
Duplicate Effective Model Input

Goodwi vesDari en. 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
Davi s, Cal i forni a

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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      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
```

PROJECT DATA

Project Title: Goodwi vesDari en
Project File : Goodwi vesDari en. prj
Run Date and Time: 5/12/2011 9: 50: 22 AM

Project in English units

PLAN DATA

Plan Title: Dupli cate
Plan File : p: \1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwi vesDari en. p01

Geometry Title: FEMA Dupli cate
Geometry File :
p: \1581-05\Desi gn\Comps\Hydraul i cs\Model s\Goodwi vesDari en. g01

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 Multiple Openi ngs = 0
Cul verts = 4 Inline Structures = 0
Bri dges = 11 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: Between every coordi nate poi nt (HEC2 Styl e)
Fri cti on Slope Method: Average Conveyance
Computati onal Flow Regi me: Subcri ti cal Flow

Goodwiv esDari en. rep

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	

			Goodwi vesDari en. rep	
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\Design\Comps\Hydraulics\Models\Goodwi vesDari en. f01

Flow Data (cfs)

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

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Goodwi ves River	mainstem	100yr	Normal S = 0. 012
Known WS = 6. 36			
Goodwi ves River	mainstem	100yr (encl)	Normal S = 0. 012
Known WS = 6. 36			
Goodwi ves River	mainstem	10yr	Normal S = 0. 012
Known WS = 5. 8			
Goodwi ves River	mainstem	50yr	Normal S = 0. 012
Known WS = 6. 15			

Goodwies River mainstem
Known WS = 7

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500yr

Normal S = 0.012

GEOMETRY DATA

Geometry Title: FEMA Duplicate

Geometry File : p:\1581-05\Design\Comps\Hydraulics\Models\Goodwies Darien. g01

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 68.0

INPUT

Description: FEMA AQ -

Station Elevation Data

num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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.
993 1006 180 190 200 .1 .3

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 67.0

INPUT

Description: FEMA AP -

Station Elevation Data

num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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.
990 1010 430 460 500 .1 .3

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 65.1

INPUT

Description: FEMA AO -

Station Elevation Data

num= 22

Goodwies Dari en. rep

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						

Manning's n	Values	num=	3
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		.1	.3
					480			

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 64.0

INPUT

Description: FEMA AN -
 Station Elevation Data

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				

Manning's n	Values	num=	3
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		.1	.3
					360			

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 62.1

INPUT

Description:
 Station Elevation Data

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						

Manning's n	Values	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		10	10		.1	.3
					10			

Ineffective Flow	num=	2
Sta L	Sta R	El ev
555	1014	114.6
1018	1230	114.7
		F
		F

CROSS SECTION

Goodwiv esDari en. rep

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 62.0

INPUT

Descri pti on:

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	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	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	Flow		num=	2					
	Sta L	Sta R	El ev	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

Descri pti on: FEMA AM -

Stati on		El evati on		Data num= 18					
Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
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	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

Descri pti on: FEMA AL - U/S Secti on

Stati on		El evati 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	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: Goodwies River
 REACH: mainstem RS: 60.3

INPUT

Description: U/S Face
 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

BRIDGE

RIVER: Goodwies River
 REACH: mainstem RS: 60.25

INPUT

Description: Dam# 15 - US of Overbrook Lane - shortened dam crest length by 1 foot to separate structure from face cross sections, now 0.5 feet away
 pair width of 0.1 indicated possible pressure flow and low flow use of momentum or yarnell.

Distance from Upstream XS = .5
 Deck/Roadway Width = 3
 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
 923 110.5 0 937 108.5 0 992 108.5 0
 992.5 106.3 0 1000 106.3 0 1000 106.3 104
 1001 106.3 104 1001 106.3 0 1008.5 106.3 0
 1009 109.1 0 1024 108.5 0 1051 108.2 0
 1130 108.2 0 1140 108.4 0

Upstream Bridge Cross Section Data

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

Goodwies Dari en. rep

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 Coeff Contr. Expan.
 992 1009 .3 .5

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

Downstream Deck/Roadway Coordinates

num= 14

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	
992.5	106.3		0		1000	106.3		0		1000	106.3		104	
1001	106.3		104		1001	106.3		0		1008.5	106.3		0	
1009	109.1		0		1024	108.5		0		1051	108.2		0	
1130	108.2		0		1140	108.4		0						

Downstream Bridge Cross Section Data

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 Coeff Contr. Expan.
 992 1009 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 923 992 106 F
 1009 1260 106 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 = 106.3
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data

Pier Station Upstream= 1000.5 Downstream= 1000.5
 Upstream num= 2

Width	Elev	Width	Elev
.1	0	.1	104

 Downstream num= 2

Width	Elev	Width	Elev
.1	0	.1	104

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy

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Momentum Cd = 1.5
 Yarnell KVal = 1.25
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd = 1.5
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord = 104

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: 60.2

INPUT

Description: D/S Face
 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 3 3 3 .3 .5
 Ineffective Flow num= 2
 Station Elevation Data Permanent
 923 992 106 F
 1009 1260 106 F

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 60.1

INPUT

Description: U/S Section & D/S Section for next bridge
 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 3 3 3 .3 .5

Goodwiv esDari en. rep

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 59.0

INPUT

Descripti on: U/S Face

Stati on Elevati on Data		num= 21		Stati on Elevati on Data		num= 21		Stati on Elevati on Data		num= 21	
Sta	Elev	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		Manni ng' s n Val ues		num= 3	
Sta	n Val	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		30	30	30		.3	.5

Ineffecti ve Flow		num= 2		Ineffecti ve Flow		num= 2	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent
855	994.5	108.5	F				
1004.5	1280	108.2	F				

CULVERT

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 58.5

INPUT

Descripti on: Overbrook Lane - Shortened deck and culvert l enght by 2 feet to sepearte structure from face cross sections, now 1 foot away

pei r width indi cates possi ble pressure flow and low flow use of momentum or yarnell .

Channel i nvert speci fi ed - entered as culvert

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

Upstream Deck/Roadway Coordi nates

num= 12		num= 12		num= 12		num= 12		num= 12		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		Stati on Elevati on Data		num= 21		Stati on Elevati on Data		num= 21	
Sta	Elev	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		Manni ng' s n Val ues		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
855	.055	994.5	.035	1004.5	.04		

Goodwies Dari en. rep

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

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 855 994.5 108.5 F
 1004.5 1280 108.2 F

Downstream Deck/Roadway Coordinates
 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						

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 num= 3
 Sta n Val Sta n Val Sta n Val
 855 .055 994.5 .035 1004.5 .04

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

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 855 994.5 106 F
 1004.5 1280 106 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 = 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	Top n	Bottom n	Depth Blocked	Entrance Loss Coef
Culvert #1	Box	4.4	4.5				
FHWA Chart # 8 - flared wingwalls							
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.							
Solution Criteria = Highest U. S. EG							
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef		
1	28	.035	.035	0	.5		

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

Goodwi vesDari en. rep

996.75 1002.25

CROSS SECTION

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

INPUT

Descri pti on: D/S Face

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	994.5	.035	1004.5	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	994.5	1004.5		50	70	90		.3	.5
Ineffecti ve	Flow		num=	2					
Sta L	Sta R	Elev	Permanent						
855	994.5	106	F						
1004.5	1280	106	F						

CROSS SECTION

RIVER: Goodwi ves Ri ver
REACH: mai nstem RS: 58.0

INPUT

Descri pti on: FEMA AK - D/S Secti on of

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	994.5	.035	1004.5	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	994.5	1004.5		310	290	270		.3	.5

CROSS SECTION

RIVER: Goodwi ves Ri ver
REACH: mai nstem RS: 56.0

INPUT

Descri pti on: FEMA AJ -

Stati on		Elevati on		Data		num= 21			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
650	114	700	112	870	110	900	106.5	950	104

Goodwies Dari en. rep									
958	102.3	989	101	990	101	990	100.3	999	100.1
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		num=		3	
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 - 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		num=		3	
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 Driveway

DUP - Decreased downstream distance by 10 feet to move dam face cross section away from structure

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		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		20	20		.3	.5

CROSS SECTION

RIVER: Goodwies River

Goodwies Dari en. rep

REACH: mainstem RS: 54.3

INPUT

Description: U/S Face of Driveway

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

Station Elevation Data		num= 16		Station Elevation Data		Station Elevation Data		Station Elevation Data	
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		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		23	23	.3	.5

CULVERT

RIVER: Goodwies River
REACH: mainstem RS: 54.25

INPUT

Description: Dam #11 (Labeled as Driveway in FIS)

Increased upstream distance to move structure away from face sections
pair width of 0.1
indicated possible pressure flow and low flow use of momentum or yarnell.

Channel invert specified - entered as culvert

Distance from Upstream XS = 10
Deck/Roadway Width = 3
Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates		num= 20		Upstream Deck/Roadway Coordinates		Upstream Deck/Roadway Coordinates		Upstream Deck/Roadway Coordinates	
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
940	105		0		945	102.4		0	
964	98.2		0		986	98.2		0	
997	97		0		997	97.5		0	
1000	97		0		1010.7	97		0	
1021	97.7		0		1021	98.6		0	
1088	99		0		1140	101.5		0	
1300	104.5		0		1308	105		0	

Upstream Bridge Cross Section Data

Station Elevation Data		num= 16		Station Elevation Data		Station Elevation Data		Station Elevation Data	
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		Manning's n Values	
Sta	n Val	Sta	n Val	Sta	n Val
940	.04	986	.04	1010.7	.05

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

Goodwiv esDari en. rep

Downstream num=	Deck/Roadway		Coordinates											
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
940		105		0	945	102.4		0		956	99.3			0
964		98.2		0	986	98.2		0		986	97.1			0
997		97		0	997	97.5		0		1000	97.7			3
1000		97		0	1010.7	97		0		1010.7	97.6			0
1021		97.7		0	1021	98.6		0		1049	99			0
1088		99		0	1140	101.5		0		1250	103			0
1300		104.5		0	1308	105		0						

Downstream Bridge Cross Section Data											
Station		Elevation		Data		num=		16			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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 Values			num=		
Sta	n Val	Sta	n Val	Sta	n Val
940	.04	986	.04	1010.7	.05

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

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 = 97
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span			
Culvert #1	Box	.5	1			
FHWA Chart # 8 - flared wingwalls						
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.						
Solution Criteria = Highest U. S. EG						
Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef
1	10	3	.035	.035	0	.5

Upstream Elevation = 96
 Centerline Station = 1000.5
 Downstream Elevation = 96
 Centerline Station = 1000.5

CROSS SECTION

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

INPUT
 Descripti on: D/S Face of Dam #11

DUP - Decreased downstream distance by 10 feet to move dam face cross section away from structure
 Station Elevation Data num= 16

GoodwiesDari en. rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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 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	30	30	30	.3	.5
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CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 54.1

INPUT
 Description: FEMA AG - D/S Section of Driveway
 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	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 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	300	300	300	.3	.5
-----	--------	-----	-----	-----	----	----

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 53.0

INPUT
 Description: FEMA AF -
 Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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 Values

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
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CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 52.4

Goodwiv esDari en. rep

INPUT

Description: U/S face of Driveway - deleted DS section 52.3, identical to this cross section

Station		Elevation		Data		num= 23			
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
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	
Sta L	Sta R	Elev	Permanent
900	994.5	91.9	F
1005.5	1340	91.9	F

BRIDGE

RIVER: Goodwiv es Ri ver
REACH: mai nstem RS: 52.25

INPUT

Description: Driveway - 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					
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		num= 23					
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
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	Elev	Permanent
900	994.5	91.9	F
1005.5	1340	91.9	F

Downstream Deck/Roadway		Coordinates		num= 4					
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

Goodwies Dari en. rep

Downstream Bridge Cross Section Data

Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
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

Station	n Value	Station	n Value	Station	n Value
900	.08	994.5	.035	1005.5	.05

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

Sta L	Sta R	Elev	Permanent
900	994.5	91	F
1005.5	1340	91	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 = 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 - Deleted US section 52.2, identical to this cross section

Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
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				

Goodwies Dari en. rep

Manning's n Values
 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 45 40 35 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 900 994.5 91 F
 1005.5 1340 91 F

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 51.0

INPUT

Description: FEMA AE -
 Station Elevation Data num= 19
 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
 Sta n Val Sta n Val
 910 .08 995 .035 1005 .05

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 49.1

INPUT

Description: FEMA AD -
 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
 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

Goodwies Dari en. rep

Description: U/S Face of Granaston Lane - 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	991.4	89	F						
1006.5	1100	88.7	F						

BRI DGE

RIVER: Goodwies Ri ver
REACH: mai nstem RS: 48.15

I NPUT

Description: Granaston Lane - 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= 6											
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi
990		89		89	991.4		90.1		85.4	993.1	
993.1		90.1		87.6	1006.5		90		87.5	1012	

Upstream Bridge Cross Section Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
680	95	920	93.5	968	89.7	990	89	991.4	85.4
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	.02

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

Ineffective Flow num= 2					
Sta L	Sta R	Elev	Permanent		
680	991.4	89	F		
1006.5	1100	88.7	F		

Downstream Deck/Roadway Coordinates num= 6											
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi
990		89		89	991.4		90.1		85.4	993.1	
993.1		90.1		87.6	1006.5		90		87.5	1012	

Goodwies Dari en. rep

Downstream Bridge Cross Section Data

Station Elevation Data		num= 18		Station Elevation Data		num= 18		Station Elevation Data		num= 18	
Sta	Elev	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

Station	n Value	Station	n Value	Station	n Value
880	.02	991.4	.025	1006.5	.02

Bank Sta: Left Right Coeff Contr. Expan.

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

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
880	991.4	88	F
1006.5	1100	88	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 = 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: Goodwies River
