



## JR ENGINEERING

---

**To:** El Paso County Engineering Division

**From:** Mike Bramlett, PE

**Date:** August 16, 2022

**Subject:** Sand Creek Center Tributary Channel Improvements

---

The purpose of this letter is to provide design information for the existing conditions of the Sand Creek Center Tributary Drainageway, located east of the Solace Apartments site. This letter will also discuss the proposed improvements for the channel, design methodology, and the modeling results. For further information on the previous evaluation of the channel in its existing conditions and conceptual design, see the *Sand Creek – Center Tributary Channel Analyses Report for Solace Apartments* by JR Engineering. For further information concerning drainage for the Solace Apartments Site, see the *Final Drainage Report for Solace Apartments*, by JR Engineering.

### **Project General Discussion**

The Sand Creek Center Tributary Channel is located in Section 7, Township 14 South, Range 65 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is part of the Solace Apartments project and is located on the eastern edge of the project. As part of the proposed improvements for the Solace Apartments Project, this reach of the Sand Creek Center Tributary will also be improved. The sections upstream and downstream of the site have already undergone improvements, and the channel in its current state shows extensive flooding in a 100 year event. In addition to improvements to the Sand Creek Center Tributary Channel, the channels secondary drainageway located to the west of the channel in Paonia Street will also be improved with an overflow channel that will direct flow present in the secondary drainageway into the main channel and avoid further flooding of the Paonia Street extension into the Solace Apartments site.

### **Channel Flows**

Evaluation of the flows present in the Sand Creek Center Tributary and its secondary drainageway were discussed in detail in the *Sand Creek – Center Tributary Channel Analysis for Solace Apartments* by JR Engineering. Since the initial analysis of the channel took place, JR Engineering was able to acquire the modeling data used by FEMA for determination of flood plain modeling shown in FEMA FIRM 08041C0752G. JR Engineering assumes FEMA's flows to be accurate, and thus utilized these as the basis for our model. The main channel contains 820 cfs of flow and the secondary channel contains 217 cfs. The flow in the main channel then jumps up to 1,037 cfs at the convergence of the secondary drainageway. The convergence of these flows occurs just upstream of the Galley Road crossing, where existing topography directs the secondary drainageway into the main channel. Downstream an existing channel coming from nearby Valley Road (east)



converges with the main channel; we then utilized FEMA's 1,100 cfs to model the remaining portion of the channel.

### **Existing Channel Conditions**

In its existing conditions the Sand Creek Center Tributary Channel along the Solace site consists of a natural channel overgrown with trees and bushes along the sides of the channel with the bottom being relatively clean and free of obstacles. The 1,350 LF reach of the Sand Creek Center Tributary Channel located incorporated with the Solace site is undeveloped, as compared to the majority of channels in the basin which have had some improvement. Downstream and upstream sections of the Sand Creek Center Tributary Channel are concrete lined. The secondary Drainageway located in Paonia Street flows south from Omaha Blvd to the Solace Apartments site where flow splits between an existing concrete channel running east to the main Sand Creek Center Tributary Channel, and a swale flowing south where it eventually rejoins the main channel at the Galley Road crossing. It is anticipated that the concrete channel will divert 42 cfs from the 217cfs present in the secondary drainageway, with 175 cfs flowing south down the existing swale. There is also an existing channel coming from Valley Road to the east. This channel intersects the main channel approximate halfway between the north and south limits of the site, adding 63 cfs to the main channel, as discussed in the Channel Flows section above. In its existing conditions, the Sand Creek Center Tributary Channel FEMA firm panel 08041C0752G, depicts 100 year flooding extending into the adjacent properties to the east and onto Paonia Street improvements to the west. The existing channel currently overtops the Galley Road crossing; primarily due to the capacity of the culverts at the crossing rather than the channel's current conditions.

### **Proposed Channel Improvements**

As determined by the Sand Creek Drainage Basin Planning Study (DBPS) & and JR Engineering Sand Creek – Center Tributary Channel Analysis for Solace Apartments, this section of the Sand Creek Center Tributary will require improvements to ensure adequate capacity in the channel and protection against erosive velocities. In order to be consistent with improvements already made in the surrounding area and to align with the recommendations made by the DBPS, JR Engineering is proposing concrete lining of the channel along the Solace site, along with widening of the existing channel and modification to the channel alignment in this area. JR Engineering is also proposing the addition of a USBR Type III Stilling Basin and 10 foot sloped concrete drop in the channel, in order to force a hydraulic jump in the channel and reduce velocities present in the channel while still matching existing grades for the majority of channel alignment. The design methodology of the sloped drop and USBR Type III Stilling Basin are based on the design procedure for Stilling Basins presented in the Federal Highway Administrations Hydraulic Engineering Circular No. 14, Chapter 8. Calculation for stilling basin and accessories sizing can be found in the Appendix of this letter. The proposed channel section shall be a trapezoidal channel section with a 10' bottom width, with a minimum channel depth of 6.5' and side slopes varying from 3:1 to 2:1 along the channel's alignment. The channel shall be lined with concrete for a depth of 5' to protect the channel from the erosive velocities present in the channel, with an average depth of flow in a 100 year event for the proposed channel being approximately 4.5-5' this will provide a minimum freeboard of 2'-1.5' from the top of the channel to the 100 year water surface, adhering to the DCM Volume 1 for minimum freeboard of 1.4'. The concrete section shall typically be a 6" thick concrete apron for the channel, with sections of the section of channel located within the sloped drop and stilling basin being a 12"



thick concrete apron. In accordance with the DBPS the channel shall be designed with a stable slope of 1% for the majority of the channel. For further details please see the Channel Improvement Plans included in the Appendix of this letter. In order to reduce the velocities present in the channel and avoid excessively steep slopes for extended portions of the channel's alignment, a 100' long sloped drop structure, with a total vertical drop of 10', will be placed at the upstream end of the channel. At the base of the drop will be a USBR Type III Stilling Basin that will include chute blocks, baffle blocks and a sill wall to decrease the velocity of the water coming down the sloped drop and force a hydraulic jump. This basin will also include a low flow channel through the sill wall located at the end of the stilling basin to allow water movement through the structure at lower flows and prevent ponding of water in the structure. Further detail for the sloped drop and stilling basin can be found in the channel improvement plans shown in the Appendix.

### **Paonia Street Secondary Drainageway Improvements**

Part of the Sand Creek Center Tributary Improvements also includes the addition of a diversion channel that will direct flows present in the Paonia Street Secondary Drainageway into the main channel. This diversion will be known as the Overflow Channel for the remainder of this letter. Just north of the Overflow Channel, the existing Paonia Street is partially supered in existing conditions routing all flows present in the street to the east side. With major flows present in the existing Paonia Street present on the east side of the road, the Overflow channel will act as a large opening weir and divert flows to the main channel. The Overflow Channel shall be a concrete and riprapped lined channel with varying widths and depths that will convey the flows present in Paonia Street into the main channel. The diversion channel shall be concrete from the edge of Paonia to the right-of-way, after which it will become a riprap trapezoidal channel section with a typical bottom width of 20' and a depth of 2'-3'. The channel will run east from Paonia until it intersects with the proposed Sand Creek Center Tributary Channel alignment, where it will outfall just upstream of the proposed sloped drop in the channel. Just south of the diversion channel opening along Paonia Street will be two 15'type R inlets, that will be used to capture nuisance flows in the curb & gutter and also any flow that may bypass the diversion channel. These inlets are a redundant and not intended to capture any flows present in Paonia as the Overflow Channel is sized and designed to capture all flows present in Paonia; each inlet has a total intercept capacity of 17cfs for a total of 34cfs combined. These inlets will directly outfall into the main channel and will not be detained by any of the onsite detention ponds. For further detail on the diversion channel please see the channel improvement plans, and for detail on the type R inlets see the exert of the Solace Construction Drawings, both shown in the Appendix of this letter.

### **Modeling Results**

The proposed conditions of the channel and its second Drainageway were modeled using GeoHecRas to determine the extents of the 100 year floodplain for the site. Flow rates from the model were used based on those discussed in the Channel Flows section and Existing Conditions section of this letter. The model was run with downstream boundary conditions for each reach using critical depths, and the entirety of the model was ran using steady flow conditions. The model was contains four separate reaches, with the main reach modeling the proposed alignment and conditions for the Sand Creek Center Tributary Channel. The other reaches modeling the Paonia Street Overflow Channel, the existing concrete overflow channel at Paonia and an existing channel that runs east to west from Valley Street and intersects the Sand Creek Center Tributary Channel, each reach



intersection were modeled using the energy equation. The model used Manning's values (n) of 0.013 for the concrete lining, 0.033 for the riprap of the overflow channel, and 0.03 for the any location outside of the concrete or riprap extents as they were determined to be most similar to a grassed area with some weeds. The results of the GeoHecRas model show that the proposed improvements to the channel substantially reduce the extents of the flood plain in the channel and contain the 100 year flood plain within the concrete extents of the channel. The results also show a maximum velocity in the channel of 10.32 ft/s in a 100 year event, showing that the concrete lining of the channel will provide sufficient protection from erosive velocities present in the channel. The GeoHecRas model for the proposed conditions also shows overtopping of the channel crossing at Galley Road, which is consistent with the flood data presented by the FEMA FIRM 08041C0752G. Flooding of the roadway is due to the insufficient capacity of the culvert crossing in this area, with the current configuration of three 48" CMP culverts only providing 365 cfs of capacity of the 1,100 cfs flow at the crossing. Flooding of the Galley Road Crossing could be alleviated by upsizing of the culvert(s), these improvements will be necessary when the County deems the historic overtopping of Galley Road to be above acceptable tolerance. *The channel improvements did not results in any change to existing overtopping of Galley Road as this is due to insufficient capacity of the culverts at this crossing, which will ultimately be addressed at a later date.* Further details on the model results can be found in the Appendix.

## Summary

The analysis of the proposed improvements of the Sand Creek Center Tributary Drainageway and its secondary drainageway located in Paonia Street show significant reduction of the flood plain extents, with it now being contained within the channel extents and no longer extensively flooding properties adjacent the proposed Solace Apartment Site. The proposed diversion channel also redirects flow that would otherwise flood the proposed extension of Paonia Street back into the channel, thus alleviating the risk of the roadway flooding in a 100 year event.

## Letter Amendment

This section of the report give an overview of the revised channel design for the drop structure located within the channel. The proposed revisions to the model will only change the length and the slope of the proposed sloped drop at the start of the USBR Type III Stilling basin. The dimensions of the baffle blocks located within the stilling basin will slightly modify as well, but the length of the basin and overall design concept will remain the same and unchanged. The primary change will be the lengthening of the sloped dropped portion of the basin to add 40' more feet to the sloped drop, thus also lowering the slope of the drop from 10% to 7.43%. This change still results in no rise of the 100yr floodplain. Calculations, results and plans can be found in the attached **Amendment Appendix**.



Please contact me should you have any questions or concerns regarding this letter at 303-740-9393.

Sincerely,

**JR ENGINEERING, LLC**

A handwritten signature in blue ink that reads "Mike Bramlett". The signature is fluid and cursive, with the first name "Mike" and last name "Bramlett" clearly legible.

Mike Bramlett, PE

JR Engineering







## USBR Type III Drop and Stilling Basin

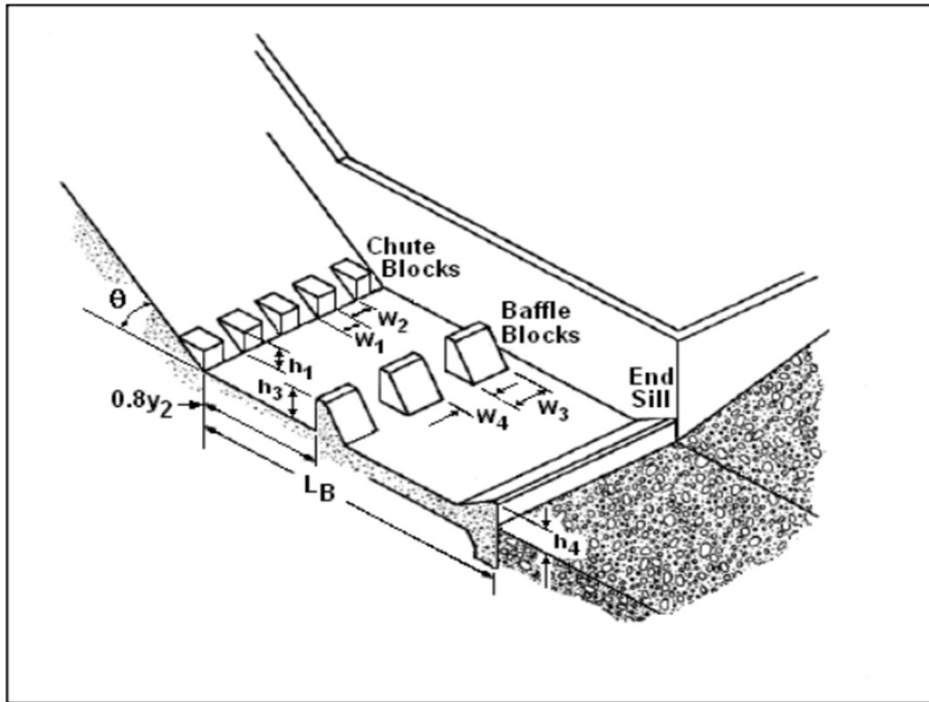
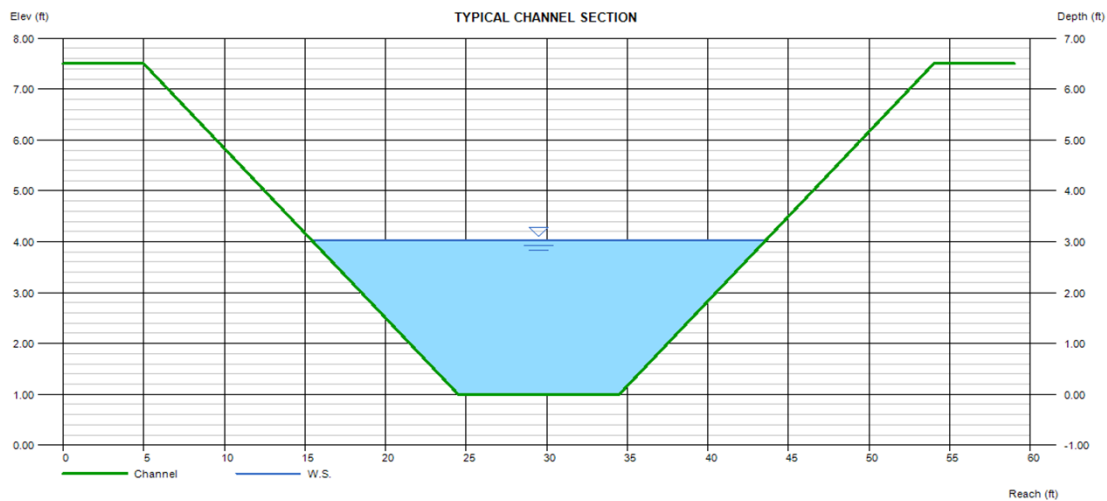


Figure 8.3. USBR Type III Stilling Basin

### Design of Energy Dissipators for Culverts and Channels

#### Upstream Channel Parameters

Channel Flow (Q)	1037 cfs
Channel Bottom Width	10 ft
Sill Slopes (Z:1)	1
Channel Total Depth	6.5 ft
Channel Depth ( $y_1$ )	3.02 ft
Drop Crest Width	35 ft
Upstream Slope	1.00%





## USBR Type III Drop and Stilling Basin (cont...)

### FHWA Criteria Checks

Unit Discharge Over Crest	29.63	cfs/ft	Limit=200 cfs/ft
Transition Slope (St)	10.00%	> as $\Theta$	5.71 °
Velocity Entering Basin(V)	41.04	ft/s	Limit=60 ft/s
Channel Depth Entering Basin (d)	1.68	ft	
Transition Length (St)	120	ft	
Basin Width (Wb)	10	ft	

### Basin Parameter Calculations

$$\text{Froude Number entering Basin: } \frac{V}{(gd)^{1/2}} = 5.579879$$

Determine  $L_b/Y_2$  value from FHWA Table 8.2

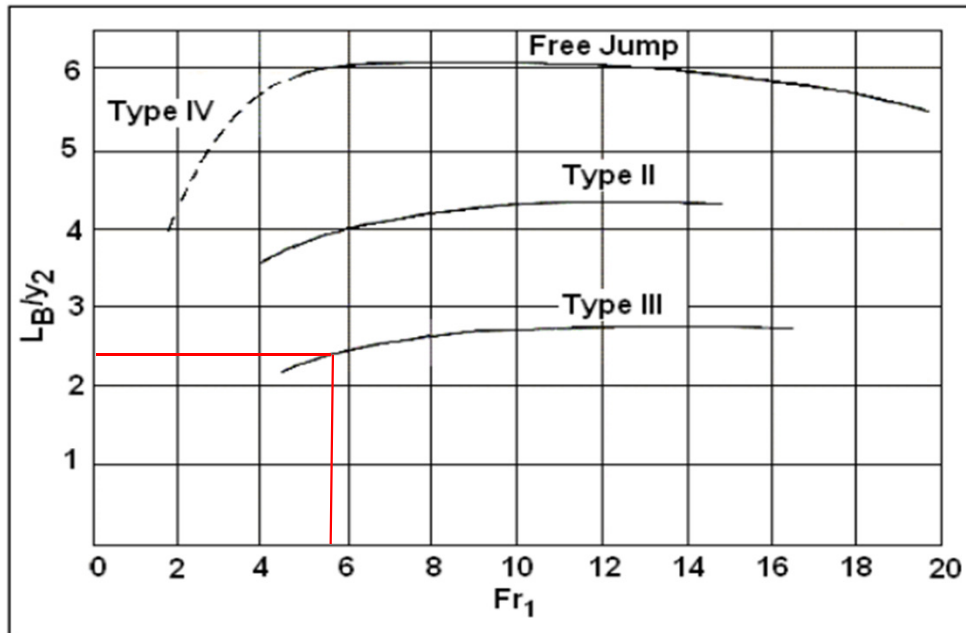


Figure 8.2. Length of Hydraulic Jump on a Horizontal Floor

$L_b/Y_2$ : 2.5      Conservative Approximation

Calculate  $Y_2$

$$Y_2: \frac{C * y_0}{2} (\sqrt{1 + 8Fr} - 1) = 12.4437 \text{ ft}$$

Length of Basin ( $L_b$ ): 31.1092536 ft

$$\text{Length of Basin Floor to Sill Top (Lt): } \frac{L_T(S_T - S_o) - L_b * S_o}{S_s + S_o} = 10.59486 \text{ ft}$$



### USBR Type III Drop and Stilling Basin (cont...)

Basin Element Sizing

Determine Number of Chute Blocks ( $N_c$ ):	$\frac{W_b}{2y_1}$	=	2.98 → 3
Chute Block Width and Spacing ( $W_1$ & $W_2$ ):	$\frac{W_b}{2N_c}$	=	1.666667
Baffle Block Height( $h_3$ ):	$y_1(0.168 * Fr + 0.58)$		2.549265 ft
Number of Baffle Blocks ( $N_b$ )	$\frac{W_b}{1.5h_3}$	=	2.615133 → 3
Baffle Width and Spacing ( $W_3$ & $W_4$ )	$\frac{W_b}{2N_b}$	=	1.666667
End Sill Height ( $h_4$ )	$y_1(0.0536 * Fr + 1.04)$		2.249657 ft
0.8*Y2			9.95496114 ft

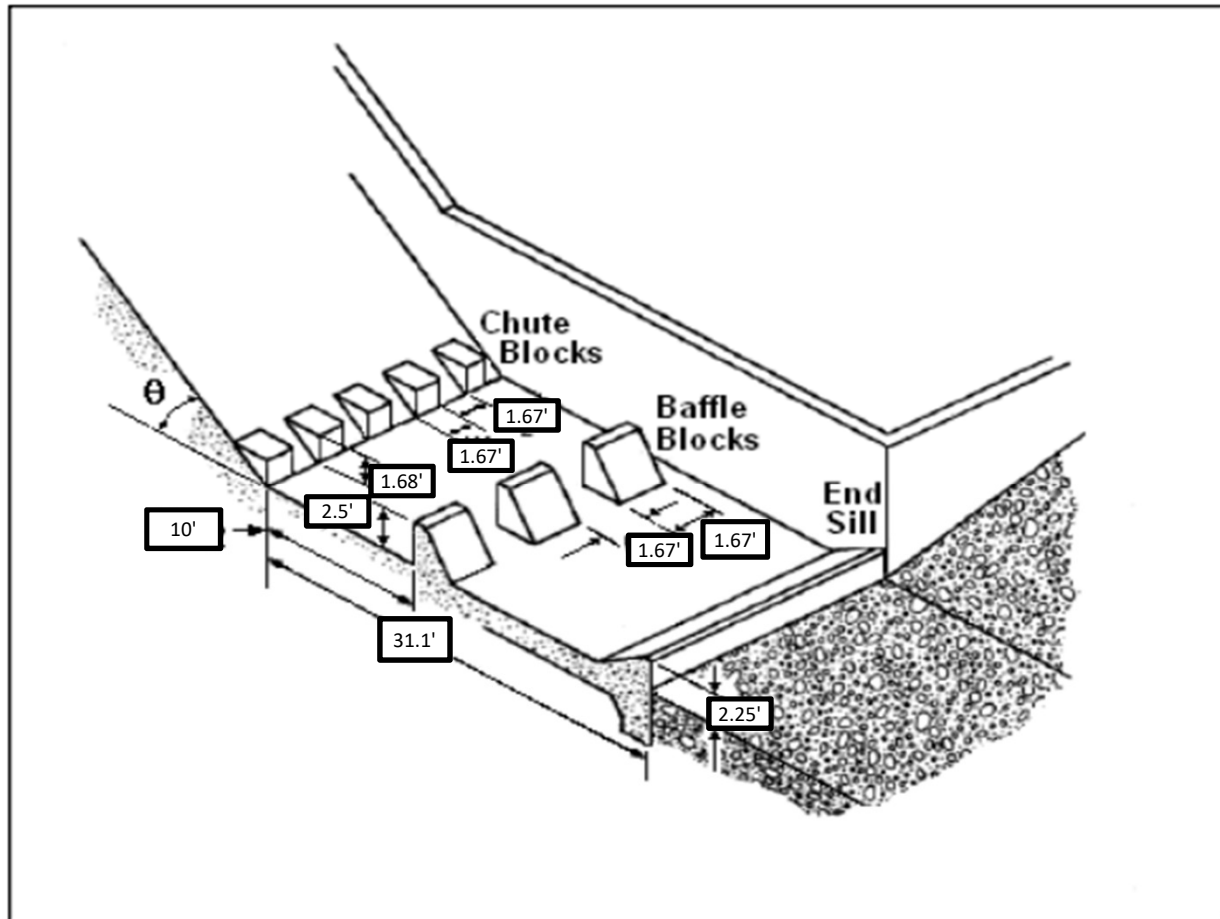
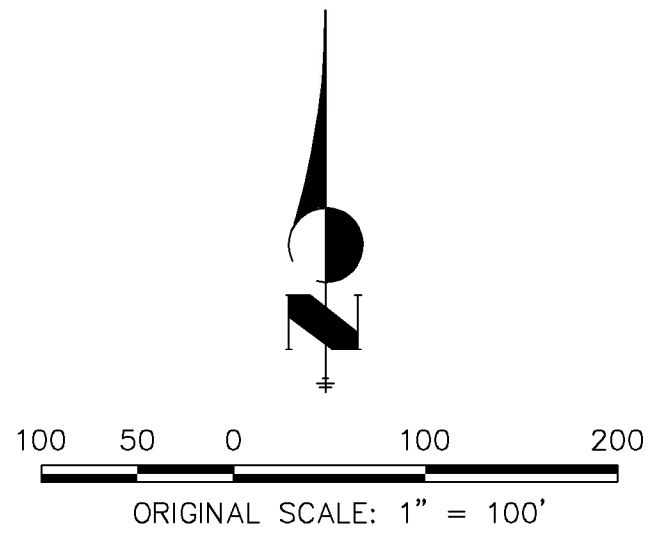
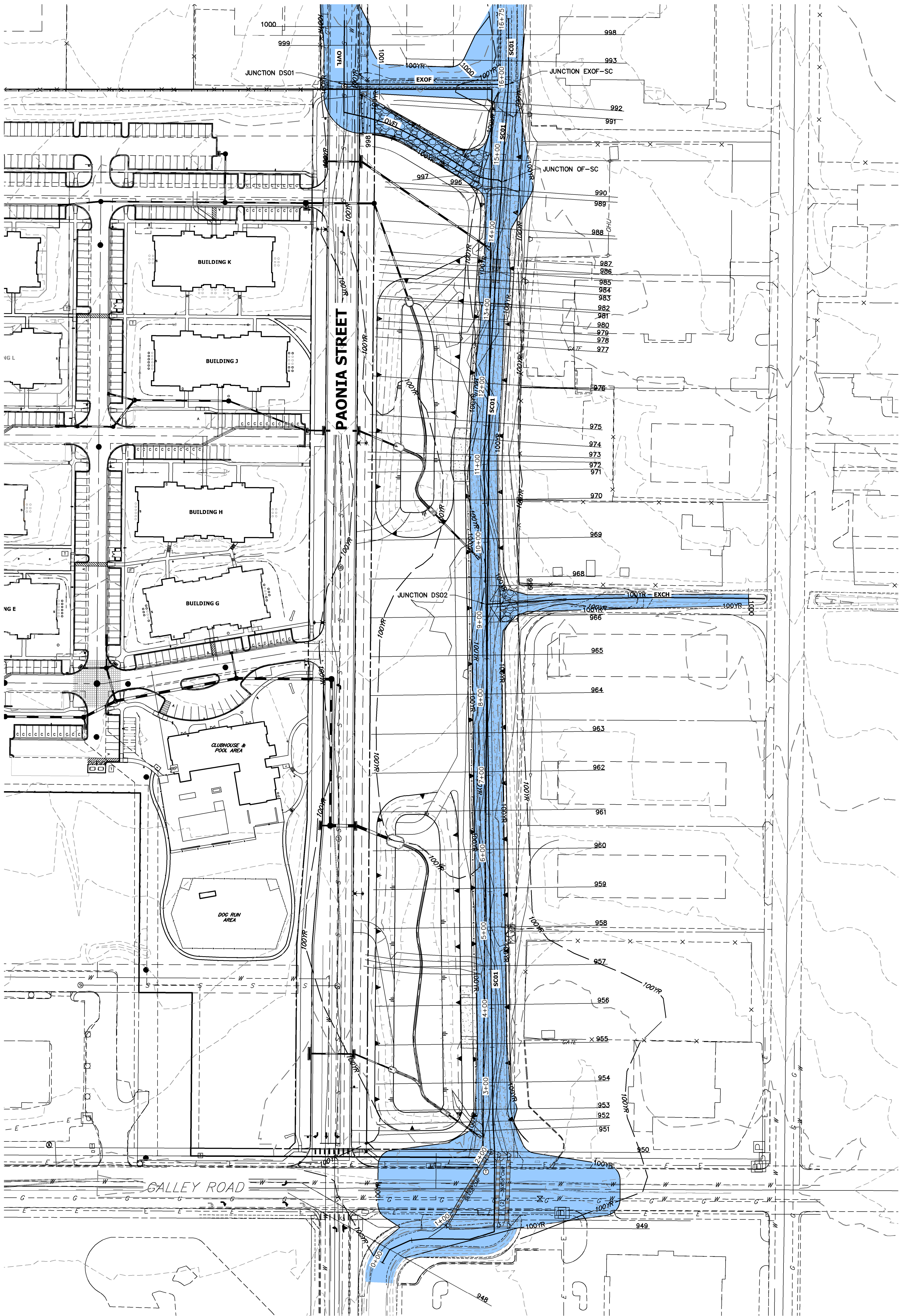


