EXHIBIT 5.3-1
URS Consultants, Inc.
CALCULATION COVER SHEET

Client: City CS/ CDOT Project Name: Powers Blvd
Project/Calculation Number: 6742130
Title: HEC-2 Runs
Total number of pages (including cover sheet): 33
Total number of computer runs: 3
Prepared by: Ralph LoCascio Date: 7/2/97
Checked by: _____ Date: _____

Description and Purpose: HEC-2 modeling for Cottonwood Creek flows. Used To get 100 year WSE & 500 year WSE for Bridge crossing.

Design bases/references/assumptions:

- Boss Hec-2 used with Fims Topo Autocad file.
- Calibration Run to match FEMA's 100 year WSE in same portion of creek.
- 100 year Flow was same used by fema
- 500 year Flow was double the 100-year

Remarks/conclusions:

Calculation Approved by: _____
Project Manager/Date

Revision No.:	Description of Revision:	Approved by:

Project Manager/Date

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BOSS HEC-2 for AutoCAD (tm)
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Version : 2.0
Serial Number : 20778

Licensed to URS Consultants, Inc.

PROGRAM ORIGIN :

BOSS HEC-2 for AutoCAD is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : POWERS BLVD
PROJECT NUMBER : 6742130
DESCRIPTION : FLOOD ANALYSIS FOR BRIDGE CROSSING-SUBCR - Calibration Run
ENGINEER : RALPH LOCASCIO
DATE OF RUN : 1/07/1997
TIME OF RUN : 12:04 pm

T1 6742130
T2 POWERS BLVD
T3 FLOOD ANALYSIS FOR BRIDGE CROSSING-SUBCRITICAL

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q
	-10	2						6423
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW
	-1		-1					-6

THIS SECTION CORRESPONDS WITH FEMA CROSS SECTION "AX" FOR COTTONWOOD CREEK

STATUS: Analyzing profile 1.

STATUS: Analyzing cross-section reach 400.000.

Cross Section Number SECNO	Left Overbank Manning XNL	Channel Manning n XNCH	Right Overbank Manning XNR	Flow Depth DEPTH (ft)	Water Surface Elevation CWSEL (ft MSL)	Critical W. S. Elevation CRIWS (ft MSL)	Known W. S. Elevation WSELK (ft MSL)
Energy Gradient SLOPE (ft/ft)	Left Overbank Length XLOBL (ft)	Channel Length XLCH (ft)	Right Overbank Length XLOBR (ft)	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss OLOSS (ft)
Cummul-ative Volume VOL (acre-ft)	Left Overbank Area ALOB (sq ft)	Channel Area ACH (sq ft)	Right Overbank Area AROB (sq ft)	Bridge Deck Area CORAR (sq ft)	Left Bank Elevation LTBNK (ft MSL)	Right Bank Elevation RTBNK (ft MSL)	Number of Balance Trials ITRIAL
Total Flow Q (cfs)	Left Overbank Flow QLOB (cfs)	Channel Flow QCH (cfs)	Right Overbank Flow QROB (cfs)	Computed W. S. Top Width TOPWD (ft)	Left W. S. Station SSTA (ft)	Right W. S. Station ENDST (ft)	Number of Crit Dpth Trials IDC
Flow Travel Time TIME (hrs)	Left Overbank Velocity VLOB (ft/s)	Channel Mean Velocity VCH (ft/s)	Right Overbank Velocity VROB (ft/s)	Length Weighted Manning n WTN	Cummul. Surface Area TWA (acres)	Minimum C. S. Elevation ELMIN (ft MSL)	Number of Other Trials ICONT
400.000	0.000	0.080	0.000	9.40	6815.40	0.00	6815.40
0.019236	0	0	0	6816.65	1.25	0.00	0.00
0.00	0	717	0	0.00	6822.00	6820.00	0
6423	0	6423	0	107.4	468.79	576.19	0
0.00	0.00	8.96	0.00	0.000	0.0	6806.00	0

STATUS: Analyzing cross-section reach 500.000.

500.000	0.000	0.080	0.000	9.12	6817.12	0.00	0.00
0.018186	83	91	104	6818.35	1.24	1.71	0.00
1.51	0	719	0	0.00	6828.00	6826.00	2
6423	0	6422	0	101.6	523.18	624.79	0
0.00	0.00	8.92	0.00	0.000	0.2	6808.00	0

STATUS: Analyzing cross-section reach 600.000.

THIS SECTION CORRESPONDS WITH FEMA CROSS

SECTION "AX" FOR COTTONWOOD CREEK

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
600.000	0.000	0.080	0.000	9.01	6819.01	0.00	0.00
0.023428	137	94	54	6820.29	1.28	1.94	0.00
3.05	0	707	0	0.00	6844.00	6846.00	2
6423	0	6422	0	122.1	455.86	578.01	0
0.01	0.00	9.07	0.00	0.000	0.5	6810.00	0

STATUS: Analyzing cross-section reach 700.000.

700.000	0.000	0.080	0.000	11.02	6821.02	0.00	0.00
0.017535	98	97	99	6822.26	1.24	1.97	0.00
4.65	0	718	0	0.00	6840.00	6840.00	2
6423	0	6423	0	98.8	485.75	584.59	0
0.01	0.00	8.93	0.00	0.000	0.7	6810.00	0

STATUS: Analyzing cross-section reach 800.000.

800.000	0.000	0.080	0.000	10.91	6822.91	0.00	0.00
0.014105	121	100	105	6823.84	0.93	1.58	0.00
6.44	0	829	0	0.00	6836.00	6830.00	2
6423	0	6422	0	122.8	562.38	685.17	0
0.01	0.00	7.74	0.00	0.000	1.0	6812.00	0

STATUS: Analyzing cross-section reach 900.000.

900.000	0.000	0.080	0.000	10.23	6824.23	0.00	0.00
0.016286	104	98	105	6825.33	1.09	1.49	0.00
8.24	0	765	0	0.00	6836.00	6838.00	2
6423	0	6423	0	111.2	478.27	589.44	0
0.02	0.00	8.39	0.00	0.000	1.2	6814.00	0

STATUS: Analyzing cross-section reach 1000.000.