 REACH: mainstem RS: 47.1

INPUT
 Description: D/S Face of Granaston Lane - deleted US cross section- inserted in internal section of bridge

Station Elevation Data		num= 16		Station Elevation Data		num= 16		Station Elevation Data		num= 16	
Sta	Elev	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	Station	n Value	Station	n Value
860	.07	991.4	.045	1006.5	.04

Goodwi vesDari en. rep

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	991.4	1006.5		40	45	50		.3	.5
Ineffecti ve Flow		num=	2						
Sta L	Sta R	Elev	Permanent						
860	991.4	88	F						
1006.5	1077	88	F						

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 47.0

INPUT

Descripti on: FEMA AC -
 Stati on Elevati on Data num= 16

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								

Manni ng' s n Val ues num= 3

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	510		.3	.5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 45.0

INPUT

Descripti on: FEMA AB -
 Stati on Elevati on Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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								

Manni ng' s n Val ues num= 3

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	130		.1	.3

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 44.1

INPUT

Descripti on: FEMA AA -
 Stati on Elevati on Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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

Goodwi vesDari en. rep

1003.4	66.4	1017	66.8	1031.5	67	1043	67.4	1048.5	67.8
1063	70.5	1075	75	1085	77				

Manni ng' s n Val ues num= 3

Sta n Val	Sta n Val	Sta n Val
908 .045	996.5	1003.3 .05

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

996.5	1003.3	190	190	190	.1	.3
-------	--------	-----	-----	-----	----	----

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 43.0

INPUT

Description: FEMA Z - U/S section of Prospect Avenue
 Station Elevati on Data num= 15

Sta Elev	Sta Elev	Sta Elev	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
1010 62.5	1050 67.5	1075 70	1091 71.5	1100 75	1005.5 59	1008 61	1091 71.5

Manni ng' s n Val ues num= 3

Sta n Val	Sta n Val	Sta n Val
843 .04	994.5	1005.5 .04

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

994.5	1005.5	25	40	50	.3	.5
-------	--------	----	----	----	----	----

Ineffe ctive Flow num= 2
 Sta L Sta R Elev Permanent

843	994.5	68.4	F
1005.5	1100	67.6	F

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 42.0

INPUT

Description: U/S Face of Prospect Avenue
 Station Elevati on Data num= 15

Sta Elev	Sta Elev	Sta Elev	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
1010 62.5	1050 67.5	1075 70	1091 71.5	1100 75	1005.5 59	1008 61	1091 71.5

Manni ng' s n Val ues num= 3

Sta n Val	Sta n Val	Sta n Val
843 .04	994.5	1005.5 .04

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

994.5	1005.5	38	38	38	.3	.5
-------	--------	----	----	----	----	----

Ineffe ctive Flow num= 2
 Sta L Sta R Elev Permanent

843	994.5	68.4	F
1005.5	1100	67.6	F

CULVERT

Goodwiv esDari en. rep

RIVER: Goodwiv es Ri ver
 REACH: mai nstem

RS: 41.5

INPUT

Description: Prospect Avenue - shortened deck and culvert by 2 feet to offset
 face cross sections by 1 foot US and DS

pei r 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	987.3		68.4		0
987.4		70.4		0	1014.5		70.6		0	1014.6		67.6		0
1037		69		0	1080		69.4		0	1095		74		0
1100		75		0										

Upstream Bridge Cross Section Data

Station Elevation Data num= 15											
Sta	Elev	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	Sta	n Val
843	.04	994.5	.045	1005.5	.04

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

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
843	994.5	68.4	F
1005.5	1100	67.6	F

Downstream 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	987.3		68.4		0
987.4		70.4		0	1014.5		70.6		0	1014.6		67.6		0
1037		69		0	1080		69.4		0	1095		74		0
1100		75		0										

Downstream Bridge Cross Section Data

Station Elevation Data num= 17											
Sta	Elev	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					
Sta	n Val	Sta	n Val	Sta	n Val
820	.05	994.5	.045	1005.5	.06

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

Goodwies Dari en. rep
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 820 994.5 67 F
 1005.5 1113 67 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 = 67.6
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 6.4 11
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U. S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef
 1 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
 Station Elevation Data num= 17
 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
 Sta n Val Sta n Val Sta n Val
 820 .05 994.5 .045 1005.5 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 994.5 1005.5 30 25 20 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 820 994.5 67 F
 1005.5 1113 67 F

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 41.0

INPUT

Description: FEMA Y - DS section of Prospect Avenue
 Page 25

Station Elevation Data			Goodwies Dari en. rep							
Sta	Elev	Sta	num=	17	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		
Sta	n Val	Sta	n Val	Sta	n Val
820	.05	994.5	.045	1005.5	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	994.5	1005.5		460	465		.1	.3

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 40.1

INPUT

Description: FEMA X -

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
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		.3	.5

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 40.0

INPUT

Description: U/S face of Boston Post Road - 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
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		.3	.5

Ineffective Flow num= 2

Goodwiv esDari en. rep

Sta L	Sta R	El ev	Permanent
873	993.2	56.7	F
1008.2	1475	56.4	F

BRIDGE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 39.15

INPUT

Descripti on: Boston Post Road - 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 Coordi nates

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 Secti on Data

Station Elevati on 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								

Manni ng' s n Val ues 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

Ineffecti ve Flow num= 2			
Sta L	Sta R	El ev	Permanent
873	993.2	56.7	F
1008.2	1475	56.4	F

Downstream Deck/Roadway Coordi nates

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 Secti on Data

Station Elevati on 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								

Manni ng' s n Val ues num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
873	.015	993.2	.025	1008.2	.015

Goodwiv esDari en. rep

Bank Sta: Left Right Coeff Contr. Expan.
 993.2 1008.2 .3 .5
 Ineffecti ve Flow num= 2
 Sta L Sta R Elev Permanent
 873 993.2 56 F
 1008.2 1475 56 F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment si de slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevati on at which weir flow begins = 56.5
 Energy head used in spillway desi gn =
 Spillway height used in desi gn =
 Weir crest shape = Broad Crested

Number of Bridge Coeffi cient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Energy Onl y

Additi 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 SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 38.1

INPUT

Descripti on: D/S Secti on of Boston Post Road

Stati on Elevati on Data num= 23

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				

Manni ng' s n Val ues num= 3

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

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 993.2 1008.2 60 50 40 .3 .5
 Ineffecti ve Flow num= 2
 Sta L Sta R Elev Permanent
 880 993.2 56 F
 1008.2 1475 56 F

CROSS SECTI ON

RIVER: Goodwiv es Ri ver

Goodwies Dari en. rep

REACH: mainstem

RS: 38.0

INPUT

Description: FEMA W -

Station Elevation Data

num= 23

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= 5

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		.3	.5

CROSS SECTION

RIVER: Goodwies River

REACH: mainstem

RS: 37.0

INPUT

Description: FEMA V -

Station Elevation Data

num= 27

Sta	Elev	Sta	Elev	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

num= 3

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		.3	.5

CROSS SECTION

RIVER: Goodwies River

REACH: mainstem

RS: 36.4

INPUT

Description: US face of Old Kings Highway North - deleted DS section 36.3, identical to this cross section

Station Elevation Data

num= 25

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	989.5	.03	1010.7	.02

Goodwiv esDari en. rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 989.5 1010.7 40 34.5 20 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 989.5 46.6 F
 1010.7 1240 46.7 F

BRI DGE

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 36.25

I NPUT

Descripti on: Ol d Ki ngs Hi ghway North - 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

Stati on Elevati on Data num= 25

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

Manni ng' s n Val ues num= 3

Sta	n Val	Sta	n Val	Sta	n Val
407	.015	989.5	.03	1010.7	.02

Bank Sta: Left Right Coeff Contr. Expan.
 989.5 1010.7 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 989.5 46.6 F
 1010.7 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

Stati on Elevati on Data num= 25

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

Goodwies Dari en. rep
 Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 407 .015 989.5 .03 1010.7 .02

Bank Sta: Left Right Coeff Contr. Expan.
 989.5 1010.7 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 989.5 46.2 F
 1010.7 1240 46.2 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 = 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 - deleted US section 36.1,
 identical to this cross section

Station Elevation Data num= 25

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 .015 989.5 .03 1010.7 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 989.5 1010.7 60 40 20 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 407 989.5 46.2 F
 1010.7 1240 46.2 F

Goodwiv esDari en. rep

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 35. 0

INPUT

Descripti on: FEMA U -
 Stati on Elevati on Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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		

Manni ng' s n Val ues

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.
 986 1015 380 375 360 . 3 . 5

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 34. 0

INPUT

Descripti on: FEMA T -
 Stati on Elevati on Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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		

Manni ng' s n Val ues

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.
 975. 5 1008. 5 25 65 80 . 3 . 5

CROSS SECTI ON

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

INPUT

Descripti on: U/S Face of Parki ng Lot - deleted DS secti on 33. 3, i denti cal to
 thi s cross secti on

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

Goodwies Dari en. rep

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 35.5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 580 990.8 44.6 F
 1009.2 1615 43.9 F

BRI DGE

RIVER: Goodwies River
 REACH: mainstem RS: 33.25

INPUT

Description: Parking Lot - 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
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
 580 990.8 44.6 F
 1009.2 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 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

Goodwi vesDari en. rep									
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
 580 990.8 44 F
 1009.2 1615 43.8 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 = 43.9
 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: Goodwi ves Ri ver

REACH: mai nstem RS: 33.1

INPUT

Description: D/S Face of Parking Lot - 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

Goodwi vesDari en. rep

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	990.8	1009.2		40	45	60		.3	.5
Ineffecti ve Flow		num=	2						
Sta L	Sta R	El ev	Permanent						
580	990.8	44	F						
1009.2	1615	43.8	F						

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 32.0

INPUT

Descri pti on: FEMA S -
 Stati on El evati on Data num= 10

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
926	46	985	45	995	41	997	39	1000	38.3
1006	39	1009	41	1060	44	1160	44.5	1211	46

Manni ng' s n Val ues 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	180		.3	.5

CROSS SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 31.0

INPUT

Descri pti on: FEMA R -
 Stati on El evati on 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		

Manni ng' s n Val ues num= 3

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 SECTI ON

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 30.0

INPUT

Descri pti on:
 Stati on El evati on 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

Goodwi vesDari en. rep

1428 57

Manning's n Values num= 3
 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: Goodwi ves Ri ver
 REACH: mai nstem RS: 29.0

INPUT
 Description: FEMA Q - U/S Section of Tokeneke Road
 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 .09 991.3 .035 1008.7 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991.3 1008.7 20 20 20 .3 .5

CROSS SECTION

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

INPUT
 Description: U/S Face of Tokeneke Road
 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 .015 991.3 .035 1008.7 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 991.3 1008.7 70 70 70 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 635 991.3 45.1 F
 1008.7 1389 44.8 F

CULVERT

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

Goodwi vesDari en. rep

INPUT

Description: Tokeneke Road - 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
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	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	991.3	.035	1008.7	.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	
635	991.3	45.1	F	
1008.7	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	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
630	.045	991.3	.035	1008.7	.045
				1038	.015

Goodwi vesDari en. rep
 Bank Sta: Left Right Coeff Contr. Expan.
 991.3 1008.7 .3 .5

Ineffecti ve Flow num= 2
 Sta L Sta R Elev Permanent
 630 991.3 42 F
 1008.7 1335 42 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 flow = .98
 Elevati on at whi ch wei r flow be gi ns = 44.8
 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 Rise 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
 Soluti on Cri teri a = Highest U. S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef

1	1	68	.035	.035	0	.035
---	---	----	------	------	---	------

Number of Barrel s = 2
 Upstream Elevati on = 37
 Centerl i ne Stati ons
 Sta. Sta.
 995.4 1004.6
 Downstream Elevati on = 36
 Centerl i ne Stati ons
 Sta. Sta.
 995.4 1004.6

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 27.1

INPUT

Descripti on: D/S Face of Tokeneke Road
 Stati on Elevati on Data num= 25

Sta	Elev	Sta	Elev	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 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
 630 991.3 42 F
 1008.7 1335 42 F

Goodwiv esDari en. rep

CROSS SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 27. 0

INPUT

Descripti on: FEMA P - D/S Secti on of Tokeneke Road
 Stati on El evati on 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

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 SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 26. 0

INPUT

Descripti on: FEMA O -
 Stati on El evati on Data num= 23

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
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 SECTI ON

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 24. 0

INPUT

Descripti on: FEMA N -
 Stati on El evati on Data num= 19

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
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

Goodwies Dari en. rep

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: Goodwies River
 REACH: mainstem RS: 23.1

INPUT

Description: FEMA M -

Station Elevation Data		num= 16		Station Elevation Data		num= 16		Station Elevation Data		num= 16	
Sta	Elev	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		Manning's n Values		num= 4	
Sta	n Val	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 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, DS section 22.2 deleted and added to internal cross section of bridge

Station Elevation Data		num= 16		Station Elevation Data		num= 16		Station Elevation Data		num= 16	
Sta	Elev	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		Manning's n Values		num= 4	
Sta	n Val	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 90 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 920 991 38.2 F
 1009 1100 36.8 F

BRIDGE

RIVER: Goodwies River
 REACH: mainstem RS: 22.15

Goodwiv esDari en. rep

INPUT

Description: Old Kings Highway South - added sections 22.1 and 22.2 as internal bridge cross sections

Distance from Upstream XS = 10

Deck/Roadway Width = 90

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
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 Section Data

Station Elevation Data

num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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

Manning's n Values

num= 3

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

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

Ineffective Flow

num= 2

Sta L	Sta R	Elev	Permanent
695	991	38.2	F
1009	1201	36.8	F

Downstream Deck/Roadway Coordinates

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 Section Data

Station Elevation Data

num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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

Manning's n Values

num= 3

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

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

Ineffective Flow

num= 2

Sta L	Sta R	Elev	Permanent
695	991	37	F

1009 1201 36 Goodwi vesDari en. rep
F