Figure 8.3. USBR Type III Stilling Basin



# SAND CREEK CHANNEL GEOHECRAS MODEL OVERLAY

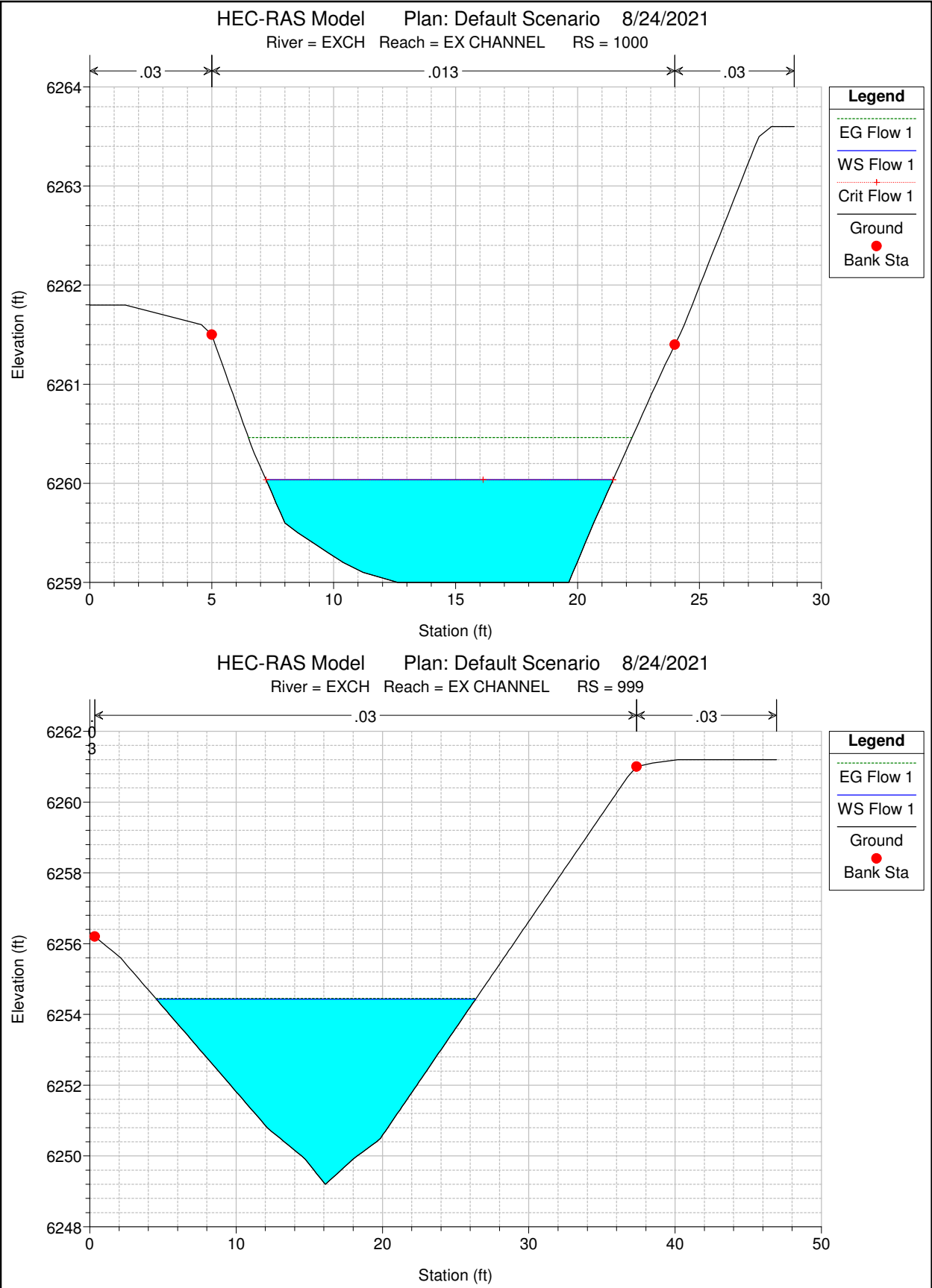


GEOHECRAS MODEL OVERLAY  
SAND CREEK CHANNEL  
JOB NO. 25174.00  
08/24/21  
SHEET 1 OF 1

**J-R ENGINEERING**  
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)

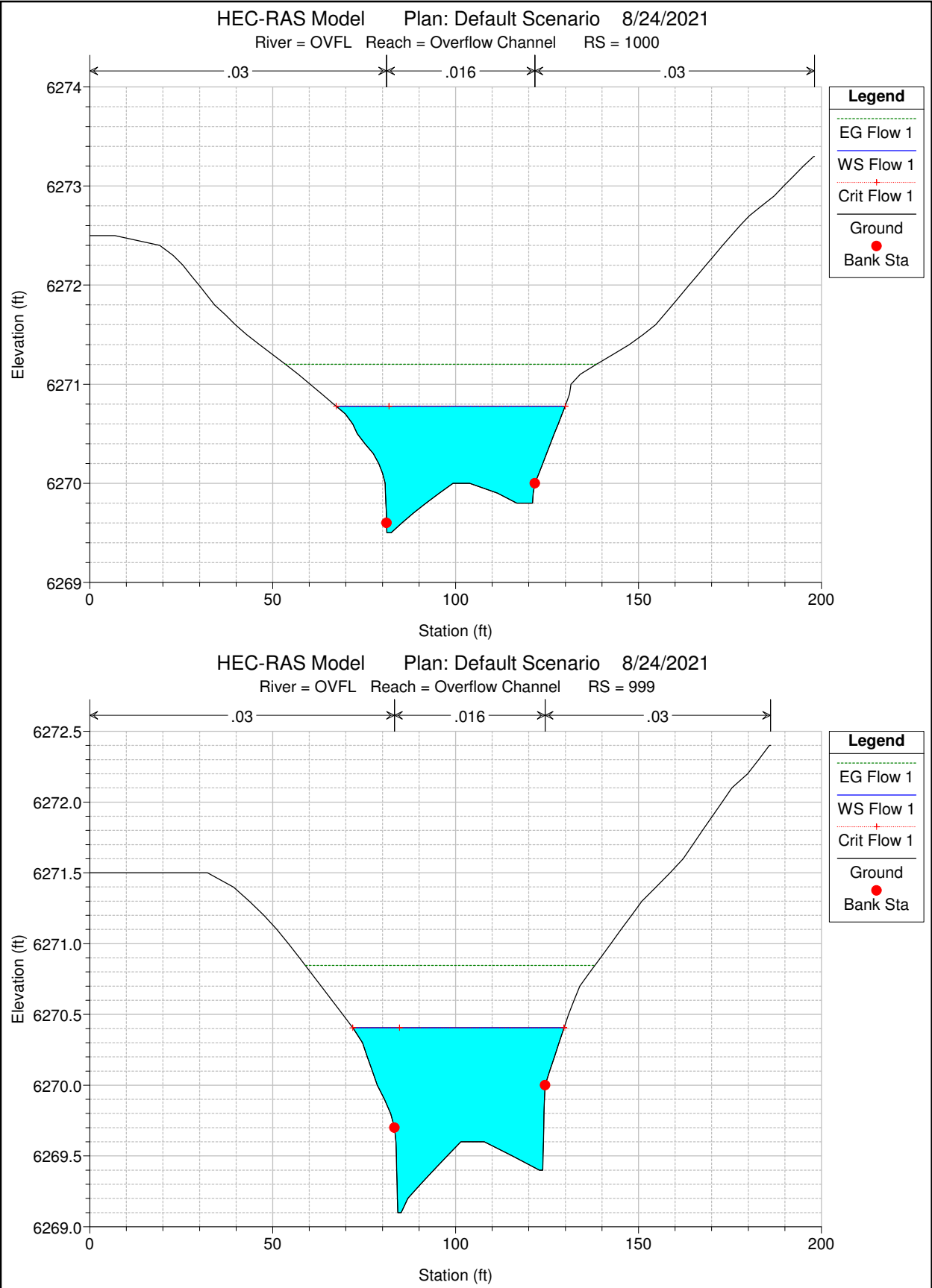












HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = OVFL    Reach = Overflow Channel    RS = 999

Elevation (ft)

6272.5

6272.0

6271.5

6271.0

6270.5

6270.0

6269.5

6269.0

0

50

100

150

200

Station (ft)

Legend

EG Flow 1

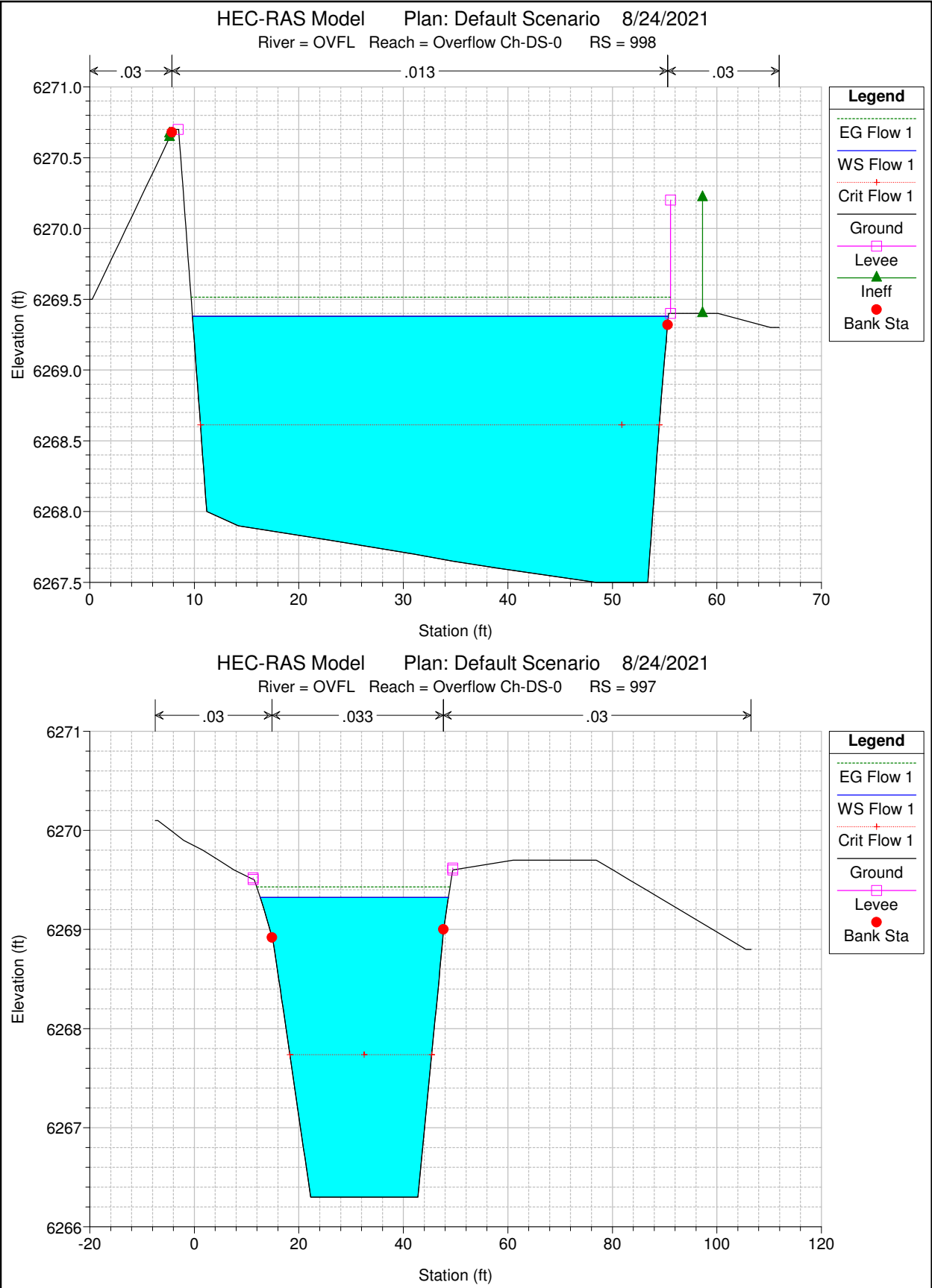
WS Flow 1

Crit Flow 1

Ground

Bank Sta





HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = OVFL    Reach = Overflow Ch-DS-0    RS = 997

Elevation (ft)

6271  
6270  
6269  
6268  
6267  
6266

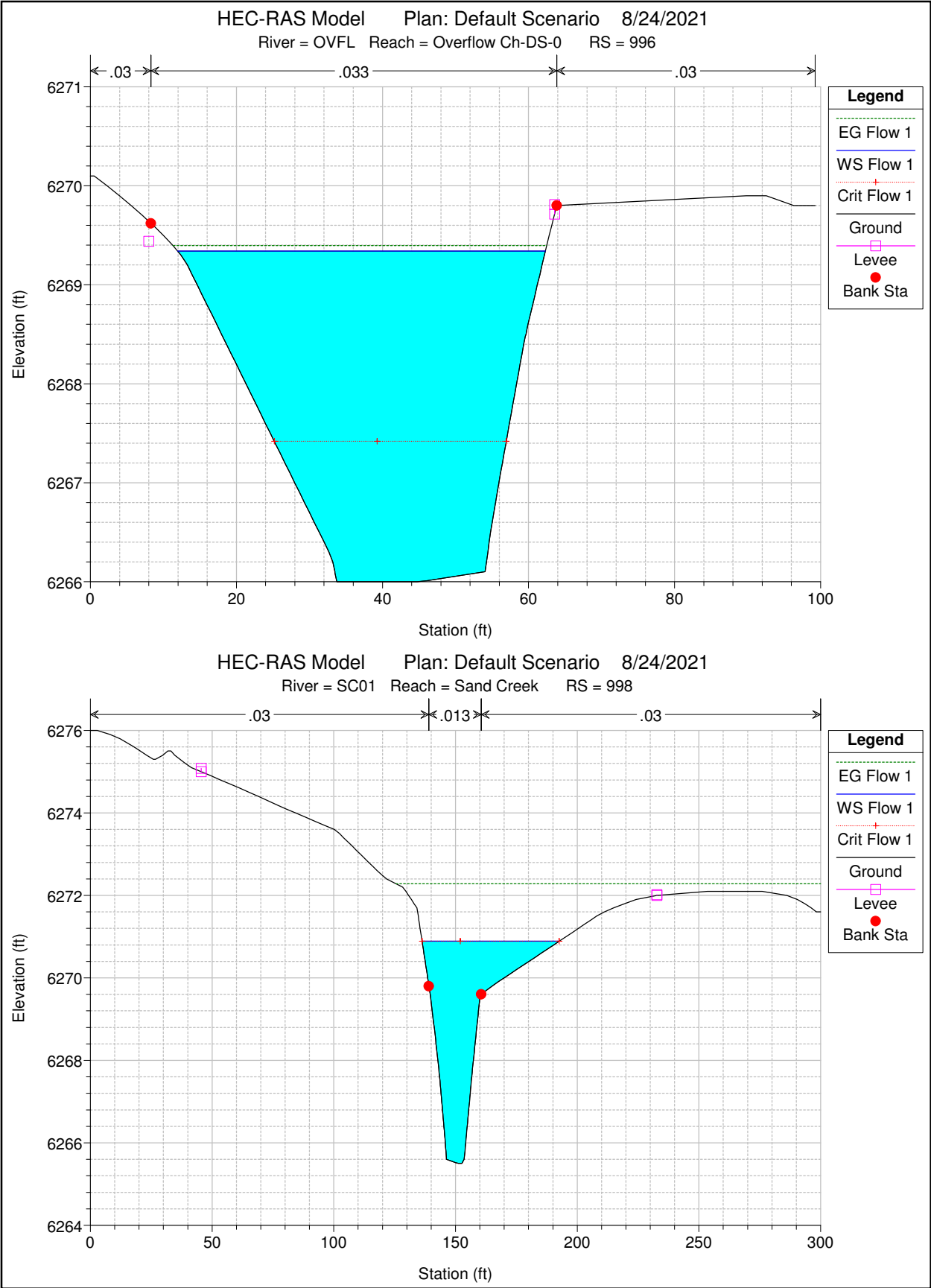
-20    0    20    40    60    80    100    120

Station (ft)

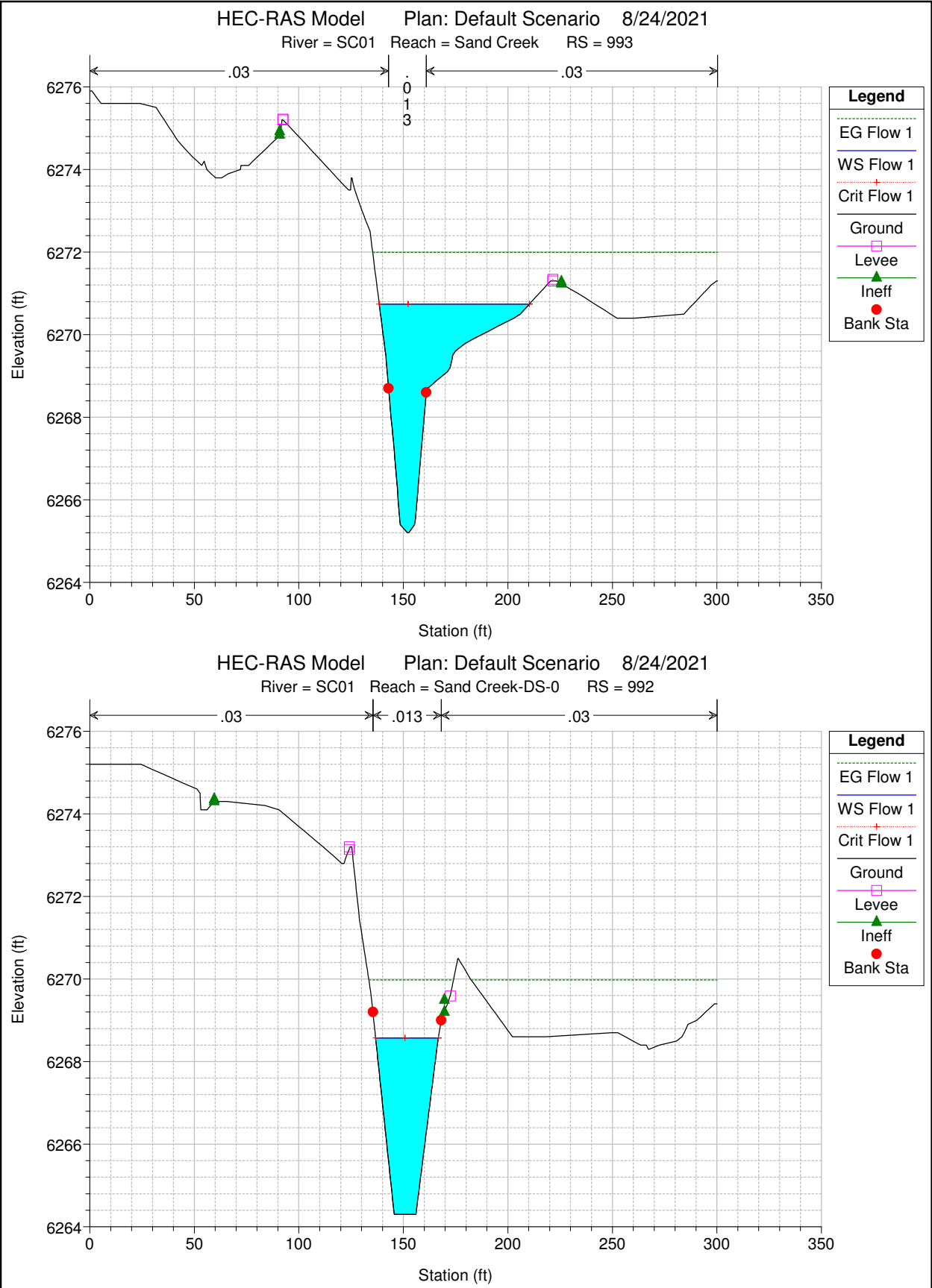
Legend

EG Flow 1  
WS Flow 1  
Crit Flow 1  
Ground  
Levee  
Bank Sta

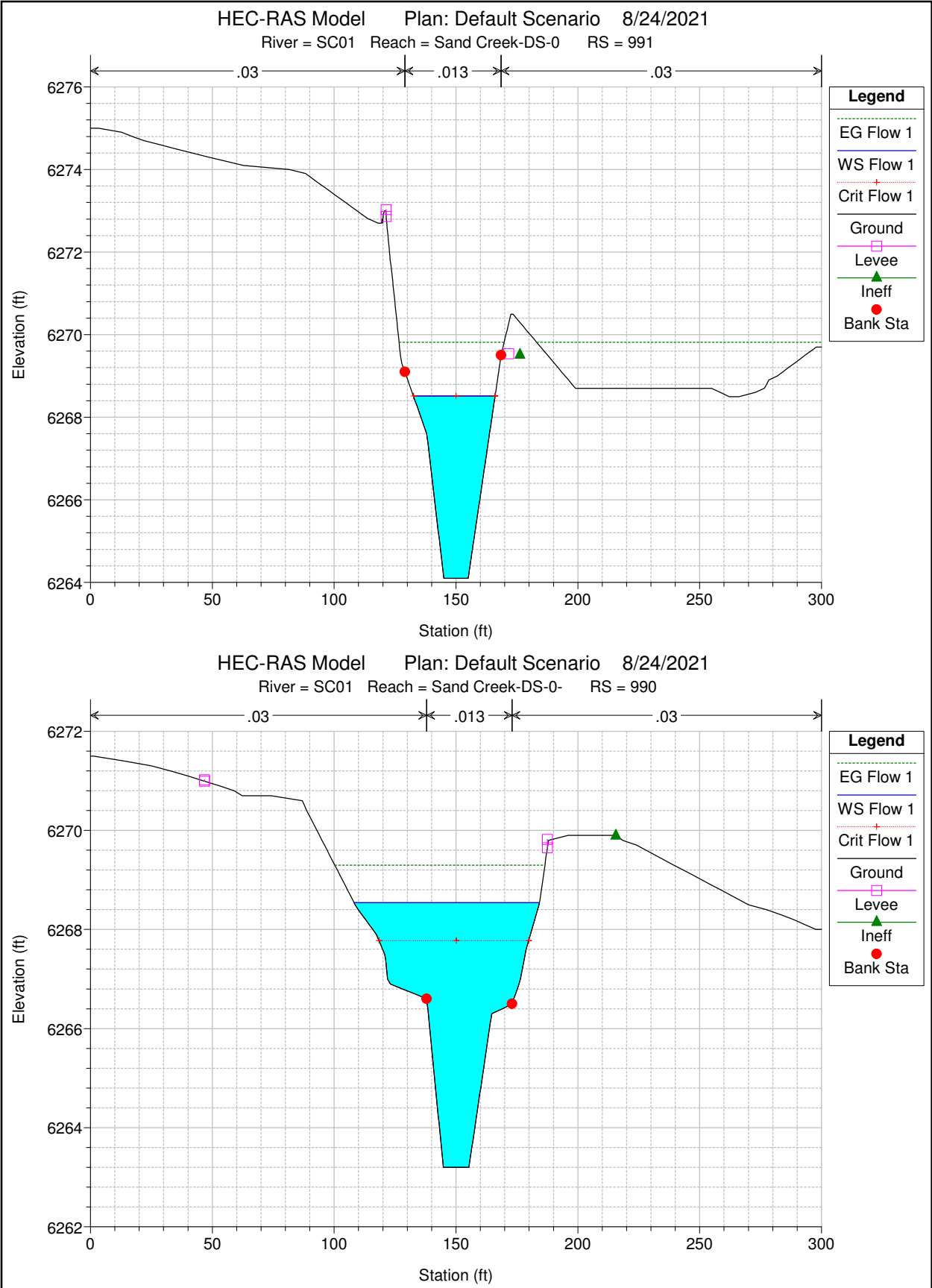




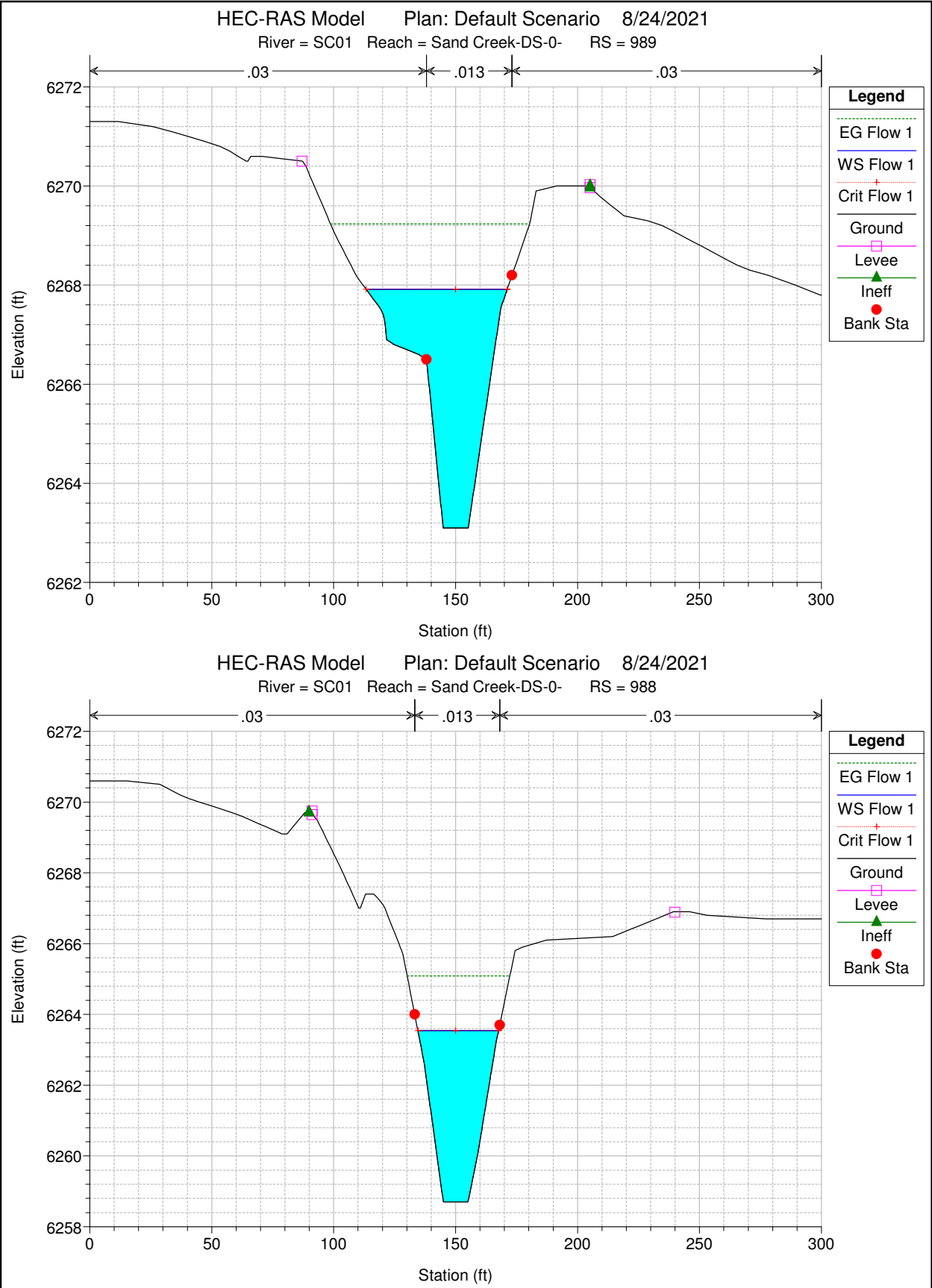




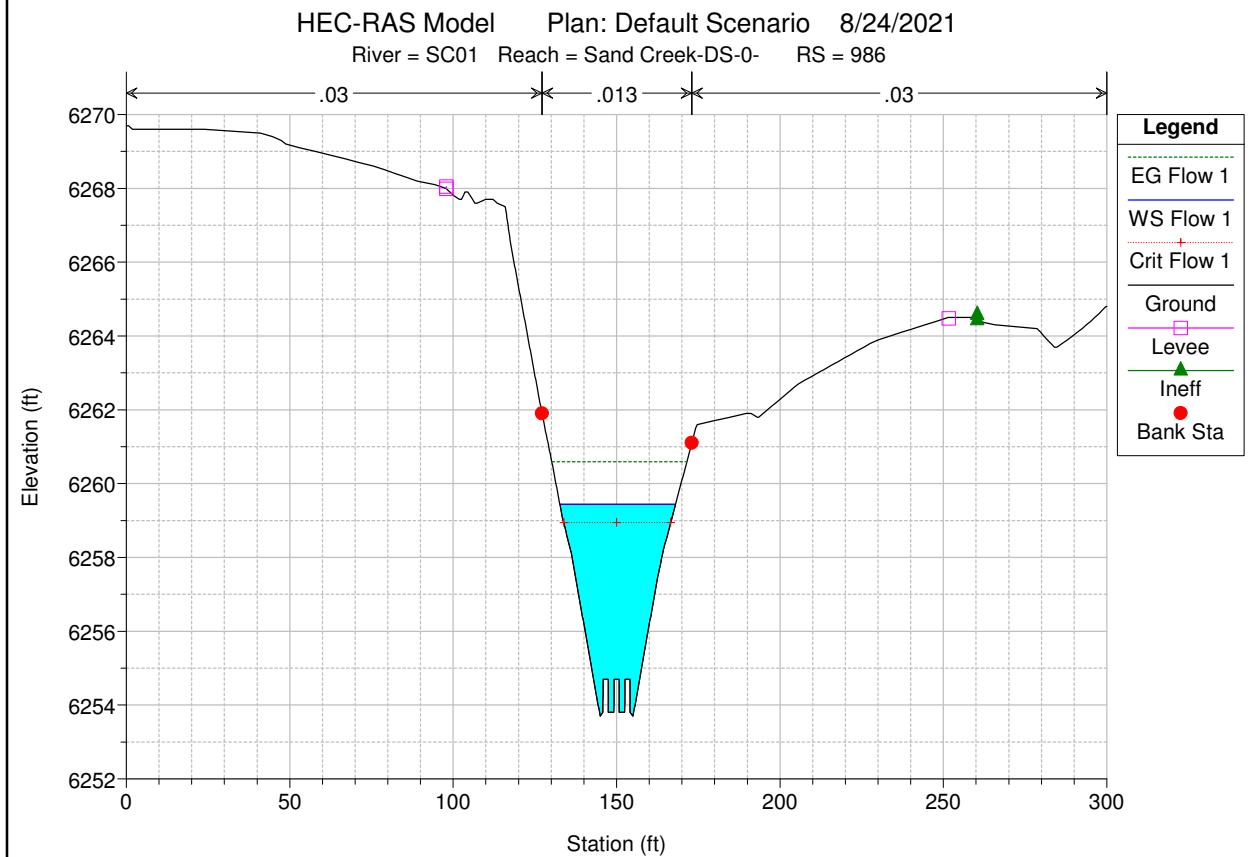
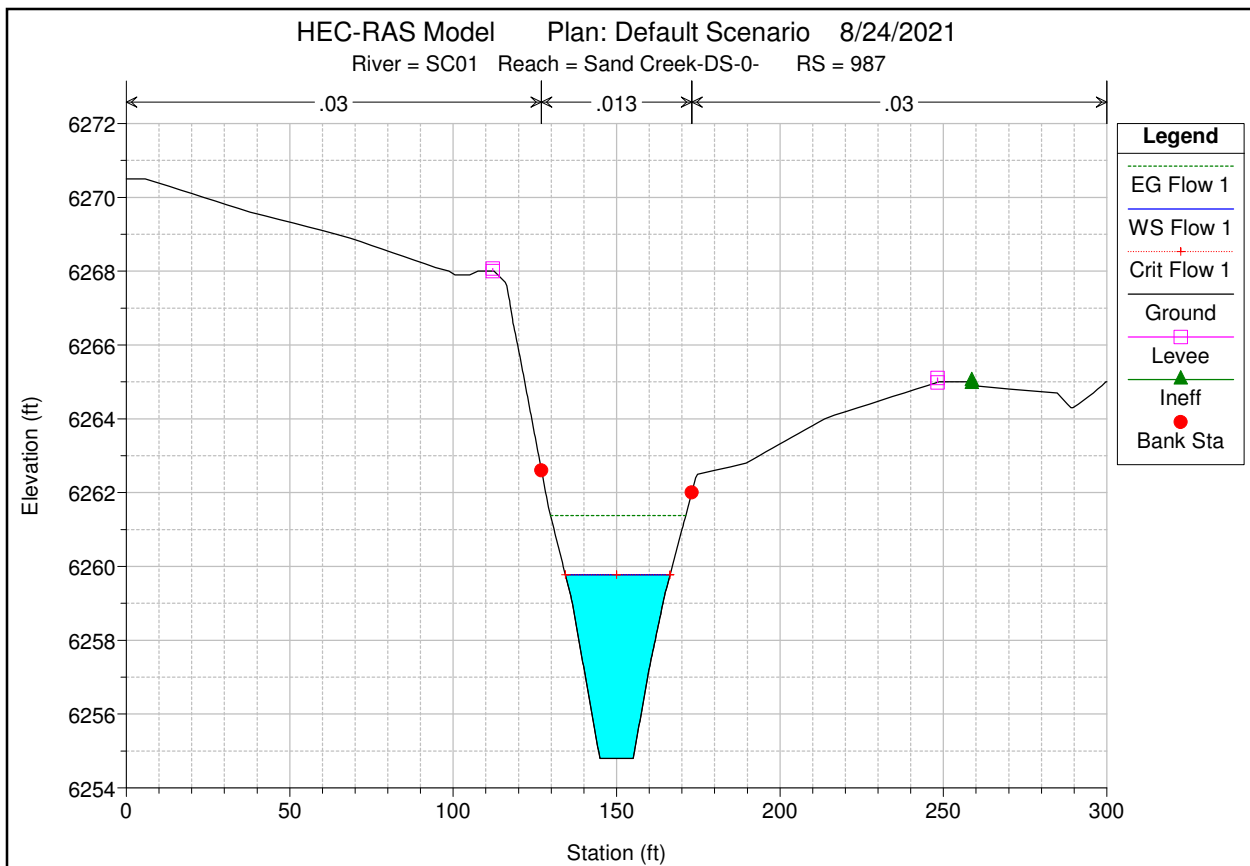




