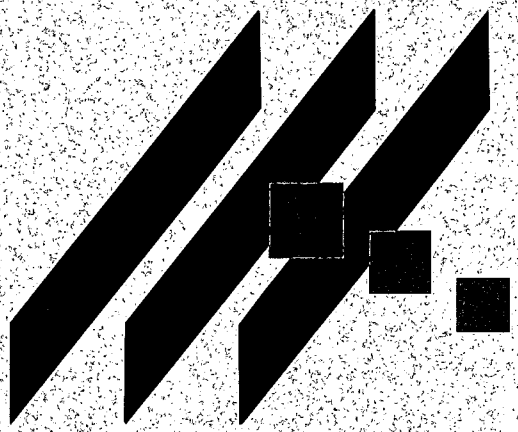
MKEC ENGINEERING CONSULTANTS, INC.



FLOODWAY VACATION ANALYSIS

FOR

WEST EVANGELICAL FREE CHURCH
WICHITA, KANSAS

MARCH 2003

411 N. WEBB ROAD • WICHITA, KS 67206 • 316-684-9600 • FAX 316-684-5100

Floodway Vacation Analysis
West Evangelical Free Church
Wichita, Kansas

Current Conditions

The site is known as Lot 1, Maranatha Addition, Wichita, Sedgwick County Kansas. It lies along the west side of Maize Road, and South of 13th Street North. The site includes 5.5 acres, and is currently developed as a church. Two platted floodway easements currently encumber the property. One is located in the southwest corner of the property, and the other along the south property line through the central portion of the property. See the attached map for exact locations. The floodway lies adjacent to drainage reserves in Arlington Place and Arlington Place Second Additions.

An existing pond lies just west of the subject property. This pond discharges into a natural channel and flows east into a double 7'x3' RCB under Maize Rd. From here the channel turns south along Maize Rd. Based on drainage plans for Arlington Place, Arlington Place Second, and Huntington Place Additions, the drainage area to the reserve area is approximately 62 acres. Based on a time of concentration of 30 minutes, and a runoff curve number of 79, the resulting flow to the lake is 252 cfs for a 100-year storm. Using this flow, and cross-sections taken in the field, a hydraulic model was constructed using the HEC-RAS computer software. The 100-year water surface elevations range from 1340.05 in the southwest corner of the subject property, to 1338.3 just upstream of the box culvert under Maize Rd. Detailed results are included with this report.

Proposed Conditions

The proposed church expansion will extend into a portion of the floodway in the central portion of the property. Some fill will be placed in this area, and a portion of the building and parking area is proposed to be constructed within the existing floodway easement. The finished floor elevation of the proposed expansion will be the same as the existing church building, 1342.82'. The HEC-RAS model was modified to include fill up to the south property line. The proposed fill raised the water surface elevation by 0.02' in the existing lake. This slight rise is negligible, and poses no risk whatsoever to adjacent properties. The highest 100-year water surface elevation adjacent to the property is 1340.05'. This is 2.77 feet below the finished floor of the proposed building. Detailed results of this model are included with this report.

Based on these results, the entire floodway easement over the central portion of the property can be vacated. However a large portion of the floodway easement

on the west side of the property should remain. The area under the 1340 contour, as shown on the attached map, should remain in a floodway easement.

Summary

The proposed floodway easement vacation along the south line of Lot 1, Maranatha Addition will have virtually no effect on the 100-year water surface elevations in the adjacent drainage reserve, and should be approved based on the results of this study. A small portion of the floodway easement in the southwest corner of the subject property may be vacated at this time as well. However, the majority of this floodway easement should remain as such until the area is filled above the 100-year water surface elevation. A detailed analysis should be completed prior to filling to insure that this will not affect 100-year water surface elevations in the adjacent drainage reserve. The attached map shows the portions of the floodway easement to be vacated.

HEC-RAS Computer Model - Existing Conditions

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
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: west evgl free
Project File : westevn.prj
Run Date and Time: 3/3/03 7:49:46 AM

Project in English units

Project Description:
West Evangelical Free Floodway Reserve - Existing Conditions

PLAN DATA

Plan Title: Plan 01
Plan File : k:\WP\PROJECT\2003\03053\westevn.p01

Geometry Title: plan 1
Geometry File : k:\WP\PROJECT\2003\03053\westevn.g01

Flow Title : flow1
Flow File : k:\WP\PROJECT\2003\03053\westevn.f01

Plan Summary Information:
Number of: Cross Sections = 8 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculaton tolerance = 0.003
Maximum number of interations = 20
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.001

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

FLOW DATA

Flow Title: flow1
Flow File : k:\WP\PROJECT\2003\03053\westevn.f01

Flow Data (cfs)

River	Reach	RS	PF 1
River 1	Reserve A	8	260

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
River 1	Reserve A	PF 1	Normal S = .003	Normal S = .001

GEOMETRY DATA

Geometry Title: plan 1
Geometry File : k:\WP\PROJECT\2003\03053\westevn.g01

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 8

INPUT
Description: West of W. PL
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
867	1340.3	908	1340	1000	1338.93	1048	1337.47	1072	1335.98
1118	1335.91	1135	1337.49	1160	1339.28	1176	1339.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
867	.04	1048	.03	1135	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1048	1135	21	45	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1340.03	Element			
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1340.03	Reach Len. (ft)	21.00	45.00	50.00
Crit W.S. (ft)	1336.85	Flow Area (sq ft)	139.15	323.40	47.64
E.G. Slope (ft/ft)	0.000033	Area (sq ft)	139.15	323.40	47.64
Q Total (cfs)	260.00	Flow (cfs)	29.00	219.84	11.17
Top Width (ft)	271.40	Top Width (ft)	143.40	87.00	41.00
Vel Total (ft/s)	0.51	Avg. Vel. (ft/s)	0.21	0.68	0.23
Max Chl Dpth (ft)	4.11	Hydr. Depth (ft)	0.97	3.72	1.16
Conv. Total (cfs)	45418.2	Conv. (cfs)	5065.5	38402.2	1950.6
Length Wtd. (ft)	41.92	Wetted Per. (ft)	143.43	87.12	41.16
Min Ch El (ft)	1335.91	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.53	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.33	2.56	0.30
C & E Loss (ft)	0.00	Cum SA (acres)	0.43	1.13	0.47

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 7

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	1340.3	1000	1338.65	1029	1337.66	1045	1337.66	1058	1338.43
1110	1339.78	1169	1340.74						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
854	.04	1000	.03	1058	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1058	217	241	250	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1340.03	Element			
Vel Head (ft)	0.03	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1340.00	Reach Len. (ft)	217.00	241.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)	80.15	116.12	47.76
E.G. Slope (ft/ft)	0.000409	Area (sq ft)	80.15	116.12	47.76
Q Total (cfs)	260.00	Flow (cfs)	46.23	184.65	29.12
Top Width (ft)	242.37	Top Width (ft)	119.09	58.00	65.27
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)	0.58	1.59	0.61
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)	0.67	2.00	0.73
Conv. Total (cfs)	12859.4	Conv. (cfs)	2286.3	9132.6	1440.4
Length Wtd. (ft)	239.37	Wetted Per. (ft)	119.10	58.04	65.29
Min Ch El (ft)	1337.66	Shear (lb/sq ft)	0.02	0.05	0.02
Alpha	1.67	Stream Power (lb/ft s)	0.01	0.08	0.01
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.28	2.33	0.25
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	1.06	0.41

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 6

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
907	1341	1004	1340.11	1023	1339.9	1050	1337.03	1056	1337.1
1088	1340.48	1098	1341.25						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
907	.04	1023	.03	1088	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1023	1088	183	185.01	188.01	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1339.81	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.17	Wt. n-Val.		0.030		
W.S. Elev (ft)	1339.63	Reach Len. (ft)	183.00	185.01	188.01	
Crit W.S. (ft)	1338.93	Flow Area (sq ft)		77.61		
E.G. Slope (ft/ft)	0.002871	Area (sq ft)		77.61		
Q Total (cfs)	260.00	Flow (cfs)		260.00		
Top Width (ft)	54.46	Top Width (ft)		54.46		
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)		3.35		
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		1.43		
Conv. Total (cfs)	4852.6	Conv. (cfs)		4852.6		
Length Wtd. (ft)	185.08	Wetted Per. (ft)		54.73		
Min Ch El (ft)	1337.03	Shear (lb/sq ft)		0.25		
Alpha	1.00	Stream Power (lb/ft s)		0.85		
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.08	1.80	0.11	
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	0.75	0.22	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 5

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
892	1341	932	1340	1014	1339	1027	1338.42	1044	1337.83
1052	1336.75	1061	1336.53	1075	1337.99	1142.71	1338.86		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
892	.04	1027	.03	1075	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1027	1075	231	224.01	219.99	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1338.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1338.45	Reach Len. (ft)	231.00	224.01	219.99
Crit W.S. (ft)	1338.45	Flow Area (sq ft)	0.01	47.79	8.26
E.G. Slope (ft/ft)	0.011080	Area (sq ft)	0.01	47.79	8.26
Q Total (cfs)	260.00	Flow (cfs)	0.00	247.86	12.13
Top Width (ft)	84.54	Top Width (ft)	0.69	48.00	35.85
Vel Total (ft/s)	4.64	Avg. Vel. (ft/s)	0.24	5.19	1.47
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)	0.02	1.00	0.23
Conv. Total (cfs)	2470.0	Conv. (cfs)	0.0	2354.7	115.3
Length Wtd. (ft)	223.90	Wetted Per. (ft)	0.69	48.16	35.86
Min Ch El (ft)	1336.53	Shear (lb/sq ft)	0.01	0.69	0.16
Alpha	1.20	Stream Power (lb/ft s)	0.00	3.56	0.23
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	1.53	0.09
C & E Loss (ft)	0.12	Cum SA (acres)	0.07	0.53	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 4