Upstream Embankment side slope = 0 hori z. to 1.0 verti cal
 Downstream Embankment si de slope = 0 hori z. to 1.0 verti cal
 Maximum allowable submergence for weir flow = .98
 Elevati on at which weir flow be gins = 36.9
 Energy head used in spi llway desi gn =
 Spi llway height used in desi gn =
 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 = Momentum

Hi gh Flow Method

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

Addi ti onal 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: 21.1

INPUT

Descripti on: DS face of Old Ki ngs Highway South, US secti on 22.1 deleted and
 added to internal cross secti on 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

Manni ng' s n Values		num= 4			
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		90	40	20	.3
							.5

Ineffecti ve Flow		num= 2	
Sta L	Sta R	Elev	Permanent
925	991	37	F
1009	1186	36	F

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 21.0

INPUT

Goodwies Dari en. rep

Description: FEMA L -
Station Elevation Data

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 991 Right 1009 Lengths: Left Channel 180 Right 170 Coeff Contr. .3 Expan. .5

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem

RS: 20.0

INPUT

Description: FEMA K -
Station Elevation Data

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

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem

RS: 19.4

INPUT

Description: U/S FACE of Driveway - deleted ds bridge edge section 19.3,
identical to this cross section

Station Elevation Data

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

Sta	n Val	Sta	n Val	Sta	n Val
830	.05	995.5	.045	1003.1	.05

Bank Sta: Left 995.5 Right 1003.1 Lengths: Left Channel 10.5 Right 10.5 Coeff Contr. .3 Expan. .5

Ineffective Flow

Sta L	Sta R	Elev	Permanent F
830	995.5	35	F

Goodwiv esDari en. rep

1003.1 1150 35.3

F

BRI DGE

RIVER: Goodwiv es Ri ver

REACH: mai nstem

RS: 19.25

I NPUT

Descripti on: Driveway - deleted sections at face (19.2 and 19.3) used i nternal cross section to insert downstream section geometry

Distance from Upstream XS = 2

Deck/Roadway Wi dth = 6.5

Weir Coeffi cient = 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

I neffecti ve Fl ow num= 2

Sta L	Sta R	Elev	Permanent
830	995.5	35	F
1003.1	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

I neffecti ve Fl ow num= 2

Sta L	Sta R	Elev	Permanent
830	995.5	35	F
1003.1	1150	35.3	F

Goodwies Dari en. rep

830 995.5 34.5 F
 1003.1 1150 34.5 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
 Elevati on at whi ch weir flow begi ns = 35
 Energy head used in spi llway design =
 Spi llway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coeffi ci ent Sets = 1

Low Flow Methods and Data

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

Hi gh Flow Method
 Energy Only

Addi ti onal 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 Ri ver
 REACH: mai nstem RS: 18.1

INPUT

Descripti on: D/S Face of Driveway - deleted 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

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 50 50 50 .3 .5

Ineffe ctive Flow num= 2

Sta L	Sta R	Elev	Permanent
830	995.5	34.5	F
1003.1	1150	34.5	F

CROSS SECTION

RIVER: Goodwies Ri ver
 REACH: mai nstem RS: 18.0

INPUT

Descripti on: FEMA J -
 Stati on Elevati on Data num= 14

Goodwies Dari en. rep

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
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

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
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CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 17.0

INPUT

Description:

Station Elevation Data

Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev	Sta	El ev
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

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
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CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 16.0

INPUT

Description: FEMA I -

Station Elevation Data

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

Manning's n Values

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
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CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 15.0

INPUT

Goodwiv esDari en. rep

Descripti on: FEMA H -

Station Elevati on Data		num= 21		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
934	43.9	945	37.4	956	31.5	976	31.1	983	31.2		
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	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: Goodwiv es Ri ver
 REACH: mai nstem RS: 14.4

INPUT
 Descripti on: U/S Face of Andrews Drive - removed upstream secti on 14.2
 duplic ate of thi s secti on previ ously l oca ted at exact edge of
 bri dge

Station Elevati on Data		num= 26		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	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										

Manni ng' s n Val ues		num= 3		Sta n Val	
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		32.5	32.5	32.5	.3
							.5

Ineffecti ve Fl ow		num= 2		Permanent	
Sta L	Sta R	Elev			
790	989	32	F		
1011.1	1110	35	F		

BRI DGE

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

INPUT
 Descripti on: Andrews Drive - del eted adj acent cross secti ons, i denti cal to
 current face secti ons
 Di stance from Upstream XS = 4
 Deck/Roadway Wi dth = 24.5
 Wei r Coeffi ci ent = 2.6

Upstream Deck/Roadway Coordi nates		num= 14		Sta Hi Cord Lo Cord		Sta Hi Cord Lo Cord		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

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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	.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
790	989	32	F	
1011.1	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								

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	.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
790	989	32	F	
1011.1	1110	35	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 = 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: Goodwies River

REACH: mainstem RS: 14.1

INPUT

Description: D/S Face of Andrews Drive - 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	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	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	989	1011.1		80	100	120	.3
							.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
790	989	32	F		
1011.1	1110	35	F		

CROSS SECTION

RIVER: Goodwies River

REACH: mainstem RS: 13.0

INPUT

Description: FEMA G -

Station Elevation Data		num= 15									
Sta	Elev	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

Goodwi vesDari en. rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 985 1010 705 705 705 .3 .5

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 12.0

INPUT

Descripti on: FEMA F -
 Stati on Elevati on Data

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

Manni ng' s n Val ues 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

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 11.9

INPUT

Descripti on:
 Stati on Elevati on Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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				

Manni ng' s n Val ues num= 3

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 270 260 220 .1 .3

CROSS SECTION

RIVER: Goodwi ves Ri ver
 REACH: mai nstem RS: 11.0

INPUT

Descripti on:
 Stati on Elevati on Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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						

Goodwies Dari en. rep

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

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 988.5 1013 210 250 280 .1 .3

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 10.0

INPUT

Description:

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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
 Sta n Val Sta n Val num= 3
 920 .04 978 .04 1022 .12

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

CROSS SECTION

RIVER: Goodwies River
 REACH: mainstem RS: 9.9

INPUT

Description:

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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
 Sta n Val Sta n Val num= 3
 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: Goodwies River
 REACH: mainstem RS: 9.0

INPUT

Description: FEMA E -

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

Goodwiv esDari en. rep

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
835 .1	986 .04
	1015 .1

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

986	1015	535	560	565	.1	.3
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CROSS SECTION

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

INPUT

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

DUP -

Decreased downstream di stances by 10 feet to move downstream face cross secti on away from bri dge

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	35	40	45	.3	.5
-----	------	----	----	----	----	----

Ineffecti ve Flow num= 2

Sta L	Sta R	Elev	Permanent
868	978	11.1	F
1032	1100	11.3	F

CROSS SECTION

RIVER: Goodwiv es Ri ver
 REACH: mai nstem RS: 8.0

INPUT

Description: U/S Face of Dam US of Goodwiv es Ri ver Road

DUP - Increased

downstream di stances in order to move face cross secti ons farther 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

Goodwiv esDari en. rep

868 .06 967 .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

BRIDGE

RIVER: Goodwiv es Ri ver
 REACH: mainstem RS: 7.5

INPUT

Description: Dam #2 - US of Goodwiv es Ri ver Road -
 pair width of 0.1

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

Distance from Upstream XS = 10
 Deck/Roadway Width = 2
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 20														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
808		20		0	875		20		0	942		22.9		0
957	14.6			0	961.3	12.3			0	977.4	11.8			0
993.7	11			0	994.3	11.1			0	1000	11.3			0
1000	11.3		3.1		1001	11.3		3.1		1001	11.3			0
1005.7	11.4			0	1006.4	11.9			0	1022	12			0
1046.4	11.7			0	1060	15			0	1072	20			0
1090	25			0	1100	27			0					

Upstream Bridge Cross Section Data

Station		Elevation Data		num= 20							
Sta	Elev	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 Coeff Contr. Expan.
 978 1032 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 868 978 11.1 F
 1032 1100 11.3 F

Downstream Deck/Roadway Coordinates

num= 20														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
808		20		0	875		20		0	942		22.9		0
957	14.6			0	961.3	12.3			0	977.4	11.8			0
993.7	11			0	994.3	11.1			0	1000	11.3			0
1000	11.3		3.1		1001	11.3		3.1		1001	11.3			0
1005.7	11.4			0	1006.4	11.9			0	1022	12			0
1046.4	11.7			0	1060	15			0	1072	20			0
1090	25			0	1100	27			0					

Goodwiv esDari en. rep

Downstream Bridge Cross Section Data

Station Elevation Data		num= 20		Station Elevation Data		num= 20		Station Elevation Data		num= 20	
Sta	Elev	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

Sta	n Val	Sta	n Val	Sta	n Val
868	.06	967	.035	1074	.06

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

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 11.1
 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 = 1.6

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd = 1.6
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord = 3.1

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: 7.1

INPUT

Description: D/S Face of Dam US of Goodwiv es Ri ver Road

DUP - decreased

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

Station Elevation Data		num= 20		Station Elevation Data		num= 20		Station Elevation Data		num= 20	
Sta	Elev	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		

Goodwies Dari en. rep

Manning's n Values
Sta n Val Sta n Val

num= 3
Sta n Val Sta n Val

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
978 1032 65 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
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 Sta n Val

num= 3
Sta n Val Sta n Val

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
978 1032 110 85 50 .3 .5

CROSS SECTION

RIVER: Goodwies River
REACH: mainstem RS: 6.0

INPUT

Description: U/S Face of Goodwies River Road

Station	Elevation	Data	num=	19	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
Sta n Val Sta n Val

num= 3
Sta n Val Sta n Val

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
992 1008.8 33 33 33 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
854 992 11.8 F
1008.8 1170 11.7 F

BRIDGE

RIVER: Goodwies River
REACH: mainstem RS: 5.5

INPUT

Description: Goodwies River Road Bridge - shortened bridge by 2 feet to allow

Goodwiv esDari en. rep

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
 Weir Coefficient = 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	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

Sta	n Val	Sta	n Val	Sta	n Val
854	.08	992	.035	1008.8	.06

Bank Sta: Left 992 Right 1008.8
 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 854 992 11.8 F
 1008.8 1170 11.7 F

Downstream 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

Downstream Bridge Cross Section Data

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

Sta	n Val	Sta	n Val	Sta	n Val
854	.08	992	.035	1008.8	.06

Bank Sta: Left 992 Right 1008.8
 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 854 992 11 F

1008.8 1170 11 F Goodwies Dari en. rep

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 = 11.7
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Abutments = 1

Abutment Data

Upstream num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev
 991.56 10.6 993 1.6 1007 1.6 1008.4 10.6
 Downstream num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev
 991.56 10.6 993 1.6 1007 1.6 1008.4 10.6

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 1.6
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd = 1.6
 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: Goodwies River
 REACH: mainstem RS: 5.1

INPUT

Description: D/S Face of Goodwies River Road
 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 .08 992 .035 1008.8 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 992 1008.8 80 100 120 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent

Goodwiv esDari en. rep

854 992 11 F
 1008.8 1170 11 F

CROSS SECTION

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

INPUT

Descripti on: FEMA C - D/S Secti on
 Stati on Elevati on 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		

Manni ng' s n Val ues

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

Bank Sta: Left 992 Right 1008.8 Lengths: Left Channel 780 Right 820 Coeff Contr. .3 Expan. .5

CROSS SECTION

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

INPUT

Descripti on: FEMA B
 Stati on Elevati on Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
936	15	950	6	953	4.6	957	2.5	1000	1.4
1029	2.5	1035	4.6	1040	6	1050	15		

Manni ng' s n Val ues

Sta	n Val	Sta	n Val	Sta	n Val
936	.04	950	.03	1040	.05

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

CROSS SECTION

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

INPUT

Descripti on: FEMA A
 Stati on Elevati on Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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		

Manni ng' s n Val ues

num= 3

				GoodwiesDari en. rep						
	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: Goodwies Ri ver

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

Goodwies Dari en. rep

maistem	52.25	Bridge				
maistem	52.1		.08	.035	.05	
maistem	51.0		.08	.035	.05	
maistem	49.1		.04	.04	.05	
maistem	49.0		.04	.04	.05	
maistem	48.15	Bridge				
maistem	47.1		.07	.045	.04	
maistem	47.0		.07	.045	.04	
maistem	45.0		.12	.035	.04	
maistem	44.1		.045	.045	.05	
maistem	43.0		.04	.045	.04	
maistem	42.0		.04	.045	.04	
maistem	41.5	Culvert				
maistem	41.1		.05	.045	.06	
maistem	41.0		.05	.045	.06	
maistem	40.1		.07	.045	.1	.02
maistem	40.0		.015	.025	.015	
maistem	39.15	Bridge				
maistem	38.1		.045	.045	.045	
maistem	38.0		.015	.12	.045	.12 .015
maistem	37.0		.1	.043	.1	
maistem	36.4		.015	.03	.02	
maistem	36.25	Bridge				
maistem	36.1		.015	.03	.02	
maistem	35.0		.015	.03	.02	
maistem	34.0		.015	.03	.02	
maistem	33.4		.015	.03	.025	
maistem	33.25	Bridge				
maistem	33.1		.015	.03	.025	
maistem	32.0		.015	.03	.025	
maistem	31.0		.055	.04	.05	
maistem	30.0		.09	.025	.07	
maistem	29.0		.09	.035	.07	
maistem	28.0		.015	.035	.015	

		Goodwi ves	Dari en. rep		
mai nstem	27. 5				
mai nstem	27. 1	Cul vert			
			. 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
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	Bri dge			
mai nstem	7. 1		. 06	. 035	. 06
mai nstem	7. 0		. 06	. 035	. 06
mai nstem	6. 0		. 08	. 035	. 06

		Goodwi ves	Dari en. rep		
mai nstem	5. 5	Bri dge			
mai nstem	5. 1		. 08	. 035	. 06
mai nstem	5. 0		. 05	. 085	. 035
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	Ri ver Sta.	Left	Channel	Ri ght
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	Bri dge		
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	Cul vert		
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		

		Goodwi vesDari en. rep		
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	34. 5	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
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	Bri dge		
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 CONTRACTION AND EXPANSION COEFFICIENTS
 Ri ver: Goodwi ves Ri ver

Reach	River Sta.	Goodwi ves Contr.	Dari en. rep 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	Bri dge	
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
mai nstem	55.0	.1	.3
mai nstem	54.4	.3	.5
mai nstem	54.3	.3	.5
mai nstem	54.25	Cul vert	
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

		Goodwiv esDari en. rep	
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
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	Bri dge	
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

Duplicate Effective Model Output

Goodwiv esDari 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      XXXXX
    
```