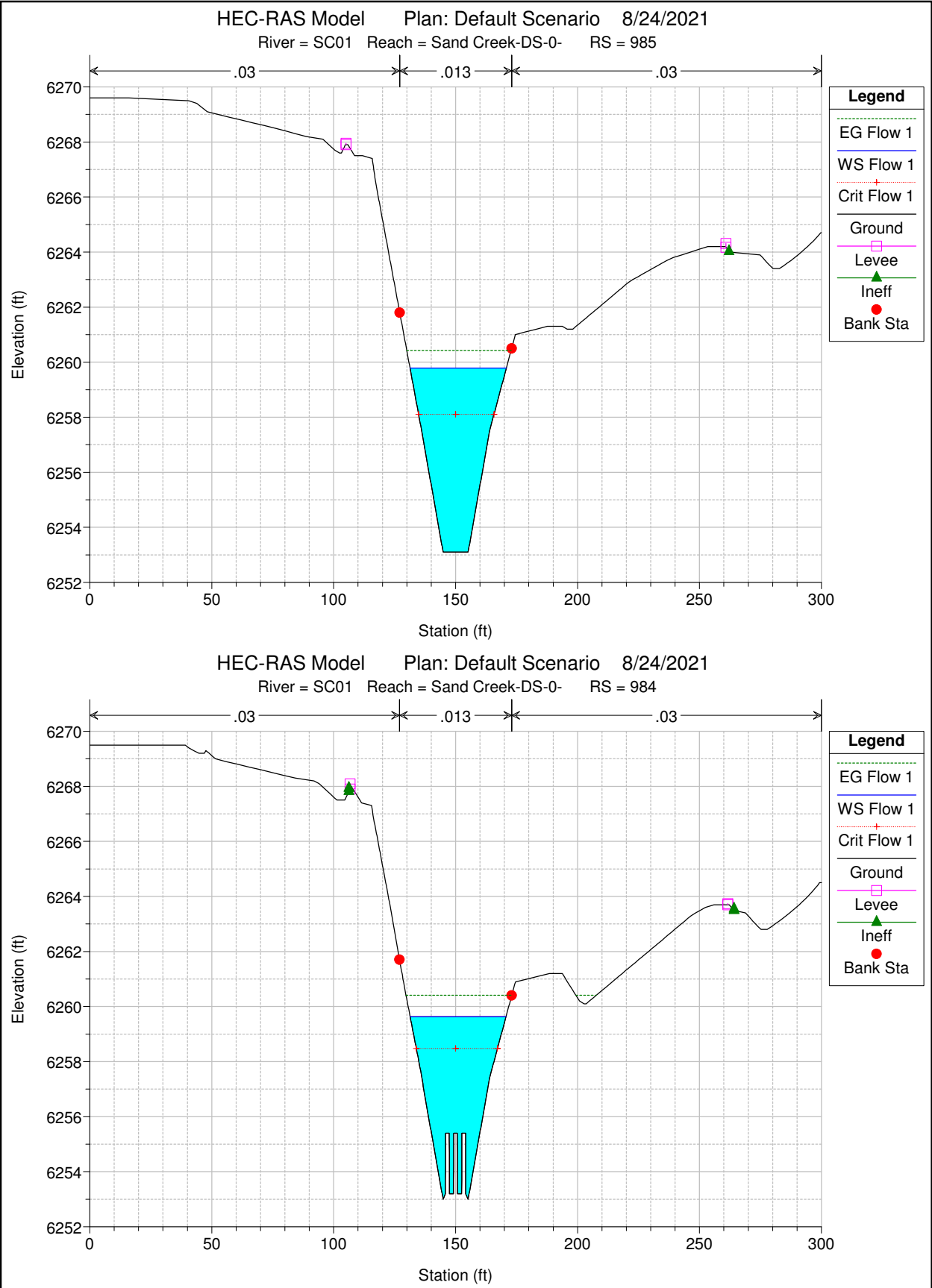




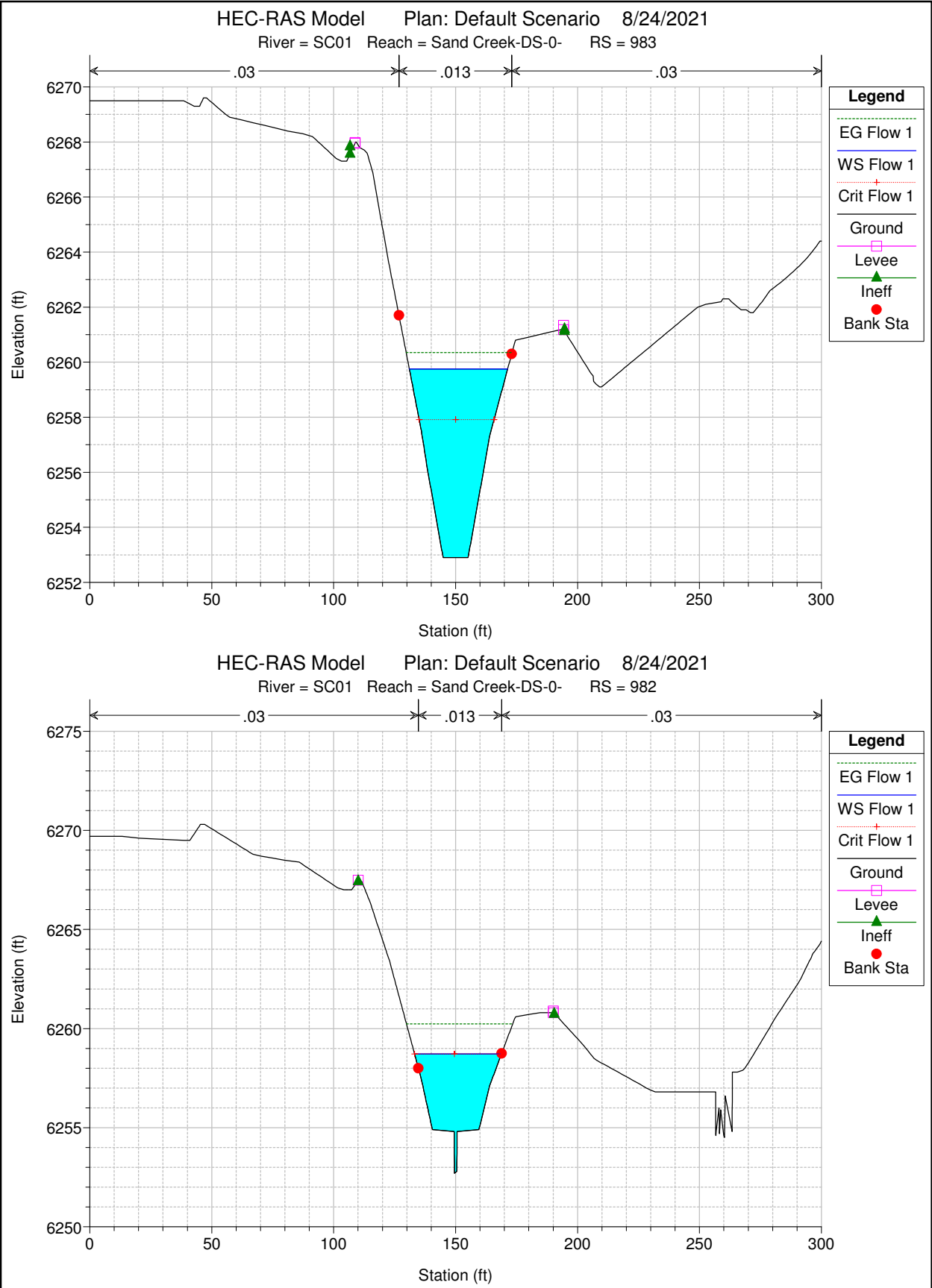




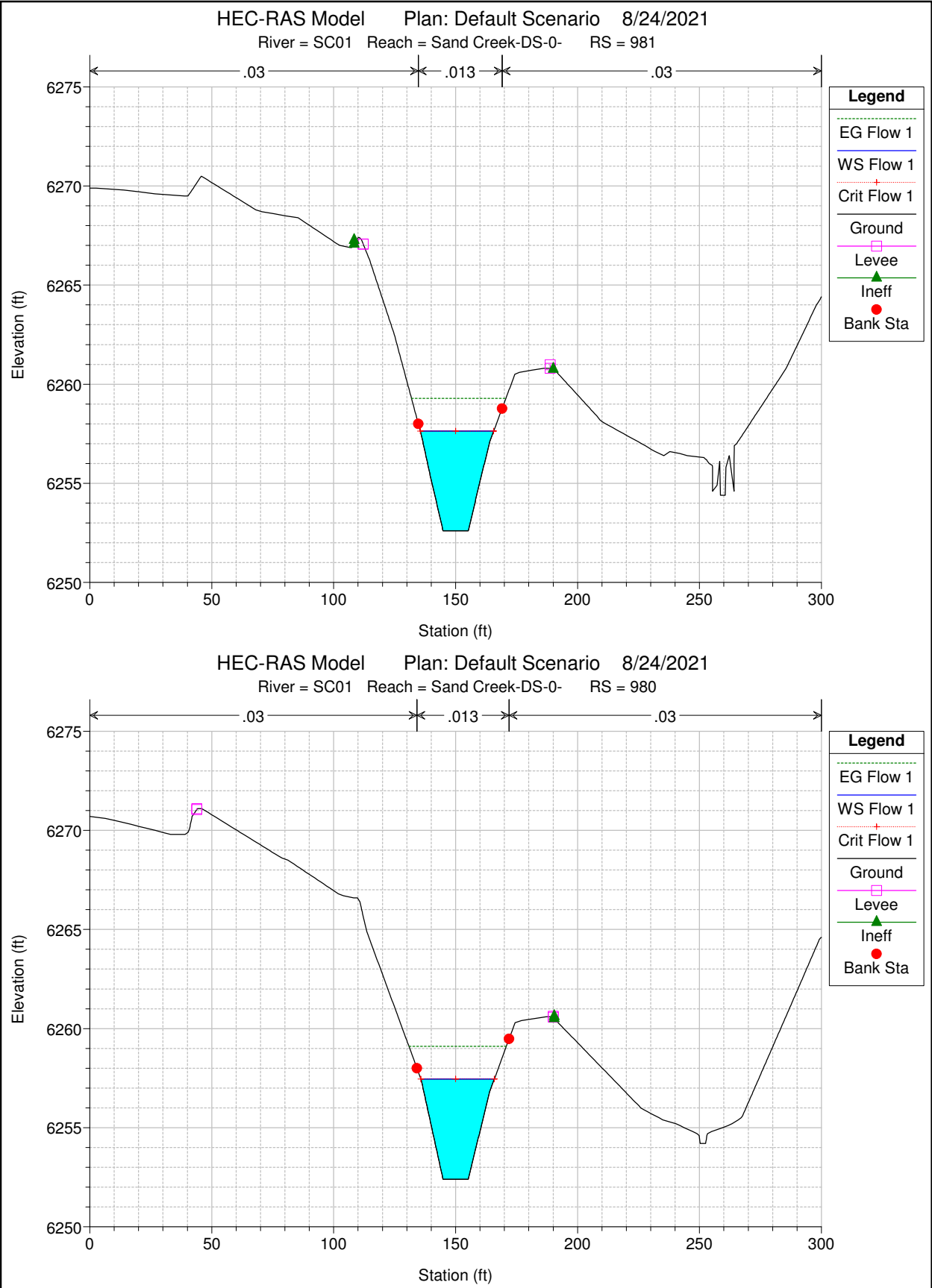




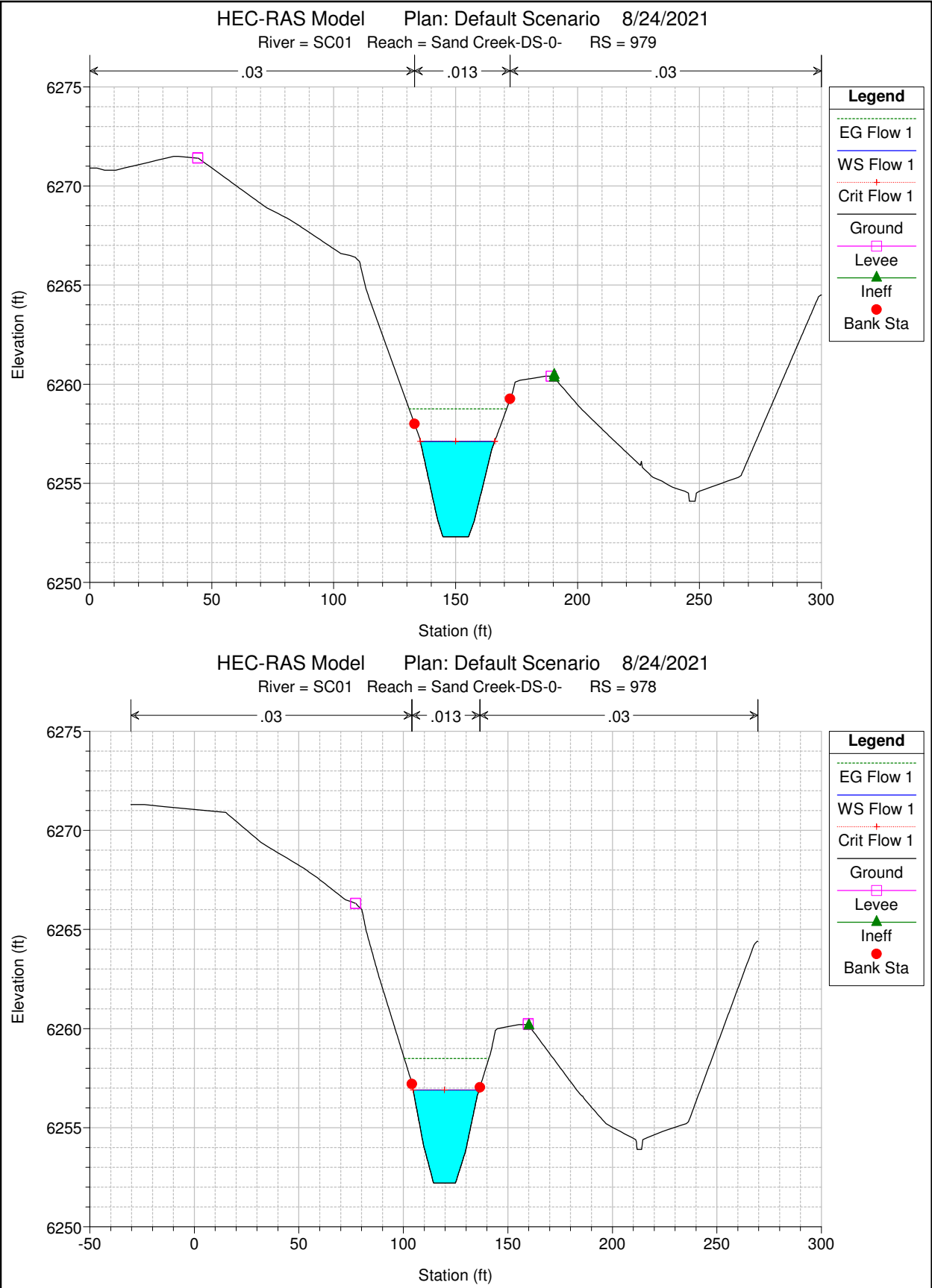




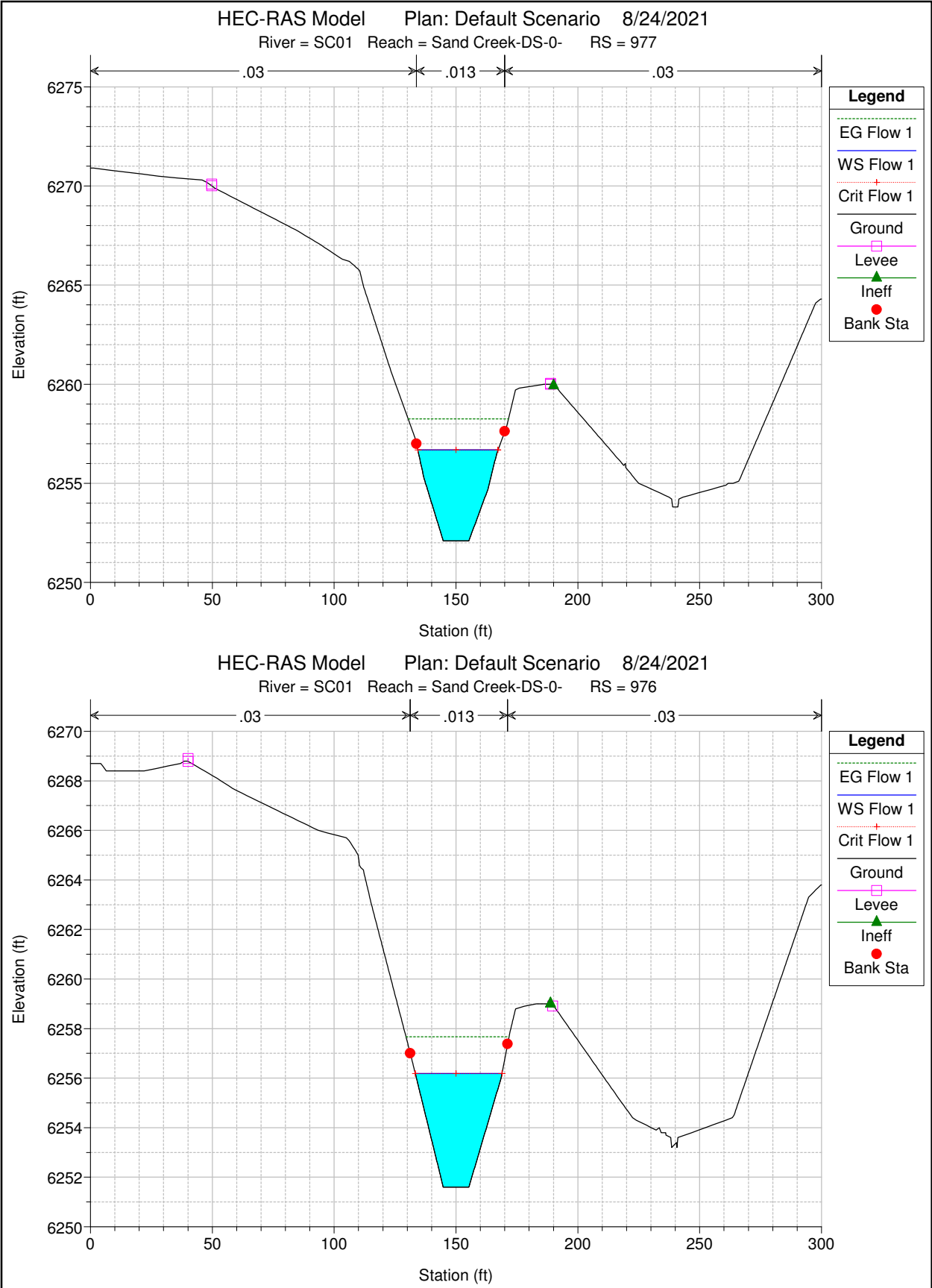












HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = SC01    Reach = Sand Creek-DS-0-    RS = 976