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1340.7	1072	1339.22	1092	1337.56	1105	1334.22	1175	1334.52
1179	1336.34	1195	1339.3	1211	1340.51				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.04	1092	.03	1179	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1092	1179	94	82	74	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1338.45	Element			
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1338.44	Reach Len. (ft)	94.00	82.00	74.00
Crit W.S. (ft)	1335.11	Flow Area (sq ft)	4.68	330.22	11.94
E.G. Slope (ft/ft)	0.000042	Area (sq ft)	4.68	330.22	11.94
Q Total (cfs)	260.00	Flow (cfs)	0.65	256.41	2.94
Top Width (ft)	108.98	Top Width (ft)	10.62	87.00	11.36
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)	0.14	0.78	0.25
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)	0.44	3.80	1.05
Conv. Total (cfs)	40105.4	Conv. (cfs)	100.5	39551.8	453.2
Length Wtd. (ft)	82.58	Wetted Per. (ft)	10.66	87.82	11.55
Min Ch El (ft)	1334.22	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.06	0.56	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	0.18	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 3

INPUT
Description: U/S of RCB @ Maize Rd.
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.31	1190	1334.66	1206	1334.64	1220	1340.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.02	1190	.018	1206	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1190	1206	104	104	104	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1338.43	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.020	0.018	0.020
W.S. Elev (ft)	1338.31	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)	1336.48	Flow Area (sq ft)	25.47	58.47	16.35
E.G. Slope (ft/ft)	0.000266	Area (sq ft)	25.47	58.47	16.35
Q Total (cfs)	260.00	Flow (cfs)	45.05	186.79	28.16
Top Width (ft)	38.90	Top Width (ft)	13.98	16.00	8.92
Vel Total (ft/s)	2.59	Avg. Vel. (ft/s)	1.77	3.19	1.72
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)	1.82	3.65	1.83
Conv. Total (cfs)	15941.3	Conv. (cfs)	2762.3	11452.4	1726.6
Length Wtd. (ft)	104.00	Wetted Per. (ft)	14.45	16.00	9.65
Min Ch El (ft)	1334.64	Shear (lb/sq ft)	0.03	0.06	0.03
Alpha	1.22	Stream Power (lb/ft s)	0.05	0.19	0.05
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	0.19	0.02
C & E Loss (ft)		Cum SA (acres)	0.02	0.08	0.01

CULVERT RIVER: River 1
REACH: Reserve A RS: 2.5

```
INPUT
Description: 2-7'x3' RCB under Maize Rd.
Distance from Upstream XS =       2
Deck/Roadway Width        =     100
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    1176    1340            1220 1340.39

Upstream Bridge Cross Section Data
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1176 1338.31    1190 1334.66    1206 1334.64    1220 1340.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1176     .02    1190    .018    1206     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1190    1206             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    1176    1340            1222    1340

Downstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1176 1338.62    1186 1338.19    1190 1334.84    1197 1334.46    1205 1334.63
    1208 1338.32    1222 1339.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1176     .03    1186    .018    1208     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1186    1208             .3       .5

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

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       3       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                   2     100       .013                  .5                1
Number of Barrels =  2
Upstream   Elevation =  1334.64
Centerline Stations
    Sta.    Sta.
    1194    1202
Downstream Elevation =  1334.46
Centerline Stations
    Sta.    Sta.
    1194    1202

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #1

  Culv Q (cfs)             260.00    Culv Ful Lngh (ft)
  # Barrels                     2    Culv Vel US (ft/s)         6.97
  Q Barrel (cfs)           130.00    Culv Vel DS (ft/s)         7.30
  E.G. US. (ft)           1338.44    Culv Inv El Up (ft)     1334.64
  W.S. US. (ft)           1338.31    Culv Inv El Dn (ft)     1334.46
  E.G. DS (ft)            1337.62    Culv Frctn Ls (ft)         0.23
  W.S. DS (ft)            1337.01    Culv Ext Lss (ft)          0.21
  Delta EG (ft)              0.81    Culv Ent Lss (ft)          0.38
  Delta WS (ft)              1.30    Q Weir (cfs)
  E.G. IC (ft)            1338.27    Weir Sta Lft (ft)
  E.G. OC (ft)            1338.44    Weir Sta Rgt (ft)
```

Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1337.30	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1337.01	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.84	Wr Flw Area (sq ft)	
Culv Crt Depth (ft)	2.20	Min El Weir Flow (ft)	1340.01

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 2

INPUT
Description: D/S of RCB @ Maize Rd.
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.62	1186	1338.19	1190	1334.84	1197	1334.46	1205	1334.63
1208	1338.32	1222	1339.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.03	1186	.018	1208	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1186	1208	75	57	37	.3 .5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1337.62	Element			
Vel Head (ft)	0.62	Wt. n-Val.		0.018	
W.S. Elev (ft)	1337.01	Reach Len. (ft)	75.00	57.00	37.00
Crit W.S. (ft)		Flow Area (sq ft)		41.26	
E.G. Slope (ft/ft)	0.002434	Area (sq ft)		41.26	
Q Total (cfs)	260.00	Flow (cfs)		260.00	
Top Width (ft)	19.52	Top Width (ft)		19.52	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	5269.6	Conv. (cfs)		5269.6	
Length Wtd. (ft)	57.00	Wetted Per. (ft)		21.45	
Min Ch El (ft)	1334.46	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.84	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		0.07	
C & E Loss (ft)	0.21	Cum SA (acres)		0.04	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 1

INPUT
Description: Conc. Channel along Maize Rd.
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1339.67	1030	1334.67	1048	1334.94	1060	1337.32	1067	1339.8
1074	1340.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.018	1067	.03

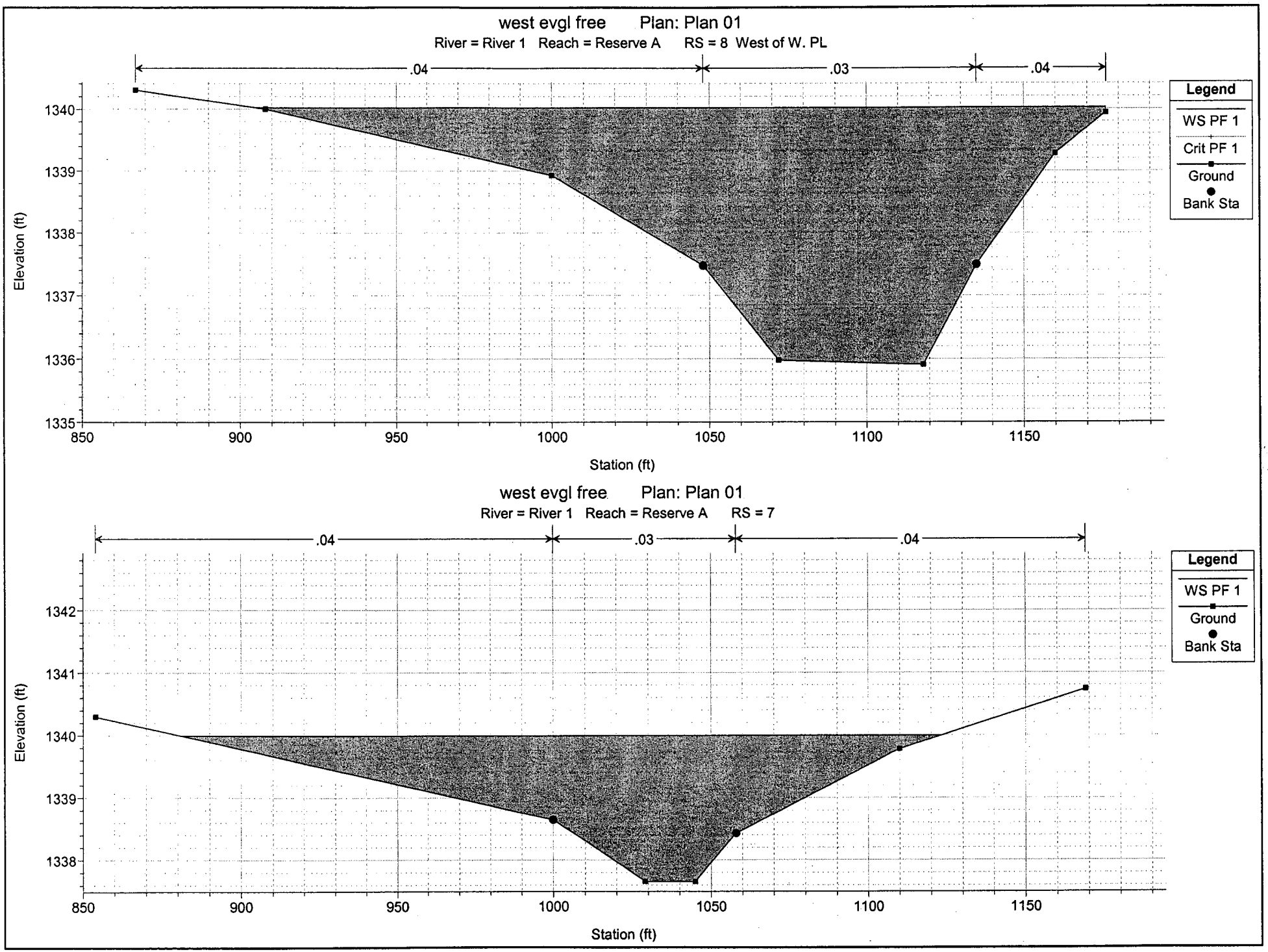
Bank Sta: Left	Right	Coeff Contr.	Expan.
1000	1067	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