PROJECT DATA

Project Title: Goodwiv esDari en
 Project File : Goodwiv esDari en. prj
 Run Date and Time: 5/12/2011 9:50:22 AM

Project in English units

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W. S. Elev	Crit W. S.	E. G. Elev	E. G.
Slope	Vel	Flow Area	Froude #	Chl	(ft)	(ft)	(ft)	(ft)
(ft/ft)	(ft/s)	(sq ft)	(cfs)	(ft)				
mainstem	68.0	100yr	360.00	129.80	133.65	133.65	134.50	
0.019685	8.22	73.82	51.74	0.88				
mainstem	68.0	100yr (encr)	360.00	129.80	133.85	133.85	135.28	
0.028906	9.63	37.40	13.00	1.00				
mainstem	68.0	10yr	210.00	129.80	133.03	133.03	133.71	
0.018734	7.01	44.28	42.41	0.84				
mainstem	68.0	50yr	300.00	129.80	133.45	133.45	134.22	
0.018733	7.69	63.62	48.52	0.85				
mainstem	68.0	500yr	565.00	129.80	134.31	134.31	135.32	
0.019172	9.39	111.98	64.59	0.90				
mainstem	67.0	100yr	360.00	127.10	130.17	130.14	130.90	

				Goodwi ves	Dari en. rep			
0.009652	7.16	73.10	71.52		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	129.64	129.40	130.16
0.009036	5.82	41.55	47.15		0.77			
mainstem	67.0	50yr		300.00	127.10	129.98	129.89	130.64
0.009513	6.70	60.11	62.65		0.81			
mainstem	67.0	500yr		565.00	127.10	130.78	130.78	131.60
0.008668	7.94	125.78	100.60		0.82			
mainstem	65.1	100yr		360.00	123.30	125.15	125.15	125.47
0.014110	6.13	132.62	182.28		0.83			
mainstem	65.1	100yr	(encr)	360.00	123.30	125.25	125.25	125.71
0.016742	6.92	113.34	110.00		0.91			
mainstem	65.1	10yr		210.00	123.30	124.89	124.89	125.17
0.012898	5.24	87.78	158.90		0.77			
mainstem	65.1	50yr		300.00	123.30	125.06	125.06	125.36
0.013548	5.79	116.32	174.42		0.80			
mainstem	65.1	500yr		565.00	123.30	125.43	125.39	125.79
0.014501	6.87	186.80	206.26		0.86			
mainstem	64.0	100yr		360.00	114.50	117.37	117.00	118.06
0.007585	6.90	66.74	40.49		0.74			
mainstem	64.0	100yr	(encr)	360.00	114.50	117.43		118.24
0.009756	7.24	49.73	18.00		0.77			
mainstem	64.0	10yr		210.00	114.50	117.04		117.37
0.004101	4.66	54.51	35.48		0.53			
mainstem	64.0	50yr		300.00	114.50	117.28		117.80
0.005926	5.97	63.34	39.16		0.65			
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	116.15	115.70	116.23
0.003395	3.48	182.55	250.83		0.39			
mainstem	62.1	100yr	(encr)	360.00	113.60	117.27	115.66	117.31
0.000883	1.79	222.50	92.89		0.17			
mainstem	62.1	10yr		210.00	113.60	115.71	115.10	115.81
0.004795	3.63	90.55	167.75		0.45			
mainstem	62.1	50yr		300.00	113.60	116.00	115.61	116.08
0.003830	3.55	147.04	218.77		0.41			
mainstem	62.1	500yr		565.00	113.60	116.53	115.95	116.60
0.002778	3.46	291.34	325.75		0.36			
mainstem	62.0	100yr		360.00	110.30	116.12	115.34	116.19