1000.000	0.000	0.080	0.000	9.86	6825.86	0.00	0.00
0.014427	101	100	96	6826.86	1.00	1.53	0.00
10.04	0	799	0	0.00	6838.00	6842.00	2
6423	0	6422	0	114.0	511.43	625.43	0
0.02	0.00	8.03	0.00	0.000	1.5	6816.00	0

STATUS: Analyzing cross-section reach 1100.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.59

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1100.000	0.000	0.080	0.000	9.22	6827.22	0.00	0.00
0.041140	103	104	108	6829.23	2.02	2.37	0.00
11.67	0	563	0	0.00	6848.00	6848.00	2
6423	0	6422	0	102.8	575.20	678.04	0
0.02	0.00	11.40	0.00	0.000	1.7	6818.00	0

STATUS: Analyzing cross-section reach 1200.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.43

1200.000	0.000	0.080	0.000	11.06	6831.06	0.00	0.00
0.020147	138	108	41	6832.25	1.19	3.02	0.00
13.28	0	733	0	0.00	6858.00	6860.00	2
6423	0	6422	0	117.4	575.36	692.75	0
0.03	0.00	8.75	0.00	0.000	2.0	6820.00	0

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 150 : POWERS BLVD
FLOOD ANALYSIS FOR BRIDGE CROSSING-SUBCR
6742130

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevatio (ft MSL) CRIWS
	400.000	0.00	0.00	0.00	6806.00	6423.00	6815.40	0.0
	500.000	91.27	0.00	0.00	6808.00	6423.00	6817.12	0.0
	600.000	94.33	0.00	0.00	6810.00	6423.00	6819.01	0.0
	700.000	97.74	0.00	0.00	6810.00	6423.00	6821.02	0.0
	800.000	100.54	0.00	0.00	6812.00	6423.00	6822.91	0.0
	900.000	98.22	0.00	0.00	6814.00	6423.00	6824.23	0.0
	1000.000	100.05	0.00	0.00	6816.00	6423.00	6825.86	0.0
*	1100.000	104.30	0.00	0.00	6818.00	6423.00	6827.22	0.0
*	1200.000	108.22	0.00	0.00	6820.00	6423.00	6831.06	0.0

SUMMARY PRINTOUT TABLE 150 : POWERS BLVD
FLOOD ANALYSIS FOR BRIDGE CROSSING-SUBCR
6742130

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	400.000	6423.00	6815.40	0.00	0.00	0.00	107.40	0.0
	500.000	6423.00	6817.12	0.00	1.72	0.00	101.61	91.2
	600.000	6423.00	6819.01	0.00	1.90	0.00	122.14	94.3
	700.000	6423.00	6821.02	0.00	2.01	0.00	98.84	97.7
	800.000	6423.00	6822.91	0.00	1.89	0.00	122.79	100.5
	900.000	6423.00	6824.23	0.00	1.32	0.00	111.17	98.2
	1000.000	6423.00	6825.86	0.00	1.62	0.00	114.00	100.0
*	1100.000	6423.00	6827.22	0.00	1.36	0.00	102.84	104.3
	1200.000	6423.00	6831.06	0.00	3.85	0.00	117.40	108.2

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 1100, profile 1, conveyance change outside acceptable range.

Section 1200, profile 1, conveyance change outside acceptable range.