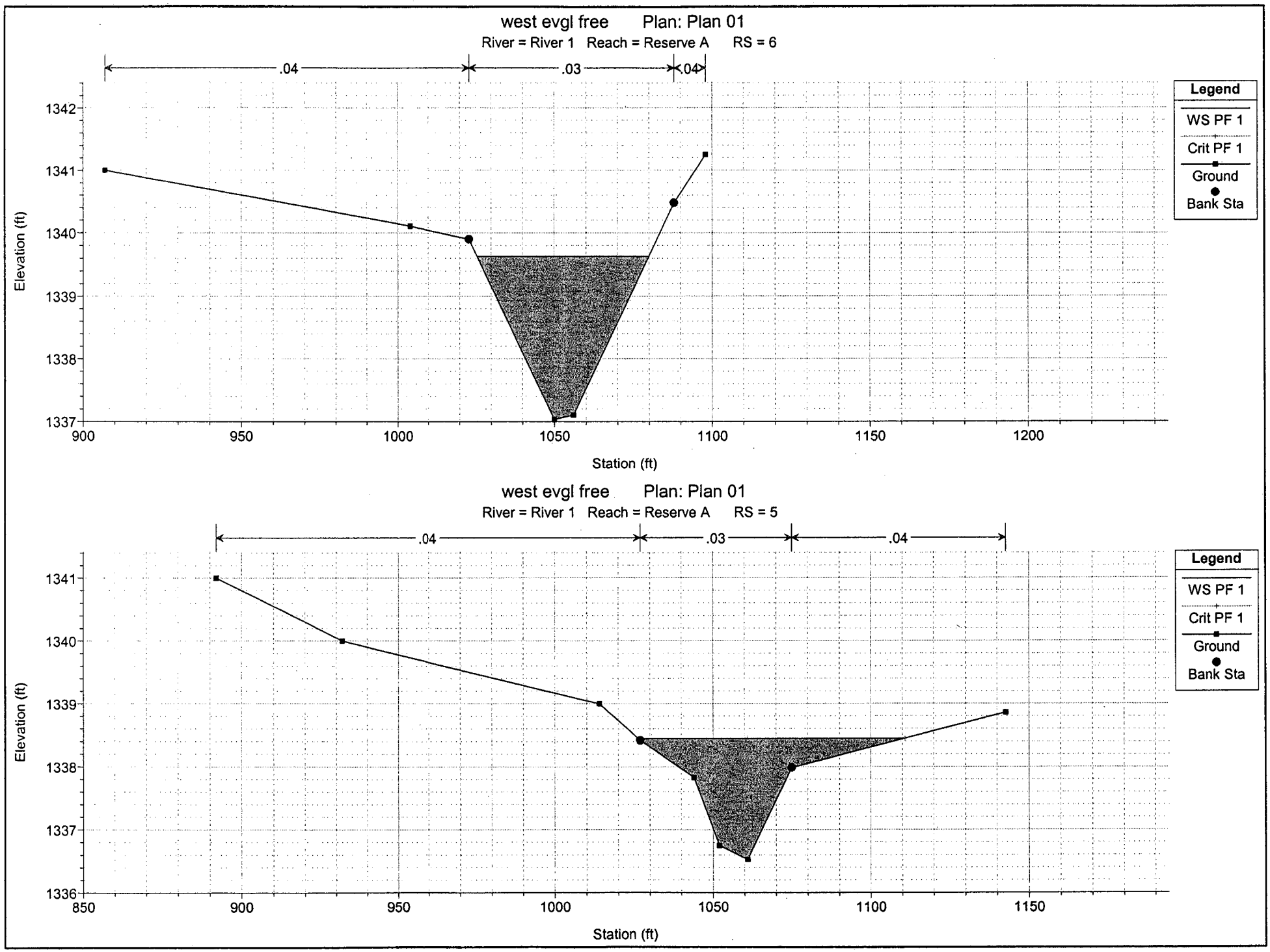
			Left OB	Channel	Right OB
E.G. Elev (ft)	1337.33	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.018	
W.S. Elev (ft)	1337.13	Reach Len. (ft)			
Crit W.S. (ft)	1336.37	Flow Area (sq ft)		71.94	
E.G. Slope (ft/ft)	0.001001	Area (sq ft)		71.94	
Q Total (cfs)	260.00	Flow (cfs)		260.00	
Top Width (ft)	43.76	Top Width (ft)		43.76	
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)		3.61	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	8219.5	Conv. (cfs)		8219.5	
Length Wtd. (ft)		Wetted Per. (ft)		44.18	
Min Ch El (ft)	1334.67	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

HEC-RAS Plan: Plan 01 River: River 1 Reach: Reserve A Profile: PF 1

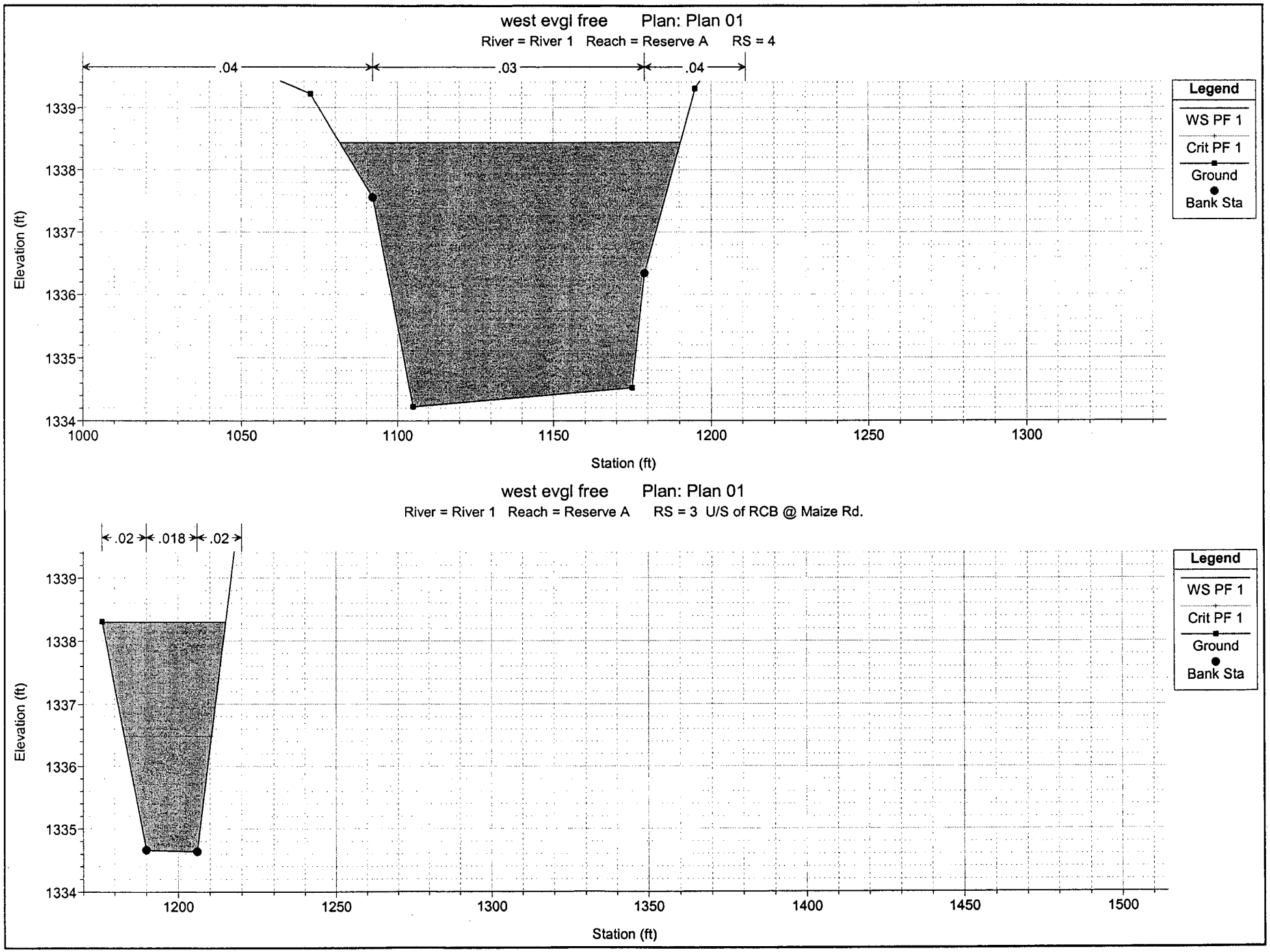
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reserve A	8	260.00	1335.91	1340.03	1336.85	1340.03	0.000033	0.68	510.18	271.40	0.06
Reserve A	7	260.00	1337.66	1340.00		1340.03	0.000409	1.59	244.03	242.37	0.20
Reserve A	6	260.00	1337.03	1339.63	1338.93	1339.81	0.002871	3.35	77.61	54.46	0.49
Reserve A	5	260.00	1336.53	1338.45	1338.45	1338.85	0.011080	5.19	56.06	84.54	0.92
Reserve A	4	260.00	1334.22	1338.44	1335.11	1338.45	0.000042	0.78	346.84	108.98	0.07
Reserve A	3	260.00	1334.64	1338.31	1336.48	1338.43	0.000266	3.19	100.29	38.90	0.29
Reserve A	2.5	Culvert									
Reserve A	2	260.00	1334.46	1337.01		1337.62	0.002434	6.30	41.26	19.52	0.76
Reserve A	1	260.00	1334.67	1337.13	1336.37	1337.33	0.001001	3.61	71.94	43.76	0.50