				Goodwi ves	Dari en. rep			
0.002881	3.41	186.37	242.59		0.25			
mainstem	62.0		100yr (encr)	360.00	110.30	117.06	115.60	117.28
0.004243	4.09	98.33	29.62		0.28			
mainstem	62.0		10yr	210.00	110.30	115.67	114.88	115.77
0.003184	3.40	97.32	160.73		0.26			
mainstem	62.0		50yr	300.00	110.30	115.96	115.18	116.05
0.003066	3.46	151.22	211.16		0.26			
mainstem	62.0		500yr	565.00	110.30	116.50	115.91	116.57
0.002560	3.36	294.78	323.76		0.24			
mainstem	61.0		100yr	360.00	108.90	113.76	113.76	114.36
0.021705	7.74	94.64	79.77		0.63			
mainstem	61.0		100yr (encr)	360.00	108.90	113.70	113.70	114.61
0.029882	9.00	68.68	35.00		0.74			
mainstem	61.0		10yr	210.00	108.90	112.96	112.96	113.70
0.025950	7.53	44.74	36.61		0.67			
mainstem	61.0		50yr	300.00	108.90	113.57	113.57	114.15
0.020844	7.37	79.74	72.12		0.61			
mainstem	61.0		500yr	565.00	108.90	114.27	114.27	114.87
0.023166	8.56	139.84	98.72		0.66			
mainstem	60.4		100yr	360.00	101.20	108.86		108.87
0.000041	1.02	636.65	208.49		0.07			
mainstem	60.4		100yr (encr)	360.00	101.20	108.92		108.93
0.000041	1.02	608.78	160.00		0.07			
mainstem	60.4		10yr	210.00	101.20	108.50		108.50
0.000019	0.67	563.82	191.44		0.04			
mainstem	60.4		50yr	300.00	101.20	108.74		108.74
0.000031	0.88	610.99	203.84		0.06			
mainstem	60.4		500yr	565.00	101.20	109.20		109.21
0.000077	1.44	707.50	215.99		0.09			
mainstem	60.3		100yr	360.00	100.00	108.74	103.61	108.84
0.000587	2.69	192.90	204.22		0.18			
mainstem	60.3		100yr (encr)	360.00	100.00	108.81	103.61	108.90
0.000540	2.59	205.45	197.09		0.17			
mainstem	60.3		10yr	210.00	100.00	108.44	102.79	108.49
0.000266	1.78	138.30	128.36		0.12			
mainstem	60.3		50yr	300.00	100.00	108.64	103.30	108.72
0.000454	2.35	173.24	198.52		0.16			
mainstem	60.3		500yr	565.00	100.00	108.98	104.55	109.16
0.001080	3.71	244.11	218.36		0.24			

mainstem 60.25

Bridge

Goodwi vesDari en. rep

mai nstem	60. 2	100yr		360. 00	100. 00	108. 32	103. 61	108. 48
0. 000846	3. 15	124. 42	113. 19		0. 21			
mai nstem	60. 2	100yr (encl)		360. 00	100. 00	108. 69	103. 61	108. 83
0. 000754	3. 02	119. 16	16. 33		0. 20			
mai nstem	60. 2	10yr		210. 00	100. 00	106. 14	102. 79	106. 25
0. 000816	2. 70	77. 78	15. 86		0. 21			
mai nstem	60. 2	50yr		300. 00	100. 00	107. 50	103. 30	107. 64
0. 000842	3. 00	99. 84	16. 43		0. 21			
mai nstem	60. 2	500yr		565. 00	100. 00	108. 85	104. 56	109. 06
0. 001271	3. 99	215. 76	210. 65		0. 26			

mai nstem	60. 1	100yr		360. 00	100. 00	108. 32		108. 47
0. 000847	3. 15	124. 12	112. 82		0. 21			
mai nstem	60. 1	100yr (encl)		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. 13		106. 25
0. 000817	2. 70	77. 74	15. 85		0. 21			
mai nstem	60. 1	50yr		300. 00	100. 00	107. 50		107. 64
0. 000843	3. 01	99. 80	16. 42		0. 21			
mai nstem	60. 1	500yr		565. 00	100. 00	108. 84		109. 06
0. 001277	3. 99	214. 89	210. 41		0. 26			

mai nstem	59. 0	100yr		360. 00	101. 20	108. 39	104. 99	108. 41
0. 000120	1. 67	338. 12	184. 10		0. 11			
mai nstem	59. 0	100yr (encl)		360. 00	101. 20	108. 28	104. 99	108. 73
0. 003946	5. 36	67. 18	10. 00		0. 36			
mai nstem	59. 0	10yr		210. 00	101. 20	105. 77	103. 95	106. 16
0. 002039	4. 99	42. 08	103. 75		0. 43			
mai nstem	59. 0	50yr		300. 00	101. 20	107. 08	104. 60	107. 54
0. 001689	5. 44	55. 16	129. 23		0. 41			
mai nstem	59. 0	500yr		565. 00	101. 20	108. 94	106. 19	108. 96
0. 000099	1. 60	636. 52	209. 17		0. 10			

mai nstem 58. 5

Cul vert

mai nstem	58. 1	100yr		360. 00	101. 20	104. 99	104. 99	106. 71
0. 011894	10. 51	34. 26	82. 47		1. 00			
mai nstem	58. 1	100yr (encl)		360. 00	101. 20	105. 35	104. 99	106. 76
0. 018204	9. 50	37. 88	10. 00		0. 86			
mai nstem	58. 1	10yr		210. 00	101. 20	104. 07	103. 96	105. 16

				Goodwi ves	Dari en. rep				
0.011458	8.38	25.07	26.61		0.93				
mainstem	58.1	50yr		300.00	101.20	104.60	104.60	106.12	
0.012412	9.89	30.32	57.28		1.00				
mainstem	58.1	500yr		565.00	101.20	106.00	106.00	106.19	
0.001809	4.87	199.91	108.17		0.41				
mainstem	58.0	100yr		360.00	101.20	104.65		105.09	
0.004995	6.35	76.74	62.20		0.64				
mainstem	58.0	100yr (encl)		360.00	101.20	105.34		105.80	
0.003515	6.09	73.44	20.00		0.55				
mainstem	58.0	10yr		210.00	101.20	104.03		104.31	
0.003973	4.87	53.05	26.42		0.55				
mainstem	58.0	50yr		300.00	101.20	104.44		104.83	
0.004617	5.82	65.72	41.76		0.61				
mainstem	58.0	500yr		565.00	101.20	105.20	104.94	105.72	
0.005477	7.42	120.71	88.72		0.69				
mainstem	56.0	100yr		360.00	99.60	102.08	102.08	102.57	
0.018121	6.38	66.27	67.45		0.78				
mainstem	56.0	100yr (encl)		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	101.68	101.68	102.10	
0.018469	5.59	42.34	52.15		0.76				
mainstem	56.0	50yr		300.00	99.60	101.93	101.93	102.40	
0.018511	6.14	56.70	61.79		0.78				
mainstem	56.0	500yr		565.00	99.60	102.46	102.46	103.05	
0.017853	7.08	94.39	78.88		0.80				
mainstem	55.0	100yr		360.00	96.20	99.62		99.95	
0.004212	4.86	83.06	29.64		0.46				
mainstem	55.0	100yr (encl)		360.00	96.20	99.65		100.09	
0.006414	5.40	68.65	20.00		0.51				
mainstem	55.0	10yr		210.00	96.20	99.04		99.21	
0.002781	3.49	66.40	27.83		0.37				
mainstem	55.0	50yr		300.00	96.20	99.42		99.69	
0.003610	4.33	77.34	29.03		0.42				
mainstem	55.0	500yr		565.00	96.20	100.15		100.73	
0.006135	6.46	99.45	32.86		0.57				
mainstem	54.4	100yr		360.00	95.60	99.18		99.25	
0.000827	2.50	185.56	134.75		0.23				
mainstem	54.4	100yr (encl)		360.00	95.60	99.17		99.25	
0.000880	2.57	167.54	65.00		0.24				
mainstem	54.4	10yr		210.00	95.60	98.75		98.79	

				GoodwiesDari en. rep			
0.000490	1.77	142.04	71.52		0.18		
mainstem	54.4		50yr	300.00	95.60	99.05	99.11
0.000682	2.21	168.34	131.11		0.21		
mainstem	54.4		500yr	565.00	95.60	99.53	99.65
0.001276	3.30	234.47	143.76		0.29		
mainstem	54.3		100yr	360.00	95.60	99.16	97.25
0.000848	2.52	183.04	134.22		0.24		
mainstem	54.3		100yr (encl)	360.00	95.60	99.15	97.25
0.000850	2.52	182.75	134.17		0.24		
mainstem	54.3		10yr	210.00	95.60	98.74	96.79
0.000497	1.78	141.30	70.71		0.18		
mainstem	54.3		50yr	300.00	95.60	99.03	97.08
0.000696	2.23	166.36	130.69		0.21		
mainstem	54.3		500yr	565.00	95.60	99.49	97.76
0.001331	3.35	229.90	142.98		0.30		
mainstem	54.25						
				Culvert			
mainstem	54.2		100yr	360.00	92.80	95.41	94.56
0.004462	4.71	85.60	40.83		0.51		
mainstem	54.2		100yr (encl)	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
0.004596	5.59	115.63	45.15		0.54		
mainstem	54.1		100yr	360.00	92.80	94.56	94.56
0.018402	7.35	53.11	35.58		0.98		
mainstem	54.1		100yr (encl)	360.00	92.80	94.59	94.59
0.017413	7.22	54.07	35.60		0.95		
mainstem	54.1		10yr	210.00	92.80	94.05	94.05
0.020904	6.24	35.76	32.43		0.98		
mainstem	54.1		50yr	300.00	92.80	94.37	94.37
0.019187	6.95	46.43	34.40		0.98		
mainstem	54.1		500yr	565.00	92.80	95.13	95.13
0.016558	8.41	74.45	39.11		0.97		
mainstem	53.0		100yr	360.00	85.70	90.76	90.95

				Goodwi vesDari en. rep				
0.001255	3.71	127.00	49.16		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
0.001908	3.55	64.96	27.97		0.34			
mainstem	53.0		50yr	300.00		85.70	90.19	90.38
0.001464	3.69	100.70	43.10		0.31			
mainstem	53.0		500yr	565.00		85.70	92.65	92.80
0.000709	3.48	239.19	69.44		0.24			

	mainstem	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	91.25	89.70	92.43	
0.008443	8.74	64.67	13.16		0.64					

mainstem 52.25

Bridge

	mainstem	52.1		100yr	360.00		84.60	89.66	88.53	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	87.53	89.15	
0.006457	5.83	36.01	10.73		0.56					
mainstem	52.1		50yr	300.00		84.60	89.31	88.15	90.05	
0.007868	6.90	43.45	10.85		0.61					
mainstem	52.1		500yr	565.00		84.60	90.16	89.70	91.94	
0.016620	10.72	52.68	10.99		0.86					

	mainstem	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	
0.016855	8.66	24.65	12.16		0.98					
mainstem	51.0		50yr	300.00		84.10	88.12	88.12	89.46	
0.014075	9.39	34.65	15.96		0.94					
mainstem	51.0		500yr	565.00		84.10	89.65	89.65	91.37	

				Goodwi vesDari en. rep				
				0. 90				
0. 011353	11. 00	65. 34	24. 13					
mai nstem	49. 1	100yr		360. 00	81. 30	85. 86		86. 21
0. 002776	5. 01	84. 68	38. 53	0. 43				
mai nstem	49. 1	100yr (enchr)		360. 00	81. 30	85. 73		86. 27
0. 006369	5. 88	61. 18	15. 10	0. 52				
mai nstem	49. 1	10yr		210. 00	81. 30	84. 67		84. 95
0. 003364	4. 41	51. 53	21. 08	0. 45				
mai nstem	49. 1	50yr		300. 00	81. 30	85. 39		85. 73
0. 003104	4. 89	68. 71	29. 48	0. 45				
mai nstem	49. 1	500yr		565. 00	81. 30	87. 40		87. 65
0. 001535	4. 59	165. 41	64. 34	0. 34				
mai nstem	49. 0	100yr		360. 00	81. 30	85. 15	84. 29	85. 89
0. 006688	6. 87	52. 40	24. 94	0. 65				
mai nstem	49. 0	100yr (enchr)		360. 00	81. 30	85. 15	84. 29	85. 89
0. 006686	6. 87	52. 41	24. 94	0. 65				
mai nstem	49. 0	10yr		210. 00	81. 30	84. 19	83. 50	84. 67
0. 006755	5. 55	37. 81	19. 75	0. 62				
mai nstem	49. 0	50yr		300. 00	81. 30	84. 79	83. 99	85. 43
0. 006699	6. 39	46. 95	21. 42	0. 64				
mai nstem	49. 0	500yr		565. 00	81. 30	86. 21	85. 19	87. 27
0. 006770	8. 26	68. 43	45. 38	0. 68				
mai nstem	48. 15							
				Bri dge				
mai nstem	47. 1	100yr		360. 00	76. 80	81. 90	80. 92	82. 59
0. 008558	6. 65	54. 10	28. 48	0. 62				
mai nstem	47. 1	100yr (enchr)		360. 00	76. 80	82. 42	80. 92	82. 94
0. 005468	5. 82	61. 89	32. 05	0. 51				
mai nstem	47. 1	10yr		210. 00	76. 80	81. 17	80. 12	81. 54
0. 006202	4. 87	43. 12	23. 95	0. 51				
mai nstem	47. 1	50yr		300. 00	76. 80	81. 65	80. 62	82. 20
0. 007585	5. 97	50. 29	26. 73	0. 58				
mai nstem	47. 1	500yr		565. 00	76. 80	82. 36	81. 83	83. 69
0. 014104	9. 26	61. 04	31. 66	0. 81				
mai nstem	47. 0	100yr		360. 00	76. 80	80. 84	80. 84	81. 89
0. 022337	8. 50	44. 92	22. 37	0. 94				
mai nstem	47. 0	100yr (enchr)		360. 00	76. 80	80. 92	80. 92	82. 22
0. 030229	9. 17	39. 28	15. 10	1. 00				
mai nstem	47. 0	10yr		210. 00	76. 80	80. 10	80. 10	80. 91