2 Warning and status message(s) generated

ND OF OUTPUT

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J
C      2
C    600THIS SECTION CORRESPONDS WITH FEMA CROSS
C    600SECTION "AX" FOR COTTONWOOD CREEK
        6742130
T2      POWERS BLVD
T3      FLOOD ANALYSIS FOR BRIDGE CROSSING-SUBCRITICAL
J1   -10       2
J2    -1              -1                                                  6423   6815.4
NC  0.05     0.05     0.08                                                  -6
X1   400       40   450.46   585.26
GR  6830      400     6828   414.19     6826   419.55     6824    422.6     6822    425.6
GR  6820   428.49     6818   431.56     6816   434.47     6816   438.34     6818   441.53
GR  6820   444.52     6822   447.49     6822   450.46     6820   456.07     6818   461.43
GR  6816   466.83     6814   473.36     6812   479.24     6810   485.52     6808   490.55
GR  6806   495.93     6806   532.26     6808   537.85     6810   564.75     6812   570.04
GR  6814   573.97     6816   577.14     6818   581.33     6820   585.26     6822   589.74
GR  6824   594.79     6826   598.37     6828   601.25     6830   605.94     6832    610.1
GR  6834   614.97     6836   619.76     6838   624.57     6840   632.55     6842   650.94
NC  0.05     0.05     0.08
X1   500       38   514.32   644.59    83.76    104.88     91.2
GR  6840      400     6838   420.49     6836    437.3     6834   457.63     6832   467.81
GR  6830    479.7     6828   514.32     6826   515.84     6824   517.38     6822   519.08
GR  6820   520.48     6818    522.8     6816   523.67     6814   525.83     6812   527.43
GR  6810   529.31     6808   530.71     6808   566.22     6810   591.78     6812   610.35
GR  6814   617.36     6816   622.37     6818   626.71     6820   630.76     6822   635.44
GR  6824   640.14     6826   644.59     6828   650.06     6830   656.59     6832   662.12
GR  6834   666.66     6836   672.03     6838   677.05     6840      683     6842    688.8
GR  6844   693.58     6846   703.05     6848   717.04
NC  0.05     0.05     0.08
   HIS SECTION CORRESPONDS WITH FEMA CROSS
  SECTION "AX" FOR COTTONWOOD CREEK
X1   600       40   417.08   680.98      137    54.43    94.33
GR  6846      400     6844   417.08     6842   419.91     6840   422.86     6838   425.76
GR  6836   428.68     6834   431.64     6832   434.86     6830   437.71     6828   440.78
GR  6826   443.89     6824   447.23     6822    450.5     6820   454.33     6818   457.44
GR  6816   467.63     6814   479.41     6812   498.98     6810   508.22     6810   538.23
GR  6812   546.44     6814   555.55     6816   564.39     6818   573.71     6820   582.19
GR  6822   592.03     6824   602.58     6826   612.31     6828    620.2     6830   628.53
GR  6832   635.99     6834   641.74     6836    648.6     6838   656.73     6840   663.85
GR  6842   670.49     6844   676.12     6846   680.98     6848    689.4     6850    705.8
NC  0.05     0.05     0.08
X1   700       46      458   684.79     98.6       99    97.74
GR  6846      400     6844   433.52     6842   449.31     6840      458     6838   460.75
GR  6836   463.63     6834   466.33     6832   469.07     6832   469.07     6830   471.93
GR  6828   474.77     6826    477.9     6824   481.12     6822   484.24     6820   487.34
GR  6818    490.4     6816   494.61     6814   512.91     6814   529.27     6814   531.61
GR  6812   542.88     6810   547.85     6810   563.35     6812   570.72     6814   575.12
GR  6816   577.73     6818   580.58     6820   583.19     6822   585.93     6824   603.08
GR  6826   616.45     6828   626.58     6830   636.66     6832   644.09     6834   654.39
GR  6836   663.91     6838   673.77     6840   684.79     6842   695.08     6844   703.61
GR  6846    712.5     6848   720.97     6850   730.69     6852   741.95     6854   753.23
GR  6856   782.21
NC  0.05     0.05     0.08
X1   800       46   513.43   703.65    121.5   105.13   100.54
GR  6850      400     6848      429     6846   453.93     6844   476.68     6842   485.39
GR  6840   490.32     6838   497.33     6836   513.43     6834   516.71     6832   522.32
GR  6830   533.59     6828   542.86     6826   546.89     6824   553.59     6824   556.16
GR  6824   560.51     6822   563.93     6820   566.72     6818   578.95     6816   595.08
GR  6814   624.19     6812   627.06     6812   644.28     6814   648.88     6816   663.86
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GR   6818   669.36    6820   675.17    6822   682.37    6824   688.53    6826    694.5
GR   6828   699.38    6830   703.65    6832   707.56    6834   711.24    6836    742.3
GR   6838   751.89    6840   762.23    6842   773.86    6844    786.4    6846   799.16
GR   6848   810.39    6850   821.71    6852   832.66    6854    843.7    6856   854.75
     6858   882.49
NC   0.05     0.05    0.08
X1    900       38     400   622.33   104.31   105.79    98.22
GR   6836      400    6834   420.81    6832   425.72    6830   430.15    6828   435.19
GR   6828   455.85    6828   465.91    6826   473.46    6824    478.9    6822   485.11
GR   6820   491.55    6818   501.21    6816   534.65    6814   559.37    6814   571.82
GR   6816   575.21    6818   578.53    6820   581.97    6822   585.34    6824      589
GR   6826   592.77    6828   597.57    6830   603.07    6832   606.81    6834   612.44
GR   6836   617.35    6838   622.33    6840   637.86    6842   658.27    6844   677.47
GR   6846    694.8    6848   708.87    6850   723.49    6852   736.94    6854   748.91
GR   6856   760.76    6858   773.12    6860   787.38
NC   0.05     0.05    0.08
X1   1000       50  483.03   650.33   101.86    96.08    100.05
GR   6850      400    6848   415.35    6846   419.01    6844   422.43    6842   426.38
GR   6840   430.54    6838   434.04    6836   439.49    6836   439.51    6836   453.71
GR   6838   458.35    6840   462.91    6840    475.7    6838   483.03    6836   485.91
GR   6834      490    6832   493.77    6830   497.44    6828   508.65    6826   511.26
GR   6824    513.6    6822    516.8    6820   523.03    6818   541.06    6816    554.9
GR   6816   585.91    6818   596.34    6820   603.37    6822   610.69    6824   619.31
GR   6826    625.9    6828   630.29    6830    635.2    6832   639.86    6834   642.32
GR   6836   644.38    6838   646.48    6840   648.32    6842   650.33    6844   652.38
GR   6846   666.13    6848   682.96    6850   697.91    6852   713.14    6854   726.67
GR   6856   738.59    6858   749.98    6860   762.97    6862   778.52    6864   862.47
NC   0.05     0.05    0.08
X1   1100       51  491.66   735.62   103.76   108.48    104.3
GR   6858      400    6856    434.3    6854   446.91    6852   463.51    6850   481.59
     6848   491.66    6848   524.94    6848   526.65    6846   532.29    6844   538.93
GR   6842   545.42    6840   558.85    6838      563    6836    565.3    6834   567.52
GR   6832   569.95    6830   572.18    6828   574.38    6828   574.38    6826   576.48
GR   6826   576.48    6824   578.66    6822   580.73    6820    582.9    6818   584.99
GR   6818   592.58    6818   592.59    6820      607    6822   641.44    6824   663.03
GR   6826   672.67    6828   681.47    6830   689.25    6832   696.28    6834   702.55
GR   6836   707.73    6838   715.22    6840   726.32    6842   730.64    6844   732.29
GR   6846   733.56    6848   735.62    6850   748.13    6852   762.04    6854   774.92
GR   6856   785.18    6858   793.66    6860   801.41    6862   808.46    6864   815.26
GR   6866    849.1
NC   0.05     0.05    0.08
X1   1200       49  531.48   810.56   138.09    41.47    108.22
GR   6864      400    6862   491.17    6860   515.27    6858   531.48    6856    534.7
GR   6854   536.98    6852   539.21    6850   542.32    6848   546.11    6846   550.66
GR   6844    554.7    6842   557.44    6840   560.23    6838   562.03    6836    567.2
GR   6834   570.87    6832   574.01    6830   576.87    6828   579.48    6826   582.09
GR   6824   584.48    6822   590.32    6820    596.5    6820    616.8    6822   625.02
GR   6824   636.76    6826   650.29    6828   666.27    6830   686.33    6832   698.46
GR   6834   705.69    6836    723.2    6838    726.3    6840   730.69    6842   734.58
GR   6844   737.95    6846   742.14    6848   745.87    6850   754.04    6852   764.63
GR   6854   775.82    6856   788.37    6858   799.85    6860   810.56    6862   821.71
GR   6864   833.28    6866    855.9    6868   952.15    6868   971.83
EJ
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EN

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BOSS HEC-2 for AutoCAD (tm)
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Version : 2.0
Serial Number : 20778

Licensed to URS Consultants, Inc.

