
Revised Duplicate Effective Model Input

Goodwi vesDari enREVDUP. rep

HEC-RAS Versi on 4. 1. 0 Jan 2010
U. S. Army Corps of Engi neers
Hydrol ogi c Engi neeri ng Center
609 Second Street
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X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X          X      X      X      X
XXXXXXXX XXXX      X          XXX XXXX      XXXXXX      XXXX
X      X  X          X          X      X      X          X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      X      XXXXX
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PROJECT DATA

Project Title: Goodwi vesDari en
Project File : Goodwi vesDari en. prj
Run Date and Time: 5/12/2011 9: 56: 57 AM

Project in English units

PLAN DATA

Plan Title: Revi sed Dupl i cate
Plan File : p: \1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwi vesDari en. p02

Geometry Title: FEMA Revi sed Dupl i cate
Geometry File :
p: \1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwi vesDari en. g02

Flow Title : Effecti ve FEMA Peak Fl ows
Flow File :
p: \1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwi vesDari en. f01

Plan Descri pti on:
see notes in geometry

Plan Summary Informati on:

Number of:	Cross Secti ons =	83	Mul ti ple Openi ngs =	0
	Cul verts =	3	Inl i ne Structures =	3
	Bri dges =	9	Lateral Structures =	0

Computati onal Informati on

Water surface calcul ati on tolerance	=	0. 01
Cri ti cal depth calcul ati on tolerance	=	0. 01
Maxi mum number of i terati ons	=	20
Maxi mum di fference tolerance	=	0. 3
Flow tolerance factor	=	0. 001

Computati on Opti ons

Cri ti cal depth computed only where necessary
Conveyance Calcul ati on Method: At breaks i n n values only
Fricti on Slope Method: Average Conveyance
Computati onal Flow Regi me: Subcri ti cal Flow

Encroachment Data

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

River =	Goodwiv es Ri ver	Reach =	mai nstem		
RS	Profi le	Method	Val ue1	Val ue2	
68.0	100yr (encl)	1	993	1006	
67.0	100yr (encl)	1	985	1010	
65.1	100yr (encl)	1	900	1010	
64.0	100yr (encl)	1	991	1009	
62.1	100yr (encl)	1	925.11	1018	
62.0	100yr (encl)	1	988.38	1018	
61.0	100yr (encl)	1	970	1005	
60.4	100yr (encl)	1	950	1110	
60.3	100yr (encl)	1	945.14	1149.53	
60.2	100yr (encl)	1	992.19	1008.52	
60.1	100yr (encl)	1	992.19	1008.51	
59.0	100yr (encl)	1	994.5	1004.5	
58.1	100yr (encl)	1	994.5	1004.5	
58.0	100yr (encl)	1	990	1010	
56.0	100yr (encl)	1	990	1010	
55.0	100yr (encl)	1	990	1010	
54.4	100yr (encl)	1	965	1030	
54.3	100yr (encl)	1	957.05	1091.25	
54.2	100yr (encl)	1	975.16	1016.29	
54.1	100yr (encl)	1	978.81	1014.41	
53.0	100yr (encl)	1	991	1008.5	
52.4	100yr (encl)	1	994.51	1005.5	
52.1	100yr (encl)	1	994.53	1005.5	
51.0	100yr (encl)	1	995	1005	
49.1	100yr (encl)	1	991.4	1006.5	
49.0	100yr (encl)	1	860	1077	
47.1	100yr (encl)	1	860	1077	
47.0	100yr (encl)	1	991.4	1006.5	
45.0	100yr (encl)	1	986.32	1035.53	
44.1	100yr (encl)	1	966.11	1036.18	
43.0	100yr (encl)	1	965.9	1023	
42.0	100yr (encl)	1	995.32	1005.5	
41.1	100yr (encl)	1	994.5	1005.5	
41.0	100yr (encl)	1	990	1008.94	
40.1	100yr (encl)	1	993.2	1008.2	
40.0	100yr (encl)	1	993.2	1008.2	
38.1	100yr (encl)	1	993.2	1008.2	
38.0	100yr (encl)	1	993.2	1008.2	
37.0	100yr (encl)	1	984	1015	
36.4	100yr (encl)	1	989.5	1010.7	
36.1	100yr (encl)	1	989.5	1010.7	
35.0	100yr (encl)	1	976.93	1027.4	
34.0	100yr (encl)	1	970	1010	
33.4	100yr (encl)	1	943.01	1130.3	
33.1	100yr (encl)	1	934.52	1116.01	
32.0	100yr (encl)	1	990	1010	
31.0	100yr (encl)	1	995.06	1015	
30.0	100yr (encl)	1	994.5	1009.3	
29.0	100yr (encl)	1	991	1009	
28.0	100yr (encl)	1	991.3	1005.7	
27.1	100yr (encl)	1	991.3	1008.7	
27.0	100yr (encl)	1	991.3	1008.7	
26.0	100yr (encl)	1	990	1010	
24.0	100yr (encl)	1	992	1012	
23.1	100yr (encl)	1	973.83	1009	
23.0	100yr (encl)	1	991	1066.37	

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21. 1	100yr (encl)	1	973. 63	1105. 52
21. 0	100yr (encl)	1	991	1009
20. 0	100yr (encl)	1	980	1018. 25
19. 4	100yr (encl)	1	928. 25	1055. 41
18. 1	100yr (encl)	1	929. 55	1052. 87
18. 0	100yr (encl)	1	898. 86	1020
17. 0	100yr (encl)	1	953. 92	1005. 4
16. 0	100yr (encl)	1	980	1020
15. 0	100yr (encl)	1	980	1020
14. 4	100yr (encl)	1	970. 16	1011. 1
14. 1	100yr (encl)	1	989	1011. 1
13. 0	100yr (encl)	1	985	1010
12. 0	100yr (encl)	1	973. 67	1011. 59
11. 9	100yr (encl)	1	984. 72	1014. 48
11. 0	100yr (encl)	1	952. 56	1055. 76
10. 0	100yr (encl)	1	977. 08	1027. 19
9. 9	100yr (encl)	1	980. 82	1014. 03
9. 0	100yr (encl)	1	990. 76	1013. 65
8. 1	100yr (encl)	1	955. 11	1080
8. 0	100yr (encl)	1	955. 13	1079. 98
7. 1	100yr (encl)	1	973	1032
7. 0	100yr (encl)	1	970. 29	1041. 72
6. 0	100yr (encl)	1	992	1008. 8
5. 1	100yr (encl)	1	992	1008. 8
5. 0	100yr (encl)	1	982	1056. 8
4. 0	100yr (encl)	1	950	1040
3. 0	100yr (encl)	1	902	1123. 3

FLOW DATA

Flow Title: Effective FEMA Peak Flows

Flow File : p:\1581-05\Desi gn\Comps\Hydraul ics\Model s\Goodwi vesDari en. f01

Flow Data (cfs)

Ri ver	Reach	RS	100yr	100yr (encl)
10yr	50yr	500yr		
Goodwi ves Ri ver	mai nstem	68. 0	360	360
210	300	565		
Goodwi ves Ri ver	mai nstem	40. 1	495	495
290	410	780		

Boundary Condi ti ons

Ri ver	Reach	Profi le	Upstream
Downstream			
Goodwi ves Ri ver	mai nstem	100yr	Normal S = 0. 012
Known WS = 6. 36			
Goodwi ves Ri ver	mai nstem	100yr (encl)	Normal S = 0. 012
Known WS = 6. 36			
Goodwi ves Ri ver	mai nstem	10yr	Normal S = 0. 012
Known WS = 5. 8			
Goodwi ves Ri ver	mai nstem	50yr	Normal S = 0. 012
Known WS = 6. 15			

Goodwiv es Ri ver mai nstem
Known WS = 7

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500yr

Normal S = 0.012

GEOMETRY DATA

Geometry Title: FEMA Revised Duplicate
Geometry File : p:\1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwiv esDari en. g02

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 68.0

INPUT
Description: FEMA AQ - DS of Buttonwood Lane - Upstream Extent of FEMA Model

Station Elevation Data num= 14

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
705	136.5	865	135.5	930	135.5	970	132.5	993	132.2
996	130.7	998	130.2	1000	129.8	1001	130.2	1003	130.7
1006	133.6	1011	134.4	1018	135.3	1050	139.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
705	.12	993	.045	1006	.15

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
993	1006	180	190	200	.1	.3	

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 67.0

INPUT
Description: FEMA AP - Across narrow armored channels of Buttonwood

Station Elevation Data num= 15

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
840	136.5	862	135	920	131	969	129.6	983	129.4
990	129	993	128.2	997	127.2	1000	127.1	1003	127.3
1006	128.1	1010	129.2	1023	130.4	1035	131.3	1058	135

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
840	.12	990	.035	1010	.045

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
990	1010	430	460	500	.1	.3	

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 65.1

INPUT
Description: FEMA A0 - Across wide/braided sections of Buttonwood

Station Elevation Data num= 22

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Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
360	132	422	128. 5	560	127. 5	678	127. 85	732	127
792	127	845	126	885	125	904	124. 6	992	124. 1
993	123. 3	997	123. 3	1003	123. 3	1003	123. 6	1008	123. 6
1009	124. 2	1018	124. 5	1031	124. 5	1100	126	1160	126
1220	129	1228	130						

Manni ng' s n Val ues	num=	3
Sta n Val	Sta n Val	Sta n Val
360 . 1	992 . 04	1009 . 045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	992	1009		550 540	480		. 1	. 3

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 64. 0

INPUT

Descripti on: FEMA AN - Upstream of Mansfi el d Pl ace

Stati on El evati on Data	num=	13		
Sta El ev	Sta El ev	Sta El ev	Sta El ev	Sta El ev
370 125	631 120. 5	882 120. 5	940 120	955 119. 5
991 115. 5	993 114. 5	1007 114. 5	1009 116. 5	1032 120
1090 121. 5	1170 123	1200 125		

Manni ng' s n Val ues	num=	3
Sta n Val	Sta n Val	Sta n Val
370 . 085	991 . 035	1009 . 09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991	1009		320 350	360		. 1	. 3

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 62. 1

INPUT

Descripti on: Isl and i n Channel DS of Mansfi el d Pl ace

Stati on El evati on Data	num=	22		
Sta El ev	Sta El ev	Sta El ev	Sta El ev	Sta El ev
555 120. 5	600 119. 5	630 118	745 118	825 117
888 115. 5	972 115. 5	975 114. 5	984 114. 2	984. 5 113. 7
999 113. 7	1000 114. 7	1008. 5 114. 8	1014 114. 6	1014 113. 6
1018 113. 7	1018 114. 7	1019 114. 7	1019 115. 5	1085 116
1170 116. 5	1230 120			

Manni ng' s n Val ues	num=	3
Sta n Val	Sta n Val	Sta n Val
555 . 05	1014 . 035	1018 . 04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1014	1018		10 10	10		. 1	. 3

Ineffecti ve Fl ow	num=	2
Sta L Sta R El ev	Permanent	
555 1014 114. 6	F	
1018 1230 114. 7	F	

CROSS SECTI ON

Goodwiv esDari enREVDUP. rep

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 62. 0

INPUT

Descripti on: Isl and i n Channel DS of Mansfi el d Pl ace

Station		Elevation		Data		num= 22			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
555	120. 5	600	119. 5	630	118	745	118	825	117
888	115. 5	972	115. 5	975	114. 5	984	114. 2	984. 5	113. 7
999	113. 7	1000	114. 7	1008. 5	114. 8	1014	114. 6	1014	110. 3
1018	110. 3	1018	114. 7	1019	114. 7	1019	115. 5	1085	116
1170	116. 5	1230	120						

Manni ng' s n Val ues		num= 3	
Sta	n Val	Sta	n Val
555	. 05	1014	. 035
		1018	. 04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1014	1018		310	270	250		. 1	. 3
Ineffecti ve Fl ow	num= 2								
	Sta L	Sta R	Elev	Permanent					
	555	1014	114. 6	F					
	1018	1230	114. 7	F					

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 61. 0

INPUT

Descripti on: FEMA AM - At Footbri dge?

Station		Elevation		Data num= 18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
620	115. 5	704	115. 5	896	115. 3	941	115	955	114
973	112	989	112. 2	995	112. 5	995	113	997	113
997	109. 2	1000	109. 1	1003	108. 9	1003	113. 1	1017	113. 1
1047	114. 1	1125	118. 5	1148	120				

Manni ng' s n Val ues		num= 3	
Sta	n Val	Sta	n Val
620	. 12	997	. 045
		1003	. 075

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	997	1003		605	685	585		. 1	. 3

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 60. 4

INPUT

Descripti on: FEMA AL - U/S Secti on of Dam #15

Station		Elevation		Data num= 21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
855	113	923	110. 5	955	105	978	104. 2	985	104. 4
989	102. 7	990	102. 1	994. 5	101. 8	1000	101. 6	1004. 5	101. 2
1005	101. 7	1011	102. 4	1011	103. 2	1011. 5	103. 6	1018	104. 4
1045	104. 8	1080	107. 5	1140	108. 8	1160	110	1195	110. 5
1260	113								

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 855 .055 994.5 .035 1004.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 994.5 1004.5 20 20 20 .3 .5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 60.3

INPUT

Description: U/S Face of Dam #15
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
923	110.5	937	108.5	992	108.5	993	102	1000	100
1007	101.5	1009	109.1	1024	108.5	1051	108.2	1130	108.2
1140	108.4	1260	113						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 923 .055 992 .035 1009 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 992 1009 4 4 4 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 923 992 106.5 F
 1009 1260 106.3 F

INLINE STRUCTURE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 60.25

INPUT

Description: Dam #15 (Upstream of Overbrook Lane)

REVDUP - inserted as

inline structure, modeled as a bridge in HEC-2

Distance from Upstream XS = .5
 Deck/Roadway Width = 3
 Weir Coefficient = 2.6

Weir Embankment Coordinates num = 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
923	110.5	937	108.5	992	108.5	992.5	106.3	1000	106.3
1000	106.3	1001	106.3	1001	106.3	1008.5	106.3	1009	109.1
1024	108.5	1051	108.2	1130	108.2	1140	108.4		

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Weir crest shape = Broad Crested

CROSS SECTION

Goodwi vesDari enREVDUP. rep

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 60. 2

INPUT

Description: D/S Face of Dam #15
 Station Elevati on Data num= 12

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
923	110. 5	937	108. 5	992	108. 5	993	102	1000	100
1007	101. 5	1009	109. 1	1024	108. 5	1051	108. 2	1130	108. 2
1140	108. 4	1260	113						

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
923	. 055	992	. 035	1009	. 04

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
992	1009	3	3	3	. 3	. 3	. 5

Ineffecti ve Flow num= 2

Sta L	Sta R	El ev	Permanent
923	992	106	F
1009	1260	106	F

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 60. 1

INPUT

Description: U/S Secti on of Overbrook Lane & D/S Secti on for Dam #15
 Station Elevati on Data num= 12

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
923	110. 5	937	108. 5	992	108. 5	993	102	1000	100
1007	101. 5	1009	109. 1	1024	108. 5	1051	108. 2	1130	108. 2
1140	108. 4	1260	113						

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
923	. 055	992	. 035	1009	. 04

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
992	1009	3	3	3	. 3	. 3	. 5

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 59. 0

INPUT

Description: U/S Face of Overbrook Lane

REVDUP - correcte d Ineffecti ve Flow

Areas to use 1:1 contracti on and mi n top of road elevati on

-correcte d bank stati ons to reflect actual top of bank (set i n HEC-2 to speci fy i neffecti ve flow area locati on)

Station Elevati on Data num= 21

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
855	113	923	110. 5	955	105. 6	978	104. 2	985	104. 4
989	102. 7	990	102. 1	994. 5	101. 8	1000	101. 6	1004. 5	101. 2
1008	101. 7	1011	102. 4	1011	103. 2	1011. 5	103. 6	1013	104. 4
1045	104. 8	1080	107. 5	1140	108. 8	1160	110	1195	110. 5

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1280 113

Manni ng' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 855 .055 985 .035 1011 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 985 1011 30 30 30 .3 .5

Ineffecti ve Flow num= 2
 Sta L Sta R Elev Permanent
 855 993.5 108.5 F
 1005.5 1280 108.2 F

CULVERT

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 58.5

INPUT
 Descri pti on: Overbrook Lane -

DUP - Shortened deck and culvert l enght by 2 feet to separete structure from face cross sections, now 1 foot away

pei r wi dth i ndi cates possi ble pressure flow and low flow use of momentum or yarnell.

Channel i nvert speci fi ed - entered as culvert

Distance from Upstream XS = 1
 Deck/Roadway Wi dth = 28
 Wei r Coeffi ci ent = 2.6

Upstream Deck/Roadway Coordi nates num= 12

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
923	110.5	0			937	108.5	0			992	108.5	0		
1001	108.6	0			1009	109.1	0			1024	108.5	0		
1051	108.2	0			1130	108.2	0			1140	108.8	0		
1160	110	0			1195	110.5	0			1280	113	0		

Upstream Bridge Cross Secti on Data

Stati on Elevati on Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
855	113	923	110.5	955	105.6	978	104.2	985	104.4
989	102.7	990	102.1	994.5	101.8	1000	101.6	1004.5	101.2
1008	101.7	1011	102.4	1011	103.2	1011.5	103.6	1013	104.4
1045	104.8	1080	107.5	1140	108.8	1160	110	1195	110.5
1280	113								

Manni ng' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 855 .055 985 .035 1011 .04

Bank Sta: Left Right Coeff Contr. Expan.
 985 1011 .3 .5

Ineffecti ve Flow num= 2
 Sta L Sta R Elev Permanent
 855 993.5 108.5 F
 1005.5 1280 108.2 F

Downstream Deck/Roadway Coordi nates

num= 12

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord

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923	110.5	0	937	108.5	0	992	108.5	0
1001	108.6	0	1009	109.1	0	1024	108.5	0
1051	108.2	0	1130	108.2	0	1140	108.8	0
1160	110	0	1195	110.5	0	1280	113	0

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	21	Sta	Elev	Sta	Elev	Sta	Elev
855	113	923	110.5	955	105.6	978	104.2	985	104.4	
989	102.7	990	102.1	994.5	101.8	1000	101.6	1004.5	101.2	
1008	101.7	1011	102.4	1011	103.2	1011.5	103.6	1013	104.4	
1045	104.8	1080	107.5	1140	108.8	1160	110	1195	110.5	
1280	113									

Manning's n Values

Station	n Value	Station	n Value	Station	n Value
855	.055	985	.035	1011	.04

Bank Sta: Left 985 Right 1011 Coeff Contr. .3 Expan. .5

Station L	Station R	Elevation	Permanent
855	993.84	107.2	F
1005.16	1280	107.1	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 108.2
 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	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef
1		Box	4.4	4.5		28	.035	.035	0	.5

Number of Barrels = 2
 Upstream Elevation = 101.5
 Centerline Stations
 Sta. 996.75 Sta. 1002.25
 Downstream Elevation = 101.5
 Centerline Stations
 Sta. 996.75 Sta. 1002.25

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 58.1

INPUT
 Descrip ti on: D/S Face of Overbrook Lane

REVDUP - corrected Ineffective Flow

Areas to use 1:1 contraction and min top of road elevation

-corrected bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
855	113	923	110.5	955	105.6	978	104.2	985	104.4
989	102.7	990	102.1	994.5	101.8	1000	101.6	1004.5	101.2
1008	101.7	1011	102.4	1011	103.2	1011.5	103.6	1013	104.4
1045	104.8	1080	107.5	1140	108.8	1160	110	1195	110.5
1280	113								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
855	.055	985	.035	1011	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	985	1011		50	70		.3	.5
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
855	993.84	107.2	F					
1005.16	1280	107.1	F					

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 58.0

INPUT
 Description: FEMA AK - D/S Section of Overbrook Lane

REVDUP -corrected bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
855	113	923	110.5	955	105.6	978	104.2	985	104.4
989	102.7	990	102.1	994.5	101.8	1000	101.6	1004.5	101.2
1008	101.7	1011	102.4	1011	103.2	1011.5	103.6	1013	104.4
1045	104.8	1080	107.5	1140	108.8	1160	110	1195	110.5
1280	113								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
855	.055	985	.035	1011	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	985	1011		310	290		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 56.0

INPUT
 Description: FEMA AJ - Crest of Dam #12

Station Elevation Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
650	114	700	112	870	110	900	106.5	950	104
958	102.3	989	101	990	101	990	100.3	999	100.1

Goodwies Dari enREVDUP. rep									
999	99.6	1001	99.6	1001	100.1	1009	100.1	1009	101.2
1018	101.2	1041	102.8	1052	105	1140	108.5	1196	108.5
1260	111								

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
650	.04	999	.045	1009	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	999	1009		10	10		.1	.3

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 55.0

INPUT

Description: FEMA AI - Toe of Dam #12

Station Elevation Data num= 15									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
650	114	700	112	870	110	900	106.5	950	104
958	102.3	985	100	990	96.2	1009	96.2	1018	101.2
1041	102	1052	105	1140	108.5	1196	108.5	1260	111

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
650	.05	990	.045	1009	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	990	1009		390	390		.1	.3

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 54.4

INPUT

Description: FEMA AH - U/S Section of Dam #11

DUP - decreased downstream
 distance by 10 feet to move face cross section 10 feet away from
 bridge