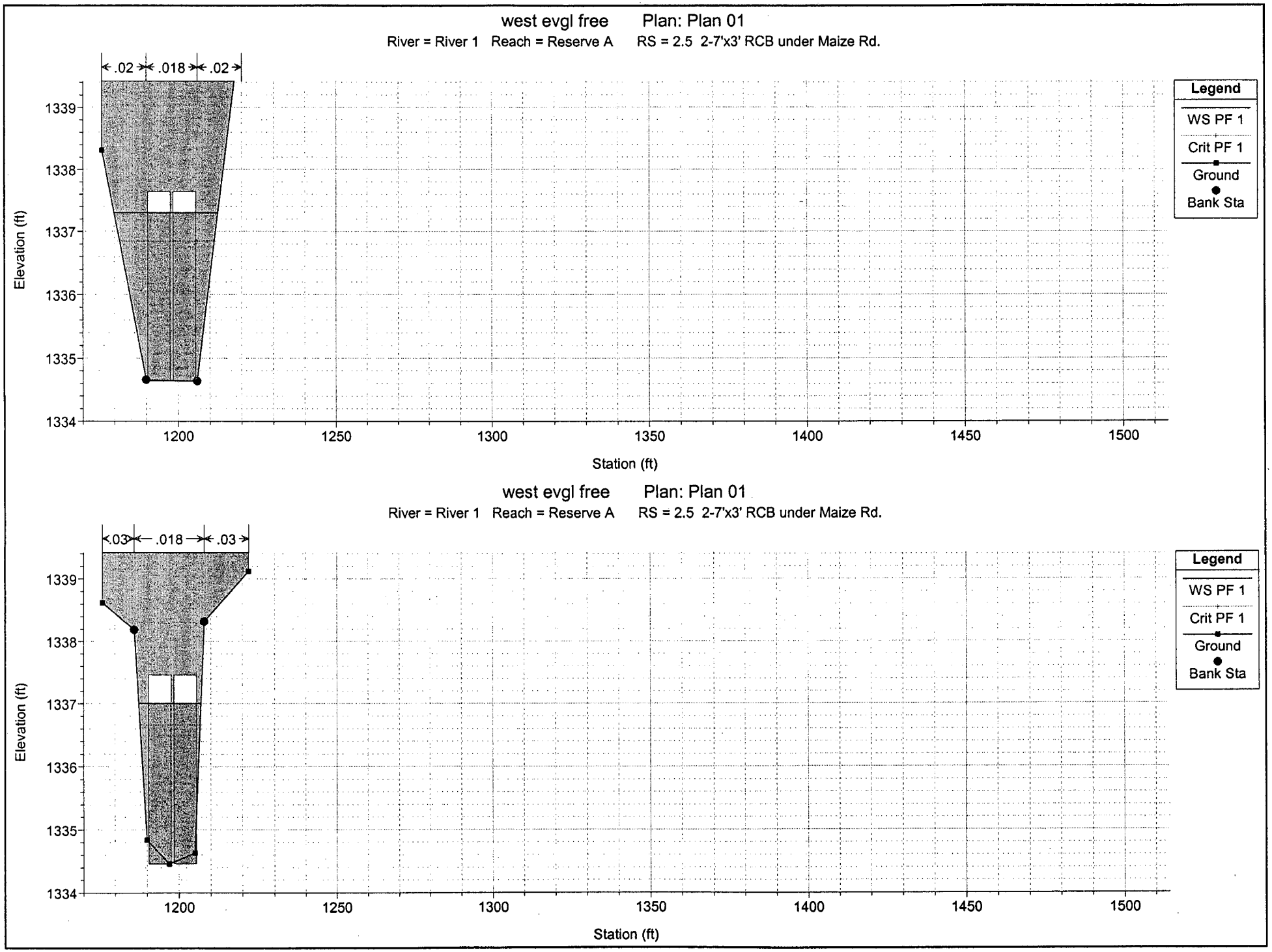
1 in Horiz. = 40 ft 1 in Vert. = 2 ft



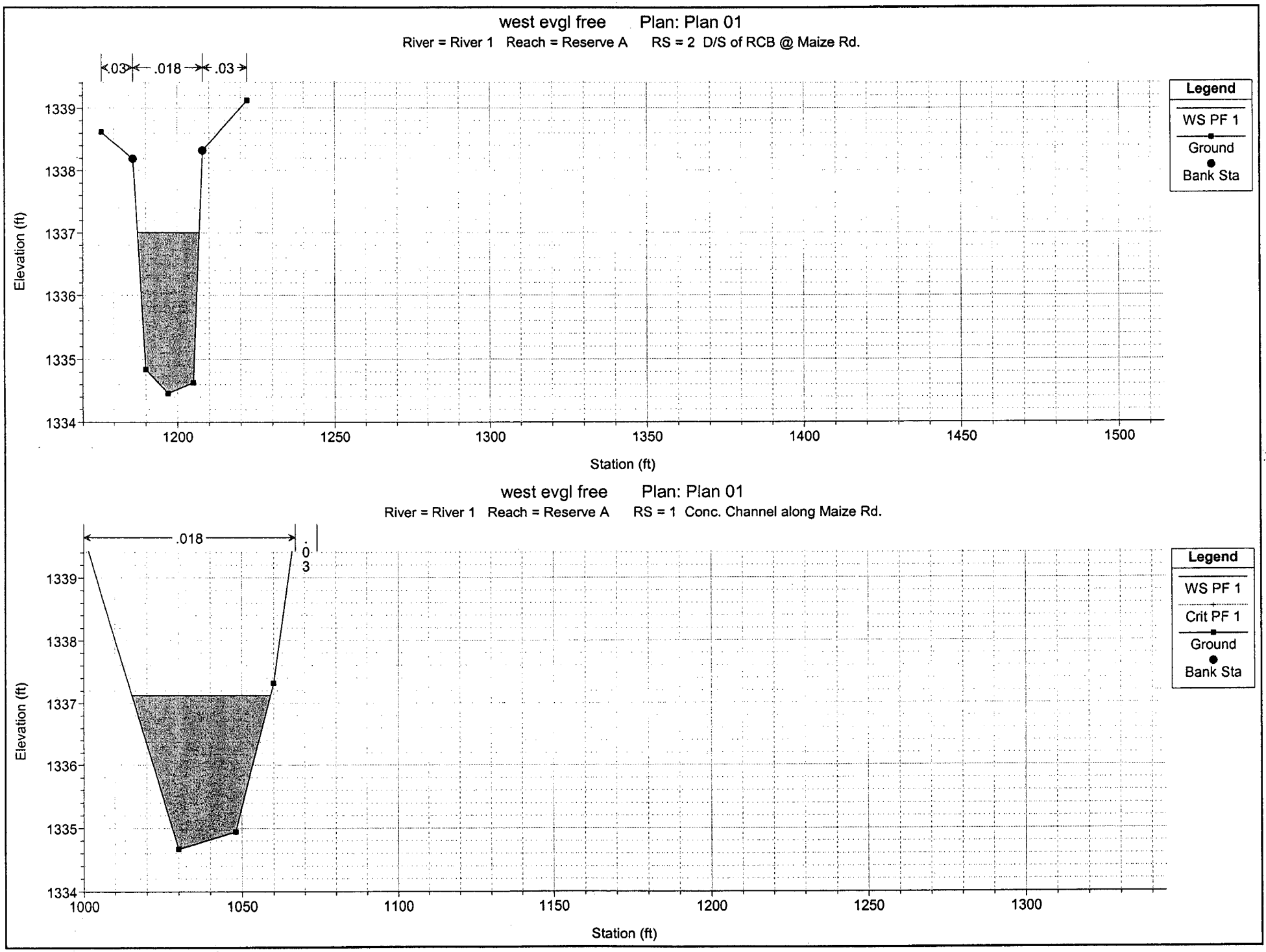
1 in Horiz. = 40 ft 1 in Vert. = 2 ft



1 in Horiz. = 40 ft 1 in Vert. = 2 ft



1 in Horiz. = 40 ft 1 in Vert. = 2 ft



1 in Horiz. = 40 ft 1 in Vert. = 2 ft

HEC-RAS Computer Model - Proposed Conditions

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
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: west evgl free - proposed conditions
Project File : westevn2.prj
Run Date and Time: 3/3/03 7:54:22 AM

Project in English units

Project Description:
West Evangelical Free Floodway Reserve - Proposed Conditions

PLAN DATA

Plan Title: Plan 01
Plan File : k:\WP\PROJECT\2003\03053\westevn2.p01

Geometry Title: plan 1
Geometry File : k:\WP\PROJECT\2003\03053\westevn2.g01

Flow Title : flow1
Flow File : k:\WP\PROJECT\2003\03053\westevn2.f01

Plan Summary Information:
Number of: Cross Sections = 8 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculaton tolerance = 0.003
Maximum number of interations = 20
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.001

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

FLOW DATA

Flow Title: flow1
Flow File : k:\WP\PROJECT\2003\03053\westevn2.f01

Flow Data (cfs)

River	Reach	RS	PF 1
River 1	Reserve A	8	260

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
River 1	Reserve A	PF 1	Normal S = .003	Normal S = .001

GEOMETRY DATA

Geometry Title: plan 1
Geometry File : k:\WP\PROJECT\2003\03053\westevn2.g01

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 8

INPUT
Description: West of W. PL
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
867	1340.3	908	1340	1000	1338.93	1048	1337.47	1072	1335.98
1118	1335.91	1135	1337.49	1160	1339.28	1176	1339.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
867	.04	1048	.03	1135	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1048	1135	21	45	50	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1340.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1340.05	Reach Len. (ft)	21.00	45.00	50.00
Crit W.S. (ft)	1336.85	Flow Area (sq ft)	142.60	325.47	48.61
E.G. Slope (ft/ft)	0.000032	Area (sq ft)	142.60	325.47	48.61
Q Total (cfs)	260.00	Flow (cfs)	29.36	219.24	11.39
Top Width (ft)	274.66	Top Width (ft)	146.66	87.00	41.00
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)	0.21	0.67	0.23
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)	0.97	3.74	1.19
Conv. Total (cfs)	46028.1	Conv. (cfs)	5198.4	38812.9	2016.8
Length Wtd. (ft)	41.86	Wetted Per. (ft)	146.68	87.12	41.19
Min Ch El (ft)	1335.91	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.54	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.34	2.57	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.44	1.14	0.33