PROGRAM ORIGIN :

BOSS HEC-2 for AutoCAD is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : POWERS BLVD
PROJECT NUMBER : 6742130
DESCRIPTION : FLOOD ANALYSIS W/BRIDGE - SUBCRITICAL
ENGINEER : RALPH LOCASCIO
DATE OF RUN : 1/09/1997
TIME OF RUN : 2:43 pm

□

T1 6742130
T2 POWERS BLVD
T3 FLOOD ANALYSIS W/BRIDGE - SUBCRITICAL

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS
Q	WSEL	FQ					
	-10	2					
6423	6815.4						

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC
IBW	CHNIM	ITRACE					
	-1		-1				
-6							

USER-DEFINED SUMMARY TABLES (J3) :
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100 105
FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING
THIS SECTION CORRESPONDS WITH FEMA CROSS
SECTION "AX" FOR COTTONWOOD CREEK
SECTION TAKEN AT DOWNSTREAM FACE OF BRIDGE
SECTION TAKEN AT UPSTREAM FACE OF BRIDGE
FARTHEST UPSTREAM SECTION FOR BRIDGE MODEL

STATUS: Analyzing profile 1.

Contraction Coefficient (CCHV)
0.300

Expansion Coefficient (CEHV)
0.500

STATUS: Analyzing cross-section reach 400.000.

□
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PAGE 3
PROJECT TITLE : POWERS BLVD
PROJECT NUMBER : 6742130
1/09/1997

FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING

Cross Section Number	Left Overbank Manning	Channel Manning n	Right Overbank Manning	Flow Depth	Water Surface Elevation	Critical W. S. Elevation	Known W. S. Elevation
SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
				(ft)	(ft MSL)	(ft MSL)	(ft MSL)
Energy Gradient SLOPE	Left Overbank Length XLOBL	Channel Length XLCH	Right Overbank Length XLOBR	Energy Gradient Elevation EG	Weighted Velocity Head HV	Friction Energy Loss HL	Other Energy Loss OLOSS
(ft/ft)	(ft)	(ft)	(ft)	(ft MSL)	(ft)	(ft)	(ft)
Cummul-ative Balance Volume	Left Overbank Area	Channel Area	Right Overbank Area	Bridge Deck Area	Left Bank Elevation	Right Bank Elevation	Number of Trials ITRIAL
(acre-ft)	(sq ft)	(sq ft)	(sq ft)	(sq ft)	(ft MSL)	(ft MSL)	
Total Flow Q	Left Overbank Flow QLOB	Channel Flow QCH	Right Overbank Flow QROB	Computed W. S. Top Width TOPWD	Left W. S. Station SSTA	Right W. S. Station ENDST	Number of Crit Dpth Trials IDC
(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	

Flow	Left	Channel	Right	Length	Cummul.	Minimum	Number of
Travel	Overbank	Mean	Overbank	Weighted	Surface	C. S.	Other
Time	Velocity	Velocity	Velocity	Manning n	Area	Elevation	Trials
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
(hrs)	(ft/s)	(ft/s)	(ft/s)		(acres)	(ft MSL)	
400.000	0.000	0.080	0.000	9.40	6815.40	0.00	6815.40
0.019236	0	0	0	6816.65	1.25	0.00	0.00
0.00	0	717	0	0.00	6822.00	6820.00	0
6423	0	6423	0	107.4	468.79	576.19	0
0.00	0.00	8.96	0.00	0.000	0.0	6806.00	0

STATUS: Analyzing cross-section reach 500.000.

500.000	0.000	0.080	0.000	9.12	6817.12	0.00	0.00
0.018160	83	91	104	6818.35	1.24	1.71	0.00
1.51	0	720	0	0.00	6828.00	6826.00	2
6423	0	6422	0	101.6	523.18	624.80	0
0.00	0.00	8.92	0.00	0.000	0.2	6808.00	0

STATUS: Analyzing cross-section reach 600.000.

THIS SECTION CORRESPONDS WITH FEMA CROSS

SECTION "AX" FOR COTTONWOOD CREEK

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC

```
TIME        VLOB        VCH         VROB        WTN         TWA         ELMIN
ICONT
---------- ---------- ---------- ---------- ---------- ---------- ---------- --
-------

  600.000      0.000      0.080      0.000       9.03    6819.03       0.00
0.00
 0.023226        137         94         54    6820.30       1.27       1.93
0.02
     3.05          0        709          0       0.00    6844.00    6846.00
2
     6423          0       6422          0      122.2     455.84     578.08
0
     0.01       0.00       9.05       0.00      0.000        0.5    6810.00
0

      STATUS: Analyzing cross-section reach 700.000.

  700.000      0.000      0.080      0.000      11.04    6821.04       0.00
0.00
 0.017446         98         97         99    6822.27       1.24       1.96
0.01
     4.66          0        720          0       0.00    6840.00    6840.00
2
     6423          0       6423          0       98.9     485.73     584.61
0
     0.01       0.00       8.92       0.00      0.000        0.7    6810.00
0

      STATUS: Analyzing cross-section reach 725.000.

      STATUS: (3470) Encroachment computation information follows:

              Left Encroachment Station (ft, STENCL)
450.31
              Right Encroachment Station (ft, STENCR)
700.67
              Encroachment Method (TYPE)
1
              Width or Percent Target
250.360
              Left Encroachment Elevation (ft, ELENCL)
6849.52
              Right Encroachment Elevation (ft, ELENCR)
6849.52

  725.000      0.000      0.080      0.000       9.87    6821.87       0.00
0.00
 0.014371         36         34         35    6822.89       1.02       0.55
0.07
     5.26          0        794          0       0.00    6836.00    6836.00
2
     6423          0       6422          0      111.1     506.84     617.99
0
     0.01       0.00       8.09       0.00      0.000        0.8    6812.00
0

      STATUS: Special bridge analysis being performed.
```

□

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)
1.50

Bridge Opening Total Area (sq ft, BAREA)
5620.34

Bridge Opening Bottom Width (ft, BWC)
75.00

Bridge Opening Side Slope (SS) 1 :
2.50

Bridge Opening Upstream Invert (ft MSL, ELCHU)
6814.00

Bridge Opening Downstream Invert (ft MSL, ELCHD)
6812.00

Bridge Skew Factor (BSQ)
1.00

Roadway Length (ft, RDLEN)
0.00

Roadway Weir Flow Discharge Coefficient (COFQ)
2.50

Pier Width (ft, BWP)
6.00

Pier Loss Drag Coefficient (CMOM)
2.00

Pier Shape Coefficient (XK)
1.05

STATUS: Analyzing cross-section reach 875.000.

STATUS: (3301) The velocity head difference for current and previous
cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)
0.59

STATUS: Class A low flow.