Station Elevation Data num= 16									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	105	945	102.4	956	99.3	964	98.2	986	95.6
1000	95.6	1001	95.6	1010.7	95.6	1021	97.7	1021	98.6
1049	99	1088	99	1140	101.5	1250	103	1300	104.5
1308	105								

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
940	.04	986	.04	1010.7	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	986	1010.7		20	20		.3	.5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 54.3

Goodwiv esDari enREVDUP. rep

INPUT

Description: U/S Face of Dam #11

DUP - increased downstream distance to move
face cross sections 10' from dam structure

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	105	945	102.4	956	99.3	964	98.2	986	95.6
1000	95.6	1001	95.6	1010.7	95.6	1021	97.7	1021	98.6
1049	99	1088	99	1140	101.5	1250	103	1300	104.5
1308	105								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
940	.04	986	.04	1010.7	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	986	1010.7		23	23	.3	.5

INLINE STRUCTURE

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 54.25

INPUT

Description: Dam #11 (A Bridge structure labeled as a Driveway in HEC-2)

REVDUP - insterted as an inline structure, modeled as a bridge in HEC-2

Distance from Upstream XS =		num =		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	105	945	102.4	956	99.3	964	98.2	986	98.2
986	97.1	997	97	997	97.5	1000	97.7	1000	97
1010.7	97	1010.7	97.6	1021	97.7	1021	98.6	1049	99
1088	99	1140	101.5	1250	103	1300	104.5	1308	105

Upstream Embankment side slope = 0 hori z. to 1.0 vertical
 Downstream Embankment side slope = 0 hori z. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 54.2

INPUT

Description: D/S Face of Dam #11

DUP - decreased downstream distance by 10
feet to move face cross section 10 feet away from bridge

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

Goodwi vesDari enREVDUP. rep									
940	105	945	102.4	956	99.3	964	98.2	986	92.8
1000	92.8	1001	92.8	1010.7	92.8	1021	97.7	1021	98.6
1049	99	1088	99	1140	101.5	1250	103	1300	104.5
1308	105								

Manning' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 940 .04 986 .04 1010.7 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 986 1010.7 30 30 30 .3 .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 54.1

INPUT
 Descripti on: FEMA AG - D/S Secti on of Dam #11

Stati on El evati on Data num= 16									
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
940	105	945	102.4	956	99.3	964	98.2	986	92.8
1000	92.8	1001	92.8	1010.7	92.8	1021	97.7	1021	98.6
1049	99	1088	99	1140	101.5	1250	103	1300	104.5
1308	105								

Manning' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 940 .04 986 .04 1010.7 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 986 1010.7 300 300 300 .3 .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 53.0

INPUT
 Descripti on: FEMA AF - US secti on of Dri veway

Stati on El evati on Data num= 17									
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
946	100	968	94.9	982	88.8	991	88.1	992	85.9
996	85.8	1000	85.9	1004	85.7	1007	85.9	1008.5	86.4
1008.5	89.2	1017	89.6	1032	91.4	1054	94	1100	98
1210	98	1235	100						

Manning' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 946 .08 991 .035 1008.5 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991 1008.5 35 30 25 .3 .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 52.4

INPUT

Descripti on: U/S face of Dri veway -

REVDUP - corrected Ineffective Flow

Areas to use 1:1 contraction and expansion and min top of road elevation

DUP - deleted DS section 52.3, identical to this cross section

Station Elevation Data		num= 23		Station Elevation Data		num= 23		Station Elevation Data		num= 23	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	111	922	105	938	100	959	94.6	977	93		
993.5	91.9	994.5	90.2	995	87.3	997	85	1000	84.6		
1002	85	1005.5	85.5	1005.5	90.2	1008	91.9	1021	92		
1042	93.6	1073	96.5	1142	98	1218	98	1235	100		
1270	102.5	1282	105	1340	110						

Manning's n Values		num= 3		Manning's n Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
900	.08	994.5	.035	1005.5	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	994.5	1005.5		12	12	.3	.5

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R
900	992.5	91.9	F		
1007.5	1340	91.9	F		

BRI DGE

RIVER: Goodwiv es Ri ver

REACH: mai nstem RS: 52.25

I NPUT

Descripti on: Dri veway -

DUP - deleted bridge edge sections 52.2 and 52.3, identical to sections 52.1 and 52.4

Distance from Upstream XS = 2
 Deck/Roadway Width = 8
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates		num= 4		Upstream Deck/Roadway Coordinates		num= 4		Upstream Deck/Roadway Coordinates		num= 4				
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
993.5	91.9	91.9	994.5	91.9	90.2	1005.5	91.9	90.2						
1008	91.9	91.9												

Upstream Bridge Cross Section Data

Station Elevation Data		num= 23		Station Elevation Data		num= 23		Station Elevation Data		num= 23	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	111	922	105	938	100	959	94.6	977	93		
993.5	91.9	994.5	90.2	995	87.3	997	85	1000	84.6		
1002	85	1005.5	85.5	1005.5	90.2	1008	91.9	1021	92		
1042	93.6	1073	96.5	1142	98	1218	98	1235	100		
1270	102.5	1282	105	1340	110						

Manning's n Values		num= 3		Manning's n Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
900	.08	994.5	.035	1005.5	.05		

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	994.5	1005.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	El ev	Permanent
900	992.5	91.9	F
1007.5	1340	91.9	F

Downstream Deck/Roadway Coordinates

num= 4				Coordinates										
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
993.5		91.9		91.9	994.5		91.9		90.2	1005.5		91.9		90.2
1008		91.9		91.9										

Downstream Bridge Cross Section Data

Station	Elevation	Data	num= 23												
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
900	111	922	105	938	100	959	94.6	977	93						
993.5	91.9	994.5	90.2	995	87.3	997	85	1000	84.6						
1002	85	1005.5	85.5	1005.5	90.2	1008	91.9	1021	92						
1042	93.6	1073	96.5	1142	98	1218	98	1235	100						
1270	102.5	1282	105	1340	110										

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
900	.08	994.5	.035	1005.5	.05

Bank Sta: Left Right Coeff Contr. Expan.

994.5	1005.5	.3	.5
-------	--------	----	----

Ineffective Flow

num= 2			
Sta L	Sta R	El ev	Permanent
900	992.5	91.1	F
1007.5	1340	91.1	F

Upstream Embankment side slope = 0 hori z. to 1.0 vertical
 Downstream Embankment side slope = 0 hori z. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 91.9
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Energy Only

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 52.1

INPUT
 Description: D/S face of Driveway -

REVDUP - corrected Ineffective Flow
 Areas to use 1:1 contraction and expansion and min top of road elevation

DUP - Deleted US section 52.2, identical to this cross section

Station Elevation Data		num= 23		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	111	922	105	938	100	959	94.6	977	93
993.5	91.9	994.5	90.2	995	87.3	997	85	1000	84.6
1002	85	1005.5	85.5	1005.5	90.2	1008	91.9	1021	92
1042	93.6	1073	96.5	1142	98	1218	98	1235	100
1270	102.5	1282	105	1340	110				

Manning's n Values		num= 3		Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val
900	.08	994.5	.035	1005.5	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expansion	
	994.5	1005.5		45	40	35	.3	.5

Ineffective Flow		num= 2		Sta L	Sta R	Elev	Permanent
Sta L	Sta R	Elev	Permanent				
900	992.5	91.1	F				
1007.5	1340	91.1	F				

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 51.0

INPUT
 Description: FEMA AE - DS section of Dri veway

Station Elevation Data		num= 19		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
910	110	932	100	945	96	958	95	970	93.3
985	90	995	87	996	85	1000	84.1	1003	85
1005	87	1011	90	1018	95	1040	96.5	1182	97
1223	98.7	1245	100	1283	102.5	1350	110		

Manning's n Values		num= 3		Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val
910	.08	995	.035	1005	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expansion	
	995	1005		230	245	255	.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 49.1

INPUT
 Description: FEMA AD - US section of Granaston Lane

Station Elevation Data		num= 19		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
800	100	820	96.5	840	95	880	91.5	910	90
960	86.5	988	85	991.4	82.5	996	81.5	1000	81.3
1004	81.5	1006.5	82.5	1010	85	1013	90	1035	94
1050	94	1065	93	1085	98.5	1100	100		

Manning's n Values		num= 3	

Goodwies Dari en REVDUP. rep
 Sta n Val Sta n Val Sta n Val
 800 .04 991.4 .04 1006.5 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991.4 1006.5 45 50 55 .3 .5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 49.0

INPUT
 Description: U/S Face of Granaston Lane -

REVDUP - corrected Ineffective
 Flow Areas to use 1:1 contraction and expansion and min top of
 road elevation

DUP - deleted DS cross section- inserted in
 internal section of bridge

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
800	100	820	96.5	840	95	880	91.5	910	90
960	86.5	988	85	991.4	82.5	996	81.5	1000	81.3
1004	81.5	1006.5	82.5	1010	85	1013	90	1035	94
1050	94	1065	93	1085	98.5	1100	100		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
800	.04	991.4	.04	1006.5	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991.4 1006.5 34 34 34 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
800	986.4	89	F
1011.3	1100	88.7	F

BRIDGE

RIVER: Goodwies River
 REACH: mainstem RS: 48.15

INPUT
 Description: Granaston Lane -

DUP - internal bridge sections used to insert
 geometry of RS 48.2 and 48.1

Distance from Upstream XS = 5
 Deck/Roadway Width = 24
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates

num=	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
6	990		89		89	991.4		90.1		85.4	993.1		90.1		86.4
	993.1		90.1		87.6	1006.5		90		87.5	1012		90		90

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
680	95	920	93.5	968	89.7	990	89	991.4	85.4		

Goodwi vesDari enREVDUP. rep

993.1	81.4	997.5	80.7	1000	80.5	1002.5	80.7	1005.5	81.2
1006.3	86	1006.5	87.5	1012	90	1012.5	91.9	1017	91.1
1021.5	91.3	1021.5	88.7	1028	88.9	1053	90.4	1078	92.6
1100	95.5								

Manning's n Values num= 3

Sta n Val	Sta n Val	Sta n Val
680 .02	991.4	.025 1006.5

Bank Sta: Left Right Coeff Contr. Expan.

991.4	1006.5	.3	.5
-------	--------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
680	986.4	89	F
1011.3	1100	88.7	F

Downstream Deck/Roadway Coordinates

num= 6

Sta Hi	Cord Lo	Cord	Sta Hi	Cord Lo	Cord	Sta Hi	Cord Lo	Cord
990	89	89	991.4	90.1	85.4	993.1	90.1	86.4
993.1	90.1	87.6	1006.5	90	87.5	1012	90	90

Downstream Bridge Cross Section Data

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
880	95	920	93.8	968	89.7	990	89	991.4	85.4
993.1	81.4	997.5	80.7	1000	80.6	1002.5	80.7	1005.5	81.2
1006.5	86.3	1006.5	87.5	1012	90	1021.5	88.7	1028	88.9
1053	90.4	1078	92.6	1100	95.5				

Manning's n Values num= 3

Sta n Val	Sta n Val	Sta n Val
880 .02	991.4	.025 1006.5

Bank Sta: Left Right Coeff Contr. Expan.

991.4	1006.5	.3	.5
-------	--------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
880	988.1	88.3	F
1009.6	1100	88.15	F

- Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
- Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
- Maximum allowable submergence for weir flow = .98
- Elevation at which weir flow begins = 88.7
- Energy head used in spillway design =
- Spillway height used in design =
- Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 47.1

INPUT
 Description: D/S Face of Granaston Lane -

REVDUP - corrected Ineffective
 Flow Areas to use 1:1 contraction and 1.5:1 expansion and average
 of min top of road elevation and max low chord

DUP - deleted US
 cross section- inserted in internal section of bridge

Station Elevation Data		num= 16		Station Elevation		Station Elevation		Station Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
860	95	872	92.5	951	89.6	963	89.8	981	87.8
991.4	80.4	996	76.8	997.5	78	1000	78.3	1004	78.3
1006.5	78.8	1015	81.4	1031	84.3	1044	88.3	1050	91
1077	95								

Manning's n Values		num= 3		Station n Value	
Sta	n Val	Sta	n Val	Sta	n Val
860	.07	991.4	.045	1006.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991.4	1006.5		40	45		.3	.5
Ineffective Flow	num= 2		Permanent					
Sta L	Sta R	Elev						
860	988.1	88.3	F					
1009.6	1077	88.15	F					

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 47.0

INPUT
 Description: FEMA AC - DS section of Granaston Lane

Station Elevation Data		num= 16		Station Elevation		Station Elevation		Station Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
860	95	872	92.5	951	89.6	963	89.8	981	87.8
991.4	80.4	996	76.8	997.5	78	1000	78.3	1004	78.3
1006.5	78.8	1015	81.4	1031	84.3	1044	88.3	1050	91
1077	95								

Manning's n Values		num= 3		Station n Value	
Sta	n Val	Sta	n Val	Sta	n Val
860	.07	991.4	.045	1006.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991.4	1006.5		570	540		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 45.0

Goodwies Dari enREVDUP. rep

INPUT

Description: FEMA AB - Dam #8?

Station		Elevation		Data		num=		11	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
942	80	953	77	970	76.2	986	68.9	996	65.8
1004	65.8	1013	67.7	1032	68	1055	69.9	1075	75
1115	80								

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
942	.12	996	.035	1004	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	996	1004		110	120		.1	.3

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 44.1

INPUT

Description: FEMA AA - Dam #7

Station		Elevation		Data		num=		18	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
908	77	915	75	930	73.5	945	70	977	65.7
989.5	65	993.3	66.4	996.5	66.5	997	64.4	1003.3	64.5
1003.4	66.4	1017	66.8	1031.5	67	1043	67.4	1048.5	67.8
1063	70.5	1075	75	1085	77				

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
908	.045	996.5	.045	1003.3	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	996.5	1003.3		190	190		.1	.3

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 43.0

INPUT

Description: FEMA Z - U/S section of Prospect Avenue

REVDUP -corrected bank

stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station		Elevation		Data		num=		15	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
843	75	875	71	930	70.5	943	67.5	978	65
994.5	62.5	997	60	1000	58.4	1005.5	59	1008	61
1010	62.5	1050	67.5	1075	70	1091	71.5	1100	75

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
843	.04	994.5	.045	1010	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	994.5	1010		25	40		.3	.5

Ineffective Flow	num=	2
Sta L	Sta R	El ev
		Permanent

843 994.5 68.4 F
 1005.5 1100 67.6 F

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 42.0

INPUT
 Description: U/S Face of Prospect Avenue

REVDUP - corrected Ineffective Flow
 Areas to use 1:1 contraction and expansion and min top of road elevation
 -corrected bank stations to reflect actual top of bank
 (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data		num= 15							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
843	75	875	71	930	70.5	943	67.5	978	65
994.5	62.5	997	60	1000	58.4	1005.5	59	1008	61
1010	62.5	1050	67.5	1075	70	1091	71.5	1100	75

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val		
843	.04	994.5	.045	1010	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	994.5	1010		38	38		.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
843	993.5	68.4	F
1006.5	1100	67.6	F

CULVERT

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 41.5

INPUT
 Description: Prospect Avenue -

DUP - shortened deck and culvert by 2 feet
 to offset face cross sections by 1 foot US and DS
 pair width of
 0.1 indicated possible pressure flow and low flow use of momentum or yarnell.

Channel invert specified so input as culvert

Distance from Upstream XS = 1
 Deck/Roadway Width = 36
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates		num= 13												
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
843	75	0	875	71	0	930	70.5	0	960	68.7	0	975.8	68.6	0
987.4	70.4	0	1014.5	70.6	0	1014.6	67.6	0	1037	69	0	1080	69.4	0
1100	75	0				1095	74	0						

Upstream Bridge Cross Section Data
 Station Elevation Data num= 15

Goodwi vesDari enREVDUP. rep

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
843	75	875	71	930	70.5	943	67.5	978	65
994.5	62.5	997	60	1000	58.4	1005.5	59	1008	61
1010	62.5	1050	67.5	1075	70	1091	71.5	1100	75

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
843	.04	994.5	.045	1010	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
994.5	1010		.3	.5

Ineffecti ve Fl ow num= 2

Sta L	Sta R	El ev	Permanent
843	993.5	68.4	F
1006.5	1100	67.6	F

Downstream Deck/Roadway Coordi nates

num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
843	75	0	0	875	71	0	0	930	70.5	0	0	943	67.5	0
960	68.7	0	0	975.8	68.6	0	0	987.3	68.4	0	0	997	60	0
987.4	70.4	0	0	1014.5	70.6	0	0	1014.6	67.6	0	0	1005.5	59	0
1037	69	0	0	1080	69.4	0	0	1095	74	0	0	1008	61	0
1100	75	0	0									1091	71.5	0

Downstream Bridge Cross Secti on Data

Stati on El evati on Data num= 17

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
820	74	835	74	905	65.5	942	65	963	63	978	65
993	59.5	994.5	58	1000	57	1002	58	1003	59.5	1008	61
1005.5	59.7	1008	60	1012	65	1048	67.5	1072	70	1091	71.5
1095	72	1113	75								

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
820	.05	993	.045	1003	.06

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
993	1003		.3	.5

Ineffecti ve Fl ow num= 2

Sta L	Sta R	El ev	Permanent
820	993.5	66.7	F
1006.5	1113	66.3	F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maxi mum allowable submergence for wei r fl ow = .98
 El evati on at whi ch wei r fl ow begi ns = 67.6
 Energy head used i n spi ll way desi gn =
 Spi ll way hei ght used i n desi gn =
 Wei r crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Ri se	Span		
Culvert #1	Box	6.4	11		
FHWA Chart # 8 - flared wi ngwal ls					
FHWA Scale # 1 - Wi ngwal l flared 30 to 75 deg.					
Soluti on Cri teria = Hi ghest U. S. EG					
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef
1	36	.045	.045	0	.5

Upstream Elevation = 58.6
 Centerline Station = 1000
 Downstream Elevation = 58.6
 Centerline Station = 1000

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 41.1

INPUT
 Description: D/S face of Prospect Avenue

REVDUP- corrected Ineffective Flow
 Areas to use 1:1 contraction and expansion and average of min top
 of road elevation and max low chord
 -corrected bank stations to
 reflect actual top of bank (set in HEC-2 to specify ineffective
 flow area location)

Station Elevation Data		num= 17		Station Elevation		Station Elevation		Station Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
820	74	835	74	905	65.5	942	65	963	63
993	59.5	994.5	58	1000	57	1002	58	1003	59.5
1005.5	59.7	1008	60	1012	65	1048	67.5	1072	70
1095	72	1113	75						

Manning's n Values		num= 3		Manning's n Values	
Sta	n Val	Sta	n Val	Sta	n Val
820	.05	993	.045	1003	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	993	1003		30	25	.3	.5
Ineffective Flow	num= 2						
	Sta L	Sta R	Elev	Permanent			
	820	993.5	66.7	F			
	1006.5	1113	66.3	F			

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 41.0

INPUT
 Description: FEMA Y - DS section of Prospect Avenue

REVDUP -corrected bank
 stations to reflect actual top of bank (set in HEC-2 to specify
 ineffective flow area location)

Station Elevation Data		num= 17		Station Elevation		Station Elevation		Station Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
820	74	835	74	905	65.5	942	65	963	63
993	59.5	994.5	58	1000	57	1002	58	1003	59.5
1005.5	59.7	1008	60	1012	65	1048	67.5	1072	70
1095	72	1113	75						

Manning's n Values		num= 3		Manning's n Values	
Sta	n Val	Sta	n Val	Sta	n Val
820	.05	993	.045	1003	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	993	1003		460	465	.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 40.1

INPUT

Description: FEMA X - US section of Boston Post Road

Station		Elevation		Data		num=		23	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
884	63.5	910	60	935	57.5	959	53.2	983.5	52.1
993.2	52.1	995.5	52.1	996	49.7	996.5	49.4	1000	49.4
1004.5	49.4	1008.2	50	1013.5	50.5	1026.5	53	1031.5	55.1
1040.5	55.8	1060	56.3	1090	57.5	1138	57.5	1190	58
1418	59	1430	60	1465	63.5				

Manning's n		Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
884	.07	993.2	.045	1008.2	.1	1031.5	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	993.2	1008.2		60	70	100	.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 40.0

INPUT

Description: U/S face of Boston Post Road -

REVDUP - corrected Ineffective
 Flow Areas to use 1:1 contraction and expansion and min top of road elevation

DUP - deleted ds section 39.2, identical to this section, this section now becomes internal cross sections US and DS

Station		Elevation		Data		num=		26	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
873	63	930	60	952	58	964	57.6	975	57.3
991.5	56.7	993.2	54.9	993.2	50.9	994.2	49.1	994.2	48.8
996.5	48.8	1000	48.3	1003	48.2	1006.8	49.1	1007.2	49.2
1007.3	50.4	1008.2	50.4	1008.2	54.8	1010	56.4	1016	56.4
1046.5	56.6	1208	56.5	1335	58	1405	59.5	1435	60
1475	62								

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
873	.015	993.2	.025	1008.2	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	993.2	1008.2		48	48	48	.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
873	988.2	56.7	F		
1013.2	1475	56.4	F		