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 7

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	1340.3	1000	1338.65	1029	1337.66	1045	1337.66	1058	1338.43
1110	1339.78	1169	1340.74						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
854	.04	1000	.03	1058	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1058	217	241	250	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1340.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1340.02	Reach Len. (ft)	217.00	241.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)	83.17	117.58	49.42
E.G. Slope (ft/ft)	0.000386	Area (sq ft)	83.17	117.58	49.42
Q Total (cfs)	260.00	Flow (cfs)	47.21	183.28	29.51
Top Width (ft)	246.14	Top Width (ft)	121.32	58.00	66.82
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)	0.57	1.56	0.60
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)	0.69	2.03	0.74
Conv. Total (cfs)	13227.9	Conv. (cfs)	2402.0	9324.6	1501.3
Length Wtd. (ft)	239.33	Wetted Per. (ft)	121.33	58.04	66.84
Min Ch El (ft)	1337.66	Shear (lb/sq ft)	0.02	0.05	0.02
Alpha	1.68	Stream Power (lb/ft s)	0.01	0.08	0.01
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.28	2.35	0.22
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	1.06	0.27

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 6

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
907	1341	1004	1340.11	1023	1339.9	1050	1337.03	1056	1337.1
1088	1340.48	1098	1341.25						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
907	.04	1023	.03	1088	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1023	1088	183	185	188	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1339.85	Element			
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	1339.68	Reach Len. (ft)	183.00	185.00	188.00
Crit W.S. (ft)	1338.93	Flow Area (sq ft)		80.38	
E.G. Slope (ft/ft)	0.002614	Area (sq ft)		80.38	
Q Total (cfs)	260.00	Flow (cfs)		260.00	
Top Width (ft)	55.41	Top Width (ft)		55.41	
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)		3.23	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	5085.4	Conv. (cfs)		5085.4	
Length Wtd. (ft)	185.02	Wetted Per. (ft)		55.68	
Min Ch El (ft)	1337.03	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.76	
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.08	1.80	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.07	0.75	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 5

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
892	1341	932	1340	1014	1339	1027	1338.42	1044	1337.83
1052	1336.75	1061	1336.53	1075	1337.99	1079	1338.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
892	.04	1027	.03	1075	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1027	1075	231	224	220	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1338.90	Element			
Vel Head (ft)	0.47	Wt. n-Val.	0.000	0.030	0.040
W.S. Elev (ft)	1338.43	Reach Len. (ft)	231.00	224.00	220.00
Crit W.S. (ft)	1338.43	Flow Area (sq ft)	0.00	46.76	1.34
E.G. Slope (ft/ft)	0.012850	Area (sq ft)	0.00	46.76	1.34
Q Total (cfs)	260.00	Flow (cfs)	0.00	257.39	2.61
Top Width (ft)	52.21	Top Width (ft)	0.21	48.00	4.00
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)	0.12	5.50	1.95
Max Chl Dpth (ft)	1.90	Hydr. Depth (ft)	0.00	0.97	0.33
Conv. Total (cfs)	2293.6	Conv. (cfs)	0.0	2270.6	23.0
Length Wtd. (ft)	223.97	Wetted Per. (ft)	0.21	48.16	4.23
Min Ch El (ft)	1336.53	Shear (lb/sq ft)		0.78	0.25
Alpha	1.03	Stream Power (lb/ft s)		4.29	0.49

Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	1.53	0.08
C & E Loss (ft)	0.14	Cum SA (acres)	0.07	0.53	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 4

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1340.7	1072	1339.22	1092	1337.56	1105	1334.22	1175	1334.52
1179	1336.34	1195	1339.3	1211	1340.51				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.04	1092	.03	1179	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1092	1179	94	82	74	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1338.45	Element			
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.030	0.040
W.S. Elev (ft)	1338.44	Reach Len. (ft)	94.00	82.00	74.00
Crit W.S. (ft)	1335.11	Flow Area (sq ft)	4.68	330.22	11.94
E.G. Slope (ft/ft)	0.000042	Area (sq ft)	4.68	330.22	11.94
Q Total (cfs)	260.00	Flow (cfs)	0.65	256.41	2.94
Top Width (ft)	108.98	Top Width (ft)	10.62	87.00	11.36
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)	0.14	0.78	0.25
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)	0.44	3.80	1.05
Conv. Total (cfs)	40105.4	Conv. (cfs)	100.5	39551.8	453.2
Length Wtd. (ft)	82.58	Wetted Per. (ft)	10.66	87.82	11.55
Min Ch El (ft)	1334.22	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.06	0.56	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	0.18	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 3

INPUT
Description: U/S of RCB @ Maize Rd.
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.31	1190	1334.66	1206	1334.64	1220	1340.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.02	1190	.018	1206	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1190	1206	104	104	104	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1338.43	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.020	0.018	0.020
W.S. Elev (ft)	1338.31	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)	1336.48	Flow Area (sq ft)	25.47	58.47	16.35
E.G. Slope (ft/ft)	0.000266	Area (sq ft)	25.47	58.47	16.35
Q Total (cfs)	260.00	Flow (cfs)	45.05	186.79	28.16
Top Width (ft)	38.90	Top Width (ft)	13.98	16.00	8.92
Vel Total (ft/s)	2.59	Avg. Vel. (ft/s)	1.77	3.19	1.72
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)	1.82	3.65	1.83

Conv. Total (cfs)	15941.3	Conv. (cfs)	2762.3	11452.4	1726.6
Length Wtd. (ft)	104.00	Wetted Per. (ft)	14.45	16.00	9.65
Min Ch El (ft)	1334.64	Shear (lb/sq ft)	0.03	0.06	0.03
Alpha	1.22	Stream Power (lb/ft s)	0.05	0.19	0.05
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	0.19	0.02
C & E Loss (ft)		Cum SA (acres)	0.02	0.08	0.01

CULVERT RIVER: River 1
REACH: Reserve A RS: 2.5

INPUT
Description: 2-7'x3' RCB under Maize Rd.
Distance from Upstream XS = 2
Deck/Roadway Width = 100
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1176	1340	1220	1340.39

Upstream Bridge Cross Section Data
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.31	1190	1334.66	1206	1334.64	1220	1340.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.02	1190	.018	1206	.02

Bank Sta: Left	Right	Coeff Contr.	Expan.
1190	1206	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1176	1340	1222	1340

Downstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.62	1186	1338.19	1190	1334.84	1197	1334.46	1205	1334.63
1208	1338.32	1222	1339.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.03	1186	.018	1208	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
1186	1208	.3	.5

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	3	7

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

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
2	100	.013	.5	1

Number of Barrels = 2
Upstream Elevation = 1334.64
Centerline Stations

Sta.	Sta.
1194	1202

Downstream Elevation = 1334.46
Centerline Stations

Sta.	Sta.
1194	1202

CULVERT OUTPUT Profile #PF 1
Culvert ID : Culvert #1

Culv Q (cfs)	260.00	Culv Ful Lngh (ft)	

# Barrels	2	Culv Vel US (ft/s)	6.97
Q Barrel (cfs)	130.00	Culv Vel DS (ft/s)	7.30
E.G. US. (ft)	1338.44	Culv Inv El Up (ft)	1334.64
W.S. US. (ft)	1338.31	Culv Inv El Dn (ft)	1334.46
E.G. DS (ft)	1337.62	Culv Frctn Ls (ft)	0.23
W.S. DS (ft)	1337.01	Culv Ext Lss (ft)	0.21
Delta EG (ft)	0.81	Culv Ent Lss (ft)	0.38
Delta WS (ft)	1.30	Q Weir (cfs)	
E.G. IC (ft)	1338.27	Weir Sta Lft (ft)	
E.G. OC (ft)	1338.44	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1337.30	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1337.01	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.84	Wr Flw Area (sq ft)	
Culv Crt Depth (ft)	2.20	Min El Weir Flow (ft)	1340.01

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 2

INPUT
Description: D/S of RCB @ Maize Rd.
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1176	1338.62	1186	1338.19	1190	1334.84	1197	1334.46	1205	1334.63
1208	1338.32	1222	1339.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1176	.03	1186	.018	1208	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1186	1208	75	57	37	.3 .5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1337.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.018	
W.S. Elev (ft)	1337.01	Reach Len. (ft)	75.00	57.00	37.00
Crit W.S. (ft)		Flow Area (sq ft)		41.26	
E.G. Slope (ft/ft)	0.002434	Area (sq ft)		41.26	
Q Total (cfs)	260.00	Flow (cfs)		260.00	
Top Width (ft)	19.52	Top Width (ft)		19.52	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	5269.6	Conv. (cfs)		5269.6	
Length Wtd. (ft)	57.00	Wetted Per. (ft)		21.45	
Min Ch El (ft)	1334.46	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.84	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		0.07	
C & E Loss (ft)	0.21	Cum SA (acres)		0.04	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: River 1
REACH: Reserve A RS: 1

INPUT
Description: Conc. Channel along Maize Rd.
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1339.67	1030	1334.67	1048	1334.94	1060	1337.32	1067	1339.8
1074	1340.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1000	.018	1067	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
1000	1067	.1	.3