STATUS: (3420) Bridge computation results:

Bridge Water-Surface Elevation (ft MSL, WSBR)
6822.76
Bridge Flow Velocity (ft/s, VBR)
7.05
Calculated Channel Area (sq ft, TRAPER)
796.

□
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PROJECT TITLE : POWERS BLVD
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1/09/1997

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)
0.00

Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)
6824.09

Low Flow Water Surface Drop Through Bridge (ft, H3)
0.19

Total Weir Flow (cfs, QWEIR)
0.

Bridge Discharge as Orifice or Low Flow (cfs, QLOW)
6423.

Actual Bridge Opening Area (sq ft, BAREA)
5620.

Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)
5000.

Bridge Low Chord Elevation (ft MSL, ELLC)
6847.00

Top of Roadway Elevation (ft MSL, ELTRD)
6851.94

Roadway Weir Length (ft, WEIRLN)
0.0

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
450.60
Right Encroachment Station (ft, STENCR)
700.12
Encroachment Method (TYPE)
1
Width or Percent Target

249.520
Left Encroachment Elevation (ft, ELENCL)
6852.42
Right Encroachment Elevation (ft, ELENCR)
6852.55

□

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
875.000	0.000	0.080	0.000	8.06	6822.06	0.00	0.00
0.041890	161	143	145	6824.09	2.03	1.20	0.00
7.50	0	562	0	0.00	6852.42	6834.00	0
6423	0	6422	0	105.5	483.95	589.49	0
0.01	0.00	11.43	0.00	0.000	1.2	6814.00	0

STATUS: Analyzing cross-section reach 900.000.

STATUS: (3301) The velocity head difference for current and previous
cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)
2.04

900.000	0.000	0.080	0.000	11.45	6825.45	0.00	0.00
0.010017	104	98	105	6826.24	0.78	1.78	0.37
9.16	0	904	0	0.00	6836.00	6838.00	2
6423	0	6423	0	116.8	474.95	591.73	0
0.02	0.00	7.10	0.00	0.000	1.4	6814.00	0

Contraction Coefficient (CCHV)
0.100

Expansion Coefficient (CEHV)
0.100

STATUS: Analyzing cross-section reach 1000.000.

1000.000 0.000 0.080 0.000 10.46 6826.46 0.00
0.00
0.011247 101 100 96 6827.30 0.85 1.06
0.01
11.19 0 869 0 0.00 6838.00 6842.00
2
6423 0 6422 0 116.2 510.66 626.91
0
0.02 0.00 7.39 0.00 0.000 1.7 6816.00
0

□

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 100 : POWERS BLVD
FLOOD ANALYSIS W/BRIDGE - SUBCRITICAL
6742130

Cross-Section	Low Flow Yarnell Energy W.S. Elev	Max. Low Chord Depth	Prs. Flow Computed Energy W. S.	Top of Channel Roadway Mean Flow Elevation	Pressure and/or Low Flow Energy Gradient	Total Bridge Weir Flow
Number	Change			Elevation Velocity	Elevation	
	(ft MSL)	(ft MSL)	(ft MSL)	(ft MSL) (ft/s)	(cfs)	(cfs)
SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR
CLASS	H3	DEPTH	CWSEL	VCH	EG	
* 875.000	6824.09	6847.00	0.00	6851.94	6423.00	0.00
1.00	0.19	8.06	6822.06	11.43	6824.09	

SUMMARY PRINTOUT TABLE 105 : POWERS BLVD

---------- FLOOD ANALYSIS W/BRIDGE - SUBCRITICAL
6742130

Cross-Section Number	Computed W. S. Elevation (ft MSL) CWSEL	Friction Energy Loss (ft) HL	Other Energy Loss (ft) OLOSS	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB
700.000	6821.04	1.96	0.01	98.87	0.00	6423.00	0.00
725.000	6821.87	0.55	0.07	111.15	0.00	6423.00	0.00
* 875.000	6822.06	1.20	0.00	105.54	0.00	6423.00	0.00
* 900.000	6825.45	1.78	0.37	116.78	0.00	6423.00	0.00

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 875, profile 1, conveyance change outside acceptable range.

Section 900, profile 1, conveyance change outside acceptable range.