BRI DGE

RIVER: Goodwiv es Ri ver

REACH: mainstem

RS: 39.15

INPUT

Description: Boston Post Road -

DUP - used internal cross sections to define

DS identical to US, deleted sections 39.2 and 39.1 (bridge edge sections)

Distance from Upstream XS = 5

Deck/Roadway Width = 38

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
991.5		56.7		56.7	993.2		56.7		54.9	1008.2		56.4		54.8
1010		56.4		56.4										

Upstream Bridge Cross Section Data

Station Elevation Data num= 26									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
873	63	930	60	952	58	964	57.6	975	57.3
991.5	56.7	993.2	54.9	993.2	50.9	994.2	49.1	994.2	48.8
996.5	48.8	1000	48.3	1003	48.2	1006.8	49.1	1007.2	49.2
1007.3	50.4	1008.2	50.4	1008.2	54.8	1010	56.4	1016	56.4
1046.5	56.6	1208	56.5	1335	58	1405	59.5	1435	60
1475	62								

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
873	.015	993.2	.025	1008.2	.015

Bank Sta: Left Right Coeff Contr. Expan.
 993.2 1008.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 873 988.2 56.7 F
 1013.2 1475 56.4 F

Downstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
991.5		56.7		56.7	993.2		56.7		54.9	1008.2		56.4		54.8
1010		56.4		56.4										

Downstream Bridge Cross Section Data

Station Elevation Data num= 26									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
873	63	930	60	952	58	964	57.6	975	57.3
991.5	56.7	993.2	54.9	993.2	50.9	994.2	49.1	994.2	48.8
996.5	48.8	1000	48.3	1003	48.2	1006.8	49.1	1007.2	49.2
1007.3	50.4	1008.2	50.4	1008.2	54.8	1010	56.4	1016	56.4
1046.5	56.6	1208	56.5	1335	58	1405	59.5	1435	60
1475	62								

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
873	.015	993.2	.025	1008.2	.015

Bank Sta: Left Right Coeff Contr. Expan.
 993.2 1008.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 873 988.2 55.8 F
 1013.2 1475 55.65 F

Upstream Embankment side slope = 0 hori z. to 1.0 vertical
 Downstream Embankment side slope = 0 hori z. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 56.5
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Goodwi ves Ri ver

REACH: mai nstem RS: 38.1

INPUT

Description: D/S Face of Boston Post Road

REVDUP - corrected Ineffective

Flow Areas to use 1:1 contraction and expansion and average of min top of road elevation and max low chord

Station Elevation Data		num= 23		Station Elevation		Station Elevation		Station Elevation		Station Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
880	62	890	60	905	56.5	910	55	960	52.5		
987	50	993.2	49.2	995	49	996	48	1000	47.8		
1003	48	1005	49	1007	50	1008.2	51.4	1011	55		
1068	55.7	1142	57	1235	56.5	1268	56.5	1335	58		
1405	59.3	1432	60	1475	62						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
880	.045	993.2	.045	1008.2	.045

Bank Sta: Left 993.2 Right 1008.2 Lengths: Left Channel 60 Right Channel 50 Right 40 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
880	988.2	55.8	F
1013.2	1475	55.65	F

CROSS SECTION

RIVER: Goodwi ves Ri ver

REACH: mai nstem RS: 38.0

INPUT

Goodwiv es Dari en REVDUP. rep

Description: FEMA W - DS section of Boston Post Road

Station	Elevation	Data	num=	23	Sta	Elev	Sta	Elev	Sta	Elev
880	62	890	60	905	56.5	910	55	960	52.5	
987	50	993.2	49.2	995	49	996	48	1000	47.8	
1003	48	1005	49	1007	50	1008.2	51.4	1011	55	
1068	55.7	1142	57	1235	56.5	1268	56.5	1335	58	
1405	59.3	1432	60	1475	62					

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
880	.015	960	.12	993.2	.045	1008.2	.12	1068	.015

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

993.2	1008.2	640	620	620	.3	.5
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CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 37.0

INPUT

Description: FEMA V - US section of Ol d Ki ngs Hi ghway North

Station	Elevation	Data	num=	27	Sta	Elev	Sta	Elev	Sta	Elev
407	57	470	55	505	52	540	50	583	49	
665	47.5	814	47.5	872	47	962	44.2	984	44.8	
994.5	41.5	997	41.2	1000	41.1	1003.5	41.2	1005.5	41.5	
1006.5	42.6	1014.5	42.7	1022	44.3	1039	44.8	1063	46.4	
1095	47	1140	48.5	1162	50	1186	51.5	1212	55	
1225	55.5	1240	60							

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
407	.1	984	.043	1006.5	.1

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

984	1006.5	50	50	30	.3	.5
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CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 36.4

INPUT

Description: US face of Ol d Ki ngs Hi ghway North -

- REVDUP - Corrected DS channel length from 0.5 to 5
- corrected Ineffective Flow Areas to use 1:1 contraction and expansion and min top of road elevation
- corrected bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

DUP -

deleted DS section 36.3, identical to this cross section

Station	Elevation	Data	num=	25	Sta	Elev	Sta	Elev	Sta	Elev
407	67	470	55	505	52	540	50	583	49	
865	47.5	884	47.5	930	47	969.5	46.8	984	46.6	

Goodwies Dari enREVDUP. rep									
987	43.6	989.5	41	989.6	41	1000.4	41	1010.6	40.6
1010.7	40.6	1012.5	46.7	1040.5	46.8	1100	47.5	1135	49
1167	50	1195	52	1212	55	1225	55.5	1240	60

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 407 .015 984 .03 1012.5 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 984 1012.5 40 39 20 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 984.8 46.6 F
 1015.6 1240 46.7 F

BRI DGE

RIVER: Goodwies Ri ver
 REACH: mai nstem RS: 36.25

I NPUT
 Descripti on: Ol d Ki ngs Hi ghway North -

DUP - deleted edge cross sections,
 identical to current face cross sections

Distance from Upstream XS = 5
 Deck/Roadway Width = 29
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 8

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	
984		46.6		46.6	987		47.8		43.6	989.5		47.8		41	
	989.8		47.8		45.8	1010.6		47.8		45.8	1010.7		47.8		40.6
		1012.5		47.8		46.7	1012.5		46.7		46.7				

Upstream Bridge Cross Section Data

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev											
407	67	470	55	505	52	540	50	583	49													
	865		47.5	884		47.5	930		47	969.5		46.8	984		46.6							
		987		43.6	989.5		41	989.6		41	1000.4		41	1010.6		40.6						
			1010.7		40.6	1012.5		46.7		1040.5		46.8		1100		47.5	1135		49			
					1167		50		1195		52		1212		55		1225		55.5	1240		60

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 407 .015 984 .03 1012.5 .02

Bank Sta: Left Right Coeff Contr. Expan.
 984 1012.5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 984.8 46.6 F
 1015.6 1240 46.7 F

Downstream Deck/Roadway Coordinates num= 8

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	
984		46.6		46.6	987		47.8		43.6	989.5		47.8		41	
	989.8		47.8		45.8	1010.6		47.8		45.8	1010.7		47.8		40.6
		1012.5		47.8		46.7	1012.5		46.7		46.7				

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	25	Sta	Elev	Sta	Elev	Sta	Elev
407	67	470	55	505	52	540	50	583	49	
865	47.5	884	47.5	930	47	969.5	46.8	984	46.6	
987	43.6	989.5	41	989.6	41	1000.4	41	1010.6	40.6	
1010.7	40.6	1012.5	46.7	1040.5	46.8	1100	47.5	1135	49	
1167	50	1195	52	1212	55	1225	55.5	1240	60	

Manning's n Values

Station	Value	Station	Value	Station	Value
407	.015	984	.03	1012.5	.02

Bank Sta: Left 984 Right 1012.5 Coeff Contr. .3 Expan. .5

Station L	Station R	Elevation	Permanent
407	984.8	46.2	F
1015.6	1240	46.2	F

Upstream Embankment side slope = 0 hori z. to 1.0 vertical
 Downstream Embankment side slope = 0 hori z. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 46.6
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Energy Only

Additional Bridge Parameters

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 36.1

INPUT

Description: DS face of Old Kings Highway North -

REVDUP - corrected

Ineffective Flow Areas to use 1:1 contraction and expansion and average of min top of road elevation and max low chord

-corrected

bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

DUP - deleted US

section 36.1, identical to this cross section

Station Elevation Data num= 25

Goodwies Dari enREVDUP. rep

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
407	67	470	55	505	52	540	50	583	49
865	47.5	884	47.5	930	47	969.5	46.8	984	46.6
987	43.6	989.5	41	989.6	41	1000.4	41	1010.6	40.6
1010.7	40.6	1012.5	46.7	1040.5	46.8	1100	47.5	1135	49
1167	50	1195	52	1212	55	1225	55.5	1240	60

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
407	.015	984	.03	1012.5	.02

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
984	1012.5	60	40	20	.3	.5	

Ineffective Flow num= 2 Permanent

Sta L	Sta R	El ev	F
407	984.8	46.2	F
1015.6	1240	46.2	F

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 35.0

INPUT

Description: FEMA U - DS section of Old Kings Highway North
 Station Elevation Data num= 19

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
735	46	755	46	810	46.5	927	46.5	970	46
986	45	996	41	1000	40.3	1005	41	1015	45
1037	46	1061	47.5	1095	47.5	1135	49	1167	50
1196	52	1212	55	1225	55.5	1240	60		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
735	.015	986	.03	1015	.02

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
986	1015	380	375	360	.3	.5	

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 34.0

INPUT

Description: FEMA T - US section of Parking Lot Bridge
 Station Elevation Data num= 24

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
580	47.5	620	47.5	690	47	765	46.5	850	46.5
912	46	950.5	44.4	975.5	43.8	985.5	40	991.5	39.8
998	39.2	1000	38.8	1001.5	39.2	1008.5	43.9	1015.5	44.4
1028	43.5	1056	44.4	1070	45.3	1130	47	1194	48
1250	50	1260	52	1406	52	1460	53		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
580	.015	975.5	.03	1008.5	.02

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
975.5	1008.5	25	65	80	.3	.5	

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 33. 4

INPUT
 Description: U/S Face of Parki ng Lot Bri dge

REVDUP - corrected Ineffective
 Flow Areas for culverts to use 1:1 contraction and 1.5:1 expansion
 and min top of road elevation

DUP - deleted DS section 33.3,
 identical to this cross section

Station Elevation Data num= 30									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
580	47.5	620	47.5	690	47	765	46.5	850	46.5
930	46	951	44.6	963.8	44.6	963.9	45	982.3	45.1
989.8	45.5	990.8	43.6	990.9	38.7	999.5	38.9	999.6	38.9
1000	39	1000.5	39	1009.1	38.7	1009.2	43.6	1009.8	45.5
1020.8	44.8	1065	43.9	1180	46	1215	47	1275	47.8
1360	49	1385	50	1465	51	1538	52.5	1615	55

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
580	.015	990.8	.03	1009.2	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	990.8	1009.2		35.5	35.5		.3	.5
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
580	985.8	44.6	F					
1014.2	1615	43.9	F					

BRIDGE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 33.25

INPUT
 Description: Parki ng Lot -

DUP - deleted cross sections 33.3 and 33.2,
 identical to 33.1 and 33.4

Distance from Upstream XS = 5
 Deck/Roadway Width = 25.5
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 10														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
989.8	45.5	45.5	989.8	48.7	45.5	990.8	48.7	43.6						
999.5	48.7	43.6	999.6	48.7	38.9	1000.4	48.7	39						
1000.5	48.7	43.6	1009.2	48.7	43.6	1009.8	48.7	45.5						
1009.8	45.5	45.5												

Upstream Bridge Cross Section Data									
Station Elevation Data num= 30									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
580	47.5	620	47.5	690	47	765	46.5	850	46.5
930	46	951	44.6	963.8	44.6	963.9	45	982.3	45.1
989.8	45.5	990.8	43.6	990.9	38.7	999.5	38.9	999.6	38.9

Goodwies Dari enREVDUP. rep									
1000	39	1000.5	39	1009.1	38.7	1009.2	43.6	1009.8	45.5
1020.8	44.8	1065	43.9	1180	46	1215	47	1275	47.8
1360	49	1385	50	1465	51	1538	52.5	1615	55

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 580 .015 990.8 .03 1009.2 .025

Bank Sta: Left Right Coeff Contr. Expan.
 990.8 1009.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 580 985.8 44.6 F
 1014.2 1615 43.9 F

Downstream Deck/Roadway Coordinates num= 10
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 989.8 45.5 45.5 989.8 48.7 45.5 990.8 48.7 43.6
 999.5 48.7 43.6 999.6 48.7 38.9 1000.4 48.7 39
 1000.5 48.7 43.6 1009.2 48.7 43.6 1009.8 48.7 45.5
 1009.8 45.5 45.5

Downstream Bridge Cross Section Data Station Elevati on Data num= 30
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 580 47.5 620 47.5 690 47 765 46.5 850 46.5
 930 46 951 44.6 963.8 44.6 963.9 45 982.3 45.1
 989.8 45.5 990.8 43.6 990.9 38.7 999.5 38.9 999.6 38.9
 1000 39 1000.5 39 1009.1 38.7 1009.2 43.6 1009.8 45.5
 1020.8 44.8 1065 43.9 1180 46 1215 47 1275 47.8
 1360 49 1385 50 1465 51 1538 52.5 1615 55

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 580 .015 990.8 .03 1009.2 .025

Bank Sta: Left Right Coeff Contr. Expan.
 990.8 1009.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 580 987.47 44.1 F
 1012.53 1615 44.25 F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevati on at whi ch weir flow begi ns = 43.9
 Energy head used i n spi llway desi gn =
 Spi llway hei ght used i n desi gn =
 Weir crest shape = Broad Crested

Number of Bridge Coeffi cient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Hi ghest Energy Answer

Hi gh Flow Method
 Energy Onl y

Addi ti onal Bridge Parameters
 Add Fri cti on component to Momentum

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 33.1

INPUT
 Description: D/S Face of Parking Lot Bridge

REVDUP - corrected Ineffective
 Flow Areas for culverts to use 1:1 contraction and 1.5:1 expansion
 and average of min top of road elevation and max low chord

DUP - US section 33.2 deleted, identical to this cross section

Station Elevation Data num= 30									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
580	47.5	620	47.5	690	47	765	46.5	850	46.5
930	46	951	44.6	963.8	44.6	963.9	45	982.3	45.1
989.8	45.5	990.8	43.6	990.9	38.7	999.5	38.9	999.6	38.9
1000	39	1000.5	39	1009.1	38.7	1009.2	43.6	1009.8	45.5
1020.8	44.8	1065	43.9	1180	46	1215	47	1275	47.8
1360	49	1385	50	1465	51	1538	52.5	1615	55

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
580	.015	990.8	.03	1009.2	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	990.8	1009.2		40	45		.3	.5
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
580	987.47	44.1	F					
1012.53	1615	44.25	F					

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 32.0

INPUT
 Description: FEMA S - DS section of Parking Lot Bridge

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
926	46	985	45	995	41	997	39	1000	38.3
1006	39	1009	41	1060	44	1160	44.5	1211	46

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
926	.015	995	.03	1009	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	995	1009		200	190		.3	.5

CROSS SECTION

Goodwiv esDari enREVDUP. rep

RIVER: Goodwiv es Ri ver
REACH: mai nstem

RS: 31.0

INPUT

Description: FEMA R - Upstream of Rai l road Bri dge

Station		Elevation		Data		num=		24	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
920	55	935	50	955	44.8	981	44.7	986	41.4
996	40.7	997	39.1	998	38.2	1000	37.6	1005.5	38.4
1008.5	39.1	1011.5	41.2	1020	41.1	1021	42.2	1027	42.8
1039	42.9	1069	44.3	1178	44	1192	45	1220	45.8
1255	45.8	1310	47	1370	47.5	1565	50		

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
920	.055	996	.04	1011.5	.05		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	996	1011.5		90	100	120		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem

RS: 30.0

INPUT

Description: Under Rai l road Bri dge

Station		Elevation		Data		num=		11	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
560	56	720	56	994.5	55.5	994.5	38.6	1000	38.5
1005.5	38.9	1009.3	39.3	1009.3	55.6	1040	55.6	1080	56
1428	57								

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
560	.09	994.5	.025	1009.3	.07		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	994.5	1009.3		50	50	50		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem

RS: 29.0

INPUT

Description: FEMA Q - U/S Secti on of Tokeneke Road

REVDUP -corrected bank
stations to reflect actual top of bank (set in HEC-2 to specify
ineffective flow area location)

Station		Elevation		Data		num=		17	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
635	53	677	50	835	47.5	929	45.1	990	41
991.3	40	993	38.5	1000	37.8	1003.5	39	1005	41
1008.7	41.2	1040	45	1085	50.5	1180	54.5	1262	55
1320	56	1389	57.5						

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
635	.09	990	.035	1005	.07		

Goodwi vesDari enREVDUP. rep

Bank Sta: Left 990 Right 1005 Lengths: Left 20 Channel 20 Right 20 Coeff Contr. .3 Expan. .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
REACH: mai nstem RS: 28.0

INPUT
Descripti on: U/S Face of Tokeneke Road

REVDUP - corrected Ineffective Flow
Areas for culverts to use 1:1 contraction and 1.5:1 expansion and
min top of road elevation
-corrected bank stations to reflect
actual top of bank (set in HEC-2 to specify ineffective flow area
location)

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
635	53	677	50	835	47.5	929	45.1	990	41
991.3	40	993	38.5	1000	37.8	1003.5	39	1005	41
1008.7	41.2	1040	45	1085	50.5	1180	54.5	1262	55
1320	56	1389	57.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
635	.015	990	.035	1005	.015

Bank Sta: Left 990 Right 1005 Lengths: Left 70 Channel 70 Right 70 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
635	990.3	45.1	F
1009.7	1389	44.8	F

CULVERT

RIVER: Goodwi ves Ri ver
REACH: mai nstem RS: 27.5

INPUT
Descripti on: Tokeneke Road -

DUP - shortened bridge deck and culvert by 2 feet to offset from bridge sections by 1 foot US and DS
peir indicates possible pressure flow and low flow use of momentum or
yarnell.

Channel invert inside bridge given, input as culvert to
specify invert.