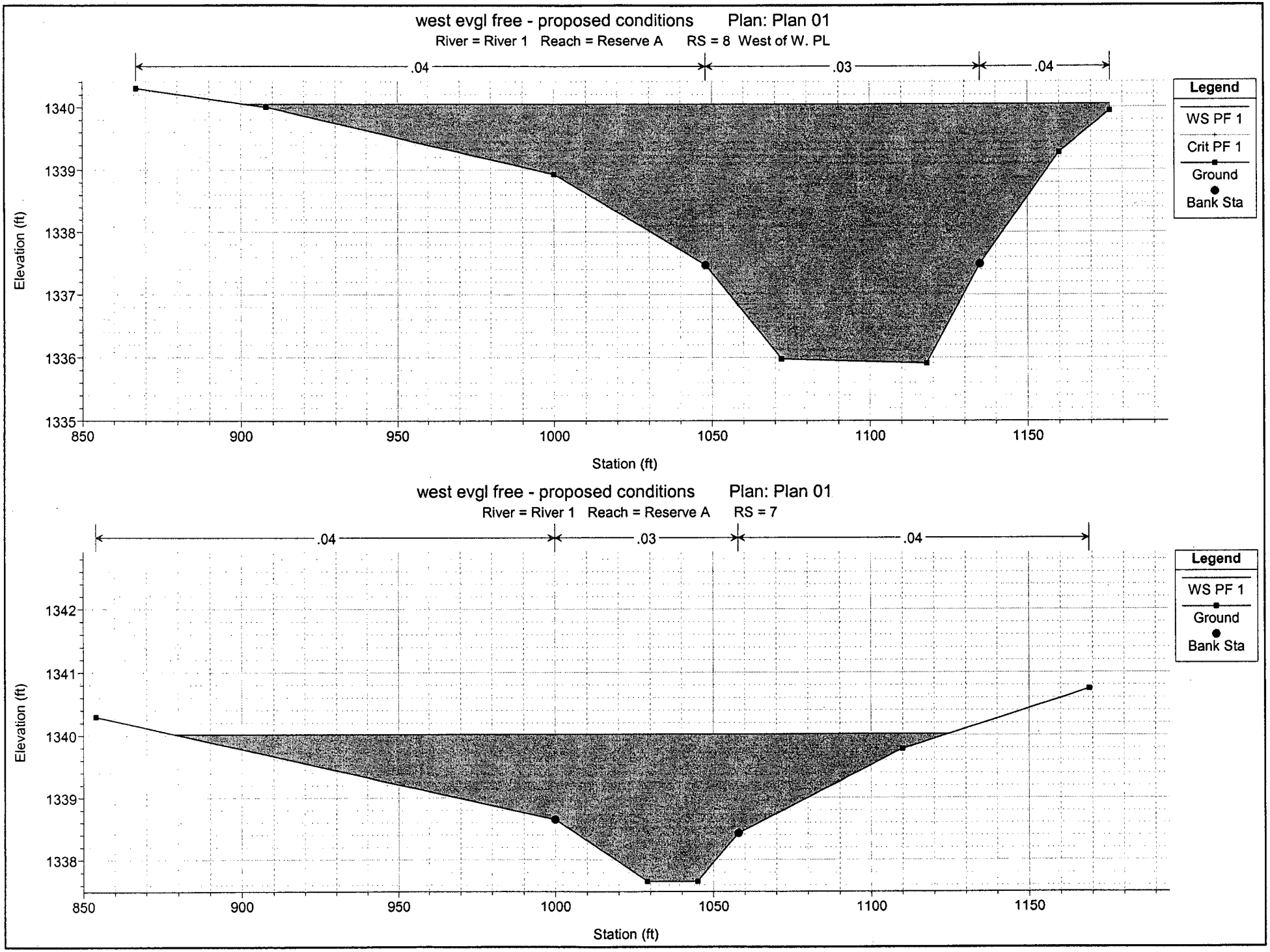
CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1337.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.018	
W.S. Elev (ft)	1337.13	Reach Len. (ft)			
Crit W.S. (ft)	1336.37	Flow Area (sq ft)		71.94	
E.G. Slope (ft/ft)	0.001001	Area (sq ft)		71.94	
Q Total (cfs)	260.00	Flow (cfs)		260.00	
Top Width (ft)	43.76	Top Width (ft)		43.76	

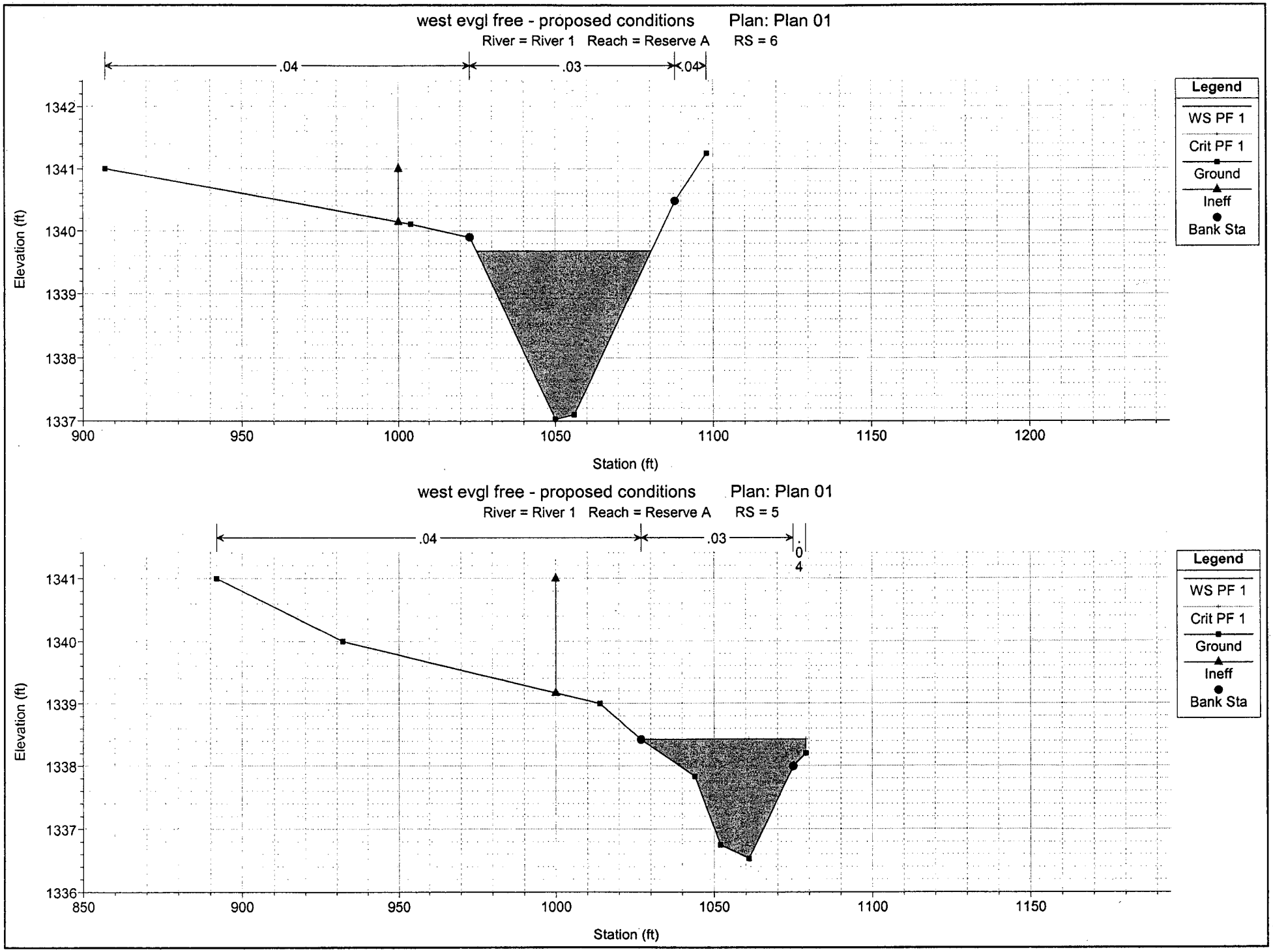
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	3.61
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)	1.64
Conv. Total (cfs)	8219.5	Conv. (cfs)	8219.5
Length Wtd. (ft)		Wetted Per. (ft)	44.18
Min Ch El (ft)	1334.67	Shear (lb/sq ft)	0.10
Alpha	1.00	Stream Power (lb/ft s)	0.37
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