				Goodwi ves	Dari en. rep				
0.025561	7.36	29.66	18.95		0.96				
mai nstem	47.0	50yr		300.00	76.80	80.57	80.57	81.53	
0.023187	8.04	39.22	21.14		0.94				
mai nstem	47.0	500yr		565.00	76.80	81.68	81.68	82.92	
0.018280	9.32	65.61	26.96		0.90				
mai nstem	45.0	100yr		360.00	65.80	68.70	68.70	69.36	
0.008955	8.17	73.38	53.81		0.85				
mai nstem	45.0	100yr (enchr)		360.00	65.80	68.68	68.68	69.37	
0.009278	8.28	71.54	48.83		0.86				
mai nstem	45.0	10yr		210.00	65.80	68.16	68.16	68.72	
0.008848	7.08	46.71	45.59		0.81				
mai nstem	45.0	50yr		300.00	65.80	68.51	68.51	69.13	
0.008900	7.78	63.39	50.89		0.83				
mai nstem	45.0	500yr		565.00	65.80	69.22	69.22	70.00	
0.009240	9.26	103.17	61.41		0.88				
mai nstem	44.1	100yr		360.00	64.40	67.17	67.17	67.70	
0.016327	6.98	68.95	70.34		0.76				
mai nstem	44.1	100yr (enchr)		360.00	64.40	67.19	67.19	67.70	
0.015744	6.88	70.02	70.07		0.74				
mai nstem	44.1	10yr		210.00	64.40	66.62	66.62	67.14	
0.020669	6.73	38.31	40.77		0.82				
mai nstem	44.1	50yr		300.00	64.40	67.00	67.00	67.51	
0.016832	6.78	57.60	64.23		0.76				
mai nstem	44.1	500yr		565.00	64.40	67.87		68.25	
0.009510	6.22	124.94	87.97		0.60				
mai nstem	43.0	100yr		360.00	58.40	64.13	62.63	64.88	
0.006614	6.94	51.84	39.28		0.56				
mai nstem	43.0	100yr (enchr)		360.00	58.40	64.29	62.63	64.99	
0.005925	6.72	53.58	40.29		0.54				
mai nstem	43.0	10yr		210.00	58.40	62.93	61.56	63.39	
0.005994	5.43	38.64	21.76		0.51				
mai nstem	43.0	50yr		300.00	58.40	63.64	62.23	64.29	
0.006631	6.46	46.43	32.10		0.55				
mai nstem	43.0	500yr		565.00	58.40	65.70	63.76	66.74	
0.006244	8.17	69.13	67.41		0.57				
mai nstem	42.0	100yr		360.00	58.40	63.37	62.63	64.43	
0.011860	8.27	43.51	28.22		0.73				
mai nstem	42.0	100yr (enchr)		360.00	58.40	63.25	62.58	64.43	
0.021728	8.74	41.19	10.18		0.77				
mai nstem	42.0	10yr		210.00	58.40	61.58	61.56	62.75	

				Goodwies Dari en. rep					
0.003887	7.54	65.68	15.00		0.63				
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	52.17	51.05	52.68
0.002779	5.71	50.81	15.00		0.55				
mainstem	40.0		50yr	410.00		48.20	52.77	51.64	53.50
0.003477	6.86	59.81	15.00		0.60				
mainstem	40.0		500yr	780.00		48.20	54.22	53.17	55.64
0.005281	9.56	81.57	15.00		0.72				

mainstem 39.15

Bridge

mainstem	38.1		100yr	495.00		47.80	52.63	51.84	53.67
0.010978	8.20	60.38	51.69		0.72				
mainstem	38.1		100yr (encl)	495.00		47.80	53.78	51.83	54.41
0.007577	6.37	77.65	15.00		0.49				
mainstem	38.1		10yr	290.00		47.80	51.96	50.83	52.47
0.006906	5.76	50.34	42.78		0.55				
mainstem	38.1		50yr	410.00		47.80	52.41	51.46	53.21
0.009045	7.17	57.15	48.03		0.65				
mainstem	38.1		500yr	780.00		47.80	53.28	52.98	55.20
0.016560	11.12	70.12	65.17		0.91				

mainstem	38.0		100yr	495.00		47.80	51.70	51.70	52.89
0.020128	9.32	75.11	39.78		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	50.82	50.82	51.77
0.021987	8.08	44.72	29.60		0.94				
mainstem	38.0		50yr	410.00		47.80	51.38	51.38	52.46
0.020628	8.79	63.12	36.13		0.93				
mainstem	38.0		500yr	780.00		47.80	52.85	52.85	54.05
0.014484	9.76	129.02	56.29		0.83				

mainstem	37.0		100yr	495.00		41.10	45.92		46.10
0.002488	4.04	240.15	149.03		0.37				
mainstem	37.0		100yr (encl)	495.00		41.10	46.14		46.47
0.003623	4.88	119.06	31.00		0.43				
mainstem	37.0		10yr	290.00		41.10	44.51		44.83
0.006173	4.79	79.43	65.52		0.54				
mainstem	37.0		50yr	410.00		41.10	45.36		45.59
0.003605	4.37	163.96	122.59		0.43				
mainstem	37.0		500yr	780.00		41.10	47.79		47.85

0.000772	2.95	695.92	469.16	Goodwies	Dari en. rep	0.22			
mainstem	36.4	100yr		495.00	40.60	45.56	43.47	45.95	
0.001316	5.01	98.78	27.13	495.00	0.41	40.60	46.03	43.47	46.35
mainstem	36.4	100yr (encr)		495.00	0.35	40.60	44.44	42.70	44.68
0.001631	4.55	108.74	21.20	290.00	0.36	40.60	45.14	43.16	45.47
mainstem	36.4	10yr		410.00	0.39	40.60	47.65	44.37	47.80
0.001126	3.86	75.10	25.68	780.00	0.25	40.60			
mainstem	36.4	50yr							
0.001236	4.56	89.89	26.58						
mainstem	36.4	500yr							
0.000419	3.62	292.92	266.43						

mainstem	36.25			Bridge					
mainstem	36.1	100yr		495.00	40.60	45.46	43.47	45.86	
0.001420	5.13	96.55	26.99	495.00	0.42	40.60	45.87	43.47	46.21
mainstem	36.1	100yr (encr)		495.00	0.37	40.60	44.37	42.70	44.61
0.001793	4.70	105.24	21.20	290.00	0.37	40.60	45.05	43.16	45.39
mainstem	36.1	10yr		410.00	0.40	40.60	46.60	44.38	47.09
0.001207	3.94	73.56	25.58	780.00	0.41	40.60			
mainstem	36.1	50yr							
0.001327	4.66	88.00	26.47						
mainstem	36.1	500yr							
0.001243	5.57	141.45	28.69						

mainstem	35.0	100yr		495.00	40.30	45.24			45.75
0.003371	5.73	87.29	38.21	495.00	0.59	40.30	45.81		46.12
mainstem	35.0	100yr (encr)		495.00	0.43	40.30	43.97		44.45
0.001699	4.57	114.06	50.47	290.00	0.67	40.30	44.75		45.26
mainstem	35.0	10yr		410.00	0.62	40.30	46.72		46.89
0.004822	5.58	51.93	23.85	780.00	0.32	40.30			
mainstem	35.0	50yr							
0.003960	5.68	72.17	27.77						
mainstem	35.0	500yr							
0.000903	3.88	264.31	313.45						

mainstem	34.0	100yr		495.00	38.80	45.17			45.25
0.000330	2.35	243.71	136.17	495.00	0.20	38.80	45.62		45.74
mainstem	34.0	100yr (encr)		495.00	0.23	38.80	43.33		43.50
0.000437	2.87	174.97	40.00	290.00		38.80			
mainstem	34.0	10yr							

				Goodwies Dari en. rep				
0.001199	3.30	87.84	30.90		0.35			
mainstem	34.0		50yr	410.00		38.80	44.40	44.53
0.000738	3.09	149.77	105.11		0.28			
mainstem	34.0		500yr	780.00		38.80	46.70	46.73
0.000103	1.59	558.98	384.42		0.11			
mainstem	33.4		100yr	495.00		38.70	45.01	41.67
0.000818	3.59	184.52	150.02		0.26			45.18
mainstem	33.4		100yr (encl)	495.00		38.70	45.63	41.67
0.000306	2.34	294.05	187.29		0.16			45.69
mainstem	33.4		10yr	290.00		38.70	43.20	40.82
0.001276	3.63	79.93	18.38		0.31			43.41
mainstem	33.4		50yr	410.00		38.70	44.16	41.34
0.001350	4.18	101.17	46.00		0.32			44.43
mainstem	33.4		500yr	780.00		38.70	46.69	42.67
0.000134	1.71	629.44	468.57		0.11			46.72
mainstem	33.25			Bridge				
mainstem	33.1		100yr	495.00		38.70	44.68	41.67
0.001255	4.29	139.73	113.77		0.31			44.94
mainstem	33.1		100yr (encl)	495.00		38.70	45.50	41.67
0.000380	2.58	264.46	178.57		0.18			45.58
mainstem	33.1		10yr	290.00		38.70	43.10	40.82
0.001368	3.72	78.05	18.38		0.32			43.31
mainstem	33.1		50yr	410.00		38.70	43.89	41.34
0.001624	4.43	92.60	18.64		0.35			44.19
mainstem	33.1		500yr	780.00		38.70	46.68	42.68
0.000136	1.72	624.11	466.46		0.11			46.71
mainstem	32.0		100yr	495.00		38.30	44.74	41.67
0.000325	2.63	261.02	182.67		0.20			44.82
mainstem	32.0		100yr (encl)	495.00		38.30	45.09	41.67
0.001042	4.90	102.86	20.00		0.35			45.58
mainstem	32.0		10yr	290.00		38.30	43.07	40.82
0.001025	3.68	96.73	54.30		0.33			43.31
mainstem	32.0		50yr	410.00		38.30	43.93	41.34
0.000684	3.43	150.54	71.05		0.28			44.06
mainstem	32.0		500yr	780.00		38.30	46.68	42.67
0.000062	1.40	742.26	285.00		0.09			46.70
mainstem	31.0		100yr	495.00		37.60	44.64	41.67