Distance from Upstream XS = 1
Deck/Roadway Width = 68
Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 16

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
633		53		0	677		50		0	835		47.5		0
929		45.1		0	963.5		45.1		0	990.5		45.3		0
990.5		46.2		0	1019.5		46.2		0	1019.5		44.8		0
1037		45.1		0	1040		45		0	1085		50.5		0

Goodwi vesDari enREVDUP. rep

1180 54.5 0 1262 55 0 1320 56 0
 1389 57.5 0

Upstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
635	53	677	50	835	47.5	929	45.1	990	41
991.3	40	993	38.5	1000	37.8	1003.5	39	1005	41
1008.7	41.2	1040	45	1085	50.5	1180	54.5	1262	55
1320	56	1389	57.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
635	.015	990	.035	1005	.015

Bank Sta: Left Right Coeff Contr. Expan.
 990 1005 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	El ev	Permanent
635	990.3	45.1	F
1009.7	1389	44.8	F

Downstream Deck/Roadway Coordinates

num= 16

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
633		53		0	677		50		0	835		47.5		0
929		45.1		0	963.5		45.1		0	990.5		45.3		0
990.5		46.2		0	1019.5		46.2		0	1019.5		44.8		0
1037		45.1		0	1040		45		0	1085		50.5		0
1180		54.5		0	1262		55		0	1320		56		0
1389		57.5		0										

Downstream Bridge Cross Section Data

Station Elevation Data num= 25

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
630	54	679	52	717	50	752	48.5	797	48.5
840	47.5	860	47.5	916	46.5	942	45	968	44
989	40	991.3	37.5	995	35.5	1000	34.7	1005	35.5
1008.7	37.5	1012	40	1025	45	1038	45.5	1068	45.5
1175	45.5	1240	47.5	1290	49	1310	50	1335	55

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
630	.045	991.3	.035	1008.7	.045	1038	.015

Bank Sta: Left Right Coeff Contr. Expan.
 991.3 1008.7 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	El ev	Permanent
630	990.63	42.4	F
1009.36	1335	42.4	F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 44.8
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Ri se Span

Culvert #1 Box 3.7 8.2
 FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
 FHWA Scale # 1 - Inlet edges chamfered 3/4 inch
 Solution Criteria = Highest U. S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef

1
 Number of Barrels = 2
 Upstream Elevati on = 37
 Centerline Stations
 Sta. Sta.
 995.4 1004.6
 Downstream Elevati on = 36
 Centerline Stations
 Sta. Sta.
 995.4 1004.6

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 27.1

INPUT
 Descripti on: D/S Face of Tokeneke Road

REVDUP - corrected Ineffective Flow
 Areas for culverts to use 1:1 contracti on and 1.5:1 expansi on and
 average of mi n top of road elevati on and max low chord

Station	Elevati on	Data	num=	25	Sta	Elev	Sta	Elev	Sta	Elev
630	54	679	52	717	50	752	48.5	797	48.5	
840	47.5	860	47.5	916	46.5	942	45	968	44	
989	40	991.3	37.5	995	35.5	1000	34.7	1005	35.5	
1008.7	37.5	1012	40	1025	45	1038	45.5	1068	45.5	
1175	45.5	1240	47.5	1290	49	1310	50	1335	55	

Manni ng' s n Val ues	num=	4	Sta	n Val	Sta	n Val	Sta	n Val
630	.045	991.3	.035	1008.7	.045	1038	.015	

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
991.3	1008.7	30	45	60	.3	.5			

Ineffecti ve Flow	num=	2	Sta L	Sta R	Elev	Permanent
630	990.63	42.4	F			
1009.36	1335	42.4	F			

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 27.0

INPUT
 Descripti on: FEMA P - D/S Secti on of Tokeneke Road

Station	Elevati on	Data	num=	25	Sta	Elev	Sta	Elev	Sta	Elev
630	54	679	52	717	50	752	48.5	797	48.5	
840	47.5	860	47.5	916	46.5	942	45	968	44	
989	40	991.3	37.5	995	35.5	1000	34.7	1005	35.5	
1008.7	37.5	1012	40	1025	45	1038	45.5	1068	45.5	

1175 45.5 1240 Goodwi ves Dari en REVDUP. rep 49 1310 50 1335 55

Manni ng' s n Val ues num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 630 .045 991.3 .035 1008.7 .045 1038 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991.3 1008.7 620 550 520 .3 .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 26.0

INPUT

Description: FEMA 0 - Dari en Land Trust Land on Left

Stati on Elevati on Data num= 23
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 947 50 955 45 961 44.5 975 38.2 991 36.5
 993 35.7 995 35.6 1000 32.3 1006 35.3 1009 35.7
 1019 40.4 1026 41.3 1034 41.8 1045 41.7 1083 42.3
 1115 43.1 1150 44.5 1186 45 1200 46 1383 47.5
 1432 48 1478 48 1560 50

Manni ng' s n Val ues num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 947 .08 995 .03 1006 .045 1019 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 995 1006 800 780 700 .1 .3

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 24.0

INPUT

Description: FEMA N - Upstream of I-95

Stati on Elevati on Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 960 50 970 45 984 40.1 992 36.4 996 35.5
 997 34.1 998 33.5 1000 33.5 1004 33.6 1006 34.1
 1008 35.7 1014.5 37.1 1028 38.4 1058 40 1088 41
 1138 42.5 1190 42.8 1245 42.8 1310 45

Manni ng' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 960 .1 996 .05 1008 .15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 996 1008 250 310 350 .1 .3

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 23.1

INPUT

Description: FEMA M - Under I-95 / US secti on of Ol d Ki ngs Hi ghway South

Stati on Elevati on Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
920	50	940	45	963	40.9	980	35	991	35
994	33	1000	32.7	1006	33	1009	35	1020	35
1040	36.6	1060	35	1070	40	1080	45	1085	48.6
1100	50								

Manning's n Values		num=	4		
Sta	n Val	Sta	n Val	Sta	n Val
920	.035	991	.025	1009	.035
				1020	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991	1009		30	30		.3	.5
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
920	991	38.2	F					
1009	1100	36.8	F					

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 23.0

INPUT
 Description: US face of Old Kings Highway South

REVDUP - corrected
 Ineffective Flow Areas for culverts to use 1:1 contraction and 1.5:1 expansion and average of min top of road elevation and max low chord

DUP - DS section 22.2 deleted and added to internal cross section of bridge

Station Elevation Data		num=	16						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
920	50	940	45	963	40.9	980	35	991	35
994	33	1000	32.7	1006	33	1009	35	1020	35
1040	36.6	1060	35	1070	40	1080	45	1085	48.6
1100	50								

Manning's n Values		num=	4		
Sta	n Val	Sta	n Val	Sta	n Val
920	.035	991	.025	1009	.035
				1020	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991	1009		110	110		.3	.5
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
920	981	38.2	F					
1019	1100	36.8	F					

BRIDGE

RIVER: Goodwies River
 REACH: mainstem RS: 22.15

INPUT
 Description: Old Kings Highway South Culverts-

DUP - added sections 22.1 and 22.2 as internal bridge cross sections
 Distance from Upstream XS = 10

Deck/Roadway Wi dth = 90
 Wei r Coeffi ci ent = 2.6

Upstream Deck/Roadway Coordi nates
 num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
983.5		38.2		38.2	983.5		38.9		38.2	991		38.9		35.6
991.5		38.9		36.2	999		38.9		36.2	999.5		38.9		35.8
999.5		38.9		31.6	1000.5		38.9		31.6	1000.5		38.9		35.7
1001		38.9		36.2	1008.5		38.8		36.1	1009		38.8		35.7
1017		38.8		37.9										

Upstream Bridge Cross Secti on Data
 Stati on El evati on Data num= 25

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
695	43	750	41.4	805	40.2	870	39	928	38.8
983.5	38.2	991	35.8	991	32.6	991.5	32.6	997	32.3
999	31.8	999.5	31.6	1000.5	31.6	1001	31.6	1006.5	31.7
1009	31.7	1009	35.7	1017	37.9	1035	37.5	1062	37.3
1105	36.8	1105	40	1168	45	1185	46.1	1201	50

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
695	.015	991	.025	1009	.015

Bank Sta: Left Right Coeff Contr. Expan.
 991 1009 .3 .5

Ineffecti ve Fl ow num= 2

Sta L	Sta R	El ev	Permanent
695	981	38.2	F
1019	1201	36.8	F

Downstream Deck/Roadway Coordi nates
 num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
983.5		38.2		38.2	983.5		38.9		38.2	991		38.9		35.6
991.5		38.9		36.2	999		38.9		36.2	999.5		38.9		35.8
999.5		38.9		31.6	1000.5		38.9		31.6	1000.5		38.9		35.7
1001		38.9		36.2	1008.5		38.8		36.1	1009		38.8		35.7
1017		38.8		37.9										

Downstream Bridge Cross Secti on Data
 Stati on El evati on Data num= 25

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
695	43	750	41.4	805	40.2	870	39	928	38.8
983.5	38.2	991	35.8	991	32.6	991.5	32.6	997	32.3
999	31.8	999.5	31.6	1000.5	31.6	1001	31.6	1006.5	31.7
1009	31.7	1009	35.7	1017	37.9	1035	37.5	1062	37.3
1105	36.8	1105	40	1168	45	1185	46.1	1201	50

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
695	.015	991	.025	1009	.015

Bank Sta: Left Right Coeff Contr. Expan.
 991 1009 .3 .5

Ineffecti ve Fl ow num= 2

Sta L	Sta R	El ev	Permanent
695	984.34	37.2	F
1015.66	1201	36.5	F

Upstream Embankment si de slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment si de slope = 0 hori z. to 1.0 verti cal
 Maxi mum al l owabl e submergence for wei r fl ow = .98

Elevation at which weir flow begins = 36.9
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 2
 Selected Low Flow Methods = Momentum

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord = 36.2

Additional Bridge Parameters

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 21.1

INPUT

Description: DS face of Old Kings Highway South,

REVDUP - corrected

Ineffective Flow Areas for culverts to use 1:1 contraction and
 1.5:1 expansion and average of min top of road elevation and max
 low chord

DUP - US section 22.1 deleted and added to internal
 cross section of bridge

Station Elevation Data		num= 15							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
925	50	940	45	963	40.9	980	35	991	34
994	32	1000	31.3	1006	32	1009	34	1030	35
1090	36.6	1135	40	1153	45	1170	46.1	1186	50

Manning's n Values

num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
925	.08	991	.05	1009	.12	1030	.015

Bank Sta: Left 991 Right 1009 Lengths: Left Channel 90 Right 40 Coeff Contr. .3 Expan. .5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
925	984.34	37.2	F		
1015.66	1186	36.5	F		

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 21.0

Goodwiv esDari enREVDUP. rep

INPUT

Description: FEMA L - DS section of Old Kings Highway South
 Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
925	50	940	45	963	40.9	980	35	991	34
994	32	1000	31.3	1006	32	1009	34	1030	35
1090	36.6	1135	40	1153	45	1170	46.1	1186	50

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
925	.08	991	.05	1009	.12	1030	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	991	1009		180	180		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 20.0

INPUT

Description: FEMA K - US section of Driveway Bridge
 Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
812	50	830	45	840	42	850	40	905	38
941	37.3	957	36.3	976	35.8	988	35.6	996	31.3
998	30.9	1000	30.7	1002	30.8	1003	31.3	1014	36.1
1025	37.7	1035	38.4	1046	38.4	1063	38.9	1118	40
1130	45	1153	50						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
812	.11	988	.04	1014	.12	1046	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	988	1014		25	40		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 19.4

INPUT

Description: U/S FACE of Driveway -

REVDUP - corrected Ineffective Flow
 Areas to use 1:1 expansion and contraction and min top of road elevation

DUP - deleted ds bridge edge section 19.3, identical to this cross section

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
830	45	840	42	850	40	905	39	945	35
973	35.4	993	35.4	993.1	35.8	995	35.9	995.5	33.6
997	31.1	997.5	30.1	1000	29.4	1003	29.5	1003.1	33.5
1004	35.6	1018	35.3	1032	35.6	1052	36.5	1087	38.3
1120	40	1135	42.9	1150	45				

Manning's n Values

num= 3

Goodwi ves Dari en REVDUP. rep
 Sta n Val Sta n Val Sta n Val
 830 .05 995.5 .045 1003.1 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 995.5 1003.1 10.5 10.5 10.5 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 830 993.5 35 F
 1005.1 1150 35.3 F

BRI DGE

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 19.25

I NPUT

Descr iption: Dri veway -

DUP - deleted sections at face (19.2 and 19.3) used
 internal cross section to insert downstream section geometry

Distance from Upstream XS = 2
 Deck/Roadway Width = 6.5
 Wei r Coeffi ci ent = 2.6

Upstream Deck/Roadway Coordi nates

num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 995 35.9 35.9 995 35.9 33.6 1003.1 35.6 33.5
 1004 35.6 35.6

Upstream Bridge Cross Secti on Data

Stati on Elevati on Data num= 23
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 830 45 840 42 850 40 905 39 945 35
 973 35.4 993 35.4 993.1 35.8 995 35.9 995.5 33.6
 997 31.1 997.5 30.1 1000 29.4 1003 29.5 1003.1 33.5
 1004 35.6 1018 35.3 1032 35.6 1052 36.5 1087 38.3
 1120 40 1135 42.9 1150 45

Manni ng' s n Val ues

num= 3
 Sta n Val Sta n Val Sta n Val
 830 .05 995.5 .045 1003.1 .05

Bank Sta: Left Right Coeff Contr. Expan.
 995.5 1003.1 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 830 993.5 35 F
 1005.1 1150 35.3 F

Downstream Deck/Roadway Coordi nates

num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 995 35.9 35.9 995 35.9 33.6 1003.1 35.6 33.5
 1004 35.6 35.6

Downstream Bridge Cross Secti on Data

Stati on Elevati on Data num= 23
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 830 45 840 42 850 40 905 39 945 35
 973 35.4 993 35.4 993.1 35.8 995 35.9 995.5 33.6
 997 31.1 997.5 30.1 1000 29.4 1003 29.5 1003.1 33.5
 1004 35.6 1018 35.3 1032 35.6 1052 36.5 1087 38.3

1120 40 1135 42.9 1150 45

Manni ng' s n Val ues num= 3
 Sta n Val Sta n Val Sta n Val
 830 .05 995.5 .045 1003.1 .05

Bank Sta: Left Right Coeff Contr. Expan.
 995.5 1003.1 .3 .5

Ineffe ctive Flow num= 2
 Sta L Sta R Elev Permanent
 830 993.5 34.3 F
 1005.1 1150 34.45 F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 35
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coeffi cient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 2
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Energy Only

Addi ti onal Bridge Parameters

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

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 18.1

INPUT

Descripti on: D/S Face of Dri veway -

REVDUP - correcte d Ineffe ctive Flow

Areas to use 1:1 expansion and contraction and average of min top of road elevation and max low chord

-correcte d bank stations to reflect actual top of bank (set in HEC-2 to speci fy ineffe ctive flow area locati on)

DUP - delete d us bridge edge secti on 19.2, di fferent from thi s secti on, i denti cal to secti on 19.4

Stati on Elevati on Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
830	45	850	40	905	39	945	35	995.5	34
996	29.3	1003.1	29.3	1005	34	1052	36.5	1087	38.3
1120	40	1150	45						

Manni ng' s n Val ues num= 3

Goodwies Dari enREVDUP. rep

Sta	n Val	Sta	n Val	Sta	n Val
830	.05	995.5	.045	1005	.05

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	995.5	1005		50	50	50		.3	.5
Ineffective Flow	num=		2						
Sta L	Sta R	Elev	Permanent						
830	993.5	34.3	F						
1005.1	1150	34.45	F						

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 18.0

INPUT

Description: FEMA J - DS section of Driveway Bridge

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
862	45	870	40	885	37.2	923	35.2	945	35
995.5	34	996	29.3	1003.1	29.3	1005	34	1050	34.5
1065	35	1112	38.2	1158	39.2	1172	45		

Manning's n Values	num=		3						
Sta	n Val	Sta	n Val	Sta	n Val				
862	.05	995.5	.045	1003.1	.05				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	995.5	1003.1		45	35	25		.3	.5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 17.0

INPUT

Description:	num=		23						
Station	Elevation	Data	num=	23					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
880	45	890	40	915	35.4	925	35	955	31.6
959	34.3	982	35.2	993.8	36	996.4	35.8	996.4	29.5
1000	29.3	1004	29.2	1004.5	30.2	1005.8	35.9	1008	36.2
1011	36.3	1023	35.3	1046	35.3	1070	38.3	1115	37.4
1148	39.7	1180	42.6	1195	45				

Manning's n Values	num=		3						
Sta	n Val	Sta	n Val	Sta	n Val				
880	.05	996.4	.045	1005.8	.05				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	996.4	1005.8		30	30	30		.1	.3

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 16.0

INPUT

Description: FEMA I -
 Station Elevation Data num= 15

Goodwi ves Dari en REVDUP. rep

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
870	45	885	40	905	35	912	34.5	960	31.2
995	31.2	996	29.4	1004	29.2	1006	31.2	1012	31.4
1062	34.2	1112	37.6	1143	39	1170	40	1180	45

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
870	.05	995	.045	1006	.05

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

995	1006	170	190	200	.1	.3
-----	------	-----	-----	-----	----	----

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 15.0

INPUT

Descripti on: FEMA H - US secti on of Andrews Drive
 Stati on El evati on Data num= 21

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
934	43.9	945	37.4	956	31.5	976	31.1	983	32
989	31.1	994	29.6	996	29.1	1000	29.2	1006	29.1
1010	29.6	1018	32.6	1025	33	1037	33.7	1040.5	32.4
1064	33	1071	35.6	1097	36.4	1110	38	1130	40
1143	45								

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
934	.085	983	.04	1018	.1

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

983	1018	85	65	45	.3	.5
-----	------	----	----	----	----	----

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 14.4

INPUT

Descripti on: U/S Face of Andrews Drive -

REVDUP - corrected Ineffective
 Flow Areas to use 1:1 expansion and contraction and min top of road elevation

DUP - removed upstream section 14.2 duplicate
 of this section previously located at exact edge of bridge

Stati on El evati on Data num= 26

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
790	45	823	38	845	35	890	32	945	33.8
970.9	34	978	34.9	978	35.2	985	35.6	989	31.3
989	28.7	991	28.6	993.7	28.4	997.1	28.7	998.3	31.6
1001.8	30.8	1002.1	26.7	1006.4	28.1	1010.1	28.7	1011.1	31.8
1013	36.1	1021	35.7	1035	35.4	1068	35	1090	40
1110	45								

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
790	.055	989	.035	1011.1	.08

Goodwiv esDari enREVDUP. rep
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 989 1011.1 32.5 32.5 32.5 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 790 985 32 F
 1015.1 1110 35 F

BRIDGE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 14.25

INPUT
 Descri pti on: Andrews Drive Culverts -

DUP - deleted adjacent cross sections, identical to current face sections

Distance from Upstream XS = 4
 Deck/Roadway Width = 24.5
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates
 num= 14

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
985		35.6		35.6	985		38.2		35.6	989		38.2		31.3
991		38.2		33.3	993.7		38.3		33.9	997.1		38.3		33.6
998.3		38.3		31.6	1001.8		38.4		30.8	1003.1		38.4		32.6
1006.4		38.4		33.8	1010.1		38.5		33.8	1011		38.5		31.8
1013		38.5		36.1	1013		36.1		36.1					

Upstream Bridge Cross Section Data

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
790	45	823	38	845	35	890	32	945	33.8
970.9	34	978	34.9	978	35.2	985	35.6	989	31.3
989	28.7	991	28.6	993.7	28.4	997.1	28.7	998.3	31.6
1001.8	30.8	1002.1	26.7	1006.4	28.1	1010.1	28.7	1011.1	31.8
1013	36.1	1021	35.7	1035	35.4	1068	35	1090	40
1110	45								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
790	.055	989	.035	1011.1	.08

Bank Sta: Left Right Coeff Contr. Expan.
 989 1011.1 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 790 985 32 F
 1015.1 1110 35 F

Downstream Deck/Roadway Coordinates
 num= 14

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
985		35.6		35.6	985		38.2		35.6	989		38.2		31.3
991		38.2		33.3	993.7		38.3		33.9	997.1		38.3		33.6
998.3		38.3		31.6	1001.8		38.4		30.8	1003.1		38.4		32.6
1006.4		38.4		33.8	1010.1		38.5		33.8	1011		38.5		31.8
1013		38.5		36.1	1013		36.1		36.1					

Downstream Bridge Cross Section Data

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
790	45	823	38	845	35	890	32	945	33.8
970.9	34	978	34.9	978	35.2	985	35.6	989	31.3
989	28.7	991	28.6	993.7	28.4	997.1	28.7	998.3	31.6
1001.8	30.8	1002.1	26.7	1006.4	28.1	1010.1	28.7	1011.1	31.8
1013	36.1	1021	35.7	1035	35.4	1068	35	1090	40
1110	45								

Goodwi vesDari enREVDUP. rep									
790	45	823	38	845	35	890	32	945	33.8
970.9	34	978	34.9	978	35.2	985	35.6	989	31.3
989	28.7	991	28.6	993.7	28.4	997.1	28.7	998.3	31.6
1001.8	30.8	1002.1	26.7	1006.4	28.1	1010.1	28.7	1011.1	31.8
1013	36.1	1021	35.7	1035	35.4	1068	35	1090	40
1110	45								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 790 .055 989 .035 1011.1 .08

Bank Sta: Left Right Coeff Contr. Expan.
 989 1011.1 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 790 986.33 32.95 F
 1013.76 1110 34.45 F

Upstream Embankment side slope = 0 hori z. to 1.0 vertical
 Downstream Embankment side slope = 0 hori z. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 32
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Goodwi ves Ri ver

REACH: mai nstem RS: 14.1

INPUT

Description: D/S Face of Andrews Drive -

REVDUP - corrected Ineffective

Flow Areas for culverts to use 1:1 contraction and 1.5:1 expansion
 and average of min top of road elevation and max low chord

DUP

- removed upstream section 14.2 duplicate of this section
 previously located at exact edge of bridge

Station Elevation Data num= 26									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
790	45	823	38	845	35	890	32	945	33.8
970.9	34	978	34.9	978	35.2	985	35.6	989	31.3
989	28.7	991	28.6	993.7	28.4	997.1	28.7	998.3	31.6

Goodwiv es Dari en REVDUP. rep

1001.8	30.8	1002.1	26.7	1006.4	28.1	1010.1	28.7	1011.1	31.8
1013	36.1	1021	35.7	1035	35.4	1068	35	1090	40
1110	45								

Manning's n Values num= 3

Sta n Val	Sta n Val	Sta n Val
790 .055	989 .035	1011.1 .08

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

989	1011.1	80	100	120	.3	.5
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
790	986.33	32.95	F
1013.76	1110	34.45	F

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 13.0

INPUT
 Description: FEMA G - DS section of Andrews Drive
 Station Elevati on Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
790	45	823	38	845	35	910	32	950	30
985	29	988	28	992	27.5	1002	27.5	1006	28
1010	29	1050	33.3	1060	34.1	1080	40	1110	45

Manning's n Values num= 3

Sta n Val	Sta n Val	Sta n Val
790 .055	985 .035	1010 .08

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

985	1010	705	705	705	.3	.5
-----	------	-----	-----	-----	----	----

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 12.0

INPUT
 Description: FEMA F - Crest of Dam #6
 Station Elevati on Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
913	40	923	35	945	33.5	954	28.4	964	28.2
964.5	27	973.2	25.6	979.2	24.7	994.2	23.9	995	22.2
1000	22.3	1006	22.3	1006.1	23.9	1011	24.7	1012	26.1
1023	27.8	1044	27.6	1062	31.3	1130	35	1148	40

Manning's n Values num= 3

Sta n Val	Sta n Val	Sta n Val
913 .08	979.2 .035	1023 .08

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

979.2	1023	20	20	20	.1	.3
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CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 11.9

Goodwiv esDari enREVDUP. rep

INPUT

Description: Toe of Dam #6

Station		Elevation Data		num= 18		Station		Elevation		Station		Elevation	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
915	40	923	35	945	33.5	954	28.4	964	28.2				
964.5	27	973.2	25.6	979.2	24.7	986	21	991	17				
1000	16.3	1009	17	1016	23	1023	27.6	1044	27.6				
1062	31.3	1139	35	1148	40								