HEC-RAS Plan: Plan 01 River: River 1 Reach: Reserve A Profile: PF 1

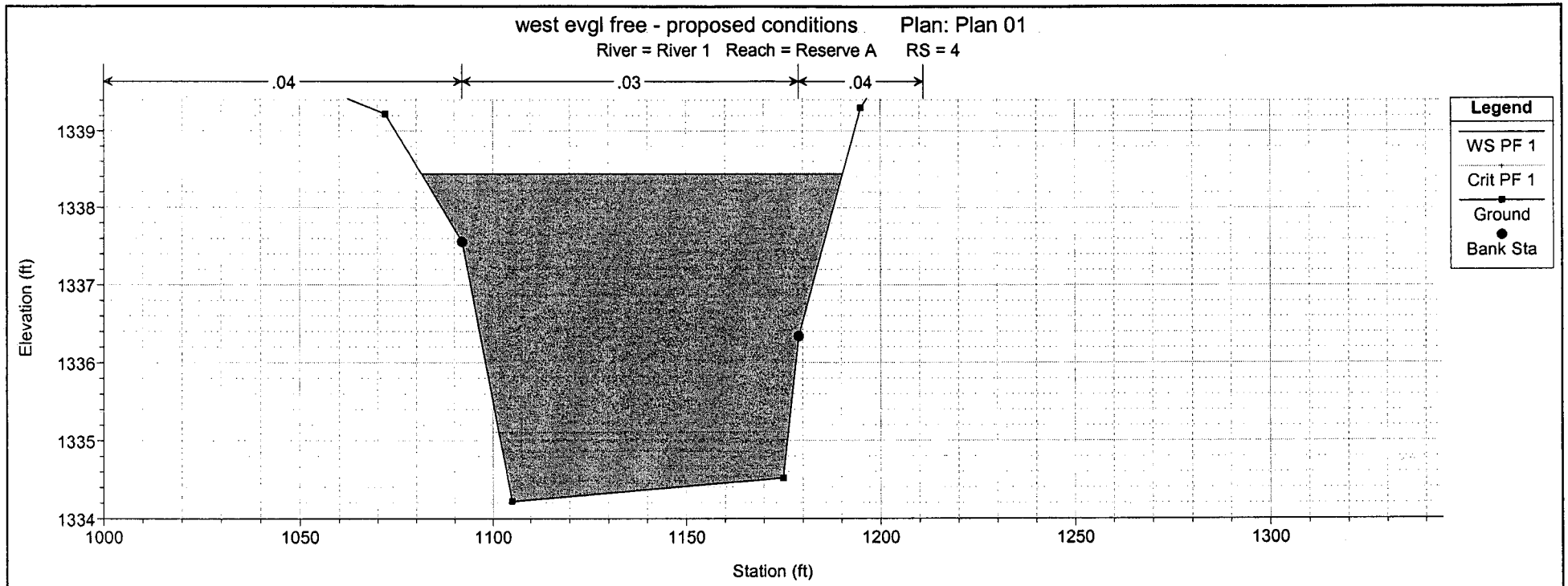
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reserve A	8	260.00	1335.91	1340.05	1336.85	1340.06	0.000032	0.67	516.68	274.66	0.06
Reserve A	7	260.00	1337.66	1340.02		1340.05	0.000386	1.56	250.18	246.14	0.19
Reserve A	6	260.00	1337.03	1339.68	1338.93	1339.85	0.002614	3.23	80.38	55.41	0.47
Reserve A	5	260.00	1336.53	1338.43	1338.43	1338.90	0.012850	5.50	48.09	52.21	0.98
Reserve A	4	260.00	1334.22	1338.44	1335.11	1338.45	0.000042	0.78	346.84	108.98	0.07
Reserve A	3	260.00	1334.64	1338.31	1336.48	1338.43	0.000266	3.19	100.29	38.90	0.29
Reserve A	2.5	Culvert									
Reserve A	2	260.00	1334.46	1337.01		1337.62	0.002434	6.30	41.26	19.52	0.76
Reserve A	1	260.00	1334.67	1337.13	1336.37	1337.33	0.001001	3.61	71.94	43.76	0.50