				Goodwi ves	Dari en. rep			
0.000718	2.99	289.41	205.81		0.22			
mainstem	31.0		100yr (encr)	495.00	37.60	44.84		45.19
0.001859	4.92	111.56	19.94		0.35			
mainstem	31.0		10yr	290.00	37.60	42.81		42.99
0.001761	3.66	99.78	44.43		0.32			
mainstem	31.0		50yr	410.00	37.60	43.73		43.88
0.001333	3.65	157.84	74.26		0.29			
mainstem	31.0		500yr	780.00	37.60	46.66		46.68
0.000173	1.79	855.19	346.72		0.11			
mainstem	30.0		100yr	495.00	38.50	43.88		44.54
0.002689	6.52	75.94	14.80		0.51			
mainstem	30.0		100yr (encr)	495.00	38.50	44.45		44.98
0.002011	5.87	84.37	14.80		0.43			
mainstem	30.0		10yr	290.00	38.50	42.25		42.74
0.002723	5.59	51.88	14.80		0.53			
mainstem	30.0		50yr	410.00	38.50	42.96		43.63
0.003209	6.57	62.37	14.80		0.56			
mainstem	30.0		500yr	780.00	38.50	45.64		46.55
0.002982	7.65	102.01	14.80		0.51			
mainstem	29.0		100yr	495.00	37.80	43.96		44.24
0.001689	4.69	186.02	85.56		0.37			
mainstem	29.0		100yr (encr)	495.00	37.80	44.39		44.84
0.001970	5.36	94.42	18.00		0.41			
mainstem	29.0		10yr	290.00	37.80	42.12	40.97	42.54
0.004012	5.27	67.74	43.04		0.53			
mainstem	29.0		50yr	410.00	37.80	42.92	41.78	43.35
0.003209	5.51	109.54	61.52		0.50			
mainstem	29.0		500yr	780.00	37.80	45.94		46.11
0.000824	4.11	408.29	151.43		0.28			
mainstem	28.0		100yr	495.00	37.80	43.39	42.02	44.07
0.003977	6.62	74.73	72.29		0.56			
mainstem	28.0		100yr (encr)	495.00	37.80	44.11	42.00	44.73
0.004434	6.33	78.25	14.40		0.48			
mainstem	28.0		10yr	290.00	37.80	40.96	40.96	42.16
0.015714	8.81	32.91	14.91		1.00			
mainstem	28.0		50yr	410.00	37.80	41.68	41.68	42.97
0.014867	9.12	44.94	32.71		1.00			
mainstem	28.0		500yr	780.00	37.80	45.99	43.06	46.05
0.000109	1.50	416.25	153.90		0.10			

mainstem 27.5

Cul vert

Goodwi vesDari en. rep

mai nstem	27. 1	100yr		495. 00		34. 70	41. 19	38. 62	41. 60
0. 001673	5. 18	95. 55	32. 32		0. 39				
mai nstem	27. 1	100yr (enchr)		495. 00		34. 70	41. 84	38. 62	42. 18
0. 001916	4. 63	106. 97	17. 40		0. 33				
mai nstem	27. 1	10yr		290. 00		34. 70	39. 83	37. 75	40. 08
0. 001483	4. 03	71. 87	22. 61		0. 35				
mai nstem	27. 1	50yr		410. 00		34. 70	40. 68	38. 28	41. 03
0. 001585	4. 73	86. 72	28. 33		0. 37				
mai nstem	27. 1	500yr		780. 00		34. 70	42. 55	39. 66	43. 01
0. 001538	5. 76	166. 06	43. 02		0. 39				
mai nstem	27. 0	100yr		495. 00		34. 70	41. 15		41. 50
0. 001513	4. 90	113. 43	32. 00		0. 37				
mai nstem	27. 0	100yr (enchr)		495. 00		34. 70	41. 74		42. 08
0. 002007	4. 71	105. 17	17. 40		0. 34				
mai nstem	27. 0	10yr		290. 00		34. 70	39. 76		40. 01
0. 001491	4. 00	76. 53	22. 47		0. 35				
mai nstem	27. 0	50yr		410. 00		34. 70	40. 63		40. 94
0. 001502	4. 57	97. 89	27. 93		0. 36				
mai nstem	27. 0	500yr		780. 00		34. 70	42. 45		42. 93
0. 001630	5. 87	161. 89	42. 25		0. 40				
mai nstem	26. 0	100yr		495. 00		32. 30	40. 66		40. 87
0. 000723	4. 34	195. 40	51. 49		0. 29				
mai nstem	26. 0	100yr (enchr)		495. 00		32. 30	41. 01		41. 35
0. 000942	5. 12	125. 10	20. 00		0. 34				
mai nstem	26. 0	10yr		290. 00		32. 30	39. 28		39. 43
0. 000664	3. 58	130. 37	44. 02		0. 27				
mai nstem	26. 0	50yr		410. 00		32. 30	40. 14		40. 33
0. 000702	4. 06	169. 91	47. 77		0. 29				
mai nstem	26. 0	500yr		780. 00		32. 30	41. 97		42. 22
0. 000760	5. 01	278. 01	95. 65		0. 31				
mai nstem	24. 0	100yr		495. 00		33. 50	37. 75	37. 75	39. 14
0. 021812	9. 89	65. 83	32. 17		0. 89				
mai nstem	24. 0	100yr (enchr)		495. 00		33. 50	38. 37		39. 44
0. 013594	8. 63	71. 74	20. 00		0. 72				
mai nstem	24. 0	10yr		290. 00		33. 50	36. 65	36. 65	37. 80
0. 026612	8. 70	37. 44	20. 94		0. 93				
mai nstem	24. 0	50yr		410. 00		33. 50	37. 35	37. 35	38. 64
0. 022905	9. 41	53. 90	27. 11		0. 90				
mai nstem	24. 0	500yr		780. 00		33. 50	38. 94	38. 94	40. 48

				Goodwi vesDari en. rep				
0.018174	10.82	114.33	51.66		0.85			
mai nstem	23.1	100yr		495.00	32.70	37.83	36.10	37.93
0.000281	2.64	203.32	93.83	495.00	0.22			
mai nstem	23.1	100yr (enchr)		495.00	32.70	38.42	36.10	38.63
0.000693	4.02	145.37	35.17		0.31			
mai nstem	23.1	10yr		290.00	32.70	36.97	35.23	37.04
0.000322	2.46	139.66	89.62		0.22			
mai nstem	23.1	50yr		410.00	32.70	37.58	35.75	37.66
0.000266	2.47	184.31	92.58		0.21			
mai nstem	23.1	500yr		780.00	32.70	38.61	36.80	38.71
0.000245	2.73	320.11	97.61		0.21			
mai nstem	23.0	100yr		495.00	32.70	37.82	36.10	37.92
0.000285	2.65	202.59	93.78	495.00	0.22			
mai nstem	23.0	100yr (enchr)		495.00	32.70	38.48	36.10	38.55
0.000150	1.88	252.23	75.37		0.14			
mai nstem	23.0	10yr		290.00	32.70	36.96	35.23	37.02
0.000328	2.48	138.79	89.56		0.23			
mai nstem	23.0	50yr		410.00	32.70	37.57	35.75	37.65
0.000269	2.48	183.62	92.54		0.21			
mai nstem	23.0	500yr		780.00	32.70	38.60	36.80	38.69
0.000247	2.74	319.34	97.57		0.21			
mai nstem	22.15			Bri dge				
mai nstem	21.1	100yr		495.00	31.30	37.24	34.96	37.30
0.000530	1.95	276.70	124.95	495.00	0.15			
mai nstem	21.1	100yr (enchr)		495.00	31.30	37.93	34.96	37.96
0.000195	1.28	365.56	131.89		0.09			
mai nstem	21.1	10yr		290.00	31.30	36.62	34.10	36.67
0.000637	1.96	175.12	114.94		0.16			
mai nstem	21.1	50yr		410.00	31.30	37.05	34.62	37.09
0.000502	1.85	252.83	121.83		0.15			
mai nstem	21.1	500yr		780.00	31.30	38.00	36.19	38.08
0.000446	1.96	375.75	137.13		0.14			
mai nstem	21.0	100yr		495.00	31.30	37.22		37.28
0.000546	1.97	274.40	124.65	495.00	0.15			
mai nstem	21.0	100yr (enchr)		495.00	31.30	37.41		37.83
0.005376	5.18	95.63	18.00		0.40			
mai nstem	21.0	10yr		290.00	31.30	36.60		36.64

				Goodwi vesDari en. rep			
0.000578	1.86	200.32	114.67		0.15		
mainstem	21.0			410.00	31.30	37.03	37.08
0.000518	1.87	250.66	121.54		0.15		
mainstem	21.0			780.00	31.30	37.98	38.06
0.000454	1.97	373.75	136.89		0.14		
mainstem	20.0						
0.003357	4.92	121.50	65.84	495.00	30.70	36.63	36.99
mainstem	20.0		100yr (encl)	495.00	30.70	36.69	37.06
0.003286	4.92	108.67	38.06		0.44		
mainstem	20.0		10yr	290.00	30.70	36.29	36.45
0.001638	3.23	100.41	57.73		0.31		
mainstem	20.0		50yr	410.00	30.70	36.58	36.84
0.002402	4.13	118.77	64.88		0.38		
mainstem	20.0		500yr	780.00	30.70	36.94	35.98
0.006118	7.01	143.53	73.09		0.61		
mainstem	19.4		100yr	495.00	29.40	36.54	36.20
0.004625	5.20	164.38	123.12		0.36		
mainstem	19.4		100yr (encl)	495.00	29.40	36.64	36.20
0.003879	4.81	176.91	126.08		0.33		
mainstem	19.4		10yr	290.00	29.40	36.19	33.79
0.002967	4.01	123.72	112.09		0.29		
mainstem	19.4		50yr	410.00	29.40	36.52	36.04
0.003270	4.36	162.29	122.62		0.31		
mainstem	19.4		500yr	780.00	29.40	36.92	36.60
0.005996	6.16	214.11	134.49		0.42		
mainstem	19.25						
				Bri dge			
mainstem	18.1		100yr	495.00	29.30	35.60	35.35
0.005719	6.24	135.71	96.10		0.44		
mainstem	18.1		100yr (encl)	495.00	29.30	36.60	35.35
0.001420	3.44	245.48	123.32		0.23		
mainstem	18.1		10yr	290.00	29.30	35.09	32.99
0.004335	5.13	90.26	81.35		0.38		
mainstem	18.1		50yr	410.00	29.30	36.48	35.14
0.001131	3.04	231.90	121.56		0.20		
mainstem	18.1		500yr	780.00	29.30	36.24	35.84
0.005665	6.63	202.90	114.48		0.45		
mainstem	18.0		100yr	495.00	29.30	35.17	35.17
							35.63

				Goodwi ves	Dari en. rep				
0.007572	6.84	133.12	140.89		0.50				
mainstem	18.0		100yr (enchr)	495.00		29.30	36.53	35.30	36.62
0.001335	3.31	250.54	121.14		0.22				
mainstem	18.0		10yr	290.00		29.30	33.66		34.78
0.017576	8.66	35.80	9.33		0.74				
mainstem	18.0		50yr	410.00		29.30	34.12	33.82	35.90
0.025464	10.95	41.11	26.08		0.89				
mainstem	18.0		500yr	780.00		29.30	36.13	35.54	36.30
0.003203	4.93	287.08	176.26		0.34				
mainstem	17.0		100yr	495.00		29.20	33.99	33.99	34.96
0.023700	8.85	68.58	33.56		0.75				
mainstem	17.0		100yr (enchr)	495.00		29.20	34.14	34.14	35.96
0.037093	11.19	48.03	13.84		0.93				
mainstem	17.0		10yr	290.00		29.20	33.03	33.03	33.96
0.023932	8.19	41.32	23.49		0.77				
mainstem	17.0		50yr	410.00		29.20	33.67	33.67	34.60
0.023197	8.54	58.34	30.17		0.74				
mainstem	17.0		500yr	780.00		29.20	34.91	34.91	35.83
0.021769	9.00	108.45	57.91		0.70				
mainstem	16.0		100yr	495.00		29.20	33.82		33.89
0.001400	2.92	256.22	133.39		0.25				
mainstem	16.0		100yr (enchr)	495.00		29.20	34.03		34.30
0.003786	4.96	127.31	40.00		0.41				
mainstem	16.0		10yr	290.00		29.20	32.85		32.94
0.002249	3.12	141.82	101.88		0.30				
mainstem	16.0		50yr	410.00		29.20	33.42		33.49
0.001731	3.04	204.62	120.20		0.27				
mainstem	16.0		500yr	780.00		29.20	35.06		35.11
0.000758	2.55	444.70	169.86		0.19				
mainstem	15.0		100yr	495.00		29.10	33.38		33.56
0.002195	3.69	191.73	106.28		0.37				
mainstem	15.0		100yr (enchr)	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
0.005753	4.26	81.78	61.43		0.54				
mainstem	15.0		50yr	410.00		29.10	32.87		33.07
0.003005	3.84	140.34	88.74		0.41				
mainstem	15.0		500yr	780.00		29.10	34.77		34.92
0.001271	3.58	351.40	118.87		0.30				
mainstem	14.4		100yr	495.00		26.70	32.82	31.32	33.27