Manning's n Values		num= 3		Station		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
915	.08	979.2	.035	1023	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	979.2	1023		270	260		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 11.0

INPUT

Description: Crest of Dam #5

Station		Elevation Data		num= 22		Station		Elevation		Station		Elevation	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
900	30	910	27	920	25	940	23.3	958	20				
961	19.2	976	19.1	988.5	18.9	988.6	18.1	997	17.9				
1000	17.5	1004	17.6	1004.5	18.3	1012	18.7	1013	19.8				
1023	19.8	1023.1	20.3	1024	20.3	1030	20.7	1094	21.3				
1145	25	1155	30.1										

Manning's n Values		num= 3		Station		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
900	.075	988.5	.04	1013	.11		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	988.5	1013		210	250		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 10.0

INPUT

Description: Crest of Dam#4

Station		Elevation Data		num= 21		Station		Elevation		Station		Elevation	
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
920	30	930	26	940	25	955	21.8	969	19.7				
977	18.5	978	16.9	986	16.7	986	16.1	992.4	16.1				
992.5	16.7	1000	16.8	1004	16.5	1008	16.6	1009	16.8				
1009.1	17.1	1022	17.6	1034	19.4	1055	21.6	1077	25				
1090	29.1												

Manning's n Values		num= 3		Station		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
920	.04	978	.04	1022	.12		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	978	1022		20	20		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 9.9

INPUT

Description: Toe of Dam #4

Station		Elevation		Data		num= 17			
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
920	30	930	26	940	25	955	21.3	969	19.7
977	18.5	978	16.9	986	11	993	10	1000	9
1007	10	1014	12	1022	17.6	1034	19.4	1055	21.6
1077	25	1090	29.1						

Manning's n		Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val
920	.1	977	.04	1022	.1

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	977	1022		240	210	200		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 9.0

INPUT

Description: FEMA E - Constriction at Dam #3

Station		Elevation		Data		num= 19			
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
835	25	855	23.2	892	20	930	16	954	15.4
967	15.1	986	15	993	13.8	993.1	7.3	1000	8
1005	9	1013	11.4	1015	15.6	1019	16.4	1028	17.2
1038	18.6	1060	19.7	1078	20	1095	25		

Manning's n		Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val
835	.1	986	.04	1015	.1

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	986	1015		535	560	565		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 8.1

INPUT

Description: FEMA D - U/S Section of Dam US of Goodwiv es Ri ver Road

DUP -

Decreased downstream distances by 10 feet to move downstream face cross section away from bridge

Station		Elevation		Data		num= 20			
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
868	20	895	13.8	953	14.2	967	9.3	974	5.6
978	4.5	987	3.1	993	2.6	1000	3	1001	3
1014	2.6	1032	4.6	1039	5.2	1042	7.8	1050	8.4
1062	9.2	1070	9.7	1074	13	1095	14.6	1100	20

Goodwies Dari en REVDUP. rep

Manning's n Values
Sta n Val
868 .06

num= 3
Sta n Val Sta n Val
.035 1074 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
978 1032 35 40 45 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
868 978 11.1 F
1032 1100 11.3 F

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 8.0

INPUT
Description: U/S Face of Dam US of Goodwies River Road

DUP - Increased
downstream distances in order to move face cross sections farther
from dam structure

Station	Elevation	Data	num=	20	Sta	Elev	Sta	Elev	Sta	Elev
868	20	895	13.8	953	14.2	967	9.3	974	5.6	
978	4.5	987	3.1	993	2.6	1000	3	1001	3	
1014	2.6	1032	4.6	1039	5.2	1042	7.8	1050	8.4	
1062	9.2	1070	9.7	1074	13	1095	14.6	1100	20	

Manning's n Values
Sta n Val
868 .06

num= 3
Sta n Val Sta n Val
.035 1074 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
978 1032 22 22 22 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
868 978 11.1 F
1032 1100 11.3 F

INLINE STRUCTURE

RIVER: Goodwies River
REACH: mainstem RS: 7.5

INPUT
Description: Dam #2 Upstream of Goodwies River Road

REVDUP - inserted as an
inline structure - modeled as a Bridge Structure in HEC-2

Distance from Upstream XS = 10
Deck/Roadway Width = 2
Weir Coefficient = 2.6
Weir Embankment Coordinates num = 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
808	20	875	20	942	22.9	957	14.6	961.3	12.3
977.4	11.8	993.7	11	994.3	11.1	1000	11.3	1000	11.3
1001	11.3	1001	11.3	1005.7	11.4	1006.4	11.9	1022	12
1046.4	11.7	1060	15	1072	20	1090	25	1100	27

Upstream Embankment side slope = 0 hori z. to 1.0 vertical

Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 7.1

INPUT

Description: D/S Face of Dam US of Goodwies River Road

DUP - decreased

downstream distances by 10 feet, to move upstream face cross sections away from dam structure

Station Elevation Data		num= 20							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
868	20	895	13.8	953	14.2	967	9.3	974	5.6
978	4.5	987	3.1	993	2.6	1000	3	1001	3
1014	2.6	1032	4.6	1039	5.2	1042	7.8	1050	8.4
1062	9.2	1070	9.7	1074	13	1095	14.6	1100	20

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
868	.06	967	.035	1074	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	978	1032		65	65	.3	.5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 7.0

INPUT

Description: U/S Section of Goodwies River Road & D/S Section for Dam

Station Elevation Data		num= 20							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
868	20	895	13.8	953	14.2	967	9.3	974	5.6
978	4.5	987	3.1	993	2.6	1000	3	1001	3
1014	2.6	1032	4.6	1039	5.2	1042	7.8	1050	8.4
1062	9.2	1070	9.7	1074	13	1095	14.6	1100	20

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
868	.06	967	.035	1074	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	978	1032		110	85	.3	.5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 6.0

INPUT

Description: U/S Face of Goodwies River Road

REVDUP - corrected Ineffective

Flow Areas to use 1:1 expansion and contraction and min top of road elevation

- corrected bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	16.2	876	15.8	890	13.8	923	11.8	941	12
956	12.4	977	5.8	984	4.6	992	3.1	1000	1.6
1008.8	2.7	1012	3.3	1032	4.7	1050	5.1	1061	7.7
1085	9.2	1100	10	1130	12	1170	15		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
854	.08	977	.035	1032	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	977	1032		33	33	.3	.5

Ineffective Flow num= 2			
Sta L	Sta R	Elev	Permanent
854	990.56	11.7	F
1009.4	1170	11.7	F

BRIDGE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 5.5

INPUT

Descri pti on: Goodwiv es Ri ver Road Bri dge -

DUP - shortened bridge by 2 feet
 to allow for 1 foot offset from cross sections US and DS
 pair

width of 0.1 indicated possible pressure flow and low flow use of momentum or yarnell.

Distance from Upstream XS = 1
 Deck/Roadway Width = 31
 Wei r Coeffi ci ent = 2.6

Upstream Deck/Roadway Coordinates num= 18														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
854		20		0	890		13.8		0	923		11.8		0
958		12.4		0	981		12.2		0	989		11.8		0
989.1		13.7		0	991.56		13.7		0	991.56		13.7		10.6
1008.4		13.4		10.6	1008.4		13.4		0	1010		13.4		0
1011		11.7		0	1032		11.8		0	1055		12.2		0
1080		12.2		0	1145		13		0	1170		15		0

Upstream Bridge Cross Section Data

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	16.2	876	15.8	890	13.8	923	11.8	941	12
956	12.4	977	5.8	984	4.6	992	3.1	1000	1.6
1008.8	2.7	1012	3.3	1032	4.7	1050	5.1	1061	7.7
1085	9.2	1100	10	1130	12	1170	15		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
854	.08	977	.035	1032	.06

Bank Sta:	Left	Right	Coeff Contr.	Expan.

Goodwi vesDari enREVDUP. rep

977		1032	
St a L	St a R	El ev	Per manent
854	990.56	11.7	F
1009.4	1170	11.7	F

Downstream Deck/Roadway Coordi nates

St a Hi	Cord Lo	Cord	St a Hi	Cord Lo	Cord	St a Hi	Cord Lo	Cord
854	20	0	890	13.8	0	923	11.8	0
958	12.4	0	981	12.2	0	989	11.8	0
989.1	13.7	0	991.56	13.7	0	991.56	13.7	10.6
1008.4	13.4	10.6	1008.4	13.4	0	1010	13.4	0
1011	11.7	0	1032	11.8	0	1055	12.2	0
1080	12.2	0	1145	13	0	1170	15	0

Downstream Bridge Cross Secti on Data

St a	El ev	St a	El ev	St a	El ev	St a	El ev	St a	El ev
854	16.2	876	15.8	890	13.8	923	11.8	941	12
956	12.4	977	5.8	984	4.6	992	3.1	1000	1.6
1008.8	2.7	1012	3.3	1032	4.7	1050	5.1	1061	7.7
1085	9.2	1100	10	1130	12	1170	15		

Manni ng' s n Val ues

St a	n Val	St a	n Val	St a	n Val
854	.08	977	.035	1032	.06

Bank Sta: Left Right Coeff Contr. Expan.

977		1032	
St a L	St a R	El ev	Per manent
854	990.56	11.15	F
1009.4	1170	11.15	F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Maxi m al lowabl e submergence for wei r fl ow = .98
 El evati on at whi ch wei r fl ow begi ns = 11.7
 Energy head used i n spi ll way desi gn =
 Spi ll way hei ght used i n desi gn =
 Wei r crest shape = Broad Crested

Number of Abutments = 1

Abutment Data

Upstream		Downstream	
St a	El ev	St a	El ev
991.56	10.6	993	1.6
1007	1.6	1008.4	10.6

Number of Bridge Coeffi ci ent Sets = 1

Low Fl ow Methods and Data

Energy
 Momentum Cd = 1.6
 Sel ected Low Fl ow Methods = Hi ghest Energy Answer

Hi gh Fl ow Method

Pressure and Wei r fl ow
 Submerged Inl et Cd = 1.6

Goodwiv es Dari en REVDUP. rep

Submerged Inlet + Outlet Cd = .8
 Max Low Cord = 10.6

Additional Bridge Parameters

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

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 5.1

INPUT
 Descrip ti on: D/S Face of Goodwiv es Ri ver Road

REVDUP - corrected Ineffective
 Flow Areas to use 1:1 expansion and contraction and average of min top of road elevation and max low chord
 -corrected bank stations
 to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data		num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	16.2	876	15.8	890	13.8	923	11.8	941	12		
956	12.4	977	5.8	984	4.6	992	3.1	1000	1.6		
1008.8	2.7	1012	3.3	1032	4.7	1050	5.1	1061	7.7		
1085	9.2	1100	10	1130	12	1170	15				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
854	.08	977	.035	1032	.06

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	977	1032		80	100	120		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
854	990.56	11.15	F		
1009.4	1170	11.15	F		

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 5.0

INPUT
 Descrip ti on: FEMA C - D/S Secti on of Goodwiv es Ri ver Road

REVDUP - corrected
 bank stations to reflect actual top of bank (set in HEC-2 to specify ineffective flow area location)

Station Elevation Data		num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
854	16.2	876	15.8	890	13.8	923	11.8	941	12		
956	12.4	977	5.8	984	4.6	992	3.1	1000	1.6		
1008.8	2.7	1012	3.3	1032	4.7	1050	5.1	1061	7.7		
1085	9.2	1100	10	1130	12	1170	15				

Manning's n Values		num= 4	
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Goodwiv esDari enREVDUP. rep

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
854	.05	956	.085	977	.035	1061	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	977	1032		780	780	820		.3	.5

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 4.0

INPUT

Description: FEMA B - Constriction in Gorham's Pond

Station	Elevation	Data	num=	9					
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
936	15	950	6	953	4.6	957	2.5	1000	1.4
1029	2.5	1035	4.6	1040	6	1050	15		

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
936	.04	950	.03	1040	.05

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	950	1040		1120	1100	1160		.1	.3

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 3.0

INPUT

Description: FEMA A - Downstream model cross section in Gorham's Pond

Station	Elevation	Data	num=	29					
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
641	15	661	11	678	8	701	7	775	6.4
824	7	828	9	836	10	852	12	865	12
878	11	891	10	900.5	9.1	900.6	10.2	902	10.1
902.1	4.1	927	1.5	985	1.4	1000	1.2	1052	.9
1123	3.8	1123.5	8.1	1126	9	1128	10	1131	11
1139	13	1154	14	1164	15	1183	16		

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
641	.045	902	.03	1123.5	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	902	1123.5		0	0	0		.1	.3

SUMMARY OF MANNING'S N VALUES

Ri ver: Goodwiv es Ri ver

Reach	Ri ver Sta.	n1	n2	n3	n4	n5
mai nstem	68.0	.12	.045	.15		

		Goodwi vesDari enREVDUP. rep		
mai nstem	67. 0	. 12	. 035	. 045
mai nstem	65. 1	. 1	. 04	. 045
mai nstem	64. 0	. 085	. 035	. 09
mai nstem	62. 1	. 05	. 035	. 04
mai nstem	62. 0	. 05	. 035	. 04
mai nstem	61. 0	. 12	. 045	. 075
mai nstem	60. 4	. 055	. 035	. 04
mai nstem	60. 3	. 055	. 035	. 04
mai nstem	60. 25	Inl Struct		
mai nstem	60. 2	. 055	. 035	. 04
mai nstem	60. 1	. 055	. 035	. 04
mai nstem	59. 0	. 055	. 035	. 04
mai nstem	58. 5	Cul vert		
mai nstem	58. 1	. 055	. 035	. 04
mai nstem	58. 0	. 055	. 035	. 04
mai nstem	56. 0	. 04	. 045	. 04
mai nstem	55. 0	. 05	. 045	. 05
mai nstem	54. 4	. 04	. 04	. 05
mai nstem	54. 3	. 04	. 04	. 05
mai nstem	54. 25	Inl Struct		
mai nstem	54. 2	. 04	. 04	. 05
mai nstem	54. 1	. 04	. 04	. 05
mai nstem	53. 0	. 08	. 035	. 05
mai nstem	52. 4	. 08	. 035	. 05
mai nstem	52. 25	Bri dge		
mai nstem	52. 1	. 08	. 035	. 05
mai nstem	51. 0	. 08	. 035	. 05
mai nstem	49. 1	. 04	. 04	. 05
mai nstem	49. 0	. 04	. 04	. 05
mai nstem	48. 15	Bri dge		
mai nstem	47. 1	. 07	. 045	. 04
mai nstem	47. 0	. 07	. 045	. 04
mai nstem	45. 0	. 12	. 035	. 04
mai nstem	44. 1	. 045	. 045	. 05

		Goodwi ves	Dari en	REVDUP. rep			
mai nstem	43. 0		. 04	. 045	. 04		
mai nstem	42. 0		. 04	. 045	. 04		
mai nstem	41. 5	Cul vert					
mai nstem	41. 1		. 05	. 045	. 06		
mai nstem	41. 0		. 05	. 045	. 06		
mai nstem	40. 1		. 07	. 045	. 1	. 02	
mai nstem	40. 0		. 015	. 025	. 015		
mai nstem	39. 15	Bri dge					
mai nstem	38. 1		. 045	. 045	. 045		
mai nstem	38. 0		. 015	. 12	. 045	. 12	. 015
mai nstem	37. 0		. 1	. 043	. 1		
mai nstem	36. 4		. 015	. 03	. 02		
mai nstem	36. 25	Bri dge					
mai nstem	36. 1		. 015	. 03	. 02		
mai nstem	35. 0		. 015	. 03	. 02		
mai nstem	34. 0		. 015	. 03	. 02		
mai nstem	33. 4		. 015	. 03	. 025		
mai nstem	33. 25	Bri dge					
mai nstem	33. 1		. 015	. 03	. 025		
mai nstem	32. 0		. 015	. 03	. 025		
mai nstem	31. 0		. 055	. 04	. 05		
mai nstem	30. 0		. 09	. 025	. 07		
mai nstem	29. 0		. 09	. 035	. 07		
mai nstem	28. 0		. 015	. 035	. 015		
mai nstem	27. 5	Cul vert					
mai nstem	27. 1		. 045	. 035	. 045	. 015	
mai nstem	27. 0		. 045	. 035	. 045	. 015	
mai nstem	26. 0		. 08	. 03	. 045	. 015	
mai nstem	24. 0		. 1	. 05	. 15		
mai nstem	23. 1		. 035	. 025	. 035	. 015	
mai nstem	23. 0		. 035	. 025	. 035	. 015	
mai nstem	22. 15	Bri dge					
mai nstem	21. 1		. 08	. 05	. 12	. 015	
mai nstem	21. 0		. 08	. 05	. 12	. 015	
mai nstem	20. 0		. 11	. 04	. 12	. 015	

Goodwi vesDari enREVDUP. rep

mai nstem	19. 4		. 05	. 045	. 05	
mai nstem	19. 25	Bri dge				
mai nstem	18. 1		. 05	. 045	. 05	
mai nstem	18. 0		. 05	. 045	. 05	
mai nstem	17. 0		. 05	. 045	. 05	
mai nstem	16. 0		. 05	. 045	. 05	
mai nstem	15. 0		. 085	. 04	. 1	
mai nstem	14. 4		. 055	. 035	. 08	
mai nstem	14. 25	Bri dge				
mai nstem	14. 1		. 055	. 035	. 08	
mai nstem	13. 0		. 055	. 035	. 08	
mai nstem	12. 0		. 08	. 035	. 08	
mai nstem	11. 9		. 08	. 035	. 08	
mai nstem	11. 0		. 075	. 04	. 11	
mai nstem	10. 0		. 04	. 04	. 12	
mai nstem	9. 9		. 1	. 04	. 1	
mai nstem	9. 0		. 1	. 04	. 1	
mai nstem	8. 1		. 06	. 035	. 06	
mai nstem	8. 0		. 06	. 035	. 06	
mai nstem	7. 5	Inl Struct				
mai nstem	7. 1		. 06	. 035	. 06	
mai nstem	7. 0		. 06	. 035	. 06	
mai nstem	6. 0		. 08	. 035	. 06	
mai nstem	5. 5	Bri dge				
mai nstem	5. 1		. 08	. 035	. 06	
mai nstem	5. 0		. 05	. 085	. 035	. 04
mai nstem	4. 0		. 04	. 03	. 05	
mai nstem	3. 0		. 045	. 03	. 04	

SUMMARY OF REACH LENGTHS

Ri ver: Goodwi ves Ri ver

Reach River Sta. Left Channel Ri ght

Goodwi vesDari enREVDUP. rep

mai nstem	68. 0	180	190	200
mai nstem	67. 0	430	460	500
mai nstem	65. 1	550	540	480
mai nstem	64. 0	320	350	360
mai nstem	62. 1	10	10	10
mai nstem	62. 0	310	270	250
mai nstem	61. 0	605	685	585
mai nstem	60. 4	20	20	20
mai nstem	60. 3	4	4	4
mai nstem	60. 25	Inl Struct		
mai nstem	60. 2	3	3	3
mai nstem	60. 1	3	3	3
mai nstem	59. 0	30	30	30
mai nstem	58. 5	Cul vert		
mai nstem	58. 1	50	70	90
mai nstem	58. 0	310	290	270
mai nstem	56. 0	10	10	10
mai nstem	55. 0	390	390	400
mai nstem	54. 4	20	20	20
mai nstem	54. 3	23	23	23
mai nstem	54. 25	Inl Struct		
mai nstem	54. 2	30	30	30
mai nstem	54. 1	300	300	300
mai nstem	53. 0	35	30	25
mai nstem	52. 4	12	12	12
mai nstem	52. 25	Bri dge		
mai nstem	52. 1	45	40	35
mai nstem	51. 0	230	245	255
mai nstem	49. 1	45	50	55
mai nstem	49. 0	34	34	34
mai nstem	48. 15	Bri dge		
mai nstem	47. 1	40	45	50
mai nstem	47. 0	570	540	510
mai nstem	45. 0	110	120	130
mai nstem	44. 1	190	190	190
mai nstem	43. 0	25	40	50
mai nstem	42. 0	38	38	38
mai nstem	41. 5	Cul vert		
mai nstem	41. 1	30	25	20
mai nstem	41. 0	460	465	470
mai nstem	40. 1	60	70	100
mai nstem	40. 0	48	48	48
mai nstem	39. 15	Bri dge		
mai nstem	38. 1	60	50	40
mai nstem	38. 0	640	620	620
mai nstem	37. 0	50	50	30
mai nstem	36. 4	40	39	20
mai nstem	36. 25	Bri dge		
mai nstem	36. 1	60	40	20
mai nstem	35. 0	380	375	360
mai nstem	34. 0	25	65	80
mai nstem	33. 4	35. 5	35. 5	35. 5
mai nstem	33. 25	Bri dge		
mai nstem	33. 1	40	45	60
mai nstem	32. 0	200	190	180
mai nstem	31. 0	90	100	120
mai nstem	30. 0	50	50	50
mai nstem	29. 0	20	20	20
mai nstem	28. 0	70	70	70
mai nstem	27. 5	Cul vert		
mai nstem	27. 1	30	45	60
mai nstem	27. 0	620	550	520