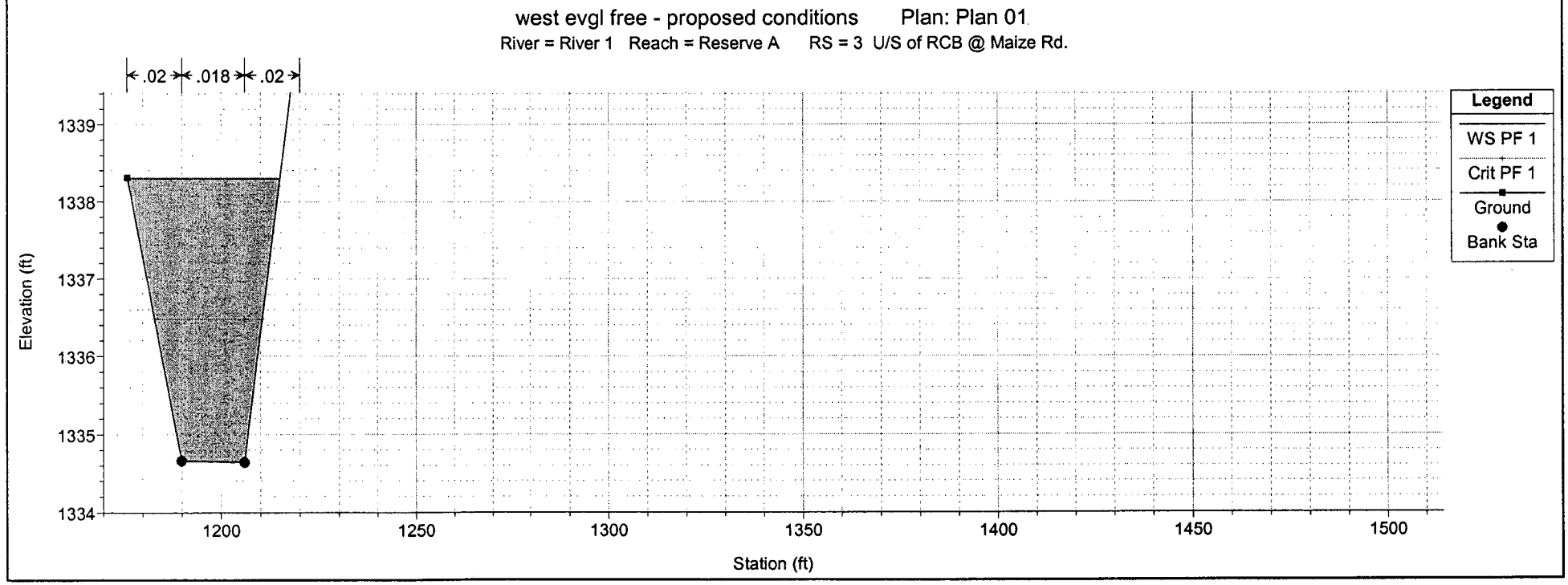


1 in Horiz. = 40 ft 1 in Vert. = 2 ft

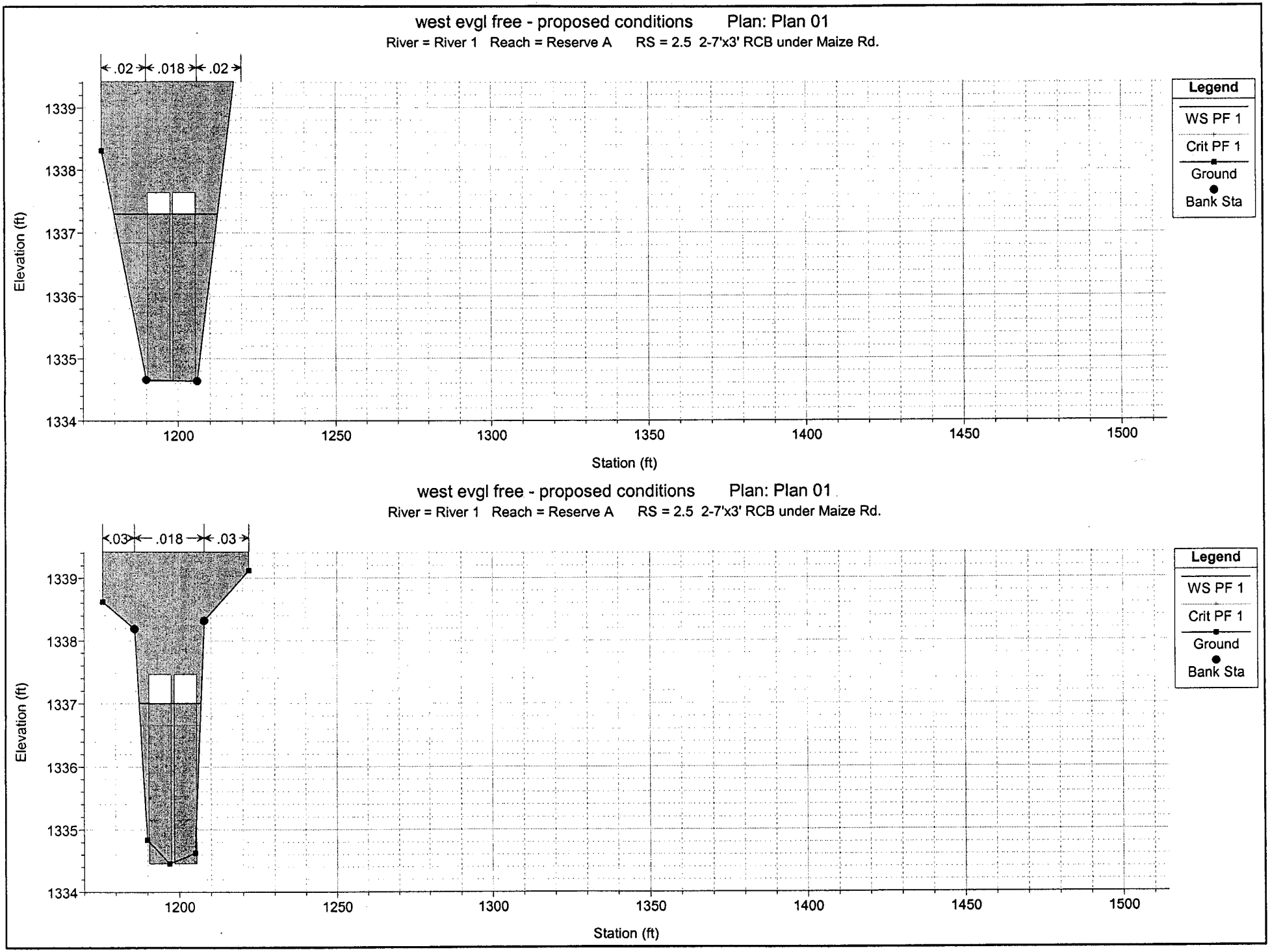


1 in Horiz. = 40 ft 1 in Vert. = 2 ft

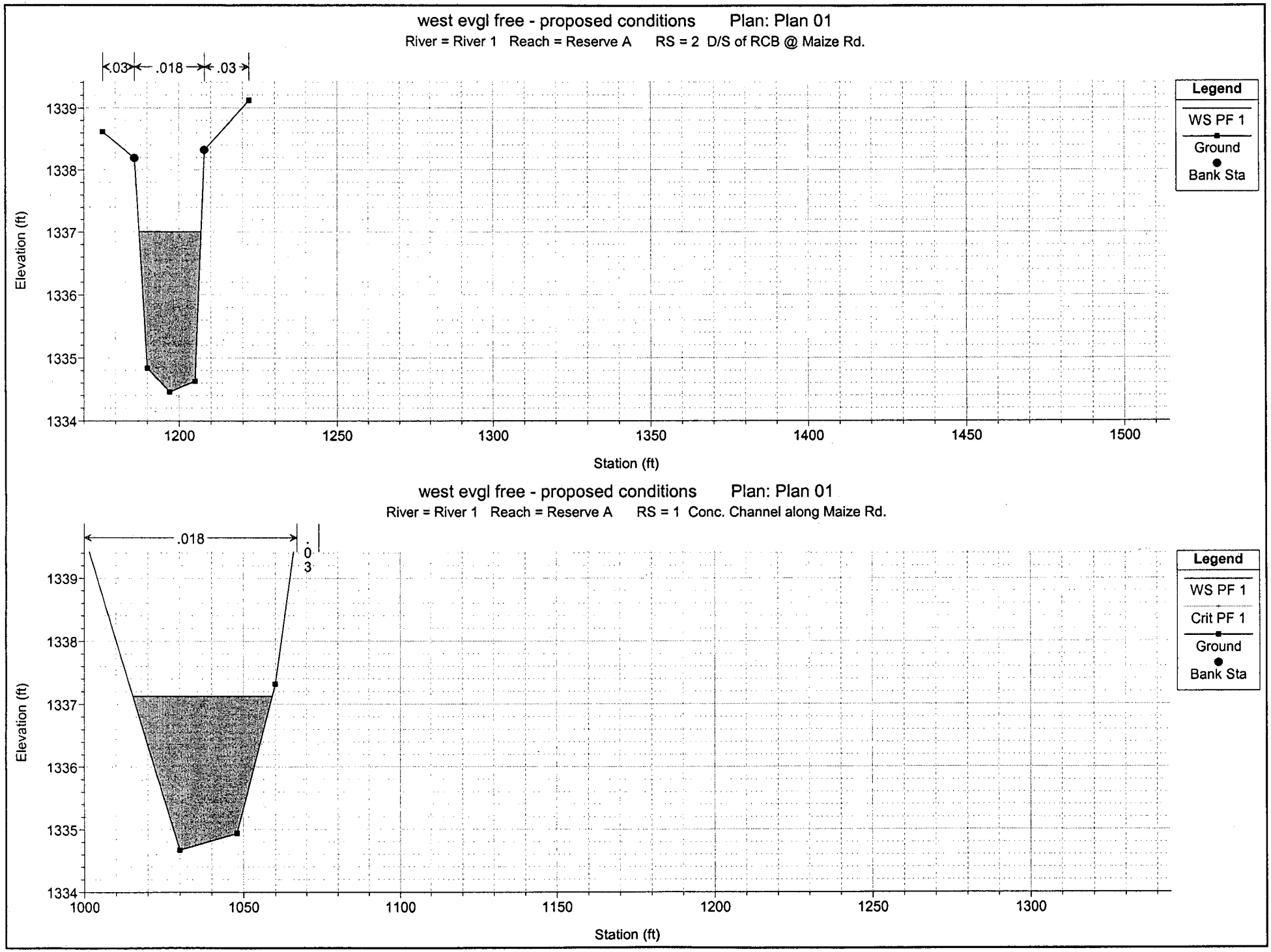




1 in Horiz. = 40 ft 1 in Vert. = 2 ft

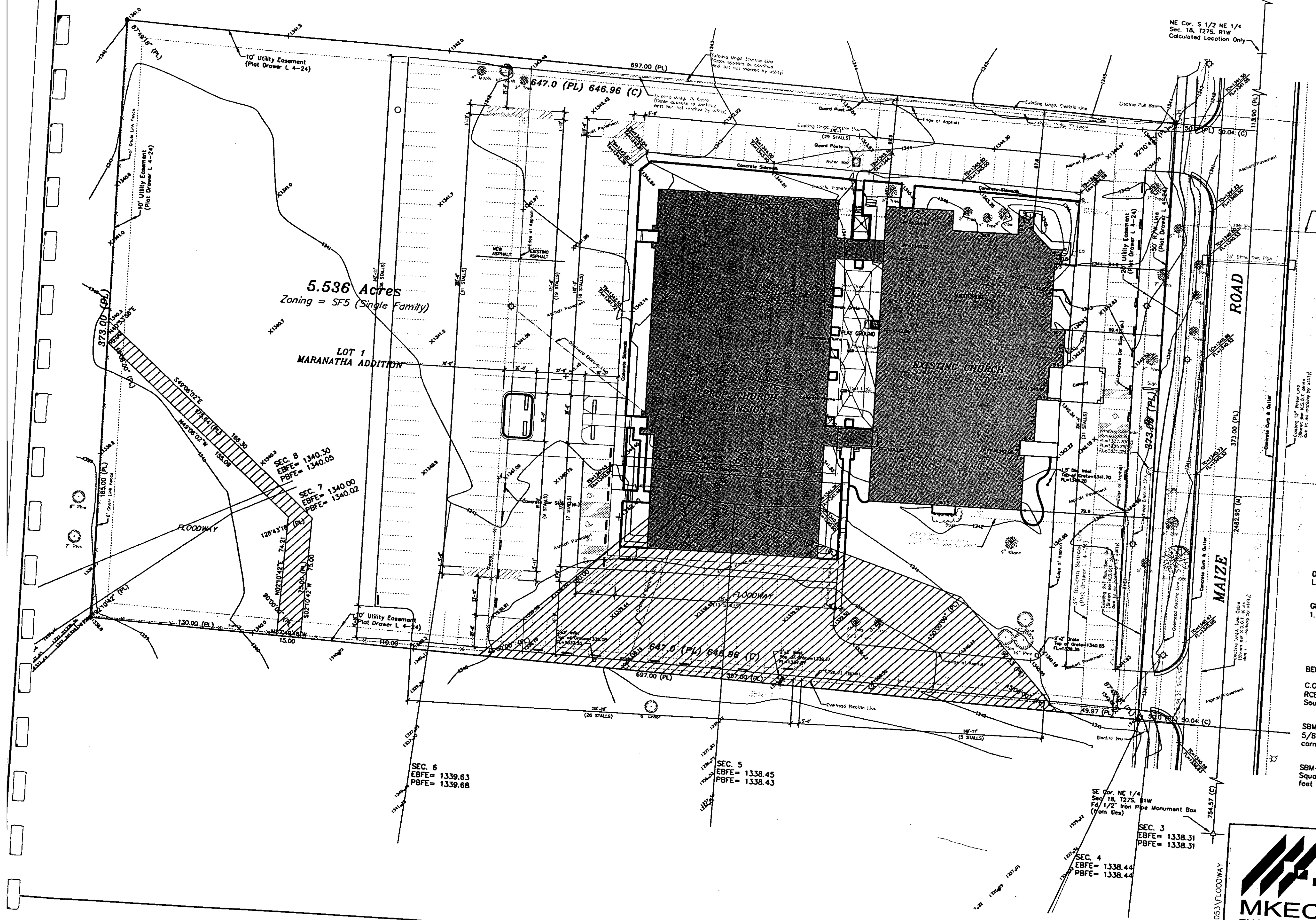


1 in Horiz. = 40 ft 1 in Vert. = 2 ft



1 in Horiz. = 40 ft 1 in Vert. = 2 ft

Site Map



N

SCALE: 1"=30'

0 30 60

LEGEND

- △ – Sectional Monument Found
- ● – 5/8" x 24" Iron Rebar Set w/C.S.S. Cap
- Fence
- FH – Fire Hydrant
- GM – Gas Meter
- Light Pole
- MH – Sanitary Sewer Manhole
- Power Pole
- Underground Telephone Pedestal
- WM – Water Meter
- (M) – Measured
- (PL) – Platted
- SBM – Site Benchmark
- CO – Sanitary Sewer Cleanout
- Underground Telephone Pedestal
- TS – Top of Sidewalk
- TA – Top of Asphalt
- TC – Top of Curb
- FL – Flow Line
- SWB – Southwestern Bell Telephone
- (hatched) – Floodway to be vacated

DESCRIPTION:
Lot 1, Maranatha Addition, an Addition to Wichita, Sedgwick County, Kansas.

GENERAL NOTES:
1.) On-site survey info provided by: Garber Surveying Services
429 West 1st Ave.
Hutchinson, Kansas 67391
Phone (620)663-7052 •Fax (620)663-7401

BENCHMARKS:

C.O.W. Benchmark
RCBC on Harvest Lane. 100 feet (30.480m) +/- East of Maize Road on the Southwest corner of RCBC, West end of hubguard.
Elevation=1341.42 NGVD29

SBM-1
5/8" Rebar approx. 220.6 feet West and 10.4 feet North of the Southeast corner of subject property.
Elevation=1339.29 NGVD29

SBM-2
Square cut in top of curb near the Northeast corner of building approx. 52.8 feet West and 55.0 feet South of the Northeast corner of subject property.
Elevation=1344.95 NGVD29

MKEC ENGINEERING CONSULTANTS 411 N. WEBB ROAD WICHITA, KS. 67206 316-684-9600	WEST EVANGELICAL FREE CHURCH PROJECT NAME	
	FLOODWAY EXHIBIT SHEET TITLE	
DRK DESIGN BY:	BFL DRAWN BY:	DRK CHECKED BY:
FEBRUARY 2003 DATE	03053 JOB NO.	1 / 1 SHEET/OF

H:\CIVIL\03053\FLOODWAY