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

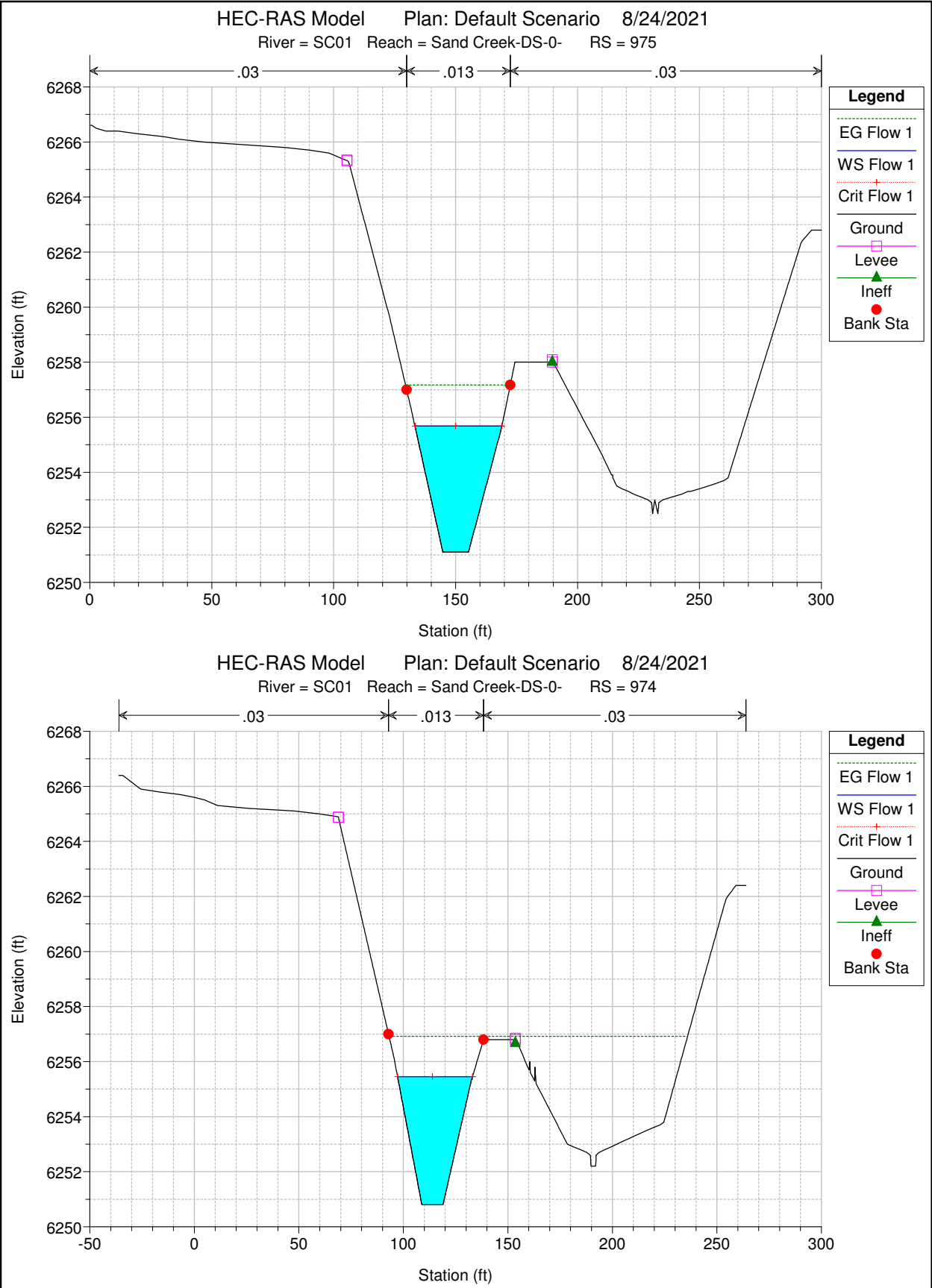
Ground

Levee

Ineff

Bank Sta





HEC-RAS Model    Plan: Default Scenario    8/24/2021

River = SC01    Reach = Sand Creek-DS-0-    RS = 974

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

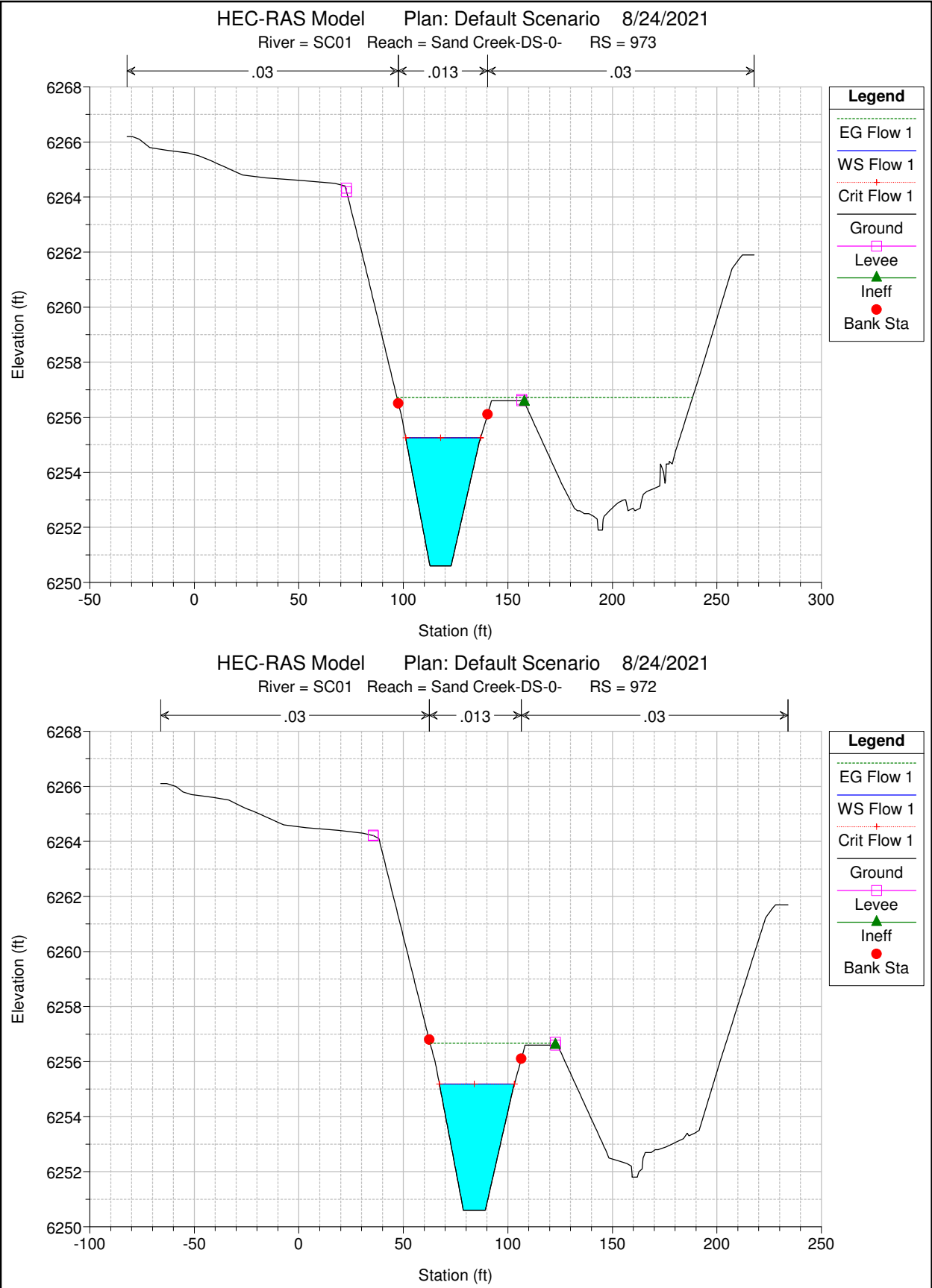
Ground

Levee

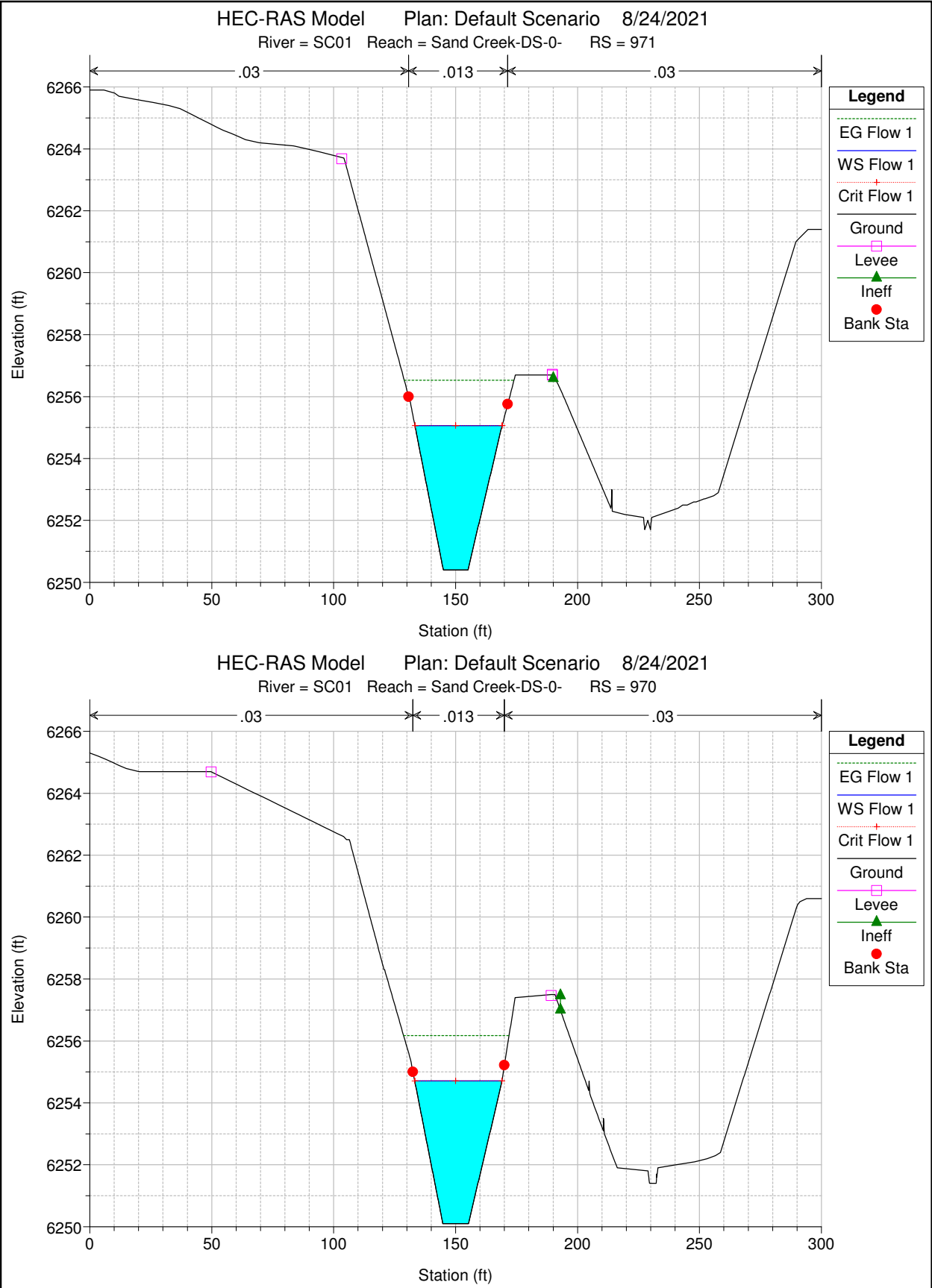
Ineff

Bank Sta

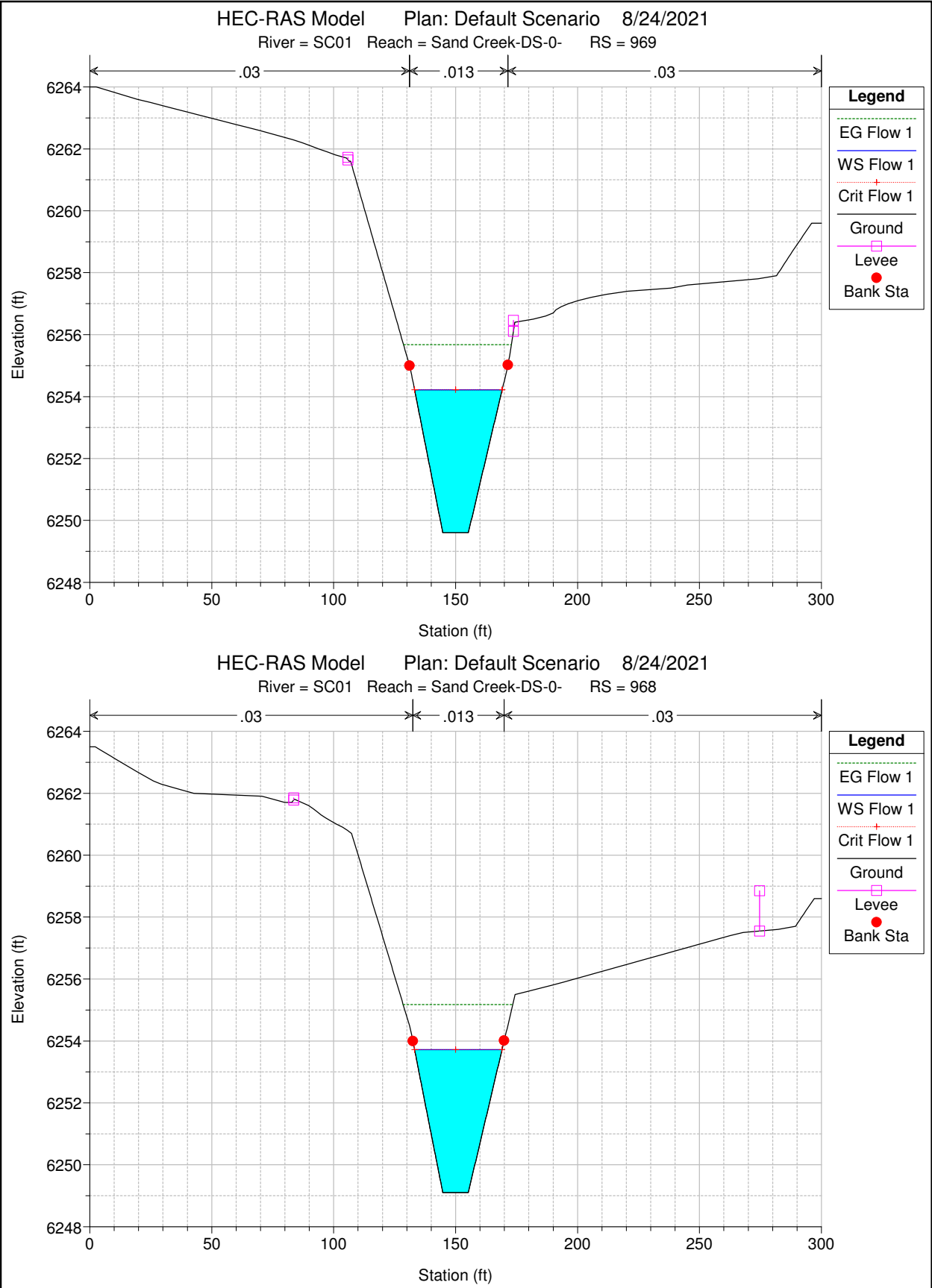




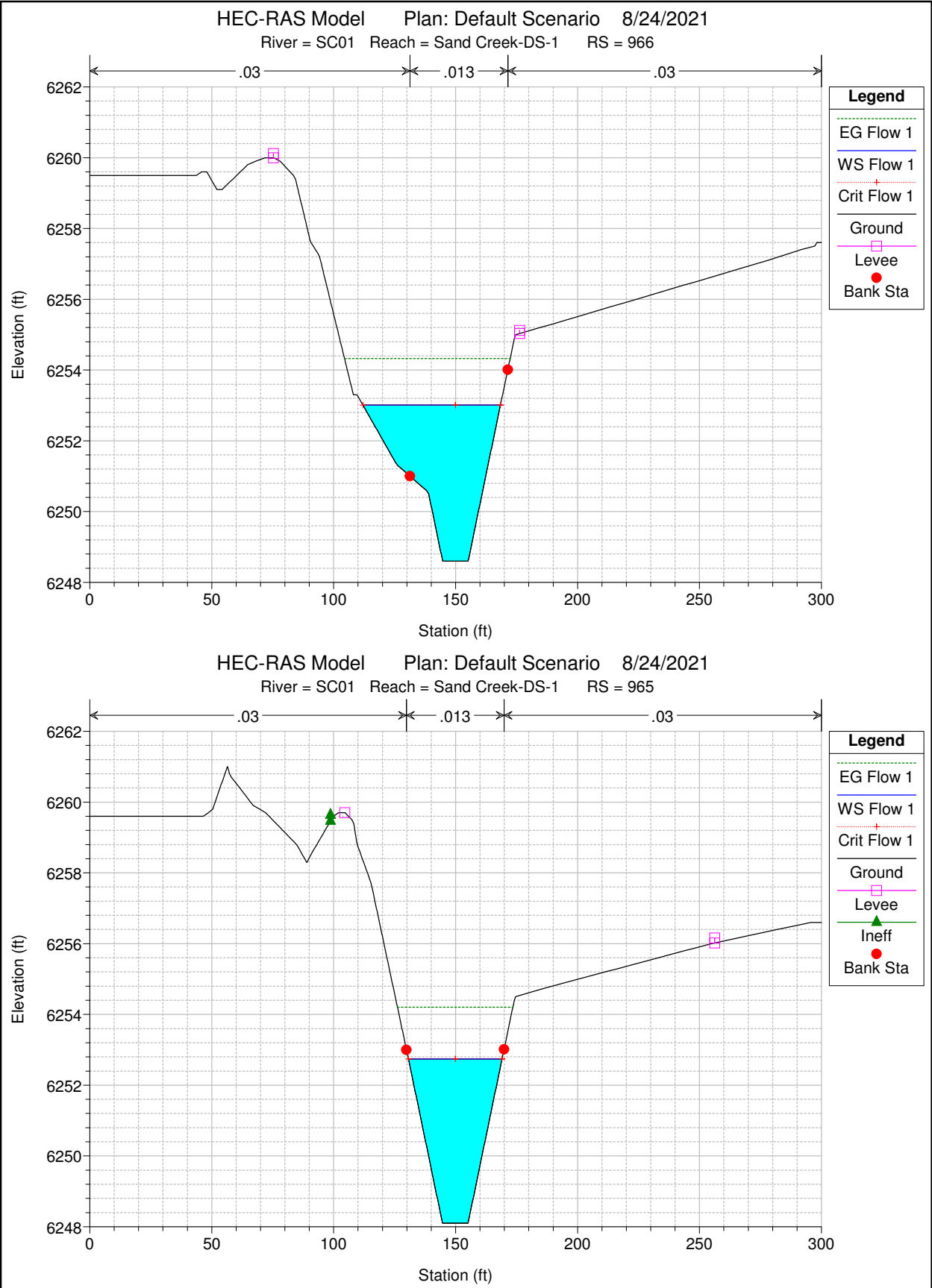




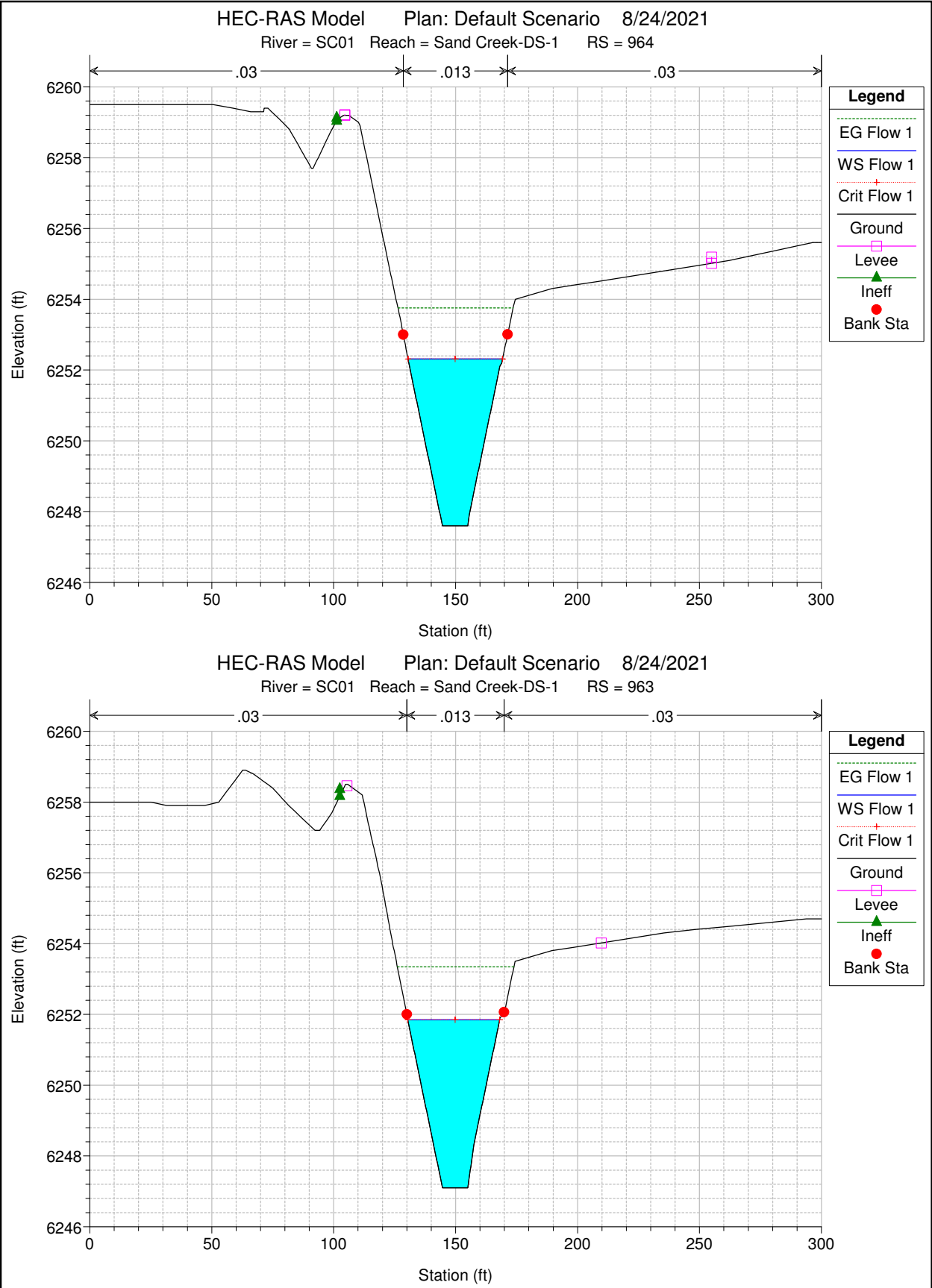




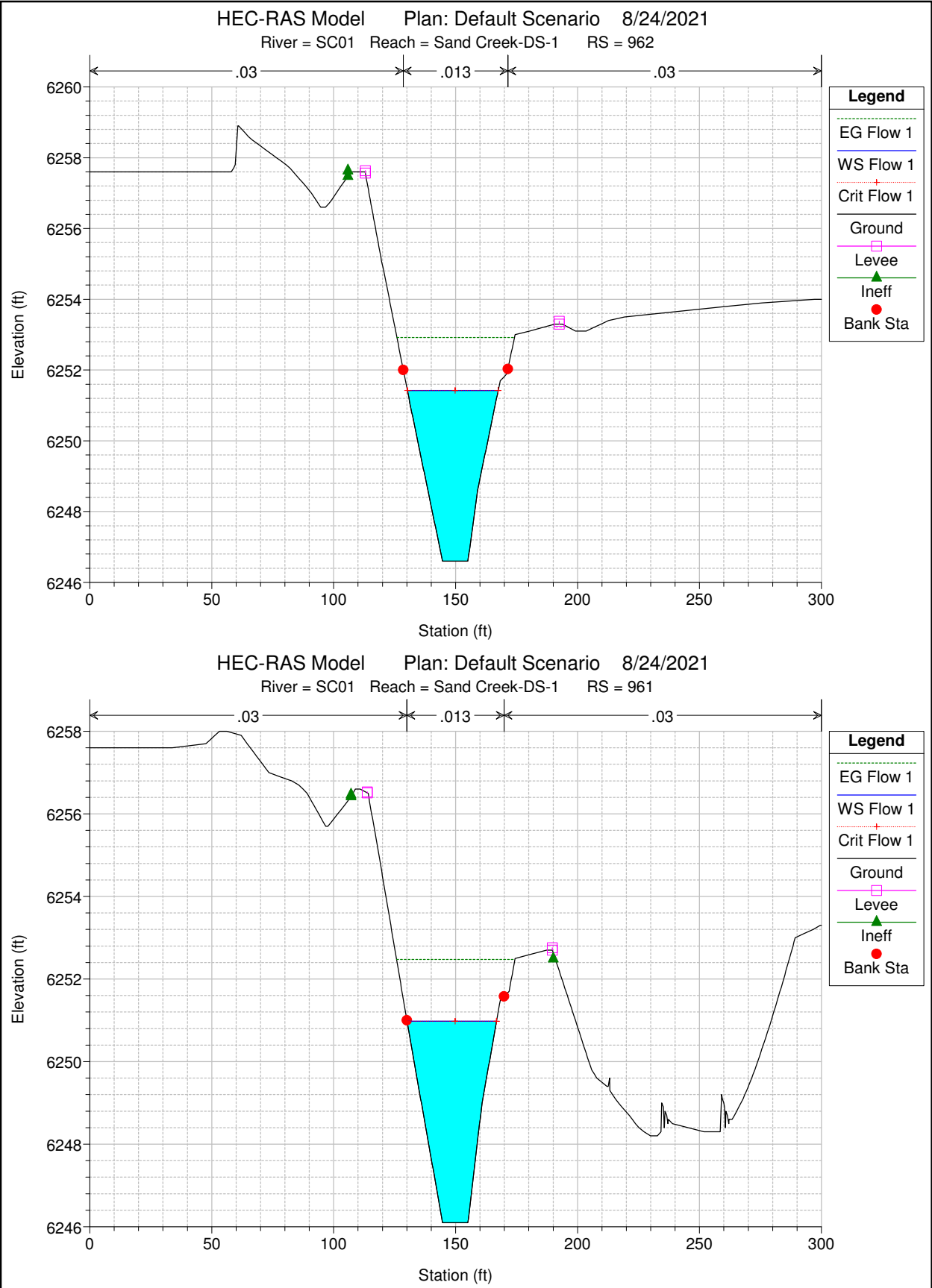




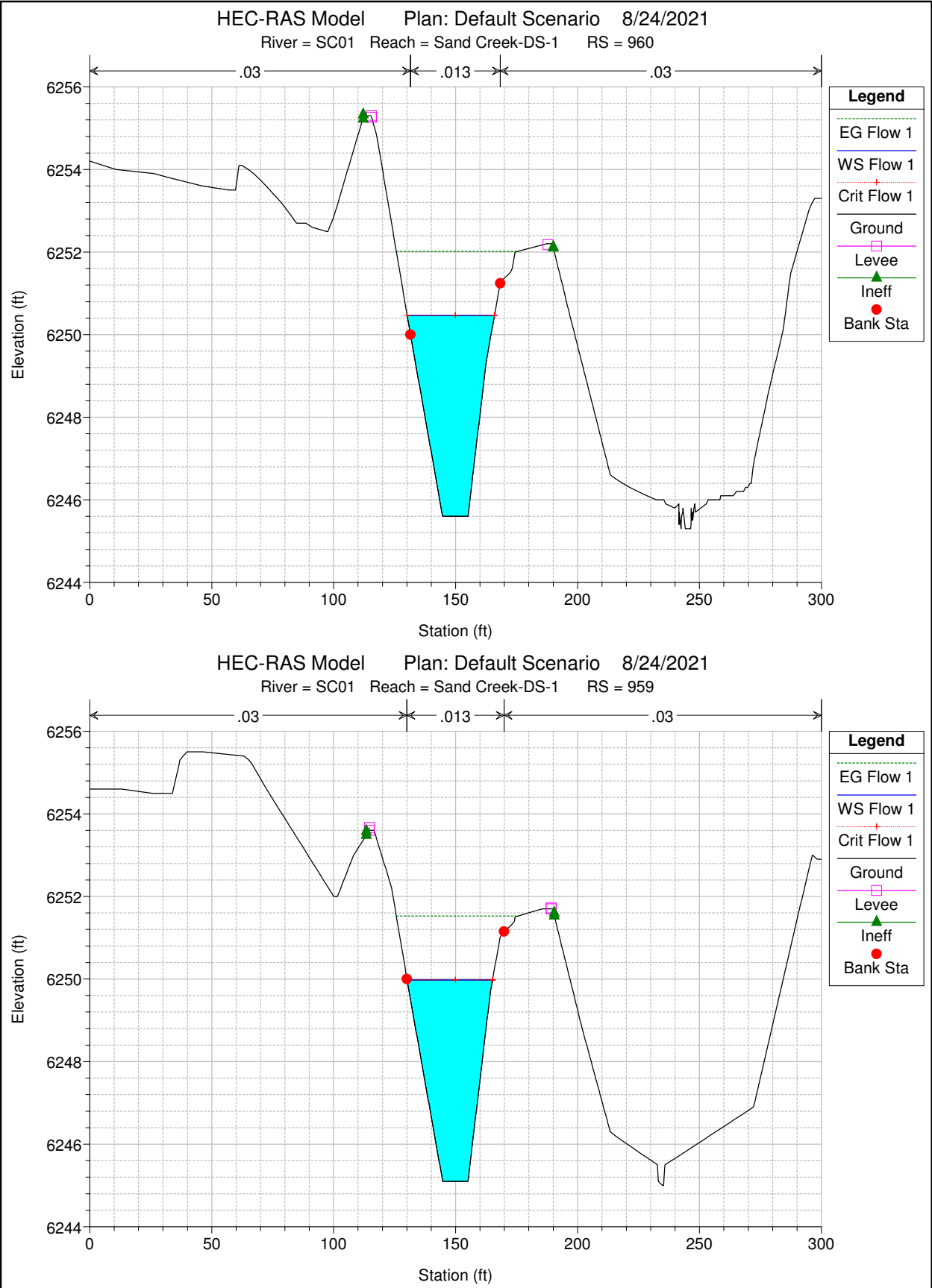








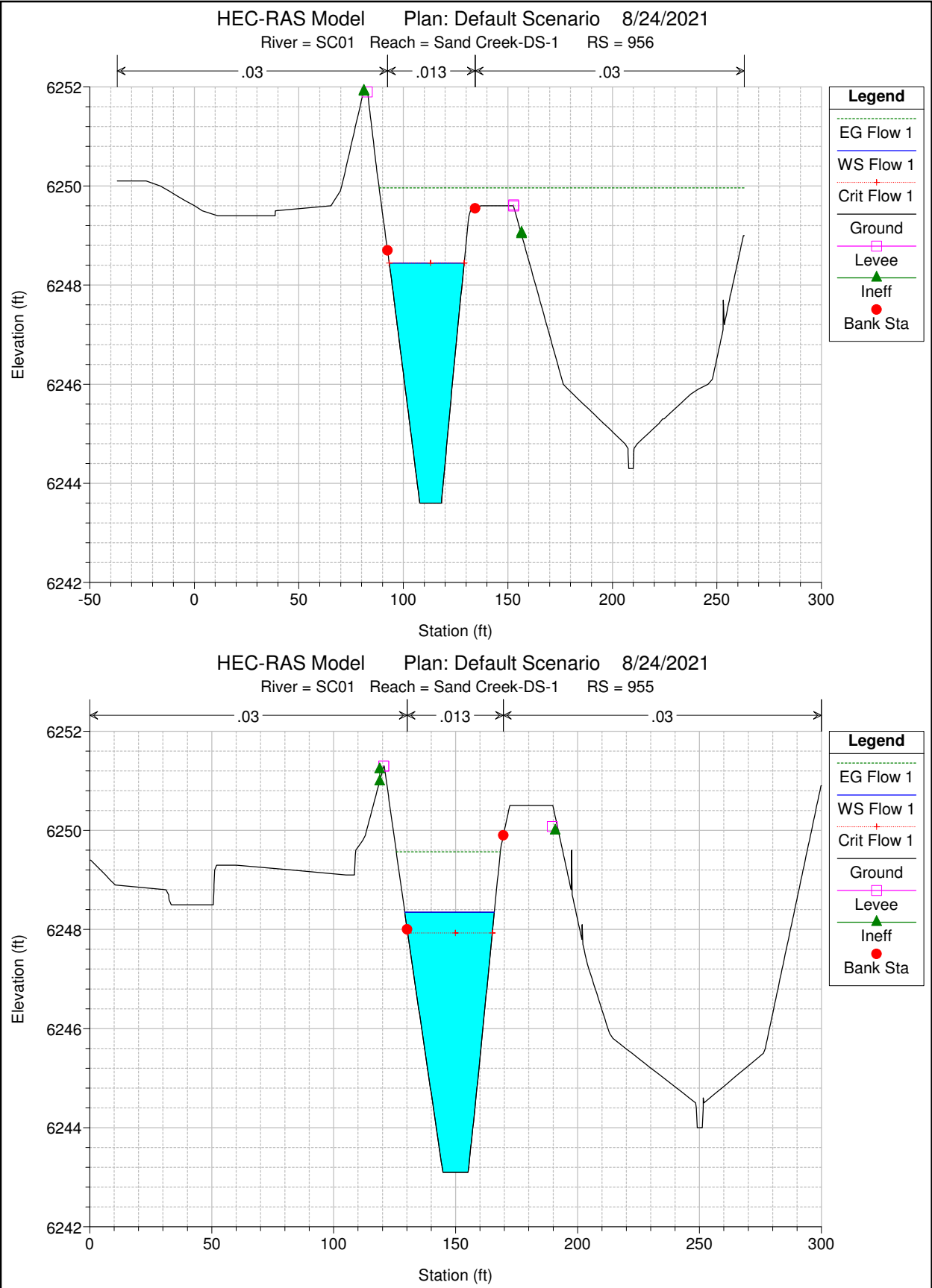




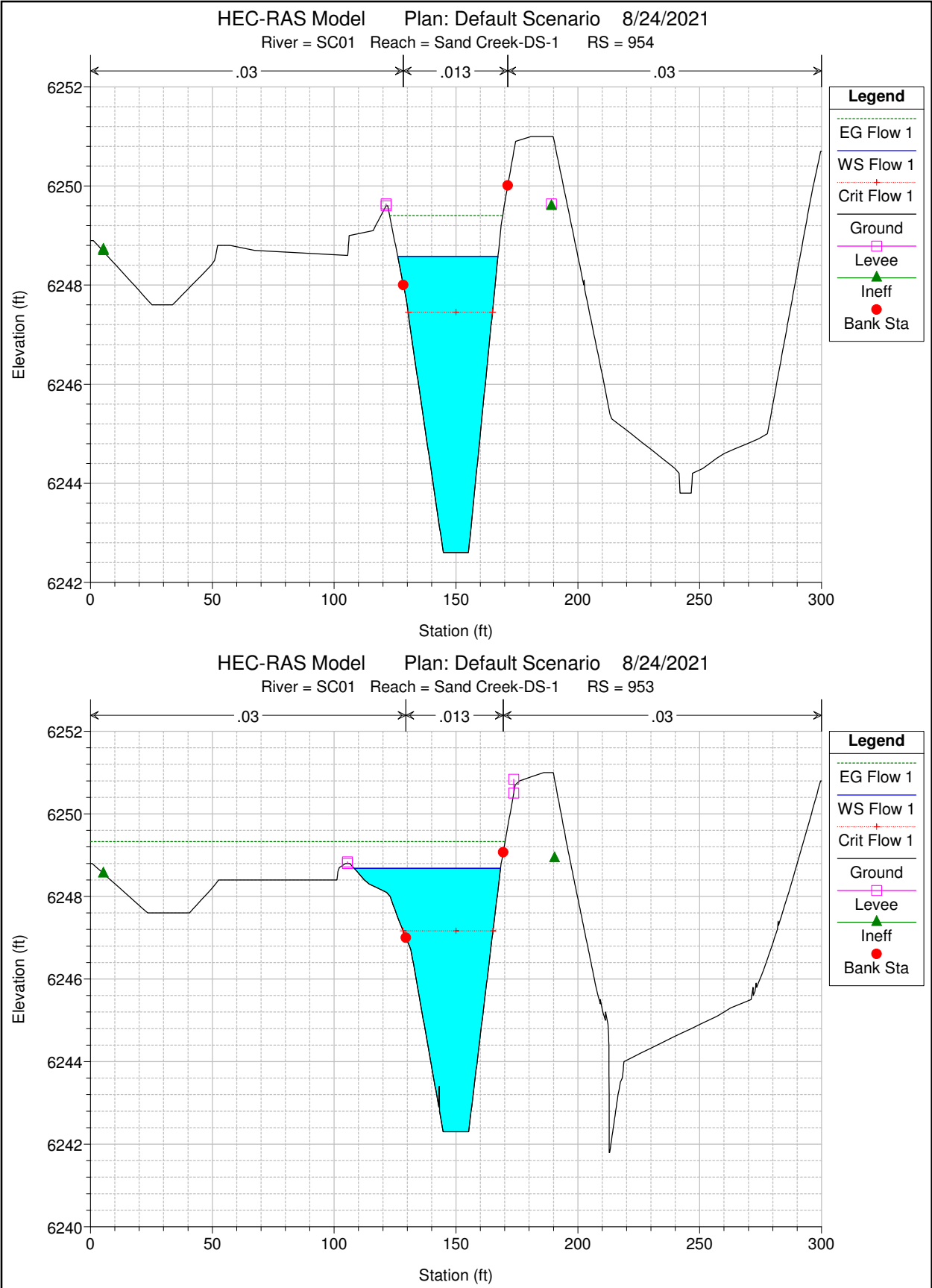




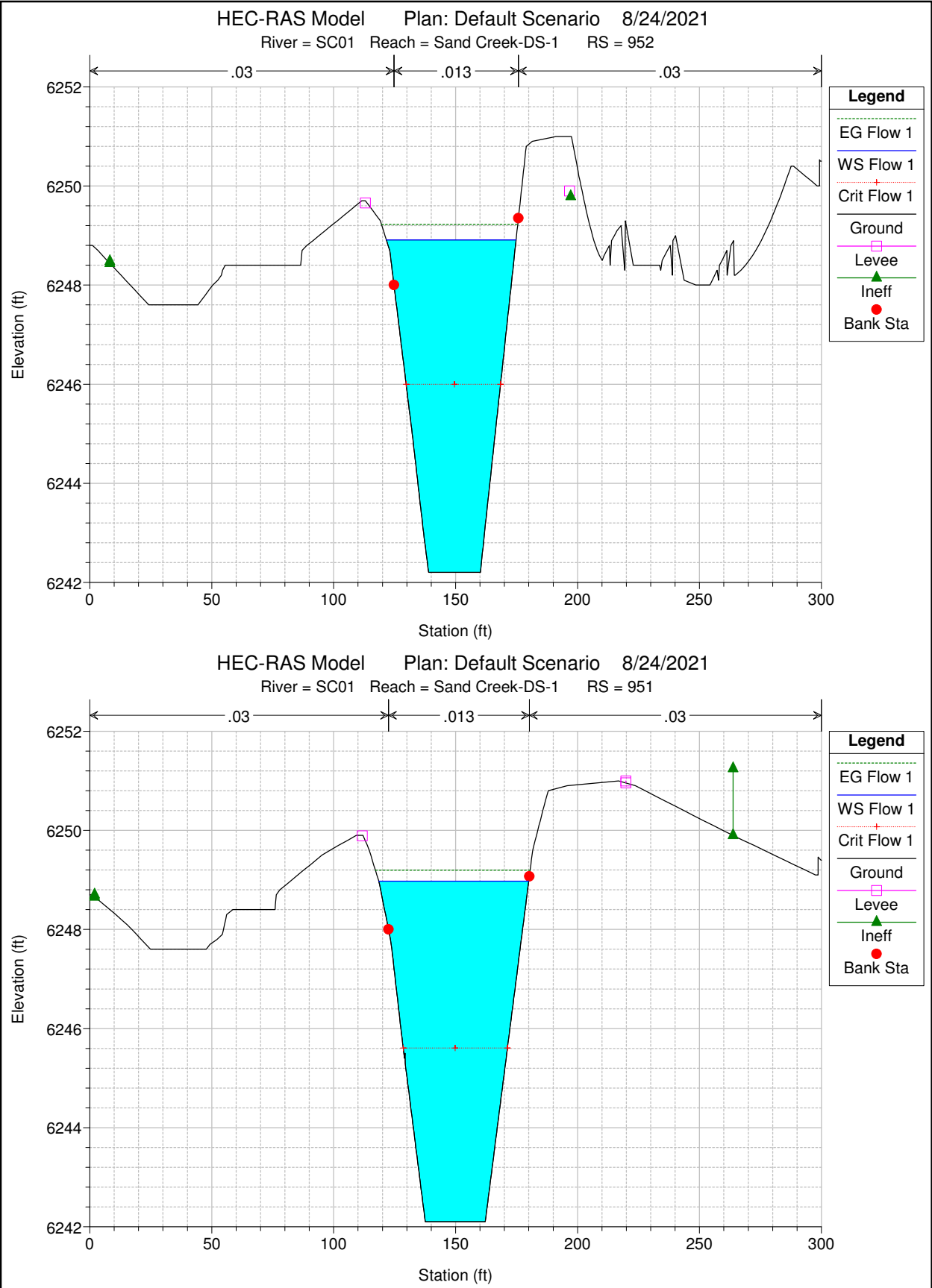




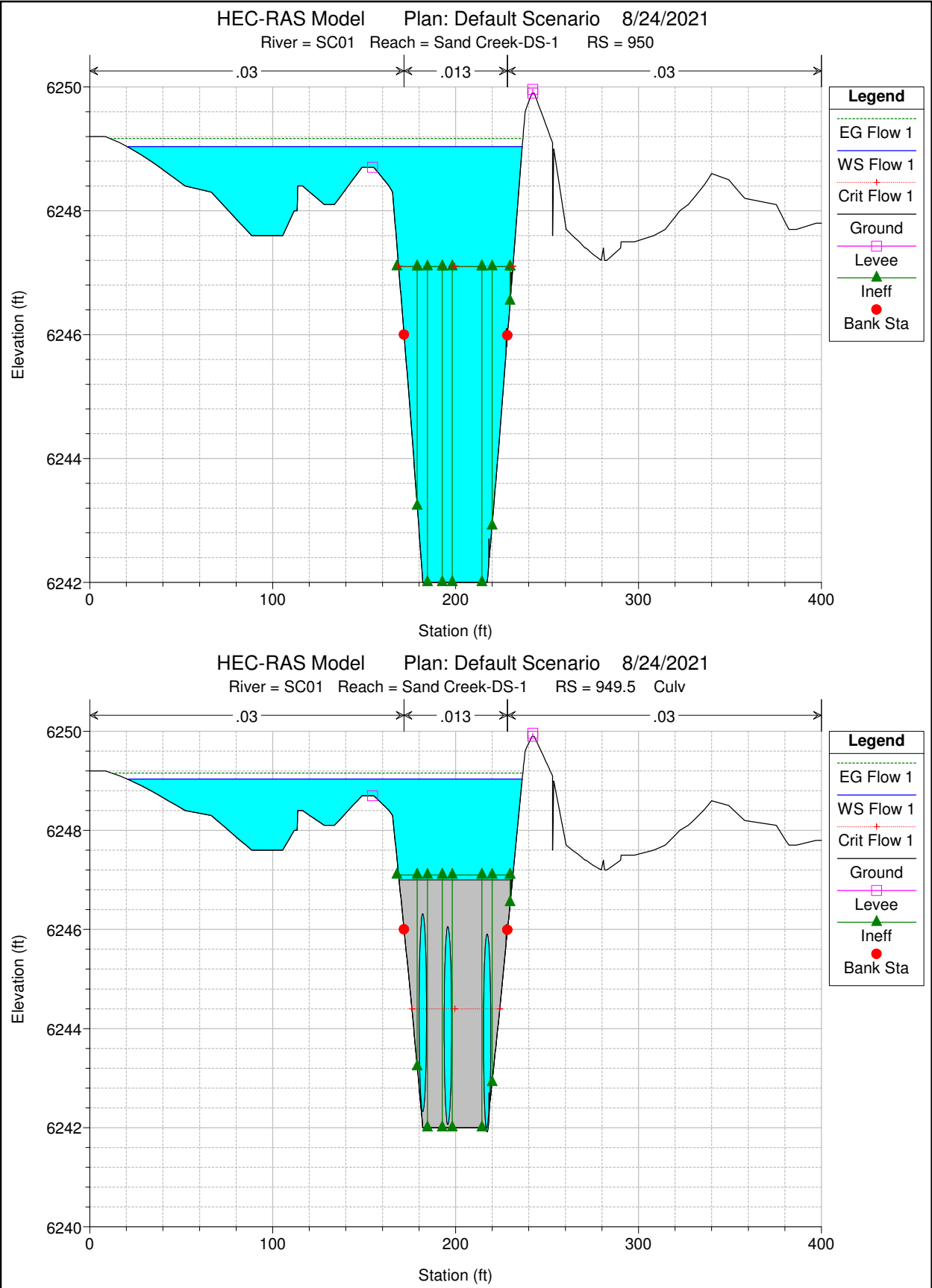




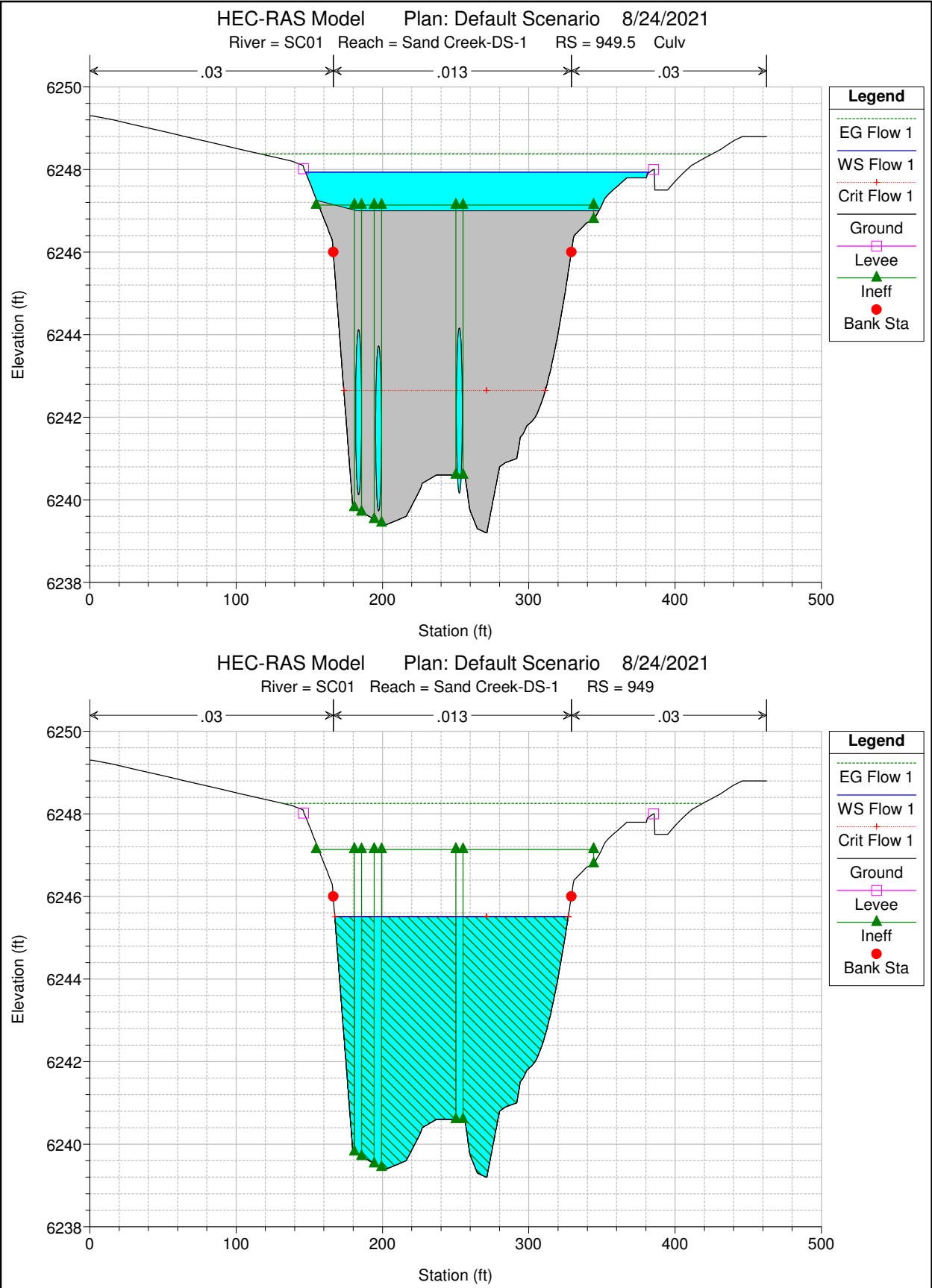






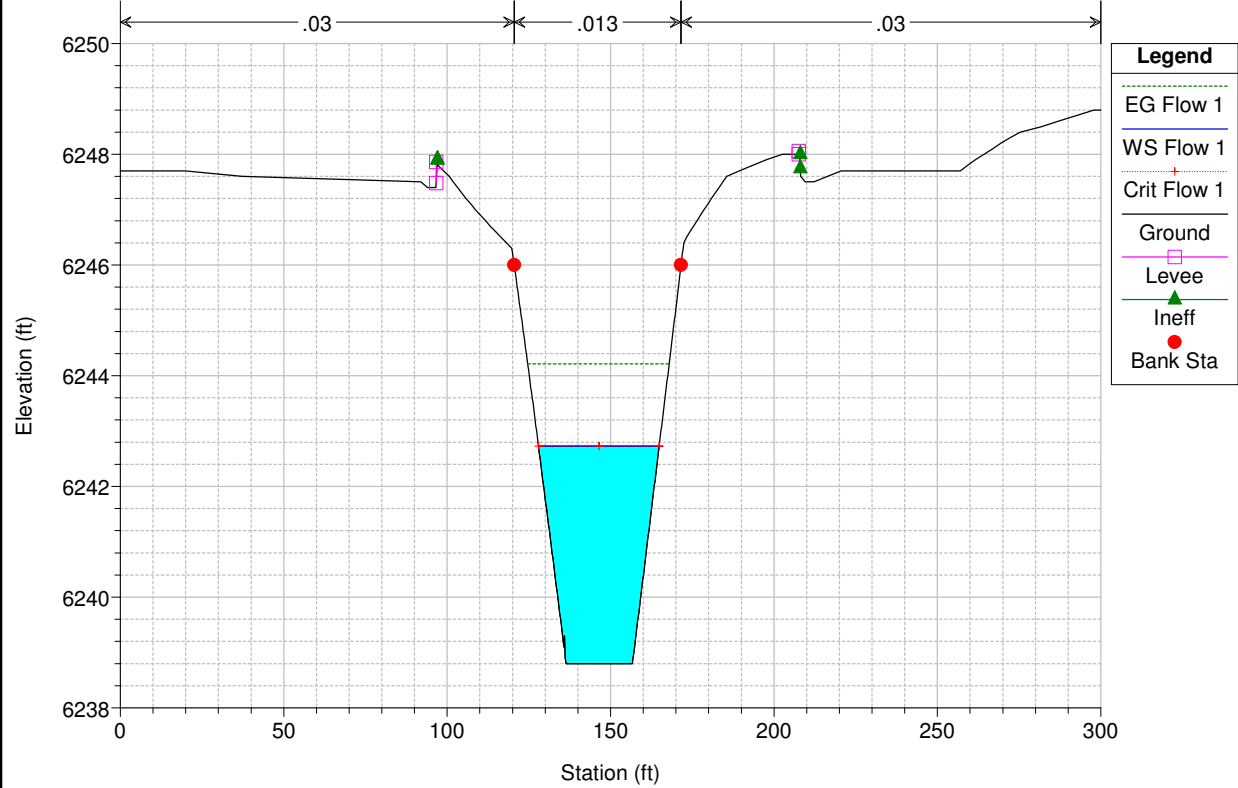






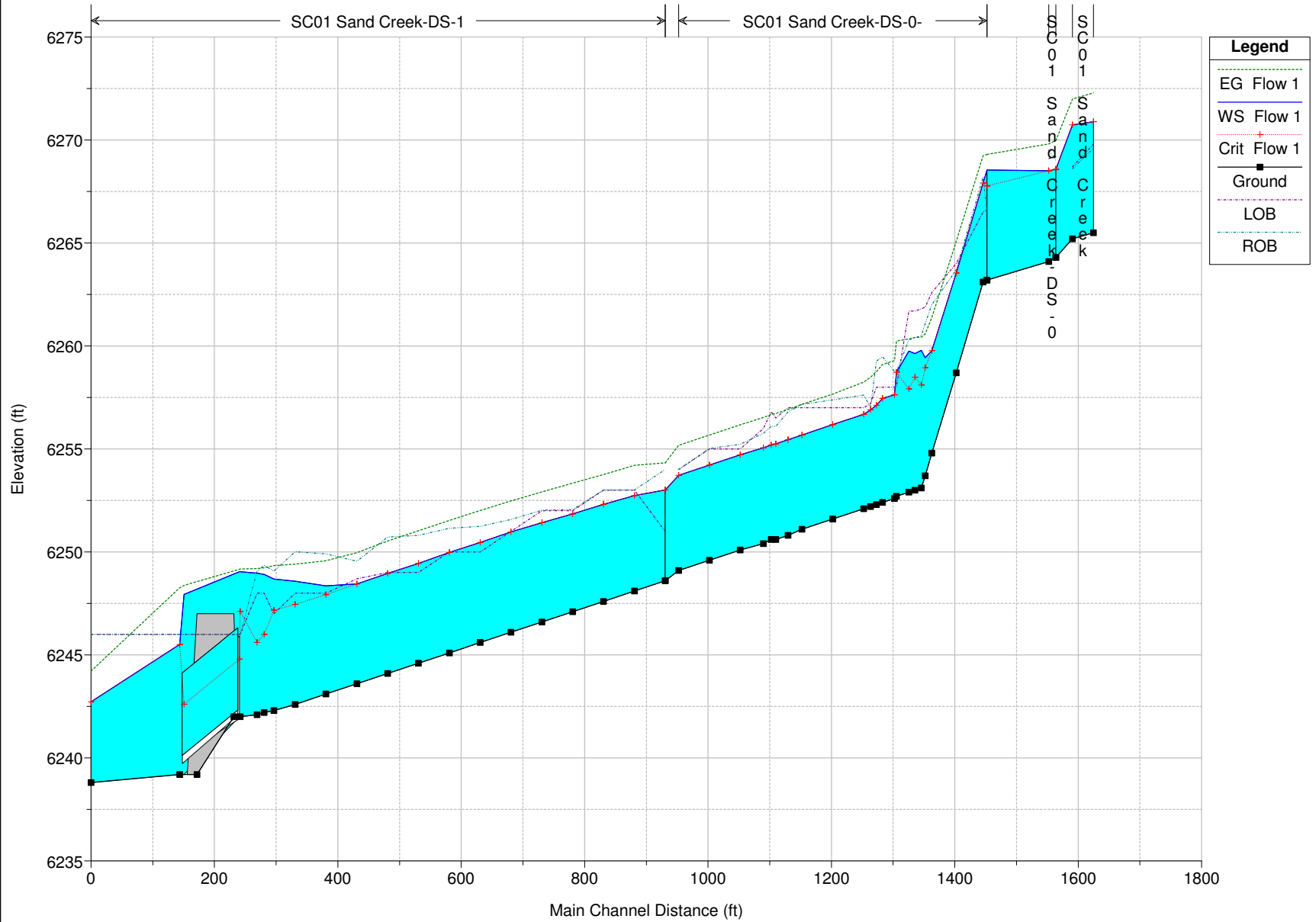


HEC-RAS Model    Plan: Default Scenario    8/24/2021  
River = SC01    Reach = Sand Creek-DS-1    RS = 948

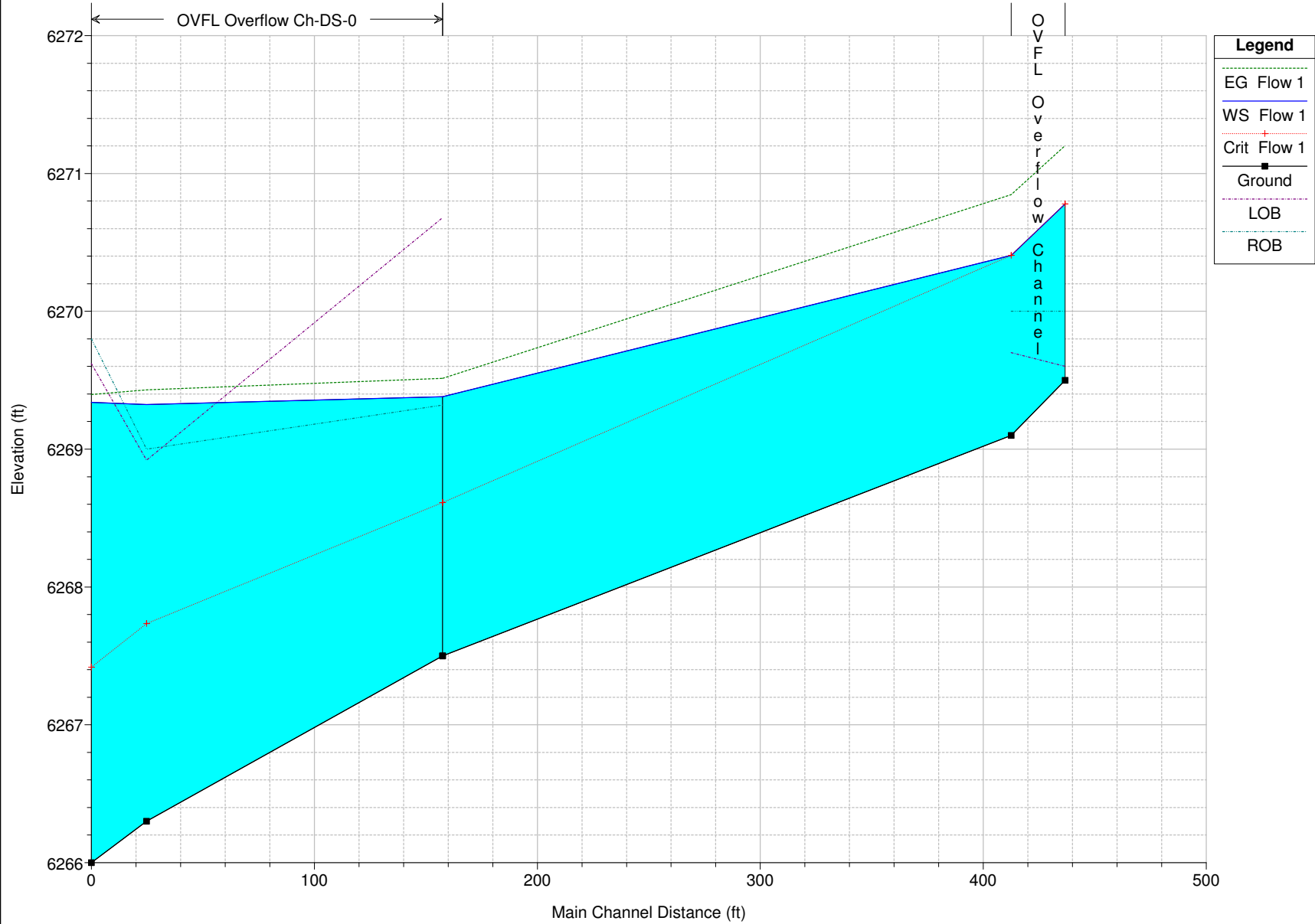




HEC-RAS Model Plan: Default Scenario 8/24/2021









HEC-RAS Plan: Default Scenario Profile: Flow 1

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
SC01	Sand Creek	998	Flow 1	820.00	6265.50	6270.89	6270.89	6272.28	0.001362	9.64	103.80	56.32	0.87
SC01	Sand Creek	993	Flow 1	820.00	6265.20	6270.74	6270.74	6272.00	0.001080	9.43	128.24	71.77	0.79
SC01	Sand Creek-DS-0	992	Flow 1	820.02	6264.30	6268.57	6268.57	6269.98	0.001829	9.51	86.27	30.02	0.99
SC01	Sand Creek-DS-0	991	Flow 1	820.02	6264.10	6268.51	6268.51	6269.81	0.001850	9.15	89.57	33.50	0.99
SC01	Sand Creek-DS-0	990	Flow 1	1037.00	6263.20	6268.54	6267.78	6269.30	0.000697	7.21	181.85	76.02	0.65
SC01	Sand Creek-DS-0	989	Flow 1	1037.00	6263.10	6267.92	6267.92	6269.24	0.001524	9.40	128.51	57.84	0.93
SC01	Sand Creek-DS-0	988	Flow 1	1037.00	6258.70	6263.54	6263.54	6265.09	0.001791	9.98	103.92	33.08	0.99
SC01	Sand Creek-DS-0	987	Flow 1	1037.00	6254.80	6259.78	6259.78	6261.38	0.001842	10.16	102.05	32.04	1.00
SC01	Sand Creek-DS-0	986	Flow 1	1037.00	6253.70	6259.44	6258.94	6260.59	0.001447	8.63	120.18	35.39	0.83
SC01	Sand Creek-DS-0	985	Flow 1	1037.00	6253.10	6259.79	6258.11	6260.43	0.000539	6.45	160.82	39.52	0.56
SC01	Sand Creek-DS-0	984	Flow 1	1037.00	6253.00	6259.63	6258.48	6260.41	0.001045	7.09	146.18	39.29	0.65
SC01	Sand Creek-DS-0	983	Flow 1	1037.00	6252.90	6259.75	6257.91	6260.35	0.000491	6.22	166.73	40.29	0.54
SC01	Sand Creek-DS-0	982	Flow 1	1037.00	6252.70	6258.72	6258.72	6260.24	0.002055	9.91	105.15	35.64	1.00
SC01	Sand Creek-DS-0	981	Flow 1	1037.00	6252.60	6257.64	6257.64	6259.29	0.001815	10.32	100.46	30.11	1.00
SC01	Sand Creek-DS-0	980	Flow 1	1037.00	6252.40	6257.46	6257.46	6259.10	0.001807	10.30	100.70	30.18	0.99
SC01	Sand Creek-DS-0	979	Flow 1	1037.00	6252.30	6257.12	6257.12	6258.76	0.001808	10.28	100.87	30.54	1.00
SC01	Sand Creek-DS-0	978	Flow 1	1037.00	6252.20	6256.90	6256.90	6258.49	0.001775	10.13	102.38	31.51	0.99
SC01	Sand Creek-DS-0	977	Flow 1	1037.00	6252.10	6256.69	6256.69	6258.25	0.001800	10.03	103.44	32.94	1.00
SC01	Sand Creek-DS-0	976	Flow 1	1037.00	6251.60	6256.19	6256.19	6257.67	0.001803	9.76	106.20	35.57	1.00
SC01	Sand Creek-DS-0	975	Flow 1	1037.00	6251.10	6255.68	6255.68	6257.17	0.001823	9.79	105.98	35.61	1.00
SC01	Sand Creek-DS-0	974	Flow 1	1037.00	6250.80	6255.45	6255.45	6256.92	0.001804	9.74	106.50	35.84	1.00
SC01	Sand Creek-DS-0	973	Flow 1	1037.00	6250.60	6255.25	6255.25	6256.72	0.001805	9.74	106.46	35.84	1.00
SC01	Sand Creek-DS-0	972	Flow 1	1037.00	6250.60	6255.19	6255.19	6256.67	0.001830	9.78	106.04	35.87	1.00
SC01	Sand Creek-DS-0	971	Flow 1	1037.00	6250.40	6255.06	6255.06	6256.53	0.001786	9.71	106.74	35.77	0.99
SC01	Sand Creek-DS-0	970	Flow 1	1037.00	6250.10	6254.71	6254.71	6256.17	0.001777	9.71	106.85	35.74	0.99
SC01	Sand Creek-DS-0	969	Flow 1	1037.00	6249.60	6254.22	6254.22	6255.68	0.001780	9.69	106.96	35.89	0.99
SC01	Sand Creek-DS-0	968	Flow 1	1037.00	6249.10	6253.72	6253.72	6255.18	0.001784	9.71	106.85	35.86	0.99
SC01	Sand Creek-DS-1	966	Flow 1	1100.00	6248.60	6253.01	6253.01	6254.32	0.001599	9.39	133.91	56.36	0.95
SC01	Sand Creek-DS-1	965	Flow 1	1100.00	6248.10	6252.74	6252.74	6254.20	0.001793	9.71	113.30	38.38	1.00
SC01	Sand Creek-DS-1	964	Flow 1	1100.00	6247.60	6252.31	6252.31	6253.75	0.001776	9.64	114.09	38.73	0.99
SC01	Sand Creek-DS-1	963	Flow 1	1100.00	6247.10	6251.84	6251.84	6253.34	0.001829	9.83	111.93	37.63	1.00
SC01	Sand Creek-DS-1	962	Flow 1	1100.00	6246.60	6251.43	6251.43	6252.92	0.001794	9.80	112.24	37.25	1.00
SC01	Sand Creek-DS-1	961	Flow 1	1100.00	6246.10	6250.98	6250.98	6252.47	0.001774	9.81	112.08	36.70	0.99
SC01	Sand Creek-DS-1	960	Flow 1	1100.00	6245.60	6250.47	6250.47	6252.02	0.001738	9.99	110.37	35.80	0.99
SC01	Sand Creek-DS-1	959	Flow 1	1100.00	6245.10	6249.98	6249.98	6251.53	0.001776	9.98	110.20	35.02	0.99
SC01	Sand Creek-DS-1	958	Flow 1	1100.00	6244.60	6249.44	6249.44	6251.04	0.001742	10.13	108.89	34.53	0.99
SC01	Sand Creek-DS-1	957	Flow 1	1100.00	6244.10	6248.96	6248.96	6250.53	0.001816	10.04	109.52	35.07	1.00
SC01	Sand Creek-DS-1	956	Flow 1	1100.00	6243.60	6248.44	6248.44	6249.96	0.001768	9.89	111.21	35.85	0.99
SC01	Sand Creek-DS-1	955	Flow 1	1100.00	6243.10	6248.35	6247.93	6249.57	0.001227	8.86	124.36	36.74	0.84
SC01	Sand Creek-DS-1	954	Flow 1	1100.00	6242.60	6248.58	6247.46	6249.40	0.000712	7.27	151.93	41.17	0.65