				Goodwi vesDari en. rep				
0.004653	5.51	103.14	61.25	0.49				
mainstem	14.4		100yr (encr)	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
0.007110	5.22	55.55	21.10	0.57				
mainstem	14.4		50yr	410.00	26.70	32.25	30.91	32.72
0.005725	5.51	76.10	34.59	0.53				
mainstem	14.4		500yr	780.00	26.70	34.60	32.53	34.81
0.001716	4.29	294.65	150.98	0.32				

mainstem 14.25 Bridge

mainstem	14.1		100yr	495.00	26.70	31.32	31.32	32.63
0.022456	9.19	53.85	20.60	1.00				
mainstem	14.1		100yr (encr)	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	30.56	30.34	31.39
0.016976	7.31	39.66	17.75	0.86				
mainstem	14.1		50yr	410.00	26.70	30.91	30.91	32.15
0.022797	8.93	45.92	18.51	1.00				
mainstem	14.1		500yr	780.00	26.70	32.53	32.53	33.93
0.015488	9.56	87.71	47.88	0.88				

mainstem	13.0		100yr	495.00	27.50	30.84		31.17
0.003456	5.12	144.33	93.96	0.52				
mainstem	13.0		100yr (encr)	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
0.003461	4.36	89.76	75.03	0.50				
mainstem	13.0		50yr	410.00	27.50	30.60		30.90
0.003441	4.83	122.59	86.91	0.51				
mainstem	13.0		500yr	780.00	27.50	31.54		31.91
0.003347	5.80	216.68	114.31	0.53				

mainstem	12.0		100yr	495.00	22.20	25.54	25.54	26.48
0.015576	7.78	65.59	38.03	0.98				
mainstem	12.0		100yr (encr)	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
0.017974	6.63	43.91	33.57	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	26.27	26.27	27.44

				Goodwi ves	Dari en. rep				
0.013847	8.78	94.97	44.03		0.97				
mai nstem	11.9	100yr		495.00	16.30	21.75			22.02
0.001749	4.15	119.21	29.92	0.37	16.30	21.75			22.01
mai nstem	11.9	100yr (encl)		495.00	16.30	21.75			22.01
0.001748	4.16	119.08	29.76	0.37	16.30	21.75			22.01
mai nstem	11.9	10yr		290.00	16.30	20.96			21.10
0.001077	3.00	96.52	27.57	0.28	16.30	21.46			21.67
mai nstem	11.9	50yr		410.00	16.30	21.46			21.67
0.001476	3.71	110.58	29.04	0.33	16.30	22.51			22.97
mai nstem	11.9	500yr		780.00	16.30	22.51			22.97
0.002639	5.46	142.89	32.21	0.46					
mai nstem	11.0	100yr		495.00	17.50	21.02	20.23		21.31
0.004644	4.97	153.92	112.03	0.51	17.50	21.01	20.23		21.31
mai nstem	11.0	100yr (encl)		495.00	17.50	21.01	20.23		21.31
0.004706	4.99	152.57	103.20	0.51	17.50	20.39	19.71		20.59
mai nstem	11.0	10yr		290.00	17.50	20.39	19.71		20.59
0.004298	4.06	100.82	69.41	0.47	17.50	20.78	20.05		21.04
mai nstem	11.0	50yr		410.00	17.50	20.78	20.05		21.04
0.004535	4.64	130.10	84.90	0.50	17.50	21.70	20.82		22.05
mai nstem	11.0	500yr		780.00	17.50	21.70	20.82		22.05
0.004649	5.71	247.74	150.75	0.53					
mai nstem	10.0	100yr		495.00	16.10	18.38	18.38		19.16
0.020832	7.10	71.89	50.15	1.00	16.10	18.40	18.40		19.16
mai nstem	10.0	100yr (encl)		495.00	16.10	18.40	18.40		19.16
0.020126	7.03	72.69	50.11	0.98	16.10	17.91	17.91		18.46
mai nstem	10.0	10yr		290.00	16.10	17.91	17.91		18.46
0.024128	6.00	48.78	46.67	1.01	16.10	18.19	18.19		18.89
mai nstem	10.0	50yr		410.00	16.10	18.19	18.19		18.89
0.022048	6.70	62.50	48.77	1.01	16.10	18.95	18.95		19.96
mai nstem	10.0	500yr		780.00	16.10	18.95	18.95		19.96
0.018132	8.14	102.17	57.02	0.98					
mai nstem	9.9	100yr		495.00	9.00	14.12			14.38
0.002488	4.07	121.74	35.26	0.39	9.00	14.13			14.40
mai nstem	9.9	100yr (encl)		495.00	9.00	14.13			14.40
0.002552	4.17	118.81	32.27	0.38	9.00	13.31			13.45
mai nstem	9.9	10yr		290.00	9.00	13.31			13.45
0.001829	3.09	93.91	32.99	0.32	9.00	13.79			14.01
mai nstem	9.9	50yr		410.00	9.00	13.79			14.01
0.002279	3.72	110.27	34.35	0.37	9.00	15.25			15.60
mai nstem	9.9	500yr		780.00	9.00	15.25			15.60

				Goodwi vesDari en. rep					
0.002651	4.78	163.19	38.40		0.41				
mainstem	9.0		100yr	495.00		7.30	13.03		13.58
0.005967	5.95	83.26	20.76		0.52	7.30	13.05		13.59
mainstem	9.0		100yr (encl)	495.00		7.30	13.05		13.59
0.005880	5.92	83.64	20.64		0.52	7.30	12.79		13.01
mainstem	9.0		10yr	290.00		7.30	12.79		13.01
0.002442	3.70	78.42	20.65		0.33	7.30	12.96		13.35
mainstem	9.0		50yr	410.00		7.30	12.96		13.35
0.004318	5.01	81.76	20.73		0.44	7.30	13.20		14.45
mainstem	9.0		500yr	780.00		7.30	13.20		14.45
0.013109	8.98	86.82	20.85		0.78				
mainstem	8.1		100yr	495.00		2.60	13.39	4.62	13.39
0.000011	0.66	864.46	123.74		0.04	2.60	13.40	4.62	13.41
mainstem	8.1		100yr (encl)	495.00		2.60	13.40	4.62	13.41
0.000011	0.66	866.42	123.99		0.04	2.60	12.93	4.14	12.93
mainstem	8.1		10yr	290.00		2.60	12.93	4.14	12.93
0.000005	0.41	809.91	117.29		0.02	2.60	13.21	4.44	13.21
mainstem	8.1		50yr	410.00		2.60	13.21	4.44	13.21
0.000008	0.56	842.90	120.92		0.03	2.60	14.02	5.11	14.03
mainstem	8.1		500yr	780.00		2.60	14.02	5.11	14.03
0.000021	0.95	949.88	166.85		0.05				
mainstem	8.0		100yr	495.00		2.60	13.39	4.62	13.39
0.000011	0.66	864.40	123.73		0.04	2.60	13.40	4.62	13.41
mainstem	8.0		100yr (encl)	495.00		2.60	13.40	4.62	13.41
0.000011	0.66	866.37	123.98		0.04	2.60	12.93	4.14	12.93
mainstem	8.0		10yr	290.00		2.60	12.93	4.14	12.93
0.000005	0.41	809.89	117.29		0.02	2.60	13.21	4.44	13.21
mainstem	8.0		50yr	410.00		2.60	13.21	4.44	13.21
0.000008	0.56	842.86	120.92		0.03	2.60	14.02	5.11	14.03
mainstem	8.0		500yr	780.00		2.60	14.02	5.11	14.03
0.000021	0.95	949.74	166.71		0.05				
mainstem	7.5			Bri dge					
mainstem	7.1		100yr	495.00		2.60	7.84		7.89
0.000237	1.80	288.78	72.77		0.15	2.60	7.86		7.91
mainstem	7.1		100yr (encl)	495.00		2.60	7.86		7.91
0.000289	1.92	262.33	59.00		0.16	2.60	6.56		6.60
mainstem	7.1		10yr	290.00		2.60	6.56		6.60

				GoodwiesDari en. rep				
0.000261	1.52	198.88	68.39		0.15			
mainstem	7.1	50yr		410.00	2.60	7.31	7.36	
0.000252	1.71	251.10	70.68		0.15			
mainstem	7.1	500yr		780.00	2.60	9.39	9.44	
0.000203	2.02	420.29	98.22		0.14			
mainstem	7.0	100yr		495.00	2.60	7.82	7.87	
0.000240	1.81	287.61	72.53		0.15			
mainstem	7.0	100yr (encl)		495.00	2.60	7.84	7.89	
0.000237	1.80	288.87	71.43		0.15			
mainstem	7.0	10yr		290.00	2.60	6.54	6.58	
0.000266	1.53	197.66	68.34		0.15			
mainstem	7.0	50yr		410.00	2.60	7.30	7.34	
0.000256	1.72	249.89	70.63		0.15			
mainstem	7.0	500yr		780.00	2.60	9.37	9.43	
0.000204	2.03	418.93	97.96		0.14			
mainstem	6.0	100yr		495.00	1.60	7.09	5.25	7.67
0.002539	6.08	81.45	85.55		0.49			
mainstem	6.0	100yr (encl)		495.00	1.60	7.11	5.25	7.68
0.004283	6.05	81.78	16.80		0.48			
mainstem	6.0	10yr		290.00	1.60	6.15	4.34	6.45
0.001796	4.42	65.56	78.54		0.39			
mainstem	6.0	50yr		410.00	1.60	6.70	4.89	7.16
0.002313	5.48	74.80	82.61		0.46			
mainstem	6.0	500yr		780.00	1.60	8.16	6.31	9.12
0.003249	7.85	99.36	98.86		0.57			
mainstem	5.5							
				Bri dge				
mainstem	5.1	100yr		495.00	1.60	6.37	5.25	7.16
0.004366	7.15	69.22	80.15		0.62			
mainstem	5.1	100yr (encl)		495.00	1.60	6.40	5.25	7.18
0.006708	7.09	69.86	16.80		0.61			
mainstem	5.1	10yr		290.00	1.60	5.88	4.35	6.23
0.002276	4.75	61.07	76.56		0.44			
mainstem	5.1	50yr		410.00	1.60	6.20	4.89	6.79
0.003439	6.17	66.41	78.91		0.55			
mainstem	5.1	500yr		780.00	1.60	6.72	6.31	8.39
0.008223	10.37	75.20	82.79		0.86			
mainstem	5.0	100yr		495.00	1.60	6.54	6.65	

				Goodwi ves	Dari en. rep			
0.000818	3.18	200.30	81.48		0.27			
mainstem	5.0		100yr (encr)	495.00	1.60	6.55		6.66
0.000851	3.25	193.62	74.11		0.28			
mainstem	5.0		10yr	290.00	1.60	5.91		5.98
0.000631	2.51	150.08	76.77		0.23			
mainstem	5.0		50yr	410.00	1.60	6.31		6.40
0.000748	2.93	181.03	79.71		0.26			
mainstem	5.0		500yr	780.00	1.60	7.26		7.42
0.000956	3.81	260.53	86.78		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			