		Goodwi ves	Dari en	REVDUP. rep	
mai nstem	26. 0	800	780	700	
mai nstem	24. 0	250	310	350	
mai nstem	23. 1	30	30	30	
mai nstem	23. 0	110	110	90	
mai nstem	22. 15	Bri dge			
mai nstem	21. 1	90	40	20	
mai nstem	21. 0	180	180	170	
mai nstem	20. 0	25	40	45	
mai nstem	19. 4	10. 5	10. 5	10. 5	
mai nstem	19. 25	Bri dge			
mai nstem	18. 1	50	50	50	
mai nstem	18. 0	45	35	25	
mai nstem	17. 0	30	30	30	
mai nstem	16. 0	170	190	200	
mai nstem	15. 0	85	65	45	
mai nstem	14. 4	32. 5	32. 5	32. 5	
mai nstem	14. 25	Bri dge			
mai nstem	14. 1	80	100	120	
mai nstem	13. 0	705	705	705	
mai nstem	12. 0	20	20	20	
mai nstem	11. 9	270	260	220	
mai nstem	11. 0	210	250	280	
mai nstem	10. 0	20	20	20	
mai nstem	9. 9	240	210	200	
mai nstem	9. 0	535	560	565	
mai nstem	8. 1	35	40	45	
mai nstem	8. 0	22	22	22	
mai nstem	7. 5	Inl Struct			
mai nstem	7. 1	65	65	65	
mai nstem	7. 0	110	85	50	
mai nstem	6. 0	33	33	33	
mai nstem	5. 5	Bri dge			
mai nstem	5. 1	80	100	120	
mai nstem	5. 0	780	780	820	
mai nstem	4. 0	1120	1100	1160	
mai nstem	3. 0	0	0	0	

SUMMARY OF CONTRACTI ON AND EXPANSI ON COEFFI CI ENTS
Ri ver: Goodwi ves Ri ver

Reach	Ri ver Sta.	Contr.	Expan.
mai nstem	68. 0	. 1	. 3
mai nstem	67. 0	. 1	. 3
mai nstem	65. 1	. 1	. 3
mai nstem	64. 0	. 1	. 3
mai nstem	62. 1	. 1	. 3
mai nstem	62. 0	. 1	. 3
mai nstem	61. 0	. 1	. 3
mai nstem	60. 4	. 3	. 5
mai nstem	60. 3	. 3	. 5
mai nstem	60. 25	Inl Struct	
mai nstem	60. 2	. 3	. 5
mai nstem	60. 1	. 3	. 5
mai nstem	59. 0	. 3	. 5
mai nstem	58. 5	Cul vert	
mai nstem	58. 1	. 3	. 5
mai nstem	58. 0	. 3	. 5
mai nstem	56. 0	. 1	. 3

Goodwi vesDari enREVDUP. rep

mai nstem	55.0	.1	.3
mai nstem	54.4	.3	.5
mai nstem	54.3	.3	.5
mai nstem	54.25	Inl Struct	
mai nstem	54.2	.3	.5
mai nstem	54.1	.3	.5
mai nstem	53.0	.3	.5
mai nstem	52.4	.3	.5
mai nstem	52.25	Bri dge	
mai nstem	52.1	.3	.5
mai nstem	51.0	.3	.5
mai nstem	49.1	.3	.5
mai nstem	49.0	.3	.5
mai nstem	48.15	Bri dge	
mai nstem	47.1	.3	.5
mai nstem	47.0	.3	.5
mai nstem	45.0	.1	.3
mai nstem	44.1	.1	.3
mai nstem	43.0	.3	.5
mai nstem	42.0	.3	.5
mai nstem	41.5	Cul vert	
mai nstem	41.1	.3	.5
mai nstem	41.0	.1	.3
mai nstem	40.1	.3	.5
mai nstem	40.0	.3	.5
mai nstem	39.15	Bri dge	
mai nstem	38.1	.3	.5
mai nstem	38.0	.3	.5
mai nstem	37.0	.3	.5
mai nstem	36.4	.3	.5
mai nstem	36.25	Bri dge	
mai nstem	36.1	.3	.5
mai nstem	35.0	.3	.5
mai nstem	34.0	.3	.5
mai nstem	33.4	.3	.5
mai nstem	33.25	Bri dge	
mai nstem	33.1	.3	.5
mai nstem	32.0	.3	.5
mai nstem	31.0	.1	.3
mai nstem	30.0	.3	.5
mai nstem	29.0	.3	.5
mai nstem	28.0	.3	.5
mai nstem	27.5	Cul vert	
mai nstem	27.1	.3	.5
mai nstem	27.0	.3	.5
mai nstem	26.0	.1	.3
mai nstem	24.0	.1	.3
mai nstem	23.1	.3	.5
mai nstem	23.0	.3	.5
mai nstem	22.15	Bri dge	
mai nstem	21.1	.3	.5
mai nstem	21.0	.3	.5
mai nstem	20.0	.3	.5
mai nstem	19.4	.3	.5
mai nstem	19.25	Bri dge	
mai nstem	18.1	.3	.5
mai nstem	18.0	.3	.5
mai nstem	17.0	.1	.3
mai nstem	16.0	.1	.3
mai nstem	15.0	.3	.5
mai nstem	14.4	.3	.5
mai nstem	14.25	Bri dge	
mai nstem	14.1	.3	.5

		Goodwi ves	Dari en	REVDUP. rep
mai nstem	13.0	.3		.5
mai nstem	12.0	.1		.3
mai nstem	11.9	.1		.3
mai nstem	11.0	.1		.3
mai nstem	10.0	.1		.3
mai nstem	9.9	.1		.3
mai nstem	9.0	.1		.3
mai nstem	8.1	.3		.5
mai nstem	8.0	.3		.5
mai nstem	7.5		Inl Struct	
mai nstem	7.1	.3		.5
mai nstem	7.0	.3		.5
mai nstem	6.0	.3		.5
mai nstem	5.5		Bri dge	
mai nstem	5.1	.3		.5
mai nstem	5.0	.3		.5
mai nstem	4.0	.1		.3
mai nstem	3.0	.1		.3

Revised Duplicate Effective Model Output

Goodwi vesDari en. rep

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

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

PROJECT DATA

Project Title: Goodwi vesDari en
 Project File : Goodwi vesDari en. prj
 Run Date and Time: 5/12/2011 9:56:57 AM

Project in English units

Profile Output Table - Standard Table 1

Reach E. G. Slope (ft/ft)	River Vel Chnl (ft/s)	Sta Flow Area (sq ft)	Profile Top Width (ft)	Q Total Froude # (cfs)	Min Ch El (ft)	W. S. Elev (ft)	Crit W. S. (ft)	E. G. Elev (ft)
mainstem 0.019969	68.0 8.30	100yr 74.25	51.90	360.00 0.89	129.80	133.66	133.66	134.54
mainstem 0.028906	68.0 9.63	100yr 37.40	(encr) 13.00	360.00 1.00	129.80	133.85	133.85	135.28
mainstem 0.019124	68.0 7.07	10yr 44.03	42.33	210.00 0.85	129.80	133.02	133.02	133.72
mainstem 0.019046	68.0 7.76	50yr 63.78	48.57	300.00 0.86	129.80	133.45	133.45	134.24
mainstem 0.019304	68.0 9.47	500yr 113.69	65.10	565.00 0.91	129.80	134.34	134.34	135.38
mainstem	67.0	100yr		360.00	127.10	130.19	130.14	130.92

Goodwies Dari en. rep

0.009504	7.14	74.28	72.28	0.83				
mainstem	67.0		100yr (encr)	360.00	127.10	130.39		131.14
0.008737	6.98	56.81	25.00	0.77				
mainstem	67.0		10yr	210.00	127.10	129.63	129.37	130.16
0.009253	5.86	41.11	46.72	0.78				
mainstem	67.0		50yr	300.00	127.10	129.99	129.89	130.65
0.009374	6.68	60.95	63.26	0.81				
mainstem	67.0		500yr	565.00	127.10	130.79	130.79	131.64
0.008942	8.07	126.24	100.82	0.83				
mainstem	65.1		100yr	360.00	123.30	125.17	125.17	125.50
0.014323	6.21	135.61	183.69	0.83				
mainstem	65.1		100yr (encr)	360.00	123.30	125.25	125.25	125.71
0.016722	6.92	113.55	110.00	0.91				
mainstem	65.1		10yr	210.00	123.30	124.91	124.91	125.18
0.012441	5.19	91.06	160.82	0.76				
mainstem	65.1		50yr	300.00	123.30	125.08	125.08	125.39
0.013739	5.86	118.68	175.58	0.81				
mainstem	65.1		500yr	565.00	123.30	125.46	125.42	125.83
0.014676	6.97	192.39	208.58	0.87				
mainstem	64.0		100yr	360.00	114.50	117.45	117.00	118.09
0.006806	6.66	70.04	41.74	0.70				
mainstem	64.0		100yr (encr)	360.00	114.50	117.50		118.27
0.009073	7.07	50.95	18.00	0.74				
mainstem	64.0		10yr	210.00	114.50	117.11		117.41
0.003701	4.51	56.97	36.54	0.51				
mainstem	64.0		50yr	300.00	114.50	117.36		117.84
0.005347	5.78	66.30	40.32	0.62				
mainstem	64.0		500yr	565.00	114.50	117.77	117.77	118.96
0.011092	9.16	84.42	46.80	0.92				
mainstem	62.1		100yr	360.00	113.60	116.26	115.33	116.32
0.003469	3.61	209.50	272.65	0.39				
mainstem	62.1		100yr (encr)	360.00	113.60	117.28	115.45	117.32
0.000956	1.86	223.41	92.89	0.17				
mainstem	62.1		10yr	210.00	113.60	115.89	115.14	115.96
0.004604	3.76	122.93	198.52	0.44				
mainstem	62.1		50yr	300.00	113.60	116.12	115.33	116.18
0.003890	3.69	173.46	243.02	0.41				
mainstem	62.1		500yr	565.00	113.60	116.62	116.03	116.68
0.002764	3.52	321.77	331.23	0.36				
mainstem	62.0		100yr	360.00	110.30	116.21	115.41	116.28

				GoodwiesDari en. rep				
0.003016	3.53	210.52	262.85	0.26				
mainstem	62.0		100yr (encr)	360.00	110.30	117.07	115.65	117.28
0.004215	4.08	98.62	29.62	0.28				
mainstem	62.0		10yr	210.00	110.30	115.82	114.70	115.91
0.003529	3.64	122.44	185.94	0.27				
mainstem	62.0		50yr	300.00	110.30	116.06	114.70	116.14
0.003267	3.61	173.81	231.36	0.27				
mainstem	62.0		500yr	565.00	110.30	116.59	115.47	116.65
0.002582	3.40	323.92	329.21	0.24				
mainstem	61.0		100yr	360.00	108.90	113.79	113.79	114.39
0.021592	7.75	96.86	80.85	0.63				
mainstem	61.0		100yr (encr)	360.00	108.90	113.71	113.71	114.63
0.030049	9.04	68.92	35.00	0.74				
mainstem	61.0		10yr	210.00	108.90	112.97	112.97	113.71
0.025725	7.51	45.33	36.75	0.67				
mainstem	61.0		50yr	300.00	108.90	113.59	113.59	114.17
0.020880	7.40	81.14	72.87	0.61				
mainstem	61.0		500yr	565.00	108.90	114.31	114.31	114.93
0.023594	8.69	143.91	100.02	0.67				
mainstem	60.4		100yr	360.00	101.20	108.89		108.89
0.000053	1.17	641.90	209.05	0.08				
mainstem	60.4		100yr (encr)	360.00	101.20	108.93		108.94
0.000047	1.10	610.21	160.00	0.07				
mainstem	60.4		10yr	210.00	101.20	108.59		108.59
0.000023	0.75	581.28	196.12	0.05				
mainstem	60.4		50yr	300.00	101.20	108.78		108.79
0.000041	1.01	620.74	206.31	0.07				
mainstem	60.4		500yr	565.00	101.20	109.25		109.26
0.000096	1.62	719.19	217.21	0.10				
mainstem	60.3		100yr	360.00	100.00	108.77	103.61	108.86
0.000572	2.66	199.01	205.96	0.18				
mainstem	60.3		100yr (encr)	360.00	100.00	108.82	103.61	108.91
0.000540	2.59	207.31	197.32	0.17				
mainstem	60.3		10yr	210.00	100.00	108.53	102.79	108.58
0.000247	1.72	152.91	192.46	0.12				
mainstem	60.3		50yr	300.00	100.00	108.69	103.30	108.77
0.000431	2.30	184.08	201.69	0.15				
mainstem	60.3		500yr	565.00	100.00	109.05	104.55	109.22
0.001001	3.59	260.59	222.72	0.23				

mainstem 60.25

Inl Struct

Goodwi vesDari en. rep

mai nstem	60. 2		100yr	360. 00	100. 00	108. 32	103. 61	108. 47
0. 000850	3. 15	123. 66	112. 25	0. 21				
mai nstem	60. 2		100yr (enchr)	360. 00	100. 00	108. 68	103. 61	108. 83
0. 000754	3. 02	119. 15	16. 33	0. 20				
mai nstem	60. 2		10yr	210. 00	100. 00	106. 08	102. 79	106. 20
0. 000841	2. 73	76. 95	15. 83	0. 22				
mai nstem	60. 2		50yr	300. 00	100. 00	107. 44	103. 30	107. 58
0. 000865	3. 04	98. 84	16. 40	0. 22				
mai nstem	60. 2		500yr	565. 00	100. 00	108. 96	104. 56	109. 14
0. 001129	3. 78	239. 07	217. 01	0. 25				

mai nstem	60. 1		100yr	360. 00	100. 00	108. 32		108. 47
0. 000851	3. 15	123. 36	111. 88	0. 21				
mai nstem	60. 1		100yr (enchr)	360. 00	100. 00	108. 68		108. 82
0. 000755	3. 02	119. 10	16. 32	0. 20				
mai nstem	60. 1		10yr	210. 00	100. 00	106. 08		106. 20
0. 000842	2. 73	76. 91	15. 83	0. 22				
mai nstem	60. 1		50yr	300. 00	100. 00	107. 44		107. 58
0. 000866	3. 04	98. 79	16. 40	0. 22				
mai nstem	60. 1		500yr	565. 00	100. 00	108. 95		109. 14
0. 001134	3. 79	238. 28	216. 80	0. 25				

mai nstem	59. 0		100yr	360. 00	101. 20	108. 38	104. 60	108. 41
0. 000137	1. 71	343. 45	183. 59	0. 12				
mai nstem	59. 0		100yr (enchr)	360. 00	101. 20	108. 28	104. 99	108. 73
0. 003947	5. 36	67. 18	10. 00	0. 36				
mai nstem	59. 0		10yr	210. 00	101. 20	105. 90	103. 68	106. 15
0. 001284	4. 04	52. 02	106. 19	0. 34				
mai nstem	59. 0		50yr	300. 00	101. 20	107. 23	104. 25	107. 53
0. 001074	4. 41	67. 98	132. 10	0. 33				
mai nstem	59. 0		500yr	565. 00	101. 20	109. 03	105. 66	109. 05
0. 000098	1. 49	656. 24	211. 35	0. 10				

mai nstem 58. 5

Cul vert

mai nstem	58. 1		100yr	360. 00	101. 20	104. 72	104. 72	106. 29
0. 012208	10. 08	35. 73	68. 93	1. 00				
mai nstem	58. 1		100yr (enchr)	360. 00	101. 20	105. 30	104. 99	106. 74
0. 018872	9. 63	37. 39	10. 00	0. 88				
mai nstem	58. 1		10yr	210. 00	101. 20	104. 10	103. 76	104. 93

				GoodwiesDari en. rep				
0.008538	7.30	28.78	26.75	0.81				
mainstem	58.1	50yr		300.00	101.20	104.38	104.35	105.75
0.012324	9.39	31.94	37.32	0.99				
mainstem	58.1	500yr		565.00	101.20	105.82	105.82	107.95
0.011069	11.72	48.22	104.68	1.00				
mainstem	58.0	100yr		360.00	101.20	104.63		105.04
0.004469	5.20	75.60	60.40	0.57				
mainstem	58.0	100yr (encr)		360.00	101.20	105.38		105.74
0.003326	4.85	74.21	20.00	0.44				
mainstem	58.0	10yr		210.00	101.20	104.03		104.27
0.003519	3.98	53.14	26.43	0.48				
mainstem	58.0	50yr		300.00	101.20	104.43		104.78
0.004121	4.74	65.50	41.25	0.54				
mainstem	58.0	500yr		565.00	101.20	105.15	104.73	105.70
0.005072	6.25	115.93	87.12	0.62				
mainstem	56.0	100yr		360.00	99.60	102.11	102.11	102.60
0.020284	6.81	68.17	68.52	0.83				
mainstem	56.0	100yr (encr)		360.00	99.60	102.32	102.32	103.41
0.025912	8.21	43.46	20.00	0.95				
mainstem	56.0	10yr		210.00	99.60	101.70	101.70	102.12
0.021627	6.09	43.21	52.79	0.82				
mainstem	56.0	50yr		300.00	99.60	101.96	101.96	102.43
0.020724	6.56	58.55	62.92	0.83				
mainstem	56.0	500yr		565.00	99.60	102.48	102.48	103.07
0.019987	7.52	95.59	79.17	0.84				
mainstem	55.0	100yr		360.00	96.20	99.69		100.01
0.003879	4.74	85.42	29.89	0.45				
mainstem	55.0	100yr (encr)		360.00	96.20	99.67		100.11
0.006263	5.36	69.18	20.00	0.51				
mainstem	55.0	10yr		210.00	96.20	99.09		99.25
0.002615	3.42	67.79	27.99	0.36				
mainstem	55.0	50yr		300.00	96.20	99.49		99.74
0.003334	4.22	79.45	29.26	0.41				
mainstem	55.0	500yr		565.00	96.20	100.25		100.81
0.005732	6.35	102.73	34.19	0.56				
mainstem	54.4	100yr		360.00	95.60	99.17		99.26
0.000988	2.73	184.89	134.61	0.25				
mainstem	54.4	100yr (encr)		360.00	95.60	99.17		99.26
0.000911	2.62	167.92	65.00	0.24				
mainstem	54.4	10yr		210.00	95.60	98.78		98.82

				GoodwiesDari en. rep				
0.000526	1.84	144.31	73.93	0.18				
mainstem	54.4		50yr	300.00	95.60	99.04		99.12
0.000827	2.43	167.81	131.00	0.23				
mainstem	54.4		500yr	565.00	95.60	99.53		99.67
0.001466	3.54	234.73	143.80	0.31				
mainstem	54.3		100yr	360.00	95.60	99.15	97.25	99.24
0.001022	2.76	181.71	133.95	0.26				
mainstem	54.3		100yr (encr)	360.00	95.60	99.15	97.25	99.24
0.001024	2.76	181.54	133.91	0.26				
mainstem	54.3		10yr	210.00	95.60	98.77	96.79	98.81
0.000532	1.85	143.50	73.08	0.18				
mainstem	54.3		50yr	300.00	95.60	99.02	97.08	99.10
0.000850	2.46	165.30	130.46	0.23				
mainstem	54.3		500yr	565.00	95.60	99.49	97.76	99.64
0.001548	3.61	229.11	142.85	0.32				

				Inl Struct				
mainstem	54.25							
mainstem	54.2		100yr	360.00	92.80	95.41	94.56	95.72
0.004462	4.71	85.60	40.83	0.51				
mainstem	54.2		100yr (encr)	360.00	92.80	95.39		95.71
0.004572	4.74	84.88	40.73	0.52				
mainstem	54.2		10yr	210.00	92.80	94.77		94.97
0.004211	3.79	60.62	36.86	0.48				
mainstem	54.2		50yr	300.00	92.80	95.17		95.44
0.004397	4.38	75.98	39.35	0.50				
mainstem	54.2		500yr	565.00	92.80	96.11	95.13	96.54
0.004596	5.59	115.63	45.15	0.54				
mainstem	54.1		100yr	360.00	92.80	94.56	94.56	95.34
0.018402	7.35	53.11	35.58	0.98				
mainstem	54.1		100yr (encr)	360.00	92.80	94.59	94.59	95.34
0.017413	7.22	54.07	35.60	0.95				
mainstem	54.1		10yr	210.00	92.80	94.05	94.05	94.62
0.020904	6.24	35.76	32.43	0.98				
mainstem	54.1		50yr	300.00	92.80	94.37	94.37	95.07
0.019187	6.95	46.43	34.40	0.98				
mainstem	54.1		500yr	565.00	92.80	95.13	95.13	96.13
0.016558	8.41	74.45	39.11	0.97				
mainstem	53.0		100yr	360.00	85.70	90.75		90.95

Goodwi vesDari en. rep

0.001288	3.76	126.68	49.09	0.30				
mainstem	53.0		100yr (encr)	360.00	85.70	90.93		91.20
0.001882	4.10	87.73	17.50	0.32				
mainstem	53.0		10yr	210.00	85.70	89.22		89.42
0.001912	3.55	64.95	27.96	0.34				
mainstem	53.0		50yr	300.00	85.70	90.18		90.38
0.001486	3.72	100.52	43.05	0.32				
mainstem	53.0		500yr	565.00	85.70	92.64		92.79
0.000762	3.60	238.22	69.28	0.24				