2 Warning and status message(s) generated

END OF OUTPUT

```
C
C    6
C   400FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING
C   600THIS SECTION CORRESPONDS WITH FEMA CROSS
C   600SECTION "AX" FOR COTTONWOOD CREEK
C   725SECTION TAKEN AT DOWNSTREAM FACE OF BRIDGE
C   875SECTION TAKEN AT UPSTREAM FACE OF BRIDGE
C  1000FARTHEST UPSTREAM SECTION FOR BRIDGE MODEL
T1     6742130
T2     POWERS BLVD
T3     FLOOD ANALYSIS W/BRIDGE - SUBCRITICAL
J1  -10     2                              6423  6815.4
J2   -1          -1                         -6
J3  100          105
NC 0.05    0.05    0.08     0.3     0.5
* FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING
X1   400     40  450.46  585.26
GR 6830    400   6828 414.19   6826 419.55   6824  422.6   6822  425.6
GR 6820 428.49   6818 431.56   6816 434.47   6816 438.34   6818 441.53
GR 6820 444.52   6822 447.49   6822 450.46   6820 456.07   6818 461.43
GR 6816 466.83   6814 473.36   6812 479.24   6810 485.52   6808 490.55
GR 6806 495.93   6806 532.26   6808 537.85   6810 564.75   6812 570.04
GR 6814 573.97   6816 577.14   6818 581.33   6820 585.26   6822 589.74
GR 6824 594.79   6826 598.37   6828 601.25   6830 605.94   6832  610.1
GR 6834 614.97   6836 619.76   6838 624.57   6840 632.55   6842 650.94
NC 0.05    0.05    0.08
X1   500     38  514.32  644.59   83.76  104.88   91.27
GR 6840    400   6838 420.49   6836  437.3   6834 457.63   6832 467.81
GR 6830  479.7   6828 514.32   6826 515.84   6824 517.38   6822 519.08
GR 6820 520.48   6818  522.8   6816 523.67   6814 525.83   6812 527.43
GR 6810 529.31   6808 530.71   6808 566.22   6810 591.78   6812 610.35
GR 6814 617.36   6816 622.37   6818 626.71   6820 630.76   6822 635.44
GR 6824 640.14   6826 644.59   6828 650.06   6830 656.59   6832 662.12
GR 6834 666.66   6836 672.03   6838 677.05   6840    683   6842  688.8
GR 6844 693.58   6846 703.05   6848 717.04
NC 0.05    0.05    0.08
* THIS SECTION CORRESPONDS WITH FEMA CROSS
* SECTION "AX" FOR COTTONWOOD CREEK
X1   600     40  417.08  680.98     137   54.43   94.33
GR 6846    400   6844 417.08   6842 419.91   6840 422.86   6838 425.76
GR 6836 428.68   6834 431.64   6832 434.86   6830 437.71   6828 440.78
GR 6826 443.89   6824 447.23   6822  450.5   6820 454.33   6818 457.44
GR 6816 467.63   6814 479.41   6812 498.98   6810 508.22   6810 538.23
GR 6812 546.44   6814 555.55   6816 564.39   6818 573.71   6820 582.19
GR 6822 592.03   6824 602.58   6826 612.31   6828  620.2   6830 628.53
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GR 6832 635.99  6834 641.74  6836  648.6  6838 656.73  6840 663.85
GR 6842 670.49  6844 676.12  6846 680.98  6848  689.4  6850  705.8
NC 0.05  0.05  0.08
X1  700    46   458 684.79  98.6    99  97.74
GR 6846   400  6844 433.52  6842 449.31  6840   458  6838 460.75
GR 6836 463.63  6834 466.33  6832 469.07  6832 469.07  6830 471.93
GR 6828 474.77  6826  477.9  6824 481.12  6822 484.24  6820 487.34
GR 6818  490.4  6816 494.61  6814 512.91  6814 529.27  6814 531.61
GR 6812 542.88  6810 547.85  6810 563.35  6812 570.72  6814 575.12
GR 6816 577.73  6818 580.58  6820 583.19  6822 585.93  6824 603.08
GR 6826 616.45  6828 626.58  6830 636.66  6832 644.09  6834 654.39
GR 6836 663.91  6838 673.77  6840 684.79  6842 695.08  6844 703.61
GR 6846  712.5  6848 720.97  6850 730.69  6852 741.95  6854 753.23
GR 6856 782.21
NC 0.05  0.05  0.08
* SECTION TAKEN AT DOWNSTREAM FACE OF BRIDGE
X1  725    30 475.06 677.47  36.09  35.24  34.81
X3   0          450.31 6849.52 700.67 6849.52
GR 6846   400  6844 423.69  6836 475.06  6834 478.72  6824 495.01
GR 6822  506.7  6820 508.89  6816   515  6814 544.83  6812 560.22
GR 6812 579.65  6814 593.98  6816 603.21  6818 608.36  6820 613.88
GR 6822 618.27  6824 621.35  6826 624.38  6828 626.18  6830 636.33
GR 6834 665.62  6836 677.47  6838 688.54  6840 699.71  6842 709.29
GR 6844 717.71  6846 725.61  6850 740.22  6852 747.61  6856   784
NC 0.05  0.05  0.08
SB 1.05   1.5   2.5        75    6 5620.34   2.5   6814   6812
* SECTION TAKEN AT UPSTREAM FACE OF BRIDGE
X1  875    29 444.74 615.71 161.51  145.1 143.89
X2            1  6847 6851.94            1.33
X3   0           450.6 6852.42 700.12 6852.55
BT  -9   400 6852.96     0 425.18 6852.55     0 473.52 6852.28     0
BT     547.24 6852.01     0 596.17 6851.94     0 634.33 6852.08     0
BT     655.73 6852.28     0 696.26 6852.55     0 758.94 6853.1     0
GR 6838   400  6836 425.18  6834 444.74  6832 450.52  6830  456.5
GR 6828 463.18  6826 467.33  6824 473.52  6822 484.28  6820 494.04
GR 6818 504.16  6816 525.03  6814 547.24  6816 579.71  6820 585.99
GR 6826 596.17  6830 604.72  6832 610.28  6834 615.71  6836 622.08
GR 6838 634.33  6840 655.73  6842 676.18  6844 696.26  6846 709.84
GR 6852 748.64  6854 758.94  6856 770.82  6858 783.28
NC 0.05  0.05  0.08
X1  900    38   400 622.33 104.31 105.79  98.22
GR 6836   400  6834 420.81  6832 425.72  6830 430.15  6828 435.19
GR 6828 455.85  6828 465.91  6826 473.46  6824  478.9  6822 485.11
GR 6820 491.55  6818 501.21  6816 534.65  6814 559.37  6814 571.82
GR 6816 575.21  6818 578.53  6820 581.97  6822 585.34  6824   589
```

GR 6826 592.77 6828 597.57 6830 603.07 6832 606.81 6834 612.44
GR 6836 617.35 6838 622.33 6840 637.86 6842 658.27 6844 677.47
GR 6846 694.8 6848 708.87 6850 723.49 6852 736.94 6854 748.91
GR 6856 760.76 6858 773.12 6860 787.38
NC 0.05 0.05 0.08 0.1 0.1
* FARTHEST UPSTREAM SECTION FOR BRIDGE MODEL
X1 1000 50 483.03 650.33 101.86 96.08 100.05
GR 6850 400 6848 415.35 6846 419.01 6844 422.43 6842 426.38
GR 6840 430.54 6838 434.04 6836 439.49 6836 439.51 6836 453.71
GR 6838 458.35 6840 462.91 6840 475.7 6838 483.03 6836 485.91
GR 6834 490 6832 493.77 6830 497.44 6828 508.65 6826 511.26
GR 6824 513.6 6822 516.8 6820 523.03 6818 541.06 6816 554.9
GR 6816 585.91 6818 596.34 6820 603.37 6822 610.69 6824 619.31
GR 6826 625.9 6828 630.29 6830 635.2 6832 639.86 6834 642.32
GR 6836 644.38 6838 646.48 6840 648.32 6842 650.33 6844 652.38
GR 6846 666.13 6848 682.96 6850 697.91 6852 713.14 6854 726.67
GR 6856 738.59 6858 749.98 6860 762.97 6862 778.52 6864 862.47
EJ

ER

==========
BOSS HEC-2 for AutoCAD (tm)
==========

Version : 2.0
Serial Number : 20778

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PROGRAM ORIGIN :