SC01	Sand Creek-DS-1	953	Flow 1	1100.00	6242.30	6248.68	6247.17	6249.33	0.000511	6.51	180.73	60.07	0.55
SC01	Sand Creek-DS-1	952	Flow 1	1100.00	6242.20	6248.91	6246.00	6249.23	0.000197	4.48	246.57	53.19	0.36
SC01	Sand Creek-DS-1	951	Flow 1	1100.00	6242.10	6248.97	6245.61	6249.20	0.000136	3.80	291.11	61.48	0.30
SC01	Sand Creek-DS-1	950	Flow 1	1100.00	6242.00	6249.04	6247.11	6249.17	0.000061	2.96	490.03	216.00	0.21
SC01	Sand Creek-DS-1	949.5		Culvert									
SC01	Sand Creek-DS-1	949	Flow 1	1100.00	6239.20	6245.51	6245.51	6248.25	0.001370	13.29	82.78	159.57	0.99
SC01	Sand Creek-DS-1	948	Flow 1	1100.00	6238.80	6242.73	6242.73	6244.22	0.001785	9.79	112.41	36.93	0.99
OVFL	Overflow Channel	1000	Flow 1	217.00	6269.50	6270.78	6270.78	6271.20	0.003604	5.36	46.17	62.59	0.97
OVFL	Overflow Channel	999	Flow 1	217.00	6269.10	6270.41	6270.41	6270.85	0.003698	5.40	43.73	57.72	0.98
OVFL	Overflow Ch-DS-0	998	Flow 1	216.98	6267.50	6269.38	6268.61	6269.51	0.000357	2.93	73.99	45.53	0.41
OVFL	Overflow Ch-DS-0	997	Flow 1	216.98	6266.30	6269.32	6267.74	6269.43	0.001027	2.62	83.44	36.02	0.29
OVFL	Overflow Ch-DS-0	996	Flow 1	216.98	6266.00	6269.34	6267.42	6269.40	0.000618	1.91	113.85	50.35	0.22
EXOF	EX OVERFLOW	1001	Flow 1	0.04	6267.70	6270.16	6267.77	6270.16	0.000000	0.00	30.50	42.71	0.00
EXOF	EX OVERFLOW	1000	Flow 1	0.04	6266.90	6270.16	6266.92	6270.16	0.000000	0.00	83.82	67.13	0.00
EXCH	EX CHANNEL	1000	Flow 1	63.00	6259.00	6260.04	6260.04	6260.46	0.002746	5.24	12.01	14.23	1.01
EXCH	EX CHANNEL	999	Flow 1	63.00	6249.20	6254.44		6254.45	0.000127	1.03	61.12	21.85	0.11



## CHANNEL IMPROVEMENTS

JOB NO. 25174.00



LAYER LINETYPE LEGEND

	EXISTING	PROPOSED
MATCH LINE		
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
CENTERLINE		
FENCE		
GUARDRAIL		
CABLE TV		
ELECTRIC		
FIBER OPTIC		
GAS MAIN		
IRRIGATION MAIN		
OVERHEAD UTILITY		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
WATER MAIN		
SWALE/WATERWAY FLOWLINE		
DIVERSION DITCH		
TOP OF SLOPE		
TOE OF SLOPE		
100 YEAR FLOODPLAIN		
5 YEAR HGL		
100 YEAR HGL		

UTILITIES LEGEND

	EXISTING	PROPOSED
<b>STORM SEWER</b>		
MANHOLE		
STORM INLET		
AREA INLET – SQUARE		
FLARED END SECTION		
RIPRAP		
<b>SANITARY SEWER</b>		
LINE MARKER		
SERVICE MARKER		
CLEAN-OUT		
MANHOLE W/ DIRECTIONAL FLOW ARROW		
<b>WATER LINE</b>		
LINE MARKER		
SERVICE MARKER		
FIRE HYDRANT		
MANHOLE		
BEND		
BLOW-OFF VALVE		
WELL		
METER		
VALVE		
REDUCER		
CROSS		
PLUG W/ THRUST BLOCK		
TEE		
AIR & VACUUM VALVE ASSEMBLY		
<b>GAS LINE</b>		
MARKER		
SERVICE MARKER		
METER		
VALVE		
PLUG		
<b>DRY UTILITIES</b>		
CABLE TV MARKER		
CABLE TELEVISION PEDESTAL		
ELECTRIC MARKER		
ELECTRIC SERVICE MARKER		
ELECTRICAL PEDESTAL		
ELECTRICAL METER		
ELECTRICAL MANHOLE		
FIBER-OPTIC MARKER		
IRRIGATION PEDESTAL		
TELEPHONE MARKER		
TELEPHONE PEDESTAL		
TELEPHONE MANHOLE		
UTILITY POLE		
GUY ANCHOR		
GUY POLE		

MONUMENTATION LEGEND

ALUMINUM CAP – FOUND	
BRASS CAP – FOUND	
BENCHMARK – FOUND	
CROSS – FOUND	
MONUMENT – SET	
MONUMENT – FOUND (DEFAULT)	
MONUMENT – FOUND (ALTERNATE 1)	
MONUMENT – FOUND (ALTERNATE 2)	
MONUMENT – FOUND (ALTERNATE 3)	
MONUMENT – FOUND (ALTERNATE 4)	
MONUMENT – FOUND (ALTERNATE 5)	
MONUMENT – FOUND (ALTERNATE 6)	
MONUMENT – FOUND (ALTERNATE 7)	
NAIL & WASHER – FOUND	
PANEL – FOUND	
PK NAIL – FOUND	
ROW MONUMENT – FOUND	
ROW MARKER – FOUND	
SECTION CORNER – FOUND	
SECTION CORNER – SET	
QUARTER-SECTION CORNER – FOUND	
QUARTER-SECTION CORNER – SET	
SECTION CENTER – FOUND	
SECTION CENTER – FOUND	
CONTROL/TRaverse POINT – SET	

DRAINAGE REPORT PLANS

	KEY
BASIN DESIGNATION (NO COEFFICIENT)	
BASIN DESIGNATION (1 COEFFICIENT)	
BASIN DESIGNATION (2 COEFFICIENTS)	
ANALYSIS POINT IDENTIFIER	
BASIN DESIGNATION (HISTORIC)	
BASIN DESIGNATION (DEVELOPED)	
SUB-BASIN DESIGNATION (DEVELOPED)	
DRAINAGE PIPE IDENTIFIER	
DRAINAGE POINT IDENTIFIER (HEXAGONAL)	
DRAINAGE POINT IDENTIFIER (TRIANGULAR)	
SWMM DESIGNATION 1	
SWMM DESIGNATION 2	
SWMM DESIGNATION 3	
SWMM DESIGNATION 4	

LANDSCAPE LEGEND

	EXISTING	PROPOSED
TREE – CONIFEROUS		
TREE – DECIDUOUS		
SHRUB/BUSH		
SHRUBS AND BUSHES		
IRRIGATION BOX		
IRRIGATION SPRINKLER		
IRRIGATION VALVE		
BOLLARD		
FLAGPOLE		

STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS

- ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
- CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOIL AND GEOTECHNICAL REPORT, AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:
  - EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
  - CITY OF COLORADO SPRINGS/ EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
  - COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS AND BRIDGE CONSTRUCTION
  - CDOT M&S STANDARDS
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSIONS OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
- CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCO. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
- ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PLANNING AND COMMUNITY DEVELOPMENT.
- CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCO PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- SIGHT VISIBILITY TRIANGLES ARE IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED IN SIGHT TRIANGLES.
- SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS AND MUTCD CRITERIA.
- CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
- THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.



ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING

DATE

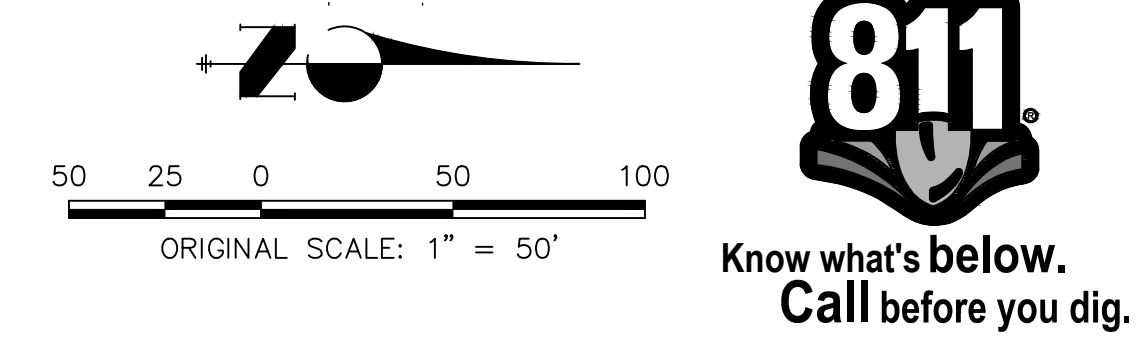
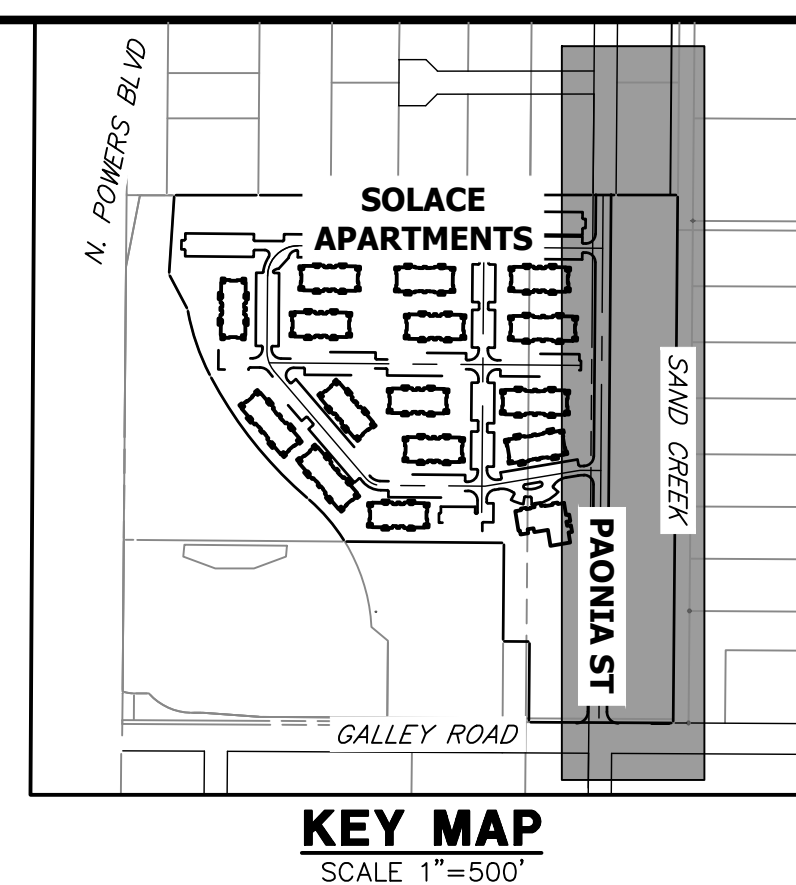
PREPARED FOR  
JACKSON DEARBORN PARTNERS  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL 60607  
OFFICE PHONE  
(734) 216-2577



Centennial 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com

SAND CREEK CENTER TRIBUTARY GENERAL NOTES	H-SCALE	N/A	DESIGNED BY DATE	DRAWN BY DATE	CHECKED BY	SHEET 2 OF 10	JOB NO. 25174.00
	V-SCALE	N/A					







**ENGINEER'S STATEMENT**

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR  
APPLICATION ON THIS PROJECT

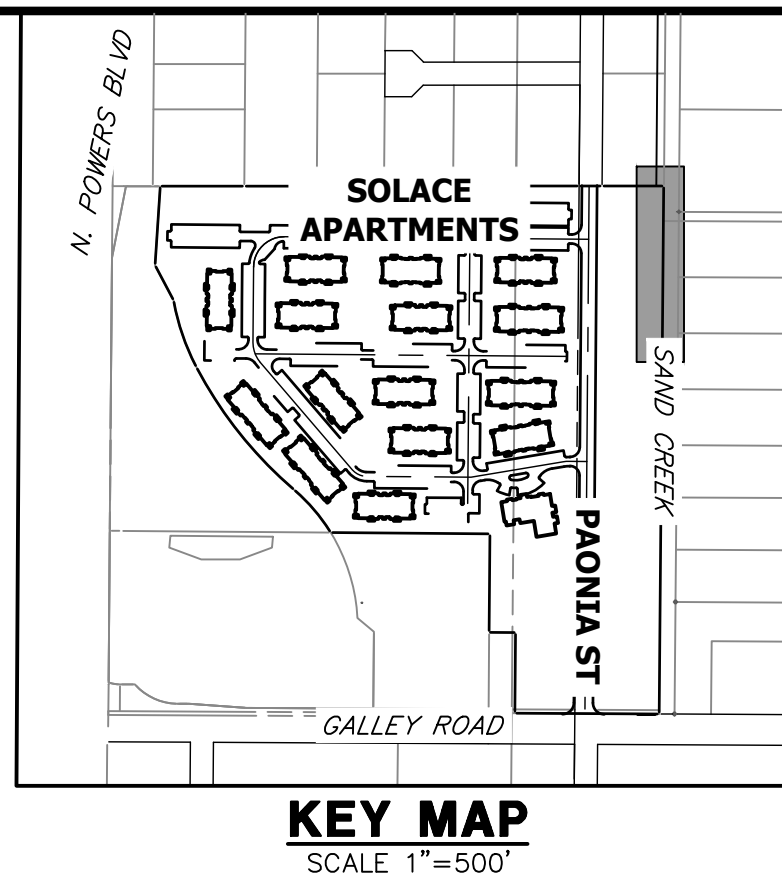
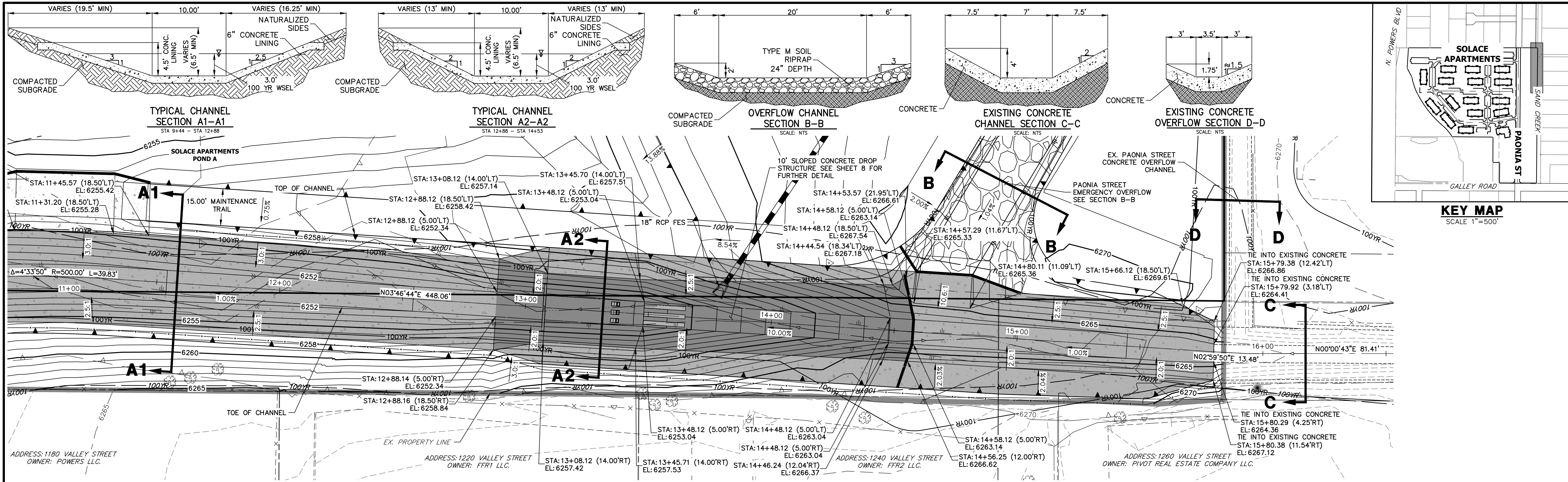
MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314

DATE

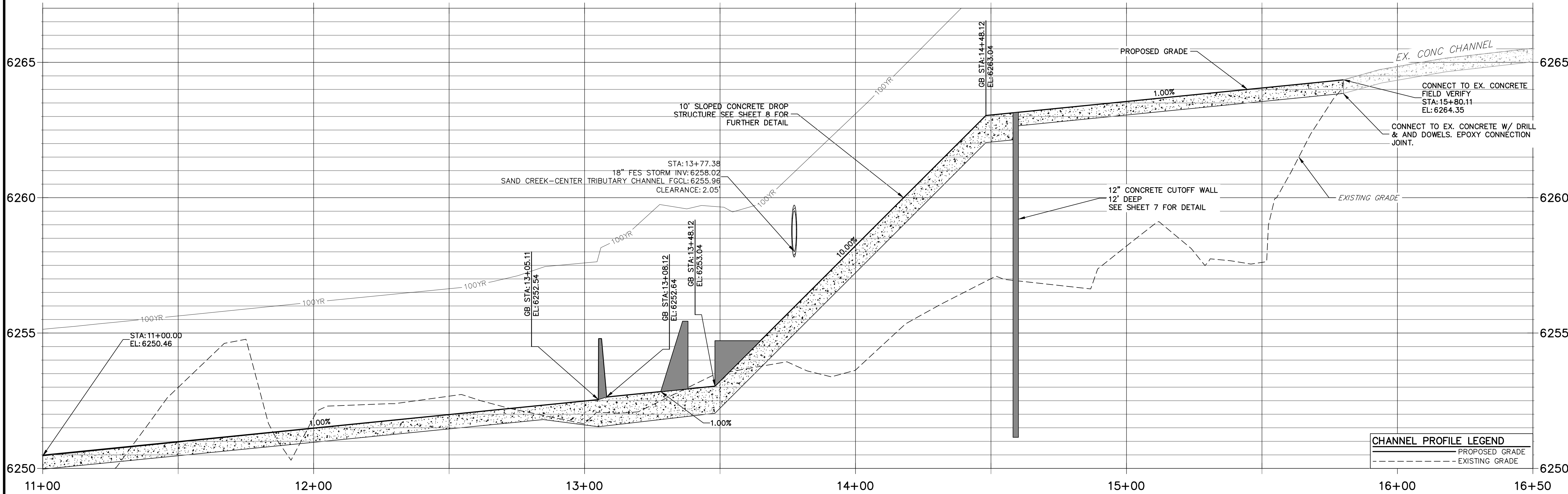


SHEET 3 OF 10		SAND CREEK CENTER TRIBUTARY		H-SCALE 1"=50'		V-SCALE N/A		DATE 11/16/20		DESIGNED BY JBP		DRAWN BY JBP		CHECKED BY		No. REVISION		BY DATE		 <b>J.R. ENGINEERING</b> A Westrian Company Central 303-740-9393 • Colorado Springs 719-583-2533 Fort Collins 970-491-9888 • <a href="http://www.jrengineering.com">www.jrengineering.com</a>		JACKSON DEARBORN PARTNERS 404 S. WELLS ST. SUITE 400 CHICAGO, ILL. 60607 OFFICE PHONE (734) 162577		UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE AND ALL CHANGES DESIGNATED BY WRITTEN AUTHORIZATION.	
		SITE AND DEMO PLAN																							



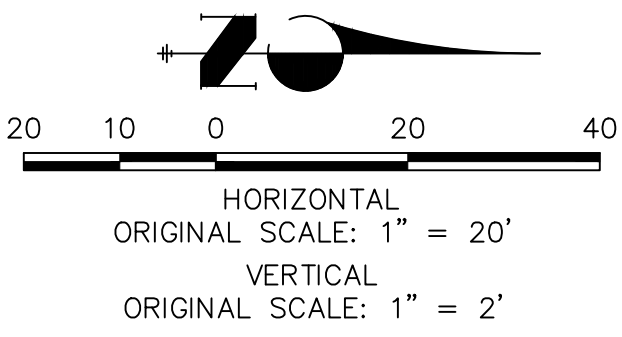


**SAND CREEK-CENTER TRIBUTARY CHANNEL PROFILE (4)**  
**STA 11+00.00 TO 16+50.00**



**FENCING NOTES**

1. FENCING SHALL BE PROVIDED ALONG THE EXTENTS OF THE CHANNEL, EXCEPT FOR AT LOCATIONS OF MAINTENANCE ACCESS.
2. FENCING SHALL CONFORM TO THE LANDSCAPING PLANS FOR SOLACE OF COLORADO SPRINGS SP-20-001, BY NES.



CHANNEL PROFILE LEGEND	
	PROPOSED GRADE
	EXISTING GRADE

**ENGINEER'S STATEMENT**

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, LLC

DATE

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE, DESIGNATED BY WRITTEN AUTHORIZATION.

**JACKSON DEARBORN PARTNERS**  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL 60607  
OFFICE PHONE (734) 216-2577

PREPARED FOR

**J.R. ENGINEERING**  
A Westman Company  
Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)

BY	DATE	REVISION

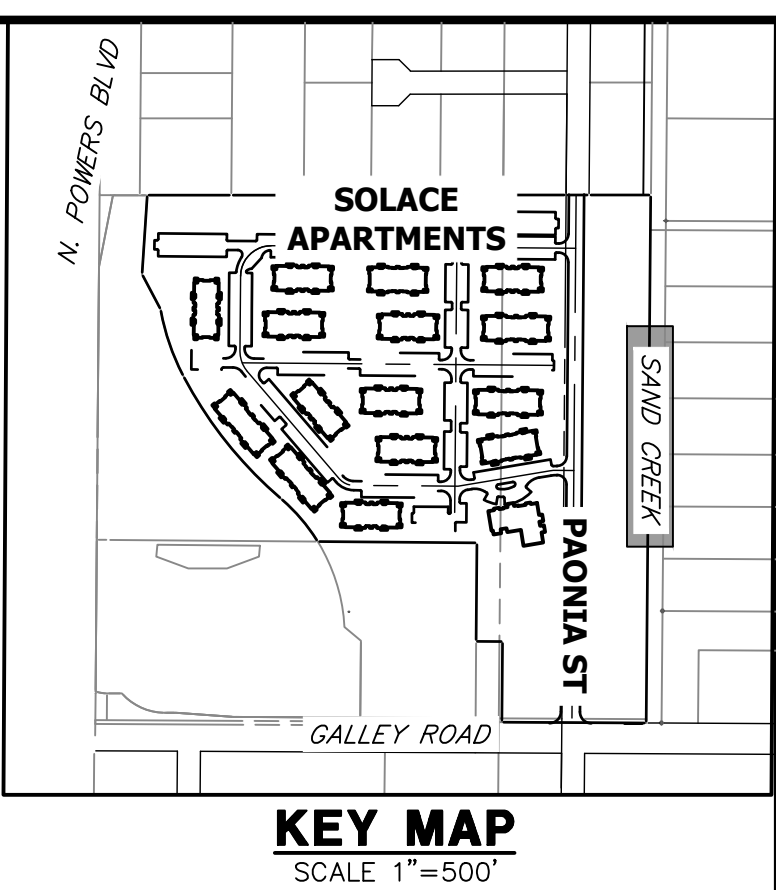
H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
1"=20'	1"=2'	11/16/20	JBP	JBP	JBP


**SAND CREEK CENTER TRIBUTARY CHANNEL PLAN AND PROFILES**

SHEET 4 OF 10

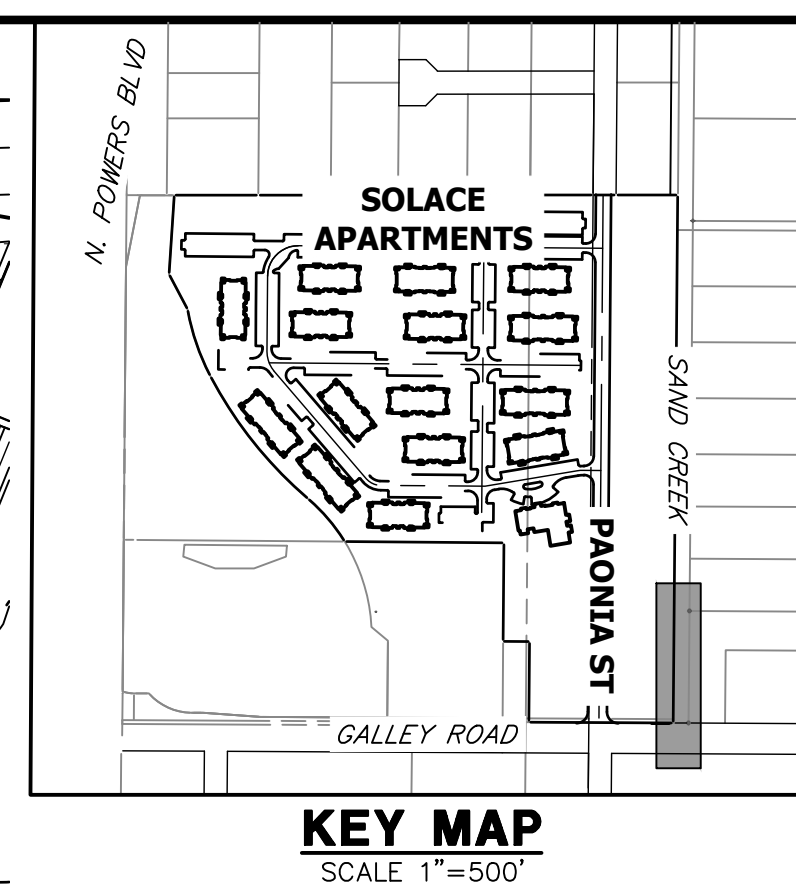
JOB NO. 25174.00





SAND CREEK CENTER TRIBUTARY		H-SCALE	1"=20'	No.	REVISION	BY	DATE	 <b>J.R. ENGINEERING</b> A Westland Company  Centennial 303-740-4333 • Colorado Springs 719-583-2533 Fort Collins 970-491-9888 • <a href="http://www.jrengineering.com">www.jrengineering.com</a>	JACKSON DEARBORN PARTNERS 404 S. WELLS ST. SUITE 400 CHICAGO, ILL 60607 OFFICE PHONE (734) 216-2577	UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING OFFICIALS, NO ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.
CHANNEL PLAN AND PROFILES	V-SCALE	1"=2'	DATE							
SHEET	5	OF	10	JOB NO. 25174.00						



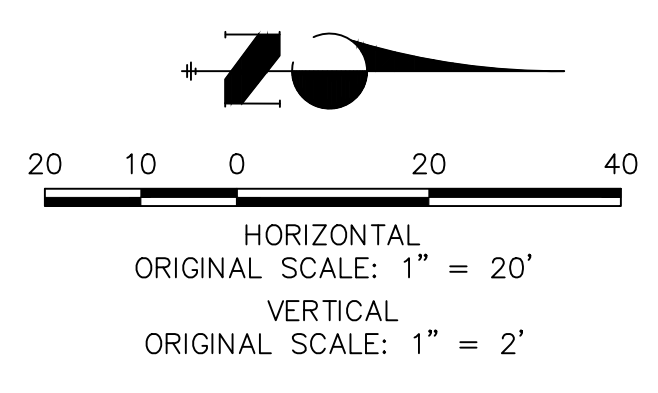


PREPARED FOR  
**JACKSON DEARBORN PARTNERS**  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL 60607  
OFFICE PHONE  
(734) 216-2577

 **J·R ENGINEERING**  
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-533-2533  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)

**CHANNEL PROFILE LEGEND**  
 \_\_\_\_\_ PROPOSED GRADE  
 - - - - - EXISTING GRADE



Know what's below.  
Call before you dig.

**ENGINEER'S STATEMENT**

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, LLC

32314

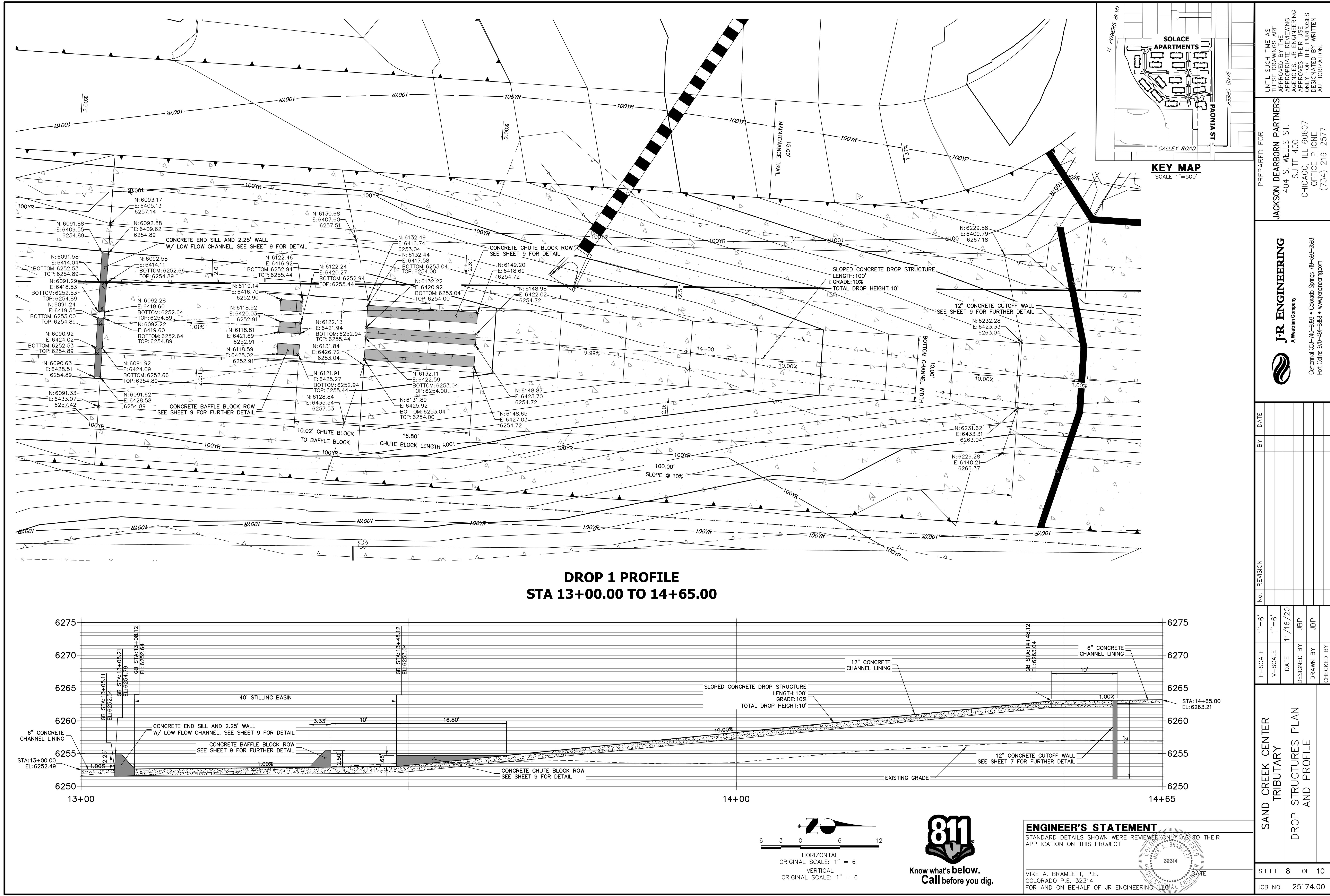
DATE

SAND CREEK CENTER TRIBUTARY	SHEET	6	OF	10
	JOB NO.	25174.00		

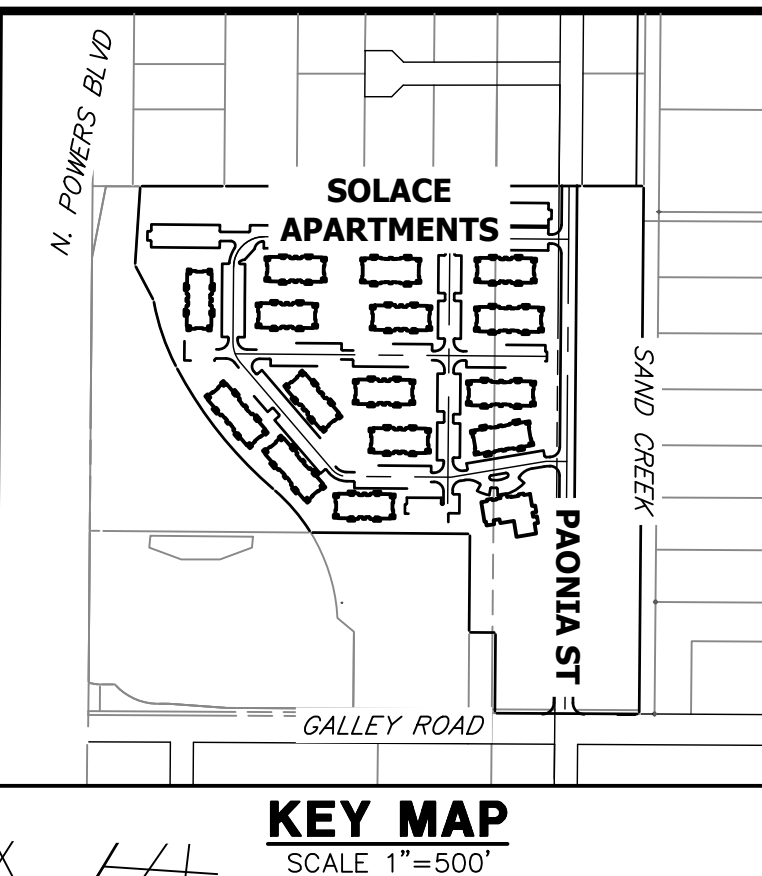
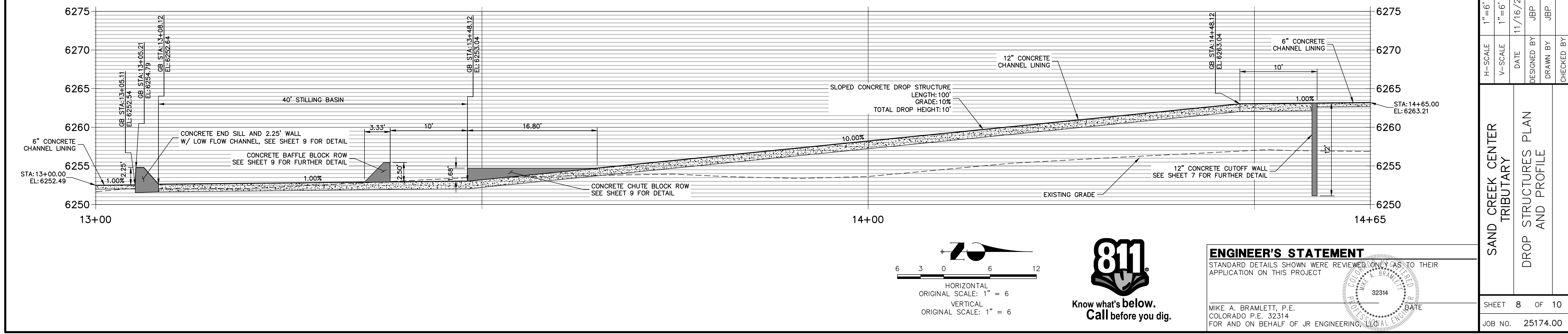






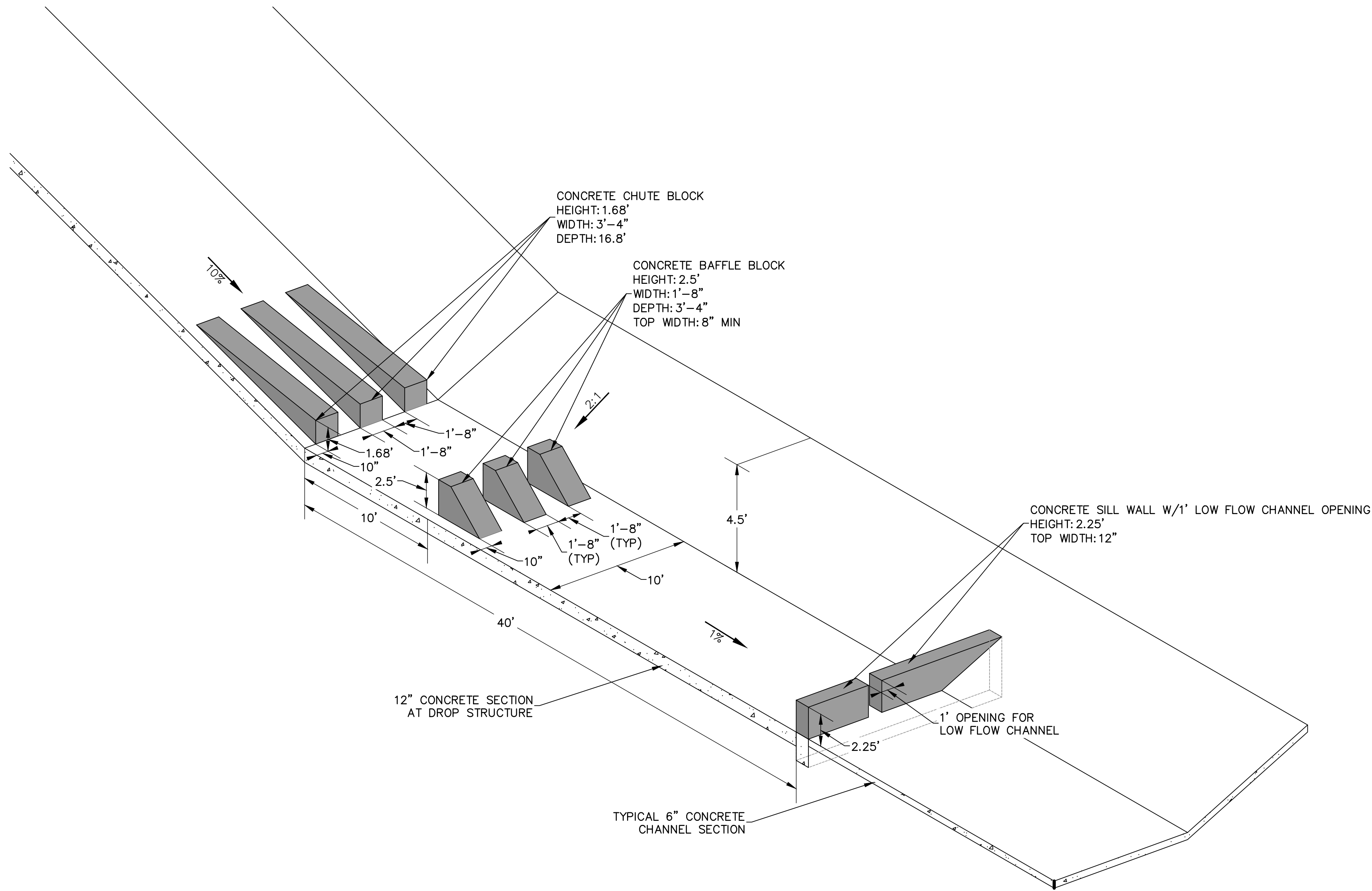


**DROP 1 PROFILE**  
**STA 13+00.00 TO 14+65.00**



PREPARED FOR		JACKSON DEARBORN PARTNERS	
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.		404 S. WELLS ST. SUITE 400 CHICAGO, ILL. 60607 OFFICE PHONE (734) 216-2577	
J.R. ENGINEERING A Western Company		Central 303-740-9888 • Colorado Springs 719-583-2583 Fort Collins 970-491-9888 • www.jrengineering.com	
BY		DATE	
No.		REVISION	
H-SCALE 1"=6'		V-SCALE 1"=6'	
DATE 11/16/20		DESIGNED BY JBP	
DRAWN BY JBP		CHECKED BY	
SAND CREEK CENTER TRIBUTARY		DROP STRUCTURES PLAN AND PROFILE	
SHEET 8 OF 10		JOB NO. 25174.00	



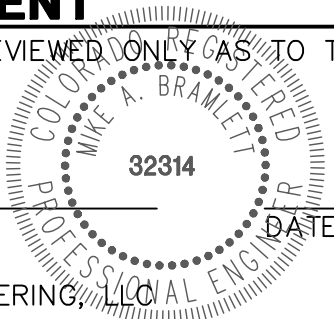


Know what's below.  
Call before you dig.