	52.4		100yr	360.00	84.60	89.85	88.54	90.68
0.008035	7.29	49.35	10.94	0.61				
mainstem	52.4		100yr (encr)	360.00	84.60	90.29	88.54	90.97
0.006290	6.66	54.09	10.99	0.53				
mainstem	52.4		10yr	210.00	84.60	88.74	87.53	89.23
0.005884	5.64	37.24	10.75	0.53				
mainstem	52.4		50yr	300.00	84.60	89.47	88.15	90.15
0.007095	6.65	45.14	10.87	0.57				
mainstem	52.4		500yr	565.00	84.60	91.27	89.70	92.44
0.008272	8.67	66.14	13.21	0.63				

mainstem 52.25

Bridge

	52.1		100yr	360.00	84.60	89.66	88.54	90.56
0.009030	7.62	47.25	10.91	0.65				
mainstem	52.1		100yr (encr)	360.00	84.60	90.13	88.54	90.86
0.006866	6.88	52.34	10.97	0.55				
mainstem	52.1		10yr	210.00	84.60	88.62	87.52	89.15
0.006456	5.83	36.01	10.73	0.56				
mainstem	52.1		50yr	300.00	84.60	89.31	88.15	90.05
0.007869	6.90	43.45	10.85	0.61				
mainstem	52.1		500yr	565.00	84.60	90.18	89.70	91.95
0.016435	10.68	52.90	11.00	0.86				

	51.0		100yr	360.00	84.10	88.52	88.52	89.97
0.013071	9.82	41.55	18.12	0.92				
mainstem	51.0		100yr (encr)	360.00	84.10	88.41	88.41	90.13
0.020588	10.51	34.26	10.00	1.00				
mainstem	51.0		10yr	210.00	84.10	87.41	87.41	88.57
0.016861	8.66	24.64	12.16	0.98				
mainstem	51.0		50yr	300.00	84.10	88.12	88.12	89.46
0.014071	9.39	34.65	15.96	0.94				
mainstem	51.0		500yr	565.00	84.10	89.70	89.70	91.37

				Goodwi vesDari en. rep			
				0.88			
0.010916	10.86	66.48	24.38				
mainstem	49.1	100yr		360.00	81.30	85.57	86.03
0.003851	5.62	74.43	33.01	0.50			
mainstem	49.1	100yr (encr)		360.00	81.30	85.47	86.09
0.007709	6.29	57.21	15.10	0.57			
mainstem	49.1	10yr		210.00	81.30	84.58	84.89
0.003725	4.55	49.77	20.85	0.47			
mainstem	49.1	50yr		300.00	81.30	85.19	85.60
0.003922	5.30	63.23	25.64	0.50			
mainstem	49.1	500yr		565.00	81.30	86.82	87.25
0.002820	5.80	130.54	55.69	0.45			
mainstem	49.0	100yr		360.00	81.30	85.14	84.29
0.005889	6.43	61.97	24.70	0.61			
mainstem	49.0	100yr (encr)		360.00	81.30	85.14	84.29
0.005889	6.43	61.97	24.70	0.61			
mainstem	49.0	10yr		210.00	81.30	84.19	83.52
0.006232	5.34	41.77	19.76	0.59			
mainstem	49.0	50yr		300.00	81.30	84.79	84.00
0.005938	6.01	54.18	21.42	0.60			
mainstem	49.0	500yr		565.00	81.30	86.23	85.24
0.005183	7.24	88.19	45.74	0.60			
mainstem	48.15			Bridge			
mainstem	47.1	100yr		360.00	76.80	82.05	80.80
0.005612	5.53	66.84	29.50	0.51			
mainstem	47.1	100yr (encr)		360.00	76.80	82.51	80.80
0.003708	4.86	76.51	32.71	0.42			
mainstem	47.1	10yr		210.00	76.80	81.21	80.10
0.004710	4.28	50.09	24.11	0.44			
mainstem	47.1	50yr		300.00	76.80	81.74	80.53
0.005279	5.07	60.61	27.37	0.48			
mainstem	47.1	500yr		565.00	76.80	82.87	81.61
0.006848	6.98	84.09	35.16	0.58			
mainstem	47.0	100yr		360.00	76.80	80.84	80.84
0.022337	8.50	44.92	22.37	0.94			
mainstem	47.0	100yr (encr)		360.00	76.80	80.92	80.92
0.030229	9.17	39.28	15.10	1.00			
mainstem	47.0	10yr		210.00	76.80	80.10	80.10

				GoodwiesDari en. rep				
0.025561	7.36	29.66	18.95	0.96				
mainstem	47.0	50yr		300.00	76.80	80.57	80.57	81.53
0.023187	8.04	39.22	21.14	0.94				
mainstem	47.0	500yr		565.00	76.80	81.62	81.62	82.94
0.020150	9.66	63.91	26.52	0.94				
mainstem	45.0	100yr		360.00	65.80	68.77	68.77	69.44
0.009000	8.31	77.02	54.84	0.85				
mainstem	45.0	100yr (encr)		360.00	65.80	68.75	68.75	69.42
0.009001	8.28	74.75	49.04	0.85				
mainstem	45.0	10yr		210.00	65.80	68.20	67.69	68.82
0.009628	7.46	48.37	46.14	0.85				
mainstem	45.0	50yr		300.00	65.80	68.60	68.60	69.21
0.008485	7.77	68.21	52.32	0.82				
mainstem	45.0	500yr		565.00	65.80	69.29	69.29	70.08
0.009420	9.47	107.47	62.40	0.89				
mainstem	44.1	100yr		360.00	64.40	67.21	67.21	67.73
0.017021	7.19	71.43	71.60	0.77				
mainstem	44.1	100yr (encr)		360.00	64.40	67.23	67.23	67.72
0.015983	7.00	72.93	70.07	0.75				
mainstem	44.1	10yr		210.00	64.40	66.67	66.67	67.18
0.020570	6.82	40.56	43.00	0.82				
mainstem	44.1	50yr		300.00	64.40	67.03	67.03	67.54
0.017589	6.99	59.75	65.43	0.78				
mainstem	44.1	500yr		565.00	64.40	67.90	67.90	68.28
0.010073	6.45	128.05	88.42	0.62				
mainstem	43.0	100yr		360.00	58.40	63.96	62.63	64.77
0.007466	7.20	49.99	36.83	0.60				
mainstem	43.0	100yr (encr)		360.00	58.40	64.29	62.63	64.99
0.005925	6.72	53.58	40.29	0.54				
mainstem	43.0	10yr		210.00	58.40	62.62	61.56	63.17
0.008139	5.96	35.25	17.26	0.59				
mainstem	43.0	50yr		300.00	58.40	63.41	62.23	64.14
0.007954	6.82	43.97	28.83	0.60				
mainstem	43.0	500yr		565.00	58.40	65.67	63.76	66.72
0.006344	8.21	68.80	66.74	0.58				
mainstem	42.0	100yr		360.00	58.40	63.69	62.44	64.43
0.007628	6.94	52.43	32.89	0.59				
mainstem	42.0	100yr (encr)		360.00	58.40	63.25	62.58	64.43
0.021728	8.74	41.19	10.18	0.77				
mainstem	42.0	10yr		210.00	58.40	62.09	61.42	62.75

				Goodwies Dari en. rep				
0.011823	6.52	32.22	14.55	0.69				
mainstem	42.0	50yr		300.00	58.40	63.08	62.06	63.79
0.008987	6.80	44.48	23.96	0.63				
mainstem	42.0	500yr		565.00	58.40	65.53	63.57	66.39
0.005486	7.47	76.36	63.69	0.53				
mainstem	41.5							
				Culvert				
mainstem	41.1	100yr		360.00	57.00	61.45	61.23	62.72
0.017005	9.34	41.62	32.90	0.85				
mainstem	41.1	100yr (encl)		360.00	57.00	61.62	61.39	63.10
0.026452	10.02	38.77	11.00	0.89				
mainstem	41.1	10yr		210.00	57.00	61.01	60.30	61.59
0.009211	6.31	35.82	28.72	0.62				
mainstem	41.1	50yr		300.00	57.00	61.25	60.89	62.26
0.014479	8.30	38.99	31.00	0.78				
mainstem	41.1	500yr		565.00	57.00	62.27	62.27	64.24
0.020340	11.68	52.31	40.60	0.97				
mainstem	41.0	100yr		360.00	57.00	61.20	61.20	62.15
0.016364	8.55	54.14	30.51	0.82				
mainstem	41.0	100yr (encl)		360.00	57.00	61.33	61.12	62.37
0.016283	8.74	48.78	18.94	0.82				
mainstem	41.0	10yr		210.00	57.00	60.38	60.38	61.21
0.018419	7.55	32.40	22.88	0.83				
mainstem	41.0	50yr		300.00	57.00	60.92	60.92	61.81
0.016577	8.14	46.13	27.94	0.81				
mainstem	41.0	500yr		565.00	57.00	61.95	61.95	63.06
0.015957	9.65	79.70	37.55	0.84				
mainstem	40.1	100yr		495.00	49.40	54.33		54.53
0.003095	4.51	189.33	76.96	0.38				
mainstem	40.1	100yr (encl)		495.00	49.40	54.13		55.09
0.015147	7.88	62.79	15.00	0.68				
mainstem	40.1	10yr		290.00	49.40	52.62		53.06
0.009968	5.83	72.61	52.68	0.63				
mainstem	40.1	50yr		410.00	49.40	53.70		53.96
0.004357	4.83	142.87	72.00	0.44				
mainstem	40.1	500yr		780.00	49.40	56.07		56.22
0.001599	4.06	341.62	108.18	0.29				
mainstem	40.0	100yr		495.00	48.20	53.25	52.02	54.10

				Goodwies Dari en. rep				
0.003671	7.38	67.03	15.00	0.62				
mainstem	40.0	100yr	(encl)	495.00	48.20	53.94	52.02	54.58
0.002461	6.40	77.37	15.00	0.50				
mainstem	40.0	10yr		290.00	48.20	52.20	51.05	52.70
0.002710	5.66	51.25	15.00	0.54				
mainstem	40.0	50yr		410.00	48.20	52.85	51.64	53.55
0.003288	6.72	60.99	15.00	0.59				
mainstem	40.0	500yr		780.00	48.20	54.22	53.17	55.64
0.005278	9.56	81.59	15.00	0.72				

mainstem 39.15

Bridge

mainstem	38.1	100yr		495.00	47.80	53.07	51.54	53.59
0.005013	5.94	85.78	60.83	0.50				
mainstem	38.1	100yr	(encl)	495.00	47.80	53.78	51.84	54.41
0.007577	6.37	77.65	15.00	0.49				
mainstem	38.1	10yr		290.00	47.80	52.10	50.72	52.40
0.004103	4.56	65.47	44.37	0.43				
mainstem	38.1	50yr		410.00	47.80	52.71	51.22	53.14
0.004623	5.39	78.20	53.39	0.47				
mainstem	38.1	500yr		780.00	47.80	53.64	52.48	54.65
0.008106	8.19	98.17	72.79	0.64				

mainstem	38.0	100yr		495.00	47.80	51.73	51.73	52.93
0.019940	9.34	76.27	40.12	0.93				
mainstem	38.0	100yr	(encl)	495.00	47.80	51.83	51.83	53.45
0.028608	10.21	48.49	15.00	1.00				
mainstem	38.0	10yr		290.00	47.80	50.83	50.83	51.80
0.022141	8.12	44.95	29.69	0.94				
mainstem	38.0	50yr		410.00	47.80	51.39	51.39	52.50
0.020837	8.86	63.53	36.26	0.93				
mainstem	38.0	500yr		780.00	47.80	52.95	52.95	54.08
0.013246	9.49	135.06	58.48	0.80				

mainstem	37.0	100yr		495.00	41.10	46.01		46.19
0.002403	4.03	253.41	153.17	0.36				
mainstem	37.0	100yr	(encl)	495.00	41.10	46.19		46.53
0.003613	4.91	120.70	31.00	0.43				
mainstem	37.0	10yr		290.00	41.10	44.60		44.91
0.005838	4.73	85.62	74.87	0.53				
mainstem	37.0	50yr		410.00	41.10	45.41		45.65
0.003621	4.42	169.87	124.84	0.43				
mainstem	37.0	500yr		780.00	41.10	47.82		47.92

				Goodwi vesDari en. rep				
0.001020	3.40	710.76	471.83	0.25				
mai nstem	36.4	100yr		495.00	40.60	45.81	43.40	46.08
0.001282	4.15	119.32	27.45	0.35				
mai nstem	36.4	100yr (encl)		495.00	40.60	46.09	43.47	46.41
0.001575	4.50	110.06	21.20	0.35				
mai nstem	36.4	10yr		290.00	40.60	44.56	42.67	44.73
0.001158	3.38	85.89	25.82	0.33				
mai nstem	36.4	50yr		410.00	40.60	45.31	43.12	45.55
0.001251	3.88	105.78	26.80	0.34				
mai nstem	36.4	500yr		780.00	40.60	47.74	44.26	47.87
0.000543	3.33	317.56	285.31	0.24				

mai nstem 36.25 Bridge

mai nstem	36.1	100yr		495.00	40.60	45.62	43.40	45.91
0.001463	4.34	114.08	27.20	0.37				
mai nstem	36.1	100yr (encl)		495.00	40.60	45.91	43.47	46.25
0.001747	4.66	106.19	21.20	0.37				
mai nstem	36.1	10yr		290.00	40.60	44.44	42.67	44.63
0.001289	3.50	82.84	25.67	0.34				
mai nstem	36.1	50yr		410.00	40.60	45.15	43.11	45.40
0.001414	4.04	101.48	26.59	0.36				
mai nstem	36.1	500yr		780.00	40.60	46.67	44.26	47.13
0.001867	5.44	143.58	33.67	0.43				

mai nstem	35.0	100yr		495.00	40.30	45.27		45.77
0.003270	5.67	88.29	39.19	0.58				
mai nstem	35.0	100yr (encl)		495.00	40.30	45.86		46.16
0.001595	4.47	116.70	50.47	0.42				
mai nstem	35.0	10yr		290.00	40.30	43.96		44.45
0.004877	5.61	51.72	23.80	0.67				
mai nstem	35.0	50yr		410.00	40.30	44.72		45.24
0.004082	5.75	71.36	27.62	0.63				
mai nstem	35.0	500yr		780.00	40.30	46.77		46.93
0.000883	3.86	279.97	314.25	0.32				

mai nstem	34.0	100yr		495.00	38.80	45.19		45.26
0.000336	2.37	246.30	136.92	0.20				
mai nstem	34.0	100yr (encl)		495.00	38.80	45.68		45.80
0.000418	2.83	177.41	40.00	0.22				
mai nstem	34.0	10yr		290.00	38.80	43.30		43.47

				Goodwies Dari en. rep				
0.001229	3.33	87.07	30.80	0.35				
mainstem	34.0		50yr	410.00	38.80	44.32		44.47
0.000815	3.20	142.29	97.69	0.30				
mainstem	34.0		500yr	780.00	38.80	46.72		46.76
0.000140	1.86	568.48	388.97	0.13				
mainstem	33.4		100yr	495.00	38.70	45.04	41.67	45.20
0.000803	3.57	188.07	156.29	0.25				
mainstem	33.4		100yr (encl)	495.00	38.70	45.69	41.67	45.74
0.000285	2.27	305.79	187.29	0.15				
mainstem	33.4		10yr	290.00	38.70	43.18	40.82	43.38
0.001299	3.65	79.45	18.38	0.31				
mainstem	33.4		50yr	410.00	38.70	44.08	41.34	44.37
0.001425	4.25	98.05	38.01	0.33				
mainstem	33.4		500yr	780.00	38.70	46.72	42.67	46.75
0.000162	1.88	640.40	472.87	0.12				
mainstem	33.25							
				Bridge				
mainstem	33.1		100yr	495.00	38.70	44.75	41.67	44.99
0.001159	4.15	148.20	122.37	0.30				
mainstem	33.1		100yr (encl)	495.00	38.70	45.59	41.67	45.66
0.000341	2.46	280.48	179.91	0.17				
mainstem	33.1		10yr	290.00	38.70	43.07	40.82	43.29
0.001395	3.74	77.53	18.38	0.32				
mainstem	33.1		50yr	410.00	38.70	43.82	41.34	44.13
0.001700	4.49	91.35	18.59	0.36				
mainstem	33.1		500yr	780.00	38.70	46.71	42.67	46.74
0.000165	1.90	635.21	470.84	0.12				
mainstem	32.0		100yr	495.00	38.30	44.80		44.88
0.000391	2.90	270.60	184.58	0.21				
mainstem	32.0		100yr (encl)	495.00	38.30	45.19		45.55
0.000981	4.80	104.85	20.00	0.34				
mainstem	32.0		10yr	290.00	38.30	43.04		43.21
0.001071	3.74	95.03	53.69	0.33				
mainstem	32.0		50yr	410.00	38.30	43.85		44.00
0.000746	3.55	145.44	69.63	0.29				
mainstem	32.0		500yr	780.00	38.30	46.71		46.73
0.000069	1.48	749.14	285.00	0.09				
mainstem	31.0		100yr	495.00	37.60	44.66		44.77

				Goodwies Dari en. rep			
0.000841	3.25	294.89	206.22	0.23			
mainstem	31.0		100yr (encr)	495.00	37.60	44.95	45.30
0.001746	4.83	113.85	19.94	0.34			
mainstem	31.0		10yr	290.00	37.60	42.74	42.94
0.001977	3.84	96.83	42.45	0.34			
mainstem	31.0		50yr	410.00	37.60	43.58	43.78
0.001696	4.04	147.45	70.98	0.32			
mainstem	31.0		500yr	780.00	37.60	46.68	46.70
0.000213	1.99	860.69	347.51	0.12			
mainstem	30.0		100yr	495.00	38.50	43.93	44.58
0.002615	6.45	76.71	14.80	0.50			
mainstem	30.0		100yr (encr)	495.00	38.50	44.59	45.10
0.001882	5.73	86.44	14.80	0.42			
mainstem	30.0		10yr	290.00	38.50	42.15	42.66
0.002968	5.76	50.36	14.80	0.55			
mainstem	30.0		50yr	410.00	38.50	42.73	43.48
0.003763	6.95	58.98	14.80	0.61			
mainstem	30.0		500yr	780.00	38.50	45.66	46.56
0.002962	7.63	102.27	14.80	0.51			
mainstem	29.0		100yr	495.00	37.80	44.01	44.29
0.001688	4.84	189.66	86.53	0.37			
mainstem	29.0		100yr (encr)	495.00	37.80	44.49	44.97
0.002762	5.72	96.10	18.00	0.41			
mainstem	29.0		10yr	290.00	37.80	41.98	40.98
0.004469	5.71	61.92	39.79	0.56			
mainstem	29.0		50yr	410.00	37.80	42.61	41.73
0.004435	6.40	91.53	54.33	0.57			
mainstem	29.0		500yr	780.00	37.80	45.93	46.13
0.000973	4.52	406.80	150.97	0.30			
mainstem	28.0		100yr	495.00	37.80	43.52	41.99
0.002488	5.56	82.48	75.40	0.44			
mainstem	28.0		100yr (encr)	495.00	37.80	44.30	42.00
0.003362	6.18	80.97	14.40	0.45			
mainstem	28.0		10yr	290.00	37.80	40.97	40.97
0.016125	8.60	33.71	14.94	1.00			
mainstem	28.0		50yr	410.00	37.80	41.72	41.72
0.011448	8.73	47.39	33.59	0.88			
mainstem	28.0		500yr	780.00	37.80	46.00	42.81
0.000131	1.67	417.32	154.23	0.11			
mainstem	27.5						