BOSS HEC-2 for AutoCAD is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : POWERS BLVD
PROJECT NUMBER : 6742130
DESCRIPTION : 500-yr ANALYSIS W/BRIDGE - SUBCRITICAL
ENGINEER : RALPH LOCASCIO
DATE OF RUN : 2/14/1997
TIME OF RUN : 2:53 pm

BOSS HEC-2 for AutoCAD version 2.0

PROJECT TITLE : POWERS BLVD
PROJECT NUMBER : 6742130
2/14/1997

T1 6742130
T2 POWERS BLVD
T3 500-yr ANALYSIS W/BRIDGE - SUBCRITICAL

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS
Q	WSEL	FQ					
	-10	2					
12846.4	6818.71						

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC
IBW	CHNIM	ITRACE					
	-1		-1				
-6							

USER-DEFINED SUMMARY TABLES (J3) :
---

100 105
FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING
THIS SECTION CORRESPONDS WITH FEMA CROSS
SECTION "AX" FOR COTTONWOOD CREEK
SECTION TAKEN AT DOWNSTREAM FACE OF BRIDGE
SECTION TAKEN AT UPSTREAM FACE OF BRIDGE
FARTHEST UPSTREAM SECTION FOR BRIDGE MODEL

STATUS: Analyzing profile 1.

Contraction Coefficient (CCHV)
0.300

Expansion Coefficient (CEHV)
0.500

STATUS: Analyzing cross-section reach 400.000.

STATUS: (3265) Divided flow.

□

FARTHEST DOWNSTREAM SECTION FOR BRIDGE MODELING

Cross Section Number	Left Overbank Manning	Channel Manning n	Right Overbank Manning	Flow Depth	Water Surface Elevation	Critical W. S. Elevation	Known W. S. Elevation
SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
				(ft)	(ft MSL)	(ft MSL)	(ft MSL)
Energy Gradient	Left Overbank Length	Channel Length	Right Overbank Length	Energy Gradient Elevation	Weighted Velocity Head	Friction Energy Loss	Other Energy Loss
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
(ft/ft)	(ft)	(ft)	(ft)	(ft MSL)	(ft)	(ft)	(ft)
Cummul-ative Volume	Left Overbank Area	Channel Area	Right Overbank Area	Bridge Deck Area	Left Bank Elevation	Right Bank Elevation	Number of Balance Trials
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
(acre-ft)	(sq ft)	(sq ft)	(sq ft)	(sq ft)	(ft MSL)	(ft MSL)	
Total Flow	Left Overbank Flow	Channel Flow	Right Overbank Flow	Computed W. S. Top Width	Left W. S. Station	Right W. S. Station	Number of Crit Dpth Trials
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC

(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	
Flow	Left	Channel	Right	Length	Cummul.	Minimum	
Number of							
Travel	Overbank	Mean	Overbank	Weighted	Surface	C. S.	
Other							
Time	Velocity	Velocity	Velocity	Manning n	Area	Elevation	
Trials							
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	
ICONT							
(hrs)	(ft/s)	(ft/s)	(ft/s)		(acres)	(ft MSL)	
400.000	0.050	0.080	0.000	12.71	6818.71	0.00	6818.71
0.021961	0	0	0	6820.77	2.06	0.00	0.00
0.00	21	1099	0	0.00	6822.00	6820.00	0
12846	149	12696	0	135.3	430.47	582.73	0
0.00	6.90	11.55	0.00	0.000	0.0	6806.00	0

STATUS: Analyzing cross-section reach 500.000.

500.000	0.000	0.080	0.000	12.63	6820.63	0.00	0.00
0.020967	83	91	104	6822.77	2.14	1.96	0.04
2.32	0	1094	0	0.00	6828.00	6826.00	2
12846	0	12846	0	112.2	520.04	632.23	0
0.00	0.00	11.74	0.00	0.000	0.3	6808.00	0

STATUS: Analyzing cross-section reach 600.000.

□

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

THIS SECTION CORRESPONDS WITH FEMA CROSS

SECTION "AX" FOR COTTONWOOD CREEK

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK

SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
600.000	0.000	0.080	0.000	13.15	6823.15	0.00	0.00
0.017679	137	94	54	6824.74	1.59	1.81	0.16
4.88	0	1269	0	0.00	6844.00	6846.00	2
12846	0	12846	0	149.6	448.60	598.15	0
0.00	0.00	10.12	0.00	0.000	0.5	6810.00	0

STATUS: Analyzing cross-section reach 700.000.

700.000	0.000	0.080	0.000	14.86	6824.86	0.00	0.00
0.021042	98	97	99	6826.80	1.94	1.88	0.18
7.59	0	1148	0	0.00	6840.00	6840.00	2
12846	0	12846	0	129.1	479.74	608.82	0
0.01	0.00	11.19	0.00	0.000	0.9	6810.00	0

STATUS: Analyzing cross-section reach 725.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
450.31
Right Encroachment Station (ft, STENCR)
700.67
Encroachment Method (TYPE)
1
Width or Percent Target
250.360
Left Encroachment Elevation (ft, ELENCL)
6849.52
Right Encroachment Elevation (ft, ELENCR)
6849.52

725.000	0.000	0.080	0.000	14.03	6826.03	0.00	0.00
0.013880	36	34	35	6827.52	1.49	0.59	0.14
8.57	0	1310	0	0.00	6836.00	6836.00	2
12846	0	12846	0	132.7	491.68	624.42	0

0.01 0.00 9.80 0.00 0.000 1.0 6812.00
0

STATUS: Special bridge analysis being performed.

□

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)
1.50

Bridge Opening Total Area (sq ft, BAREA)
5620.34

Bridge Opening Bottom Width (ft, BWC)
75.00

Bridge Opening Side Slope (SS) 1 :
2.50

Bridge Opening Upstream Invert (ft MSL, ELCHU)
6814.00

Bridge Opening Downstream Invert (ft MSL, ELCHD)
6812.00

Bridge Skew Factor (BSQ)
1.00

Roadway Length (ft, RDLEN)
0.00

Roadway Weir Flow Discharge Coefficient (COFQ)
2.50

Pier Width (ft, BWP)
6.00

Pier Loss Drag Coefficient (CMOM)
2.00

Pier Shape Coefficient (XK)
1.05

STATUS: Analyzing cross-section reach 875.000.

STATUS: (3301) The velocity head difference for current and previous
cross-sections exceeded the allowable specified by HVINS.

STATUS: Class A low flow.

STATUS: (3420) Bridge computation results:

Bridge Water-Surface Elevation (ft MSL, WSBR)
6826.87
Bridge Flow Velocity (ft/s, VBR)
8.94
Calculated Channel Area (sq ft, TRAPER)
1302.

□

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)
0.00

Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)
6828.55

Low Flow Water Surface Drop Through Bridge (ft, H3)
0.26

Total Weir Flow (cfs, QWEIR)
0.

Bridge Discharge as Orifice or Low Flow (cfs, QLOW)
12846.

Actual Bridge Opening Area (sq ft, BAREA)
5620.

Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)
5000.

Bridge Low Chord Elevation (ft MSL, ELLC)
6847.00

Top of Roadway Elevation (ft MSL, ELTRD)
6851.94

Roadway Weir Length (ft, WEIRLN)
0.0

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
450.60
Right Encroachment Station (ft, STENCR)
700.12
Encroachment Method (TYPE)
1

Width or Percent Target
249.520
Left Encroachment Elevation (ft, ELENCL)
6852.42
Right Encroachment Elevation (ft, ELENCR)
6852.55

□

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
875.000	0.000	0.080	0.000	12.29	6826.29	0.00	0.00
0.026536	161	143	145	6828.55	2.25	1.02	0.00
12.50	0	1066	0	0.00	6852.42	6834.00	0
12846	0	12846	0	130.1	466.72	596.80	0
0.01	0.00	12.05	0.00	0.000	1.4	6814.00	0

STATUS: Analyzing cross-section reach 900.000.

STATUS: (3301) The velocity head difference for current and previous
cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)
1.41

900.000	0.000	0.080	0.000	15.45	6829.45	0.00	0.00
0.013282	104	98	105	6830.65	1.20	1.79	0.32
15.35	0	1461	0	0.00	6836.00	6838.00	3
12846	0	12846	0	170.0	431.52	601.57	0
0.01	0.00	8.79	0.00	0.000	1.7	6814.00	0

0

Contraction Coefficient (CCHV)
0.100

Expansion Coefficient (CEHV)
0.100

STATUS: Analyzing cross-section reach 1000.000.

```
 1000.000     0.000     0.080     0.000     14.61   6830.61      0.00
0.00
 0.011995       101       100        96   6831.93      1.31      1.26
0.01
    18.63         0      1397         0      0.00   6838.00   6842.00
3
    12846         0     12846         0     140.3    496.31    636.63
0
     0.02      0.00      9.19      0.00     0.000       2.1   6816.00
0
```

□

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 100 : POWERS BLVD
500-yr ANALYSIS W/BRIDGE - SUBCRITICAL
6742130

Cross-Section	Low Flow Yarnell Energy Elevation (ft MSL)	Max. Low Chord Elevation (ft MSL)	Prs. Flow Computed Energy Elevation (ft MSL)	Top of Roadway Elevation (ft MSL)	Pressure and/or Energy Mean Velocity (ft/s)	Total Bridge Flow Gradient Elevation (ft MSL)
Number	Change (ft)	W.S. Elev (ft MSL)	W. S. Elevation (ft MSL)	Low Flow (cfs)	Weir Flow (cfs)	
Class	Depth	Elevation	Elevation			
SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR
CLASS	H3	DEPTH	CWSEL	VCH	EG	
875.000	6828.55	6847.00	0.00	6851.94	12846.40	0.00
1.00	0.26	12.29	6826.29	12.05	6828.55	

SUMMARY PRINTOUT TABLE 105 : POWERS BLVD
---------- 500-yr ANALYSIS W/BRIDGE - SUBCRITICAL
6742130

Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	Friction Energy Loss (ft) HL	Other Energy Loss (ft) OLOSS	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB
700.000	6824.86	1.88	0.18	129.08	0.00	12846.40	0.00
725.000	6826.03	0.59	0.14	132.73	0.00	12846.40	0.00
875.000	6826.29	1.02	0.00	130.07	0.00	12846.40	0.00
* 900.000	6829.45	1.79	0.32	170.05	0.00	12846.40	0.00

□

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 900, profile 1, conveyance change outside acceptable range.

1 Warning and status message(s) generated

END OF OUTPUT

Table 2. Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD ELEVATION			
Cross Section	Distance[1]	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet per Second)	Regulatory (Feet)	Without Floodway (Feet)	With Floodway (Feet)	Increase (Feet)
Cottonwood Creek (Cont'd)								
AK	20,195	176	775	11.9	6,587.5	6,587.5	6,588.5	1.0
AL	20,715	180	797	11.5	6,595.4	6,595.4	6,596.3	0.9
AM	21,635	202	816	11.3	6,609.5	6,609.5	6,610.3	0.8
AN	22,275	191	796	11.6	6,620.3	6,620.3	6,620.7	0.4
AO	23,375	82	599	15.4	6,638.5	6,638.5	6,639.2	0.7
AP	23,980	83	537	14.5	6,647.4	6,647.4	6,647.4	0.0
AQ	25,010	83	537	14.5	6,664.7	6,664.7	6,664.7	0.0
AR	26,265	99	570	13.7	6,684.9	6,684.9	6,684.9	0.0
AU	29,786	130	590	12.3	6,745.3	6,745.3	6,745.3	0.0
AV	31,256	130	553	13.1	6,765.3	6,765.3	6,765.3	0.0
AW	32,666	100	504	12.7	6,791.5	6,791.5	6,791.5	0.0
AX	34,246	110	518	12.4	6,819.0	6,819.0	6,819.0	0.0
BB	37,268	77	555	11.6	6,875.2	6,875.2	6,876.2	1.0
BC	37,701	80	466	13.8	6,885.2	6,885.2	6,885.2	0.0
BD	37,991	80	468	13.7	6,890.3	6,890.3	6,890.3	0.0
BE	39,056	90	414	11.8	6,903.3	6,903.3	6,903.3	0.0
BF	40,236	110	435	11.2	6,922.2	6,922.2	6,922.2	0.0
BG	41,231	100	424	11.5	6,938.7	6,938.7	6,938.7	0.0
BH	42,206	60	349	14.0	6,957.0	6,957.0	6,957.0	0.0

$Q = VA = (518)(12.4) = 6,423.2$ cfs

[1] Feet Above Confluence With Monument Creek