Culvert

Goodwi vesDari en. rep

mai nstem	27. 1	100yr		495. 00	34. 70	41. 26	38. 64	41. 65
0. 001526	4. 99	101. 50	32. 93	0. 37				
mai nstem	27. 1	100yr (enchr)		495. 00	34. 70	42. 00	38. 62	42. 31
0. 001792	4. 52	109. 63	17. 40	0. 32				
mai nstem	27. 1	10yr		290. 00	34. 70	39. 86	37. 75	40. 10
0. 001394	3. 94	75. 28	22. 70	0. 34				
mai nstem	27. 1	50yr		410. 00	34. 70	40. 75	38. 30	41. 07
0. 001454	4. 57	91. 83	28. 87	0. 36				
mai nstem	27. 1	500yr		780. 00	34. 70	42. 65	39. 65	43. 11
0. 001476	5. 70	170. 59	43. 83	0. 38				
mai nstem	27. 0	100yr		495. 00	34. 70	41. 21		41. 56
0. 001471	4. 87	115. 55	32. 52	0. 37				
mai nstem	27. 0	100yr (enchr)		495. 00	34. 70	41. 90		42. 23
0. 001868	4. 58	107. 97	17. 40	0. 32				
mai nstem	27. 0	10yr		290. 00	34. 70	39. 80		40. 04
0. 001446	3. 97	77. 33	22. 55	0. 35				
mai nstem	27. 0	50yr		410. 00	34. 70	40. 69		41. 00
0. 001456	4. 54	99. 59	28. 40	0. 36				
mai nstem	27. 0	500yr		780. 00	34. 70	42. 56		43. 03
0. 001559	5. 80	166. 56	43. 11	0. 39				
mai nstem	26. 0	100yr		495. 00	32. 30	40. 73	37. 77	40. 94
0. 000729	4. 39	198. 78	52. 15	0. 30				
mai nstem	26. 0	100yr (enchr)		495. 00	32. 30	41. 08		41. 47
0. 001017	5. 36	126. 53	20. 00	0. 35				
mai nstem	26. 0	10yr		290. 00	32. 30	39. 31		39. 47
0. 000678	3. 63	131. 70	44. 16	0. 27				
mai nstem	26. 0	50yr		410. 00	32. 30	40. 20		40. 39
0. 000710	4. 10	172. 73	48. 03	0. 29				
mai nstem	26. 0	500yr		780. 00	32. 30	42. 09		42. 34
0. 000748	5. 02	290. 02	103. 56	0. 31				
mai nstem	24. 0	100yr		495. 00	33. 50	37. 75	37. 75	39. 19
0. 022410	10. 02	65. 70	32. 12	0. 91				
mai nstem	24. 0	100yr (enchr)		495. 00	33. 50	38. 39		39. 45
0. 013364	8. 59	72. 18	20. 00	0. 72				
mai nstem	24. 0	10yr		290. 00	33. 50	36. 64	36. 64	37. 80
0. 027013	8. 75	37. 24	20. 88	0. 94				
mai nstem	24. 0	50yr		410. 00	33. 50	37. 30	37. 30	38. 67
0. 024520	9. 64	52. 56	26. 49	0. 93				
mai nstem	24. 0	500yr		780. 00	33. 50	38. 95	38. 95	40. 60

				Goodwies Dari en. rep				
0.019003	11.09	114.91	51.89	0.87				
mainstem	23.1	100yr		495.00	32.70	38.21	36.10	38.26
0.000152	2.04	281.82	95.67	0.16				
mainstem	23.1	100yr (encr)		495.00	32.70	38.42	36.10	38.64
0.000705	4.06	145.54	35.17	0.31				
mainstem	23.1	10yr		290.00	32.70	36.99	35.23	37.06
0.000315	2.44	140.80	89.70	0.22				
mainstem	23.1	50yr		410.00	32.70	37.63	35.75	37.71
0.000250	2.42	188.19	92.84	0.20				
mainstem	23.1	500yr		780.00	32.70	38.61	36.80	38.71
0.000252	2.77	320.32	97.62	0.21				
mainstem	23.0	100yr		495.00	32.70	38.21	36.08	38.26
0.000153	2.05	281.35	95.65	0.16				
mainstem	23.0	100yr (encr)		495.00	32.70	38.49	36.11	38.55
0.000151	1.89	252.73	75.37	0.15				
mainstem	23.0	10yr		290.00	32.70	36.98	35.42	37.04
0.000270	2.26	160.49	89.69	0.21				
mainstem	23.0	50yr		410.00	32.70	37.63	35.83	37.69
0.000214	2.23	214.50	92.84	0.19				
mainstem	23.0	500yr		780.00	32.70	38.60	36.80	38.71
0.000254	2.78	319.52	97.58	0.21				
mainstem	22.15							
				Bridge				
mainstem	21.1	100yr		495.00	31.30	37.90	35.08	37.94
0.000222	1.36	362.93	135.61	0.10				
mainstem	21.1	100yr (encr)		495.00	31.30	37.94	35.08	37.97
0.000207	1.32	367.20	131.89	0.10				
mainstem	21.1	10yr		290.00	31.30	36.64	34.12	36.68
0.000567	1.85	192.34	115.21	0.15				
mainstem	21.1	50yr		410.00	31.30	37.13	34.75	37.17
0.000480	1.82	245.83	123.09	0.14				
mainstem	21.1	500yr		780.00	31.30	38.03	35.93	38.11
0.000471	2.02	380.05	137.63	0.15				
mainstem	21.0	100yr		495.00	31.30	37.90		37.93
0.000224	1.37	362.00	135.50	0.10				
mainstem	21.0	100yr (encr)		495.00	31.30	37.43		37.84
0.005338	5.16	95.87	18.00	0.39				
mainstem	21.0	10yr		290.00	31.30	36.62		36.66

				Goodwies Dari en. rep			
0.000567	1.85	202.01	114.91	0.15			
mainstem	21.0	50yr		410.00	31.30	37.11	37.16
0.000473	1.81	260.71	122.87	0.14			
mainstem	21.0	500yr		780.00	31.30	38.01	38.09
0.000480	2.03	378.01	137.39	0.15			
mainstem	20.0	100yr		495.00	30.70	37.60	37.80
0.001400	3.71	198.41	98.96	0.30			
mainstem	20.0	100yr (encr)		495.00	30.70	36.72	37.08
0.003202	4.88	109.76	38.25	0.44			
mainstem	20.0	10yr		290.00	30.70	36.30	36.46
0.001609	3.21	101.53	58.49	0.31			
mainstem	20.0	50yr		410.00	30.70	36.70	36.94
0.002145	3.99	126.62	67.59	0.36			
mainstem	20.0	500yr		780.00	30.70	36.97	35.97
0.006022	6.98	145.38	73.67	0.61			
mainstem	19.4	100yr		495.00	29.40	37.63	36.22
0.000956	2.63	316.95	155.38	0.17			
mainstem	19.4	100yr (encr)		495.00	29.40	36.66	36.21
0.003923	4.85	180.16	126.84	0.34			
mainstem	19.4	10yr		290.00	29.40	36.21	33.79
0.002976	4.02	125.55	112.62	0.29			
mainstem	19.4	50yr		410.00	29.40	36.66	36.05
0.002706	4.03	179.75	126.75	0.28			
mainstem	19.4	500yr		780.00	29.40	36.94	36.61
0.006317	6.33	215.65	134.83	0.43			
mainstem	19.25						
				Bridge			
mainstem	18.1	100yr		495.00	29.30	37.63	35.28
0.000484	1.94	390.49	155.29	0.12			
mainstem	18.1	100yr (encr)		495.00	29.30	36.63	35.28
0.001480	3.09	249.82	123.32	0.21			
mainstem	18.1	10yr		290.00	29.30	35.18	32.86
0.004183	4.42	97.95	84.03	0.34			
mainstem	18.1	50yr		410.00	29.30	36.64	35.06
0.001013	2.56	251.48	126.20	0.17			
mainstem	18.1	500yr		780.00	29.30	36.37	35.77
0.005175	5.63	218.66	118.38	0.39			
mainstem	18.0	100yr		495.00	29.30	34.21	33.97

Goodwies Dari en. rep

0.035856	13.18	44.28	39.63	1.06				
mainstem	18.0		100yr (encl)	495.00	29.30	36.55	33.98	36.64
0.001390	3.39	252.91	121.14	0.22				
mainstem	18.0		10yr	290.00	29.30	33.66		34.78
0.017569	8.66	35.80	9.33	0.74				
mainstem	18.0		50yr	410.00	29.30	34.08	33.82	36.00
0.027335	11.29	40.23	20.84	0.92				
mainstem	18.0		500yr	780.00	29.30	36.25	35.60	36.41
0.002943	4.78	307.85	180.19	0.32				
mainstem	17.0		100yr	495.00	29.20	34.02	34.02	34.96
0.022967	8.73	69.60	33.87	0.73				
mainstem	17.0		100yr (encl)	495.00	29.20	34.10	34.10	35.96
0.038090	11.31	47.53	13.78	0.94				
mainstem	17.0		10yr	290.00	29.20	33.03	33.03	33.96
0.023945	8.19	41.32	23.49	0.77				
mainstem	17.0		50yr	410.00	29.20	33.67	33.67	34.60
0.023208	8.54	58.36	30.18	0.74				
mainstem	17.0		500yr	780.00	29.20	34.94	34.94	35.92
0.023857	9.44	110.26	58.98	0.73				
mainstem	16.0		100yr	495.00	29.20	33.83		33.91
0.001497	3.03	257.90	133.80	0.26				
mainstem	16.0		100yr (encl)	495.00	29.20	34.03		34.30
0.003814	4.98	127.34	40.00	0.42				
mainstem	16.0		10yr	290.00	29.20	32.86		32.95
0.002341	3.19	143.37	102.37	0.31				
mainstem	16.0		50yr	410.00	29.20	33.43		33.51
0.001834	3.14	206.29	120.65	0.28				
mainstem	16.0		500yr	780.00	29.20	34.99		35.05
0.000944	2.82	433.09	168.48	0.21				
mainstem	15.0		100yr	495.00	29.10	33.38		33.56
0.002224	3.71	191.48	106.22	0.37				
mainstem	15.0		100yr (encl)	495.00	29.10	33.30		33.62
0.003419	4.53	113.94	40.00	0.45				
mainstem	15.0		10yr	290.00	29.10	32.02		32.29
0.005781	4.27	81.73	61.43	0.55				
mainstem	15.0		50yr	410.00	29.10	32.87		33.07
0.003025	3.85	140.30	88.71	0.42				
mainstem	15.0		500yr	780.00	29.10	34.66		34.83
0.001432	3.74	338.07	118.36	0.31				
mainstem	14.4		100yr	495.00	26.70	32.82	31.32	33.27

				Goodwi vesDari en. rep				
0.004649	5.51	103.40	61.27	0.49				
mainstem	14.4		100yr (encl)	495.00	26.70	32.77	31.32	33.28
0.005375	5.76	86.74	23.47	0.52				
mainstem	14.4		10yr	290.00	26.70	31.40	30.34	31.82
0.007109	5.22	55.56	21.10	0.57				
mainstem	14.4		50yr	410.00	26.70	32.25	30.91	32.72
0.005714	5.50	76.21	34.67	0.53				
mainstem	14.4		500yr	780.00	26.70	34.42	32.54	34.68
0.002164	4.72	269.36	146.58	0.35				

				Bri dge				
mainstem	14.25							
mainstem	14.1		100yr	495.00	26.70	31.32	31.32	32.63
0.022439	9.19	53.86	20.61	1.00				
mainstem	14.1		100yr (encl)	495.00	26.70	31.85	31.32	32.74
0.013145	7.57	65.37	22.10	0.78				
mainstem	14.1		10yr	290.00	26.70	30.57	30.34	31.39
0.016816	7.29	39.80	17.76	0.86				
mainstem	14.1		50yr	410.00	26.70	30.91	30.91	32.15
0.022923	8.95	45.81	18.48	1.00				
mainstem	14.1		500yr	780.00	26.70	32.28	32.28	33.96
0.020161	10.40	75.44	36.05	0.99				

mainstem	13.0		100yr	495.00	27.50	30.86		31.19
0.003488	5.17	146.06	94.49	0.53				
mainstem	13.0		100yr (encl)	495.00	27.50	31.34		31.84
0.004341	5.69	87.05	25.00	0.54				
mainstem	13.0		10yr	290.00	27.50	30.20		30.46
0.003468	4.37	90.10	75.16	0.50				
mainstem	13.0		50yr	410.00	27.50	30.61		30.92
0.003473	4.87	123.60	87.25	0.52				
mainstem	13.0		500yr	780.00	27.50	31.57		31.96
0.003372	5.86	221.03	115.42	0.54				

mainstem	12.0		100yr	495.00	22.20	25.54	25.54	26.48
0.015654	7.79	65.47	38.01	0.98				
mainstem	12.0		100yr (encl)	495.00	22.20	25.55	25.55	26.48
0.015504	7.77	65.68	37.92	0.98				
mainstem	12.0		10yr	290.00	22.20	24.94	24.94	25.62
0.017977	6.63	43.90	33.56	1.00				
mainstem	12.0		50yr	410.00	22.20	25.30	25.30	26.15
0.016707	7.41	56.38	36.20	1.00				
mainstem	12.0		500yr	780.00	22.20	26.26	26.26	27.45

				Goodwi vesDari en. rep				
0.013976	8.82	94.81	43.98	0.97				
mainstem	11.9	100yr		495.00	16.30	21.79		22.05
0.001706	4.12	120.28	30.03	0.36				
mainstem	11.9	100yr (encl)		495.00	16.30	21.78		22.04
0.001708	4.12	120.01	29.76	0.36				
mainstem	11.9	10yr		290.00	16.30	20.97		21.11
0.001068	3.00	96.80	27.59	0.28				
mainstem	11.9	50yr		410.00	16.30	21.48		21.69
0.001449	3.68	111.32	29.11	0.33				
mainstem	11.9	500yr		780.00	16.30	22.55		23.01
0.002575	5.41	144.18	32.33	0.45				
mainstem	11.0	100yr		495.00	17.50	21.04	20.24	21.35
0.004771	5.06	155.92	114.01	0.52				
mainstem	11.0	100yr (encl)		495.00	17.50	21.03	20.24	21.34
0.004809	5.06	154.34	103.20	0.52				
mainstem	11.0	10yr		290.00	17.50	20.39	19.71	20.61
0.004327	4.08	101.34	69.56	0.47				
mainstem	11.0	50yr		410.00	17.50	20.80	20.05	21.07
0.004615	4.69	131.39	86.60	0.50				
mainstem	11.0	500yr		780.00	17.50	21.72	20.77	22.09
0.004763	5.81	251.70	151.25	0.54				
mainstem	10.0	100yr		495.00	16.10	18.39	18.39	19.16
0.020702	7.09	72.03	50.17	1.00				
mainstem	10.0	100yr (encl)		495.00	16.10	18.40	18.40	19.16
0.020126	7.03	72.69	50.11	0.98				
mainstem	10.0	10yr		290.00	16.10	17.91	17.91	18.46
0.024128	6.00	48.78	46.67	1.01				
mainstem	10.0	50yr		410.00	16.10	18.19	18.19	18.89
0.022048	6.70	62.50	48.77	1.01				
mainstem	10.0	500yr		780.00	16.10	18.95	18.95	19.97
0.018185	8.15	102.14	57.01	0.98				
mainstem	9.9	100yr		495.00	9.00	14.12		14.38
0.002482	4.06	121.84	35.27	0.39				
mainstem	9.9	100yr (encl)		495.00	9.00	14.12		14.39
0.002560	4.17	118.67	32.27	0.38				
mainstem	9.9	10yr		290.00	9.00	13.29		13.44
0.001870	3.11	93.21	32.94	0.33				
mainstem	9.9	50yr		410.00	9.00	13.79		14.00
0.002292	3.73	110.06	34.33	0.37				
mainstem	9.9	500yr		780.00	9.00	15.24		15.60

				GoodwiesDari en. rep			
0.002663	4.79	162.94	38.38	0.41			
mainstem	9.0	100yr		495.00	7.30	13.04	13.58
0.005934	5.93	83.41	20.77	0.52			
mainstem	9.0	100yr (encl)		495.00	7.30	13.04	13.58
0.005925	5.93	83.42	20.64	0.52			
mainstem	9.0	10yr		290.00	7.30	12.76	12.98
0.002507	3.73	77.72	20.63	0.34			
mainstem	9.0	50yr		410.00	7.30	12.94	13.34
0.004360	5.03	81.49	20.72	0.45			
mainstem	9.0	500yr		780.00	7.30	13.09	14.41
0.014211	9.24	84.45	20.79	0.81			
mainstem	8.1	100yr		495.00	2.60	13.39	4.62
0.000011	0.67	865.10	123.82	0.04			13.40
mainstem	8.1	100yr (encl)		495.00	2.60	13.39	4.62
0.000011	0.67	865.25	123.84	0.04			13.40
mainstem	8.1	10yr		290.00	2.60	12.90	4.14
0.000005	0.42	806.22	117.17	0.02			12.90
mainstem	8.1	50yr		410.00	2.60	13.20	4.44
0.000008	0.57	841.47	120.73	0.03			13.20
mainstem	8.1	500yr		780.00	2.60	13.96	5.11
0.000023	0.98	939.65	156.39	0.05			13.97
mainstem	8.0	100yr		495.00	2.60	13.39	4.62
0.000011	0.67	865.04	123.81	0.04			13.40
mainstem	8.0	100yr (encl)		495.00	2.60	13.39	4.62
0.000011	0.67	865.19	123.83	0.04			13.40
mainstem	8.0	10yr		290.00	2.60	12.90	4.14
0.000005	0.42	806.19	117.17	0.02			12.90
mainstem	8.0	50yr		410.00	2.60	13.20	4.44
0.000008	0.57	841.43	120.73	0.03			13.20
mainstem	8.0	500yr		780.00	2.60	13.96	5.11
0.000023	0.98	939.51	156.24	0.05			13.97
mainstem	7.5						
				Inl Struct			
mainstem	7.1	100yr		495.00	2.60	7.84	7.89
0.000243	1.82	288.56	72.73	0.15			
mainstem	7.1	100yr (encl)		495.00	2.60	7.86	7.92
0.000291	1.93	262.57	59.00	0.16			
mainstem	7.1	10yr		290.00	2.60	6.56	6.60

				GoodwiesDari en. rep				
0.000263	1.53	198.96	68.40	0.15				
mainstem	7.1	50yr		410.00	2.60	7.31	7.36	
0.000256	1.73	250.98	70.67	0.15				
mainstem	7.1	500yr		780.00	2.60	9.71	9.77	
0.000177	1.96	453.28	104.19	0.14				
mainstem	7.0	100yr		495.00	2.60	7.82	7.87	
0.000246	1.83	287.36	72.47	0.15				
mainstem	7.0	100yr (encr)		495.00	2.60	7.85	7.90	
0.000240	1.82	289.14	71.43	0.15				
mainstem	7.0	10yr		290.00	2.60	6.55	6.58	
0.000268	1.54	197.74	68.34	0.15				
mainstem	7.0	50yr		410.00	2.60	7.29	7.34	
0.000260	1.73	249.75	70.62	0.15				
mainstem	7.0	500yr		780.00	2.60	9.70	9.75	
0.000179	1.96	452.02	104.13	0.14				
mainstem	6.0	100yr		495.00	1.60	7.27	5.11	7.71
0.001913	5.33	92.85	86.83	0.42				
mainstem	6.0	100yr (encr)		495.00	1.60	7.12	5.24	7.69
0.004269	6.05	81.88	16.80	0.48				
mainstem	6.0	10yr		290.00	1.60	6.23	4.29	6.47
0.001439	3.95	73.37	79.16	0.35				
mainstem	6.0	50yr		410.00	1.60	6.83	4.79	7.20
0.001783	4.84	84.69	83.62	0.40				
mainstem	6.0	500yr		780.00	1.60	8.94	6.10	9.55
0.001790	6.27	124.43	113.87	0.43				
mainstem	5.5							
				Bri dge				
mainstem	5.1	100yr		495.00	1.60	6.45	5.11	7.08
0.003504	6.39	77.43	80.76	0.56				
mainstem	5.1	100yr (encr)		495.00	1.60	6.42	5.24	7.19
0.006630	7.06	70.14	16.80	0.61				
mainstem	5.1	10yr		290.00	1.60	5.92	4.29	6.21
0.001902	4.30	67.48	76.84	0.40				
mainstem	5.1	50yr		410.00	1.60	6.26	4.79	6.74
0.002810	5.55	73.89	79.36	0.49				
mainstem	5.1	500yr		780.00	1.60	6.92	6.10	8.19
0.006057	9.04	86.32	84.25	0.74				
mainstem	5.0	100yr		495.00	1.60	6.55		6.65

				GoodwiesDari en. rep				
0.000908	2.65	200.96	81.54	0.27				
mainstem	5.0		100yr (encr)	495.00	1.60	6.55	6.66	
0.000937	2.75	194.17	74.15	0.27				
mainstem	5.0		10yr	290.00	1.60	5.92	5.98	
0.000743	2.05	150.70	76.83	0.23				
mainstem	5.0		50yr	410.00	1.60	6.31	6.40	
0.000844	2.42	181.69	79.77	0.26				
mainstem	5.0		500yr	780.00	1.60	7.27	7.42	
0.001031	3.26	261.10	86.83	0.30				
mainstem	4.0		100yr	495.00	1.40	6.38	6.41	
0.000129	1.39	355.64	91.00	0.12				
mainstem	4.0		100yr (encr)	495.00	1.40	6.38	6.41	
0.000131	1.39	355.46	90.00	0.12				
mainstem	4.0		10yr	290.00	1.40	5.81	5.82	
0.000073	0.95	304.64	88.91	0.09				
mainstem	4.0		50yr	410.00	1.40	6.16	6.19	
0.000107	1.22	336.39	90.43	0.11				
mainstem	4.0		500yr	780.00	1.40	7.02	7.07	
0.000194	1.89	414.82	92.72	0.16				
mainstem	3.0		100yr	495.00	0.90	6.36	1.98	6.36
0.000013	0.49	1010.58	221.24	0.04				
mainstem	3.0		100yr (encr)	495.00	0.90	6.36	1.98	6.36
0.000013	0.49	1010.58	221.24	0.04				
mainstem	3.0		10yr	290.00	0.90	5.80	1.77	5.80
0.000007	0.33	886.71	221.16	0.03				
mainstem	3.0		50yr	410.00	0.90	6.15	1.90	6.15
0.000011	0.43	964.12	221.21	0.04				
mainstem	3.0		500yr	780.00	0.90	7.00	2.23	7.01
0.000021	0.67	1189.10	344.32	0.05				