**ENGINEER'S STATEMENT**

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING



SAND CREEK CENTER  
TRIBUTARY  
DROP STRUCTURE DETAIL  
SHEETS

SHEET 9 OF 10

JOB NO. 25174.00

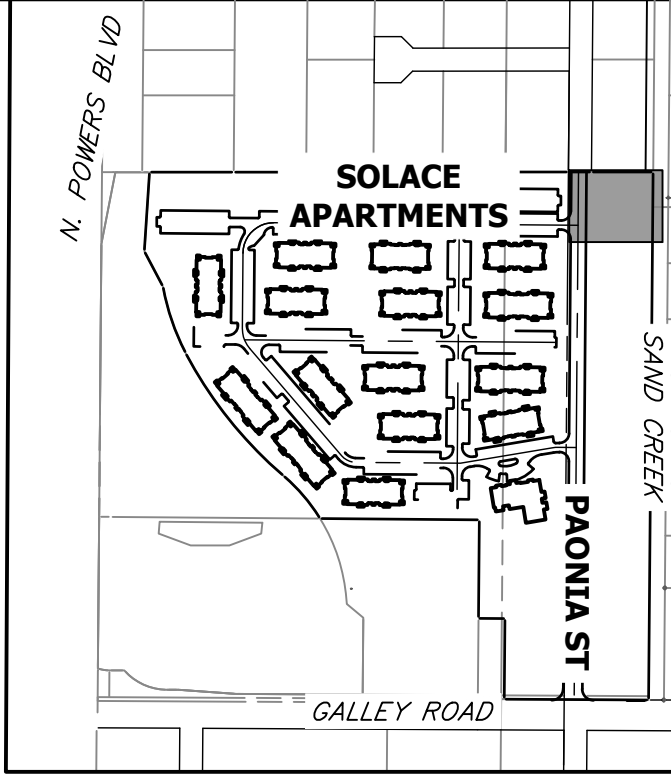
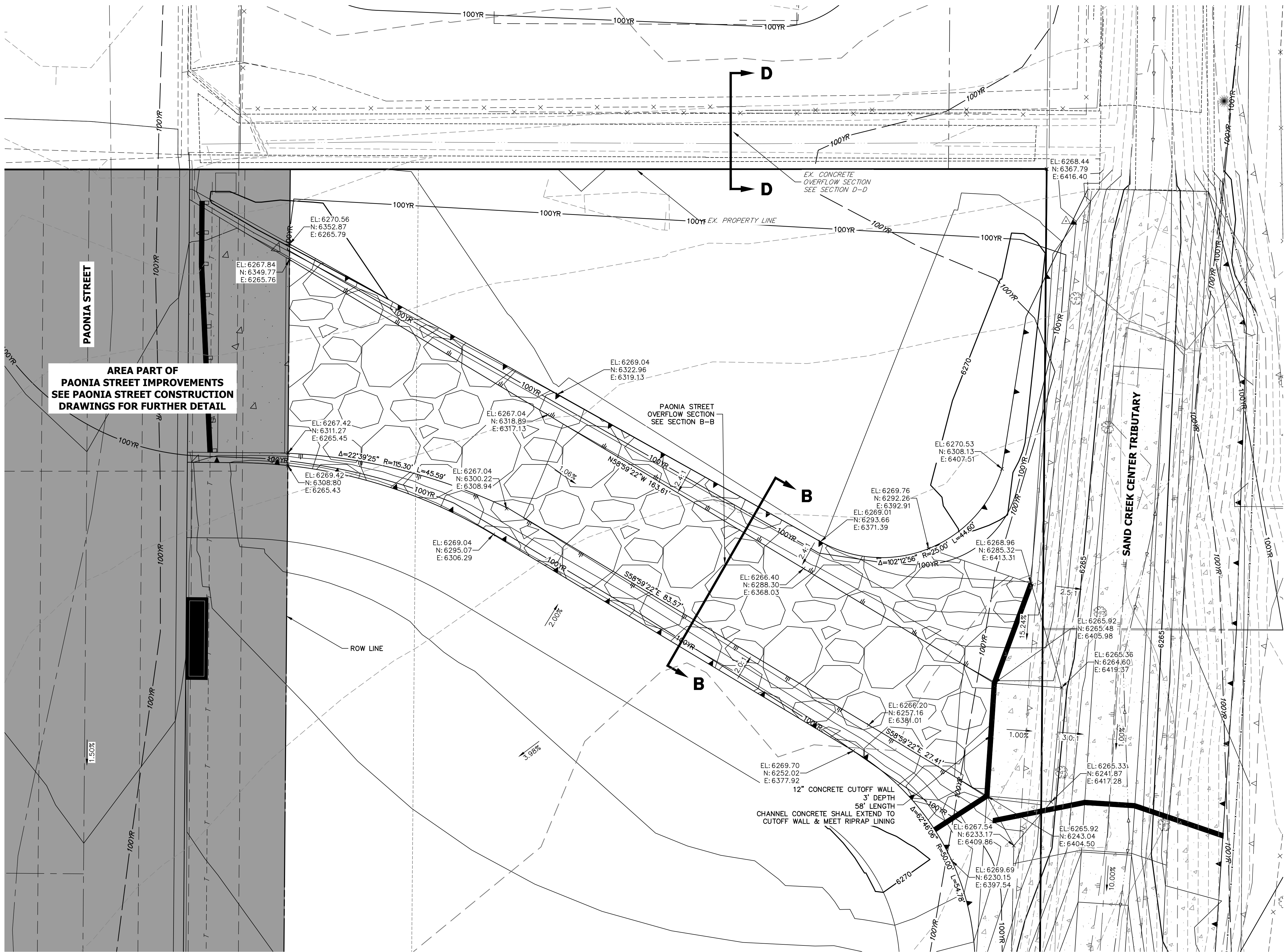
No.	REVISION	BY	DATE

**J.R. ENGINEERING**  
A Western Company  
Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)

PREPARED FOR  
**JACKSON DEARBORN PARTNERS**  
404 S. WELLS ST.  
SUITE 400  
CHICAGO, ILL. 60607  
OFFICE PHONE  
(734) 216-2577

UNTIL SUCH TIME AS  
THESE DRAWINGS ARE  
APPROVED BY THE  
APPROPRIATE REVIEWING  
AGENCIES, OR ENGINEERING  
APPROVES THEIR USE  
FOR ANY OTHER PURPOSES  
DESIGNATED BY WRITTEN  
AUTHORIZATION.

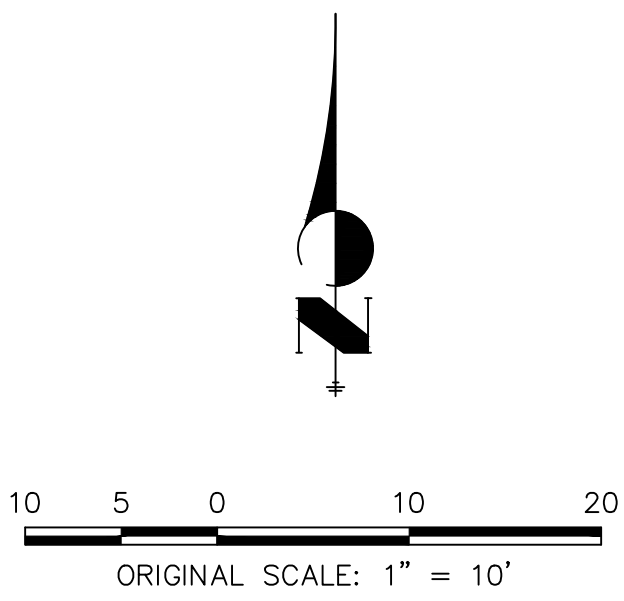
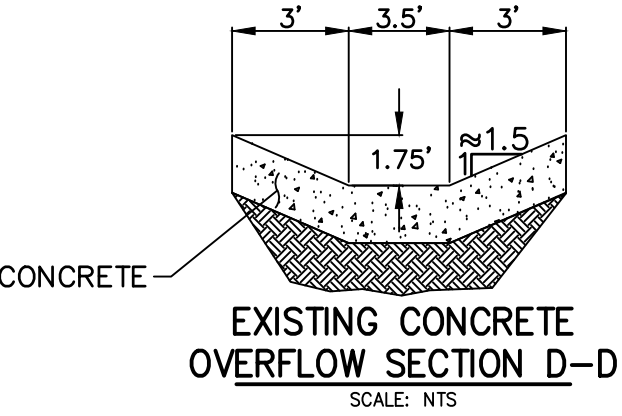
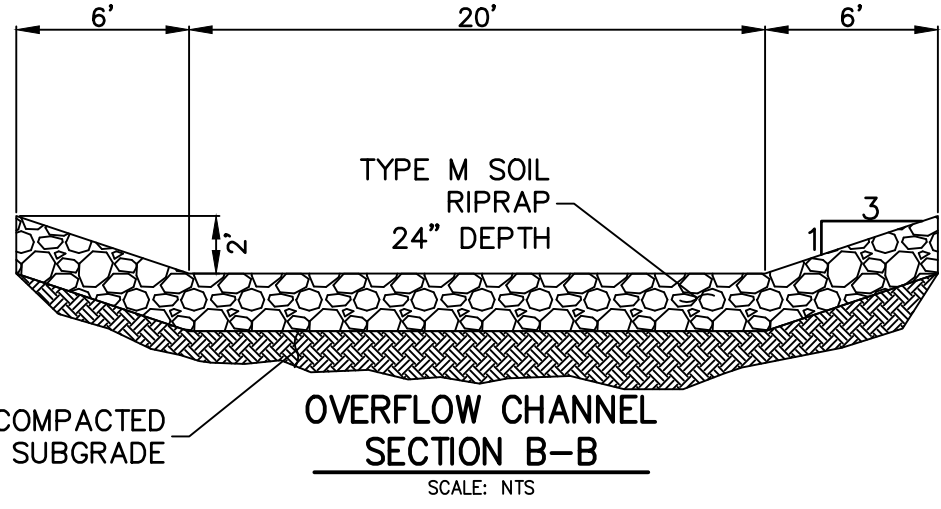




AREA PART OF  
PAONIA STREET IMPROVEMENTS  
SEE PAONIA STREET CONSTRUCTION  
DRAWINGS FOR FURTHER DETAIL


PAONIA STREET  
OVERFLOW SECTION  
SEE SECTION B-B

12" CONCRETE CUTOFF WALL  
3' DEPTH  
58' LENGTH  
CHANNEL CONCRETE SHALL EXTEND TO  
CUTOFF WALL & MEET RIPRAP LINING



**811**  
Know what's below.  
Call before you dig.

**ENGINEER'S STATEMENT**  
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR  
ENGINEERING  
*Mike Bramlett*  
MIKE A. BRAMLETT, P.E.  
COLORADO P.E. 32314  
FOR AND ON BEHALF OF JR ENGINEERING, LLC  
DATE 7/14/21

SAND CREEK CENTER TRIBUTARY		H-SCALE V-SCALE		1"= 10'		No.		REVISION		BY		DATE		PREPARED FOR  <b>JACKSON DEARBORN PARTNERS</b> 404 S. WELLS ST. SUITE 400 CHICAGO, ILL 60607 OFFICE PHONE (734) 216-2577
				N/A										
		DATE		11/16/20										
		DESIGNED BY		JBP										
		DRAWN BY		JBP										
PAONIA STREET OVERFLOW PLAN		CHECKED BY												 <b>J&amp;R ENGINEERING</b> A Westrian Company  Central 303-740-9383 • Colorado Springs 719-583-2633 Fort Collins 970-491-9888 • <a href="http://www.jrengineering.com">www.jrengineering.com</a>
SHEET 10 OF 10		UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.												
JOB NO. 25174.00														

**J.R. ENGINEERING**  
A Westman Company  
Central 303-740-9888 • Colorado Springs 719-583-2583  
Fort Collins 970-491-9888 • www.jrengineering.com







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

```
X   X   XXXXXX   XXXX   XXXX   XX   XXXX
X   X   X       X   X   X   X   X   X
X   X   X       X   X   X   X   X   X
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
X   X   XXXXXX   XXXX   X   X   X   X   XXXXX
```

#### PROJECT DATA

Project Title: HEC-RAS Model  
Project File : Updated 08-24-2021 Proposed Model.prj  
Run Date and Time: 8/24/2021 9:48:33 AM

Project in English units

#### Project Description:

CRS Info=<SpatialReference> <CoordinateSystem WKT="PROJCS[&quot;WGS 84 /  
World  
Mercator&quot;;GEOGCS[&quot;WGS  
84&quot;;DATUM[&quot;WGS\_1984&quot;;SPHEROID[&quot;WGS  
84&quot;;6378137,298.257223563,AUTHORITY[&quot;EPSG&quot;;&quot;7030&quot;];],A  
UT  
HORITY[&quot;EPSG&quot;;&quot;6326&quot;];],PRIMEM[&quot;Greenwich&quot;;0,AUTH  
OR  
ITY[&quot;EPSG&quot;;&quot;8901&quot;];],UNIT[&quot;degree&quot;;0.017453292519  
94  
33,AUTHORITY[&quot;EPSG&quot;;&quot;9122&quot;];],AUTHORITY[&quot;EPSG&quot;;&q  
uo  
t;4326&quot;];],PROJECTION[&quot;Mercator\_1SP&quot;];,PARAMETER[&quot;central\_me  
ri  
dian&quot;;0],PARAMETER[&quot;scale\_factor&quot;;1],PARAMETER[&quot;false\_east  
in  
g&quot;;0],PARAMETER[&quot;false\_northing&quot;;0],UNIT[&quot;International  
Foot&quot;;0.3048],AXIS[&quot;Easting&quot;;EAST],AXIS[&quot;Northing&quot;;NO  
RT  
H]]" AcadCode="" /> <Registration OffsetX="0" OffsetY="0" OffsetZ="0"  
ScaleX="1" ScaleY="1" ScaleZ="1" /></SpatialReference>

#### PLAN DATA

Plan Title: Default Scenario  
Plan File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed  
Model.p01

Geometry Title: Default Geometry  
Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021  
Proposed Model.g01

Flow Title : Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021  
Proposed Model.f01

Plan Description:  
Default Scenario

#### Plan Summary Information:

Number of:	Cross Sections =	55	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

#### Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.33
Flow tolerance factor =	0.001

#### Computation Options

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

#### FLOW DATA

Flow Title: Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed  
Model.f01

#### Flow Data (cfs)

River	Reach	RS	Flow 1
EXCH	EX CHANNEL	1000	63
EXOF	EX OVERFLOW	1001	42
OVFL	Overflow Channel	1000	217



OVFL	Overflow Ch-DS-0998	175
SC01	Sand Creek 998	820
SC01	Sand Creek-DS-0 992	862
SC01	Sand Creek-DS-0-990	1037
SC01	Sand Creek-DS-1 966	1100

Boundary Conditions

River	Reach	Profile	Upstream
	Downstream		
SC01	Sand Creek-DS-1 Flow 1 Critical		

GEOMETRY DATA

Geometry Title: Default Geometry  
Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model.g01

Reach Connection Table

River Boundary	Reach	Upstream Boundary	Downstream
EXCH	EX CHANNEL		Junc-DS02
EXOF	EX OVERFLOW	Junc-DS01	EXOF-SC
OVFL	Overflow Channel		Junc-DS01
OVFL	Overflow Ch-DS-0	Junc-DS01	OF-SC
SC01	Sand Creek		EXOF-SC
SC01	Sand Creek-DS-0	EXOF-SC	OF-SC
SC01	Sand Creek-DS-0-	OF-SC	Junc-DS02
SC01	Sand Creek-DS-1	Junc-DS02	

JUNCTION INFORMATION

Name: Junc-DS01  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle OVFL 0	Overflow Channel to OVFL		Overflow Ch-DS-0	255.09
OVFL 0	Overflow Channel to EXOF		EX OVERFLOW	209.74

Name: EXOF-SC  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle SC01 0	Sand Creek to SC01		Sand Creek-DS-0	26.69
EXOF 0	EX OVERFLOW to SC01		Sand Creek-DS-0	47.45

Name: OF-SC  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle SC01 0	Sand Creek-DS-0 to SC01		Sand Creek-DS-0-	100.01
OVFL 0	Overflow Ch-DS-0 to SC01		Sand Creek-DS-0-	41.97

Name: Junc-DS02  
Description:  
Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle SC01 0	Sand Creek-DS-0- to SC01		Sand Creek-DS-1	21.51
EXCH 0	EX CHANNEL to SC01		Sand Creek-DS-1	0

CROSS SECTION



RIVER: EXCH  
REACH: EX CHANNEL RS: 1000

INPUT  
Description:

Station	Elevation	Data	num=	78					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6261.5	0	6261.8	1.46	6261.8	3.02	6261.7	4.57	6261.6	5
6261	5.14	6261.4	5.29	6261.3	5.43	6261.2	5.58	6261.1	5.72
6260.5	5.87	6260.9	6.01	6260.8	6.16	6260.7	6.3	6260.6	6.45
6260	6.59	6260.4	6.75	6260.3	6.93	6260.2	7.11	6260.1	7.29
6259.5	7.47	6259.9	7.64	6259.8	7.82	6259.7	8	6259.6	8.53
6259	9.15	6259.4	9.77	6259.3	10.4	6259.2	11.2	6259.1	12.62
6259.4	19.64	6259	19.81	6259.1	19.98	6259.2	20.15	6259.3	20.32
6259.9	20.49	6259.5	20.66	6259.6	20.85	6259.7	21.03	6259.8	21.21
6260.4	21.39	6260	21.57	6260.1	21.76	6260.2	21.94	6260.3	22.12
6260.9	22.3	6260.5	22.49	6260.6	22.67	6260.7	22.85	6260.8	23.03
6261.4	23.22	6261	23.41	6261.1	23.6	6261.2	23.8	6261.3	23.99
6261.9	24.19	6261.5	24.38	6261.6	24.54	6261.7	24.7	6261.8	24.86
6262.4	25.02	6262	25.18	6262.1	25.34	6262.2	25.5	6262.3	25.66
6262.9	25.83	6262.5	25.99	6262.6	26.15	6262.7	26.31	6262.8	26.47
6263.4	26.63	6263	26.79	6263.1	26.95	6263.2	27.11	6263.3	27.27
	27.44	6263.5	27.95	6263.6	28.88	6263.6			

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 5 .013 23.99 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 5 23.99 284.89 284.89 284.89 .1  
.3

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6260.46	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.43	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6260.04	Reach Len. (ft)	284.89
284.89 284.89			
Crit W.S. (ft)	6260.04	Flow Area (sq ft)	
12.01			
E.G. Slope (ft/ft)	0.002746	Area (sq ft)	
12.01			
Q Total (cfs)	63.00	Flow (cfs)	
63.00			
Top Width (ft)	14.23	Top Width (ft)	
14.23			
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	
5.24			
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)	
0.84			
Conv. Total (cfs)	1202.3	Conv. (cfs)	
1202.3			
Length Wtd. (ft)	284.89	Wetted Per. (ft)	
14.66			
Min Ch El (ft)	6259.00	Shear (lb/sq ft)	
0.14			
Alpha	1.00	Stream Power (lb/ft s)	28.88
0.00 0.00			
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	
0.24			
C & E Loss (ft)	0.12	Cum SA (acres)	
0.12			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.  
This may indicate the need for additional cross sections.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: EXCH  
REACH: EX CHANNEL RS: 999







E.G. Slope (ft/ft)	0.000127	Area (sq ft)	
61.12			
Q Total (cfs)	63.00	Flow (cfs)	
63.00			
Top Width (ft)	21.85	Top Width (ft)	
21.85			
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	
1.03			
Max Chl Dpth (ft)	5.24	Hydr. Depth (ft)	
2.80			
Conv. Total (cfs)	5597.5	Conv. (cfs)	
5597.5			
Length Wtd. (ft)	0.00	Wetted Per. (ft)	
24.31			
Min Ch El (ft)	6249.20	Shear (lb/sq ft)	
0.02			
Alpha	1.00	Stream Power (lb/ft s)	46.94
0.00	0.00		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	
C & E Loss (ft)	0.13	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: EXOF  
REACH: EX OVERFLOW RS: 1001

INPUT  
Description:  
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-27.78	6270.7	-26.94	6270.7	-22.94	6270.6	-19.83	6270.5	-17.18
6270.4								
-14.53	6270.3	-11.88	6270.2	-9.23	6270.1	-6.58	6270	-3.93
6269.9								
-1.28	6269.8	.37	6269.72	.87	6269.7	2.83	6269.6	4.83
6269.5								
6.82	6269.4	8.81	6269.3	10.8	6269.2	11.28	6269.1	11.65
6269								
12.03	6268.9	12.41	6268.8	12.79	6268.7	13.17	6268.6	13.55
6268.5								
13.93	6268.4	14.31	6268.3	14.69	6268.2	14.98	6268.12	15.07
6268.1								
15.45	6268	15.74	6267.9	15.93	6267.8	16.4	6267.7	16.69
6267.7								

16.85	6267.8	17.02	6267.9	17.18	6268	17.35	6268.1	17.51
6268.2								
17.68	6268.3	17.84	6268.4	18.01	6268.5	18.17	6268.6	18.34
6268.7								
18.5	6268.8	18.67	6268.9	18.82	6269	18.98	6269.1	20.23
6269.1								
21.99	6269.2	22.73	6269.3	23.48	6269.4	24.22	6269.5	24.97
6269.6								
25.71	6269.7	26.46	6269.8	27.2	6269.9	27.98	6270	30.04
6270.1								
33.26	6270.2	34.47	6270.2					
Manning's n Values		num=	3					
Sta n Val	Sta n Val	Sta n Val						
-27.78	.03	11.28	.013	18.98	.03			
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.		
Expan.		11.28	18.98	138.8	138.8	138.8	.1	
.3								
Ineffective Flow	num=	1						
Sta L Sta R Elev	Permanent							
-27.78 -17.16	6270.42	F						
Left Levee	Station=	-27.1	Elevation=	6270.72				
Right Levee	Station=	30.02	Elevation=	6270.11				

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013 0.030			
W.S. Elev (ft)	6270.16	Reach Len. (ft)	138.80
138.80 138.80			
Crit W.S. (ft)	6267.77	Flow Area (sq ft)	10.11
13.67 6.71			
E.G. Slope (ft/ft)	0.000000	Area (sq ft)	10.11
13.67 6.71			
Q Total (cfs)	0.04	Flow (cfs)	0.00
0.03 0.00			
Top Width (ft)	42.71	Top Width (ft)	22.06
7.70 12.94			
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00 0.00			
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)	0.46
1.78 0.52			
Conv. Total (cfs)	2693.3	Conv. (cfs)	297.5
2182.1 213.7			
Length Wtd. (ft)	138.80	Wetted Per. (ft)	22.09
8.29 13.03			
Min Ch El (ft)	6267.70	Shear (lb/sq ft)	0.00
0.00 0.00			



Alpha	2.67	Stream Power (lb/ft s)	34.47
-27.10 30.02			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.10
0.13 0.05			
C & E Loss (ft)	0.00	Cum SA (acres)	0.10
0.03 0.05			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: EXOF

REACH: EX OVERFLOW RS: 1000

#### INPUT

Description:

Station	Elevation	Data	num=	84					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6270.6	.76	6270.6	1.98	6270.5	3.2	6270.4	4.43	
6270.3									
5.65	6270.2	6.87	6270.1	8.1	6270	9.32	6269.9	10.55	
6269.8									
11.86	6269.7	13.18	6269.6	14.51	6269.5	15.84	6269.4	17.16	
6269.3									
19.12	6269.2	21.27	6269.1	22.31	6269.09	35.85	6269	41.17	
6268.9									
41.99	6268.89	43.96	6268.8	47.37	6268.7	48.05	6268.6	48.4	
6268.5									
48.55	6268.4	48.69	6268.3	48.84	6268.2	48.99	6268.1	49.14	
6268									
49.29	6267.9	49.43	6267.8	49.56	6267.7	49.69	6267.6	49.82	
6267.5									
49.96	6267.4	50.09	6267.3	50.22	6267.2	50.35	6267.1	50.48	
6267									
50.61	6266.9	54.45	6266.9	54.6	6267	54.75	6267.1	54.9	
6267.2									
55.06	6267.3	55.21	6267.4	55.36	6267.5	55.51	6267.6	55.67	
6267.7									
55.82	6267.8	55.98	6267.9	56.15	6268	56.31	6268.1	56.48	
6268.2									
56.65	6268.3	56.81	6268.4	57.77	6268.43	60.49	6268.5	62.85	
6268.6									

65.12	6268.7	65.57	6268.8	66.03	6268.9	66.49	6269	66.95
6269.1								
67.41	6269.2	67.87	6269.3	68.32	6269.4	68.78	6269.5	69.24
6269.6								
69.7	6269.7	70.36	6269.8	71.11	6269.9	71.85	6270	72.6
6270.1								
73.77	6270.2	75.1	6270.3	76.43	6270.4	77.87	6270.4	78.31
6270.3								
78.76	6270.2	79.21	6270.1	79.65	6270	79.81	6270	

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .03	47.37 .013	57.77 .03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.
Expan.				
	47.37	57.77	0 0 0	.1

.3			
Right Levee	Station=	76.07	Elevation= 6270.41

#### CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013 0.030			
W.S. Elev (ft)	6270.16	Reach Len. (ft)	47.45
47.45 47.45			
Crit W.S. (ft)	6266.92	Flow Area (sq ft)	39.81
27.04 16.97			
E.G. Slope (ft/ft)	0.000000	Area (sq ft)	39.81
27.04 16.97			
Q Total (cfs)	0.04	Flow (cfs)	0.01
0.03 0.00			
Top Width (ft)	67.13	Top Width (ft)	41.21
10.40 15.51			
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00 0.00			
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)	0.97
2.60 1.09			
Conv. Total (cfs)	8316.8	Conv. (cfs)	1925.4
5504.3 887.1			
Length Wtd. (ft)	47.45	Wetted Per. (ft)	41.26
11.38 15.66			
Min Ch El (ft)	6266.90	Shear (lb/sq ft)	0.00
0.00 0.00			
Alpha	2.87	Stream Power (lb/ft s)	79.81
0.00 76.07			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02
0.06 0.01			
C & E Loss (ft)	0.14	Cum SA (acres)	



Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Channel RS: 1000

INPUT

Description:

Station	Elevation	Data	num=	78					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6272.5	6.84	6272.5	19.1	6272.4	22.75	6272.3	25.46	
6272.2									
27.63	6272.1	29.8	6272	31.97	6271.9	34.14	6271.8	37.09	
6271.7									
39.72	6271.6	42.88	6271.5	46.38	6271.4	49.92	6271.3	53.46	
6271.2									
56.99	6271.1	60.28	6271	63.46	6270.9	66.65	6270.8	69.84	
6270.7									
71.87	6270.6	73.1	6270.5	75.2	6270.4	77.48	6270.3	78.97	
6270.2									
80.03	6270.1	80.74	6270	80.84	6269.9	80.94	6269.8	81.04	
6269.7									
81.14	6269.6	81.23	6269.5	82.37	6269.5	85.34	6269.6	88.52	
6269.7									
91.88	6269.8	95.58	6269.9	99.28	6270	103.82	6270	111.4	
6269.9									
116.73	6269.8	121.02	6269.8	121.23	6269.9	121.7	6270	122.76	
6270.1									
123.82	6270.2	124.88	6270.3	125.93	6270.4	126.99	6270.5	128.05	
6270.6									
129.1	6270.7	130.16	6270.8	131.15	6270.9	131.5	6271	134.06	
6271.1									
138.53	6271.2	142.99	6271.3	147.45	6271.4	151.27	6271.5	154.7	
6271.6									
156.98	6271.7	159.26	6271.8	161.54	6271.9	163.82	6272	166.1	
6272.1									
168.39	6272.2	170.67	6272.3	172.95	6272.4	175.35	6272.5	177.75	
6272.6									
180.28	6272.7	183.71	6272.8	187.06	6272.9	189.71	6273	192.36	
6273.1									
195.02	6273.2	197.9	6273.3	198.12	6273.3				

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val

0 .03 81.14 .016 121.7 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 81.14 121.7 24.16 24.16 24.16 .1  
.3

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6271.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.42	Wt. n-Val.	0.030
0.016 0.030			
W.S. Elev (ft)	6270.78	Reach Len. (ft)	24.16
24.16 24.16			
Crit W.S. (ft)	6270.78	Flow Area (sq ft)	4.67
38.30 3.20			
E.G. Slope (ft/ft)	0.003604	Area (sq ft)	4.67
38.30 3.20			
Q Total (cfs)	217.00	Flow (cfs)	6.67
205.26 5.07			
Top Width (ft)	62.59	Top Width (ft)	13.80
40.56 8.23			
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)	1.43
5.36 1.58			
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)	0.34
0.94 0.39			
Conv. Total (cfs)	3614.5	Conv. (cfs)	111.1
3419.0 84.4			
Length Wtd. (ft)	24.16	Wetted Per. (ft)	13.99
40.65 8.27			
Min Ch El (ft)	6269.50	Shear (lb/sq ft)	0.08
0.21 0.09			
Alpha	1.24	Stream Power (lb/ft s)	198.12
0.00 0.00			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.02
0.25 0.01			
C & E Loss (ft)	0.00	Cum SA (acres)	0.01
0.02 0.00			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION



RIVER: OVFL  
REACH: Overflow Channel RS: 999

INPUT									
Description:									
Station	Elevation	Data	num=	67					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6271.2	0	6271.5	32.18	6271.5	39.29	6271.4	43.62	6271.3	47.59
6270.7	51.08	6271.1	54.32	6271	57.34	6270.9	60.28	6270.8	63.22
6270.2	66.16	6270.6	69.11	6270.5	72.05	6270.4	74.52	6270.3	75.88
6269.7	77.24	6270.1	78.61	6270	80.54	6269.9	82.25	6269.8	83.31
6269.2	83.7	6269.6	83.8	6269.5	83.9	6269.4	84	6269.3	84.1
6269.4	84.2	6269.1	85.11	6269.1	86.96	6269.2	90.43	6269.3	94.01
6269.4	97.72	6269.5	101.43	6269.6	107.82	6269.6	115.44	6269.5	122.9
6269.4	123.81	6269.4	123.91	6269.5	124	6269.6	124.1	6269.7	124.18
6269.8	124.25	6269.9	124.47	6270	125.74	6270.1	127.01	6270.2	128.28
6270.3	129.54	6270.4	130.9	6270.5	132.39	6270.6	133.95	6270.7	136.77
6270.8	139.6	6270.9	142.43	6271	145.25	6271.1	148.08	6271.2	150.93
6271.3	154.76	6271.4	158.6	6271.5	162.19	6271.6	164.85	6271.7	167.51
6271.8	170.17	6271.9	172.83	6272	175.49	6272.1	179.83	6272.2	182.81
6272.3	185.79	6272.4	186.08	6272.4					

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	83.31	.016	124.47	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	83.31	124.47		0	0		.1
.3							

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6270.85	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.44	Wt. n-Val.	0.030

0.016	0.030		
W.S. Elev (ft)	6270.41	Reach Len. (ft)	
Crit W.S. (ft)	6270.41	Flow Area (sq ft)	3.71
38.98	1.04	E.G. Slope (ft/ft)	0.003698
38.98	1.04	Area (sq ft)	3.71
Q Total (cfs)	217.00	Flow (cfs)	5.26
210.66	1.08	Top Width (ft)	11.42
41.16	5.14	Avg. Vel. (ft/s)	1.42
Vel Total (ft/s)	4.96	Hydr. Depth (ft)	0.32
5.40	1.04	Conv. (cfs)	86.5
Max Chl Dpth (ft)	1.31	Wetted Per. (ft)	11.44
0.95	0.20	Shear (lb/sq ft)	0.07
Conv. Total (cfs)	3568.5	Stream Power (lb/ft s)	186.08
3464.2	17.8	Cum Volume (acre-ft)	0.02
Length Wtd. (ft)		Cum SA (acres)	
41.64	5.16		
Min Ch El (ft)	6269.10		
0.22	0.05		
Alpha	1.15		
0.00	0.00		
Frctn Loss (ft)	0.21		
0.23	0.01		
C & E Loss (ft)	0.09		

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

Warning: A flow split was encountered. The program first calculated the momentum of both channels below the junction. An energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: OVFL  
REACH: Overflow Ch-DS-0 RS: 998







-7.48	6270.1	-6.96	6270.1	-4.51	6270	-2.05	6269.9	1.62
6269.8								
4.68	6269.7	7.62	6269.6	11.47	6269.5	12.12	6269.4	12.77
6269.3								
13.37	6269.2	13.91	6269.1	14.45	6269	14.88	6268.92	14.99
6268.9								
15.33	6268.8	15.61	6268.7	15.88	6268.6	16.16	6268.5	16.44
6268.4								
16.71	6268.3	16.99	6268.2	17.27	6268.1	17.55	6268	17.82
6267.9								
18.1	6267.8	18.38	6267.7	18.65	6267.6	18.93	6267.5	19.21
6267.4								
19.48	6267.3	19.76	6267.2	20.04	6267.1	20.31	6267	20.59
6266.9								
20.87	6266.8	21.15	6266.7	21.42	6266.6	21.7	6266.5	21.98
6266.4								
22.25	6266.3	42.77	6266.3	42.95	6266.4	43.14	6266.5	43.32
6266.6								
43.5	6266.7	43.69	6266.8	43.87	6266.9	44.06	6267	44.24
6267.1								
44.43	6267.2	44.61	6267.3	44.8	6267.4	44.98	6267.5	45.17
6267.6								
45.35	6267.7	45.54	6267.8	45.72	6267.9	45.91	6268	46.09
6268.1								
46.28	6268.2	46.46	6268.3	46.65	6268.4	46.83	6268.5	47
6268.6								
47.17	6268.7	47.35	6268.8	47.52	6268.9	47.69	6269	47.98
6269.1								
48.27	6269.2	48.56	6269.3	48.85	6269.4	49.14	6269.5	49.43
6269.6								
60.99	6269.7	76.9	6269.7	80.09	6269.6	83.27	6269.5	86.45
6269.4								
89.64	6269.3	92.82	6269.2	96	6269.1	99.18	6269	102.37
6268.9								
105.55	6268.8	106.52	6268.8					

Manning's n Values						num=	3
Sta	n Val	Sta	n Val	Sta	n Val		
-7.48	.03	14.88	.033	47.69	.03		

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.		
Expan.							
	14.88	47.69		24.72	24.72	24.72	.1
.3							
Left Levee	Station=	11.26	Elevation=	6269.52			
Right Levee	Station=	49.45	Elevation=	6269.62			

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6269.43	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.11	Wt. n-Val.	0.030

0.033	0.030		
W.S. Elev (ft)	6269.32	Reach Len. (ft)	24.72
24.72	24.72		
Crit W.S. (ft)	6267.74	Flow Area (sq ft)	0.45
82.84	0.15		
E.G. Slope (ft/ft)	0.001027	Area (sq ft)	0.45
82.84	0.15		
Q Total (cfs)	216.98	Flow (cfs)	0.24
216.67	0.07		
Top Width (ft)	36.02	Top Width (ft)	2.27
32.81	0.94		
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.53
2.62	0.45		
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)	0.20
2.52	0.16		
Conv. Total (cfs)	6769.7	Conv. (cfs)	7.4
6760.2	2.2		
Length Wtd. (ft)	24.72	Wetted Per. (ft)	2.30
33.96	1.00		
Min Ch El (ft)	6266.30	Shear (lb/sq ft)	0.01
0.16	0.01		
Alpha	1.01	Stream Power (lb/ft s)	106.52
11.26	49.45		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.02
0.18	0.01		
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.02	0.00		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: OVFL  
REACH: Overflow Ch-DS-0 RS: 996

INPUT									
Description:									
Station	Elevation	Data	num=	92					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6270.1	.51	6270.1	2.27	6270	3.98	6269.9	5.59	
6269.8									
7.14	6269.7	8.3	6269.62	8.61	6269.6	9.99	6269.5	11.27	
6269.4									
12.41	6269.3	13.29	6269.2	13.95	6269.1	14.62	6269	15.29	
6268.9									
15.96	6268.8	16.63	6268.7	17.29	6268.6	17.96	6268.5	18.63	
6268.4									
19.3	6268.3	19.96	6268.2	20.63	6268.1	21.3	6268	21.97	







107.47	6273.2	109.19	6273.1	110.91	6273	112.64	6272.9	114.36
6272.8								
116.09	6272.7	117.81	6272.6	119.77	6272.5	121.72	6272.4	124.95
6272.3								
128.22	6272.2	129.6	6272.1	130.73	6272	131.86	6271.9	133
6271.8								
134.13	6271.7	134.45	6271.6	134.69	6271.5	134.93	6271.4	135.19
6271.3								
135.45	6271.2	135.7	6271.1	135.96	6271	136.22	6270.9	136.48
6270.8								
136.74	6270.7	137	6270.6	137.26	6270.5	137.52	6270.4	137.78
6270.3								
138.04	6270.2	138.3	6270.1	138.56	6270	138.81	6269.9	139.07
6269.8								
139.33	6269.7	139.59	6269.6	139.81	6269.5	140.01	6269.4	140.22
6269.3								
140.42	6269.2	140.62	6269.1	140.83	6269	141.03	6268.9	141.24
6268.8								
141.44	6268.7	141.65	6268.6	141.83	6268.5	142.01	6268.4	142.19
6268.3								
142.38	6268.2	142.56	6268.1	142.74	6268	142.92	6267.9	143.1
6267.8								
143.29	6267.7	143.47	6267.6	143.62	6267.5	143.77	6267.4	143.92
6267.3								
144.06	6267.2	144.21	6267.1	144.36	6267	144.51	6266.9	144.65
6266.8								
144.8	6266.7	144.95	6266.6	145.09	6266.5	145.24	6266.4	145.39
6266.3								
145.52	6266.2	145.65	6266.1	145.79	6266	145.92	6265.9	146.05
6265.8								
146.19	6265.7	146.32	6265.6	150.01	6265.52	151.21	6265.5	152.65
6265.5								
153.56	6265.6	153.71	6265.7	153.87	6265.8	154.03	6265.9	154.18
6266								
154.34	6266.1	154.5	6266.2	154.65	6266.3	154.81	6266.4	154.97
6266.5								
155.12	6266.6	155.27	6266.7	155.42	6266.8	155.57	6266.9	155.73
6267								
155.88	6267.1	156.03	6267.2	156.18	6267.3	156.33	6267.4	156.48
6267.5								
156.63	6267.6	156.81	6267.7	156.98	6267.8	157.16	6267.9	157.34
6268								
157.51	6268.1	157.69	6268.2	157.86	6268.3	158.04	6268.4	158.21
6268.5								
158.39	6268.6	158.56	6268.7	158.74	6268.8	158.92	6268.9	159.09
6269								
159.27	6269.1	159.44	6269.2	159.62	6269.3	159.79	6269.4	159.97
6269.5								
160.54	6269.6	162.69	6269.7	165.02	6269.8	167.45	6269.9	169.96
6270								
172.48	6270.1	175.02	6270.2	177.57	6270.3	180.12	6270.4	182.67
6270.5								
185.22	6270.6	187.77	6270.7	190.31	6270.8	192.86	6270.9	195.41

6271								
197.96	6271.1	200.49	6271.2	203.01	6271.3	205.54	6271.4	208.06
6271.5								
211.16	6271.6	215.04	6271.7	219.38	6271.8	224.24	6271.9	232.83
6272								
253.5	6272.1	276.06	6272.1	286.06	6272	290.37	6271.9	293.51
6271.8								
296.08	6271.7	298.25	6271.6	300	6271.6			
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	139.07	.013	160.54	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.								
	139.07	160.54		33.99	33.99	33.99		.1
.3								
Left Levee	Station=	45.54	Elevation=	6275.08				
Right Levee	Station=	232.75	Elevation=	6272.02				
CROSS SECTION OUTPUT Profile #Flow 1								
E.G. Elev (ft)		6272.28	Element				Left OB	
Channel Right OB								
Vel Head (ft)		1.39	Wt. n-Val.				0.030	
0.013	0.030							
W.S. Elev (ft)		6270.89	Reach Len. (ft)				33.99	
33.99	33.99							
Crit W.S. (ft)		6270.89	Flow Area (sq ft)				1.53	
82.03	20.23							
E.G. Slope (ft/ft)		0.001362	Area (sq ft)				1.53	
82.03	20.23							
Q Total (cfs)		820.00	Flow (cfs)				1.78	
791.01	27.21							
Top Width (ft)		56.32	Top Width (ft)				2.82	
21.47	32.03							
Vel Total (ft/s)		7.90	Avg. Vel. (ft/s)				1.16	
9.64	1.34							
Max Chl Dpth (ft)		5.39	Hydr. Depth (ft)				0.54	
3.82	0.63							
Conv. Total (cfs)		22217.5	Conv. (cfs)				48.2	
21432.0	737.2							
Length Wtd. (ft)		33.99	Wetted Per. (ft)				3.02	
23.74	32.06							
Min Ch El (ft)		6265.50	Shear (lb/sq ft)				0.04	
0.29	0.05							
Alpha		1.44	Stream Power (lb/ft s)				300.00	
45.54	232.75							
Frctn Loss (ft)		0.04	Cum Volume (acre-ft)				0.00	
0.11	0.04							
C & E Loss (ft)		0.04	Cum SA (acres)				0.00	
0.02	0.03							



Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek RS: 993

INPUT  
Description:

Station		Elevation		Data		num= 235			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6275.9	1.05	6275.9	2.47	6275.8	3.9	6275.7	5.33	
6275.6									
23.88	6275.6	31.7	6275.5	33	6275.4	34.29	6275.3	35.59	
6275.2									
36.89	6275.1	38.18	6275	39.48	6274.9	40.78	6274.8	42.08	
6274.7									
43.77	6274.6	45.56	6274.5	47.35	6274.4	49.19	6274.3	51.35	
6274.2									
53.57	6274.1	54.72	6274.2	56.01	6274	57.87	6273.9	60.22	
6273.8									
63.01	6273.8	66.37	6273.9	66.49	6273.9	72.12	6274	72.36	
6274.1									
75.96	6274.1	78.03	6274.2	80.09	6274.3	82.15	6274.4	84.22	
6274.5									
86.28	6274.6	88.34	6274.7	90.4	6274.8	91.31	6274.9	91.53	
6275									
91.76	6275.1	91.98	6275.2	92.44	6275.2	94.3	6275.1	96.17	
6275									
98.04	6274.9	99.9	6274.8	101.77	6274.7	103.63	6274.6	105.48	
6274.5									
107.29	6274.4	109.11	6274.3	110.92	6274.2	112.74	6274.1	114.55	
6274									
116.37	6273.9	118.18	6273.8	120	6273.7	121.85	6273.6	123.79	
6273.5									
124.77	6273.5	124.89	6273.6	125	6273.7	125.11	6273.8	125.42	
6273.8									
125.81	6273.7	126.19	6273.6	126.74	6273.5	127.44	6273.4	128.15	
6273.3									

128.85	6273.2	129.56	6273.1	130.27	6273	130.97	6272.9	131.73	
6272.8									
132.53	6272.7	133.34	6272.6	134.05	6272.5	134.3	6272.4	134.55	
6272.3									
134.8	6272.2	135.05	6272.1	135.31	6272	135.56	6271.9	135.81	
6271.8									
136.06	6271.7	136.31	6271.6	136.56	6271.5	136.81	6271.4	137.06	
6271.3									
137.32	6271.2	137.57	6271.1	137.82	6271	138.07	6270.9	138.32	
6270.8									
138.57	6270.7	138.82	6270.6	139.07	6270.5	139.33	6270.4	139.58	
6270.3									
139.83	6270.2	140.08	6270.1	140.33	6270	140.58	6269.9	140.84	
6269.8									
141.09	6269.7	141.34	6269.6	141.59	6269.5	141.76	6269.4	141.92	
6269.3									
142.09	6269.2	142.25	6269.1	142.42	6269	142.59	6268.9	142.75	
6268.8									
142.92	6268.7	143.09	6268.6	143.25	6268.5	143.42	6268.4	143.58	
6268.3									
143.75	6268.2	143.92	6268.1	144.08	6268	144.28	6267.9	144.48	
6267.8									
144.69	6267.7	144.89	6267.6	145.09	6267.5	145.26	6267.4	145.42	
6267.3									
145.59	6267.2	145.76	6267.1	145.92	6267	146.09	6266.9	146.26	
6266.8									
146.42	6266.7	146.59	6266.6	146.76	6266.5	146.92	6266.4	147.09	
6266.3									
147.25	6266.2	147.38	6266.1	147.51	6266	147.64	6265.9	147.81	
6265.8									
147.97	6265.7	148.14	6265.6	148.31	6265.5	148.47	6265.4	150.16	
6265.3									
151.95	6265.2	152.65	6265.2	153.99	6265.3	155.38	6265.4	155.71	
6265.5									
155.88	6265.6	156.05	6265.7	156.22	6265.8	156.39	6265.9	156.57	
6266									
156.74	6266.1	156.9	6266.2	157.06	6266.3	157.21	6266.4	157.37	
6266.5									
157.54	6266.6	157.71	6266.7	157.88	6266.8	158.05	6266.9	158.22	
6267									
158.39	6267.1	158.56	6267.2	158.74	6267.3	158.91	6267.4	159.08	
6267.5									
159.25	6267.6	159.42	6267.7	159.59	6267.8	159.76	6267.9	159.93	
6268									
160.1	6268.1	160.27	6268.2	160.44	6268.3	160.61	6268.4	160.79	
6268.5									
160.96	6268.6	161.13	6268.7	161.55	6268.7	163.9	6268.8	166.25	
6268.9									
168.6	6269	170.95	6269.1	172.4	6269.2	172.82	6269.3	173.25	
6269.4									
173.67	6269.5	174.83	6269.6	177.34	6269.7	179.87	6269.8	183.68	
6269.9									
187.5	6270	191.32	6270.1	195.14	6270.2	198.98	6270.3	202.82	



Manning's n Values			num= 3			
Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	142.92	.013	160.96	.03	
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	142.92	160.96	40.51	40.51	40.51	.1
.3 Ineffective Flow			num= 2			
Sta L	Sta R	Elev	Permanent			
0	90.77	6274.92	F			
225.62	300.27	6271.28	F			
Left Levee	Station=	92.44	Elevation= 6275.22			
Right Levee	Station=	221.44	Elevation= 6271.34			

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6272.00	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.26	Wt. n-Val.	0.030
0.013 0.030			
W.S. Elev (ft)	6270.74	Reach Len. (ft)	26.69
26.69 26.69			
Crit W.S. (ft)	6270.74	Flow Area (sq ft)	4.11
78.94 45.19			
E.G. Slope (ft/ft)	0.001080	Area (sq ft)	4.11
78.94 45.19			
Q Total (cfs)	820.00	Flow (cfs)	5.94
744.73 69.33			
Top Width (ft)	71.77	Top Width (ft)	4.44
18.04 49.29			
Vel Total (ft/s)	6.39	Avg. Vel. (ft/s)	1.45
9.43 1.53			
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)	0.92
4.38 0.92			
Conv. Total (cfs)	24955.3	Conv. (cfs)	180.7
22664.8 2109.9			
Length Wtd. (ft)	26.69	Wetted Per. (ft)	4.90

19.83	49.39			
Min Ch El (ft)		6265.20	Shear (lb/sq ft)	0.06
0.27	0.06			
Alpha		1.98	Stream Power (lb/ft s)	300.27
92.44	221.44			
Frctn Loss (ft)		0.04	Cum Volume (acre-ft)	0.00
0.05	0.01			
C & E Loss (ft)		0.01	Cum SA (acres)	

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0 RS: 992

### INPUT

Station	Elevation	Data	num=	234					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6274.9	6275.2	24.42	6275.2	28.89	6275.1	33.36	6275	37.83	
42.3	6274.8	46.77	6274.7	51.24	6274.6	52.72	6274.5	52.82	
52.93	6274.3	53.04	6274.2	53.15	6274.1	56.09	6274.1	57.83	
59.57	6274.3	65.43	6274.3	83.8	6274.2	90.51	6274.1	92.85	
95.19	6273.9	97.53	6273.8	99.87	6273.7	102.22	6273.6	104.56	
106.9	6273.4	109.24	6273.3	111.58	6273.2	113.93	6273.1	116.17	
118.35	6272.9	120.53	6272.8	121.62	6272.8	122.28	6272.9	122.94	
123.75	6273.1	124.66	6273.2	125.3	6273.2	125.51	6273.1	125.72	



125.93 6272.9 126.14 6272.8 126.36 6272.7 126.57 6272.6 126.78  
6272.5  
126.99 6272.4 127.2 6272.3 127.42 6272.2 127.63 6272.1 127.84  
6272  
128.05 6271.9 128.26 6271.8 128.48 6271.7 128.69 6271.6 128.9  
6271.5  
129.11 6271.4 129.43 6271.3 129.77 6271.2 130.07 6271.1 130.38  
6271  
130.68 6270.9 130.99 6270.8 131.29 6270.7 131.6 6270.6 131.9  
6270.5  
132.21 6270.4 132.52 6270.3 132.82 6270.2 133.13 6270.1 133.43  
6270  
133.74 6269.9 134.04 6269.8 134.31 6269.7 134.59 6269.6 134.8  
6269.5  
135.01 6269.4 135.21 6269.3 135.42 6269.2 135.63 6269.1 135.83  
6269  
136.04 6268.9 136.25 6268.8 136.45 6268.7 136.66 6268.6 136.87  
6268.5  
137.07 6268.4 137.28 6268.3 137.49 6268.2 137.69 6268.1 137.9  
6268  
138.11 6267.9 138.31 6267.8 138.52 6267.7 138.73 6267.6 138.93  
6267.5  
139.14 6267.4 139.35 6267.3 139.56 6267.2 139.77 6267.1 139.98  
6267  
140.19 6266.9 140.39 6266.8 140.6 6266.7 140.81 6266.6 141.02  
6266.5  
141.23 6266.4 141.44 6266.3 141.65 6266.2 141.85 6266.1 142.06  
6266  
142.27 6265.9 142.48 6265.8 142.69 6265.7 142.9 6265.6 143.11  
6265.5  
143.31 6265.4 143.52 6265.3 143.73 6265.2 143.94 6265.1 144.15  
6265  
144.36 6264.9 144.57 6264.8 144.77 6264.7 144.98 6264.6 145.19  
6264.5  
145.4 6264.4 145.61 6264.3 156 6264.3 156.25 6264.4 156.5  
6264.5  
156.75 6264.6 157 6264.7 157.25 6264.8 157.5 6264.9 157.75  
6265  
158 6265.1 158.25 6265.2 158.5 6265.3 158.75 6265.4 159  
6265.5  
159.25 6265.6 159.5 6265.7 159.75 6265.8 160 6265.9 160.25  
6266  
160.5 6266.1 160.75 6266.2 161 6266.3 161.25 6266.4 161.5  
6266.5  
161.75 6266.6 162 6266.7 162.25 6266.8 162.5 6266.9 162.75  
6267  
163 6267.1 163.25 6267.2 163.5 6267.3 163.75 6267.4 164  
6267.5  
164.25 6267.6 164.5 6267.7 164.75 6267.8 165 6267.9 165.25  
6268  
165.5 6268.1 165.75 6268.2 166 6268.3 166.25 6268.4 166.5  
6268.5  
166.82 6268.6 167.14 6268.7 167.46 6268.8 167.78 6268.9 168.04

6268.97  
168.18 6269 168.9 6269.1 169.62 6269.2 170.35 6269.3 171.07  
6269.4  
171.79 6269.5 172.38 6269.59 172.48 6269.6 172.88 6269.7 173.28  
6269.8  
173.68 6269.9 174.08 6270 174.48 6270.1 174.88 6270.2 175.28  
6270.3  
175.68 6270.4 176.08 6270.5 176.29 6270.5 177.45 6270.4 178.6  
6270.3  
179.76 6270.2 180.91 6270.1 182.06 6270 183.61 6269.9 185.04  
6269.8  
186.47 6269.7 187.9 6269.6 189.33 6269.5 190.76 6269.4 192.19  
6269.3  
193.63 6269.2 195.06 6269.1 196.49 6269 197.92 6268.9 199.35  
6268.8  
200.78 6268.7 202.21 6268.6 218.17 6268.6 249.61 6268.7 252.54  
6268.7  
256.2 6268.6 259.87 6268.5 263.53 6268.4 266.25 6268.4 267.2  
6268.3  
267.59 6268.3 272.49 6268.4 280.68 6268.5 283.34 6268.6 284.27  
6268.7  
285.21 6268.8 286.14 6268.9 290.42 6269 290.56 6269.01 292.54  
6269.1  
294.65 6269.2 296.76 6269.3 298.88 6269.4 300.03 6269.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 135.42 .013 168.18 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 135.42 168.18 11.58 11.58 11.58 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 59.57 6274.35 F  
169.59 300.03 6269.49 F  
Left Levee Station= 124.12 Elevation= 6273.2  
Right Levee Station= 172.46 Elevation= 6269.59  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6269.98 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.40 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6268.57 Reach Len. (ft) 11.58  
11.58 11.58  
Crit W.S. (ft) 6268.57 Flow Area (sq ft)  
86.27  
E.G. Slope (ft/ft) 0.001829 Area (sq ft)  
86.27



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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

RIVER: SC01  
REACH: Sand Creek-DS-0 RS: 991

Station	Elevation	Data	num=	223					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
0	6275	3.37	6275	12.83	6274.9	17.27	6274.8	21.92	
6274.7									
28.54	6274.6	35.17	6274.5	41.79	6274.4	48.41	6274.3	55.39	
6274.2									
62.76	6274.1	81.52	6274	88.28	6273.9	90.62	6273.8	92.95	

6273.7								
95.29	6273.6	97.63	6273.5	99.97	6273.4	102.3	6273.3	104.64
6273.2								
106.98	6273.1	109.32	6273	111.66	6272.9	114.16	6272.8	114.33
6272.8								
118.08	6272.7	119.39	6272.7	119.78	6272.8	119.9	6272.7	120.18
6272.9								
120.58	6273	121.12	6273	121.28	6272.9	121.44	6272.8	121.6
6272.7								
121.75	6272.6	121.91	6272.5	122.07	6272.4	122.23	6272.3	122.38
6272.2								
122.54	6272.1	122.7	6272	122.86	6271.9	123.02	6271.8	123.31
6271.7								
123.49	6271.6	123.67	6271.5	123.84	6271.4	124.02	6271.3	124.19
6271.2								
124.37	6271.1	124.55	6271	124.72	6270.9	124.9	6270.8	125.07
6270.7								
125.25	6270.6	125.42	6270.5	125.6	6270.4	125.77	6270.3	125.95
6270.2								
126.12	6270.1	126.3	6270	126.47	6269.9	126.65	6269.8	126.83
6269.7								
127	6269.6	127.18	6269.5	127.45	6269.4	127.81	6269.3	128.41
6269.2								
129.01	6269.1	129.61	6269	130.21	6268.9	130.81	6268.8	131.41
6268.7								
132.01	6268.6	132.6	6268.5	133.2	6268.4	133.8	6268.3	134.4
6268.2								
135	6268.1	135.6	6268	136.2	6267.9	136.8	6267.8	137.4
6267.7								
138	6267.6	138.2	6267.5	138.4	6267.4	138.6	6267.3	138.8
6267.2								
139	6267.1	139.2	6267	139.4	6266.9	139.6	6266.8	139.8
6266.7								
140	6266.6	140.2	6266.5	140.4	6266.4	140.6	6266.3	140.8
6266.2								
141	6266.1	141.2	6266	141.4	6265.9	141.6	6265.8	141.8
6265.7								
142	6265.6	142.2	6265.5	142.4	6265.4	142.6	6265.3	142.8
6265.2								
143	6265.1	143.2	6265	143.4	6264.9	143.6	6264.8	143.8
6264.7								
144	6264.6	144.2	6264.5	144.4	6264.4	144.6	6264.3	144.8
6264.2								
145	6264.1	155	6264.1	155.25	6264.2	155.5	6264.3	155.75
6264.4								
156	6264.5	156.25	6264.6	156.5	6264.7	156.75	6264.8	157
6264.9								
157.25	6265	157.5	6265.1	157.75	6265.2	158	6265.3	158.25
6265.4								
158.5	6265.5	158.75	6265.6	159	6265.7	159.25	6265.8	159.5
6265.9								
159.75	6266	160	6266.1	160.25	6266.2	160.5	6266.3	160.75
6266.4								



161 6266.5 161.25 6266.6 161.5 6266.7 161.75 6266.8 162  
6266.9  
162.25 6267 162.5 6267.1 162.75 6267.2 163 6267.3 163.25  
6267.4  
163.5 6267.5 163.75 6267.6 164 6267.7 164.25 6267.8 164.5  
6267.9  
164.75 6268 165 6268.1 165.25 6268.2 165.5 6268.3 165.75  
6268.4  
166 6268.5 166.25 6268.6 166.5 6268.7 166.75 6268.8 167  
6268.9  
167.25 6269 167.5 6269.1 167.75 6269.2 168 6269.3 168.25  
6269.4  
168.5 6269.5 168.52 6269.5 168.9 6269.6 169.3 6269.7 169.7  
6269.8  
170.1 6269.9 170.5 6270 170.91 6270.1 171.31 6270.2 171.71  
6270.3  
172.11 6270.4 172.51 6270.5 173.41 6270.5 174.74 6270.4 176.17  
6270.3  
177.6 6270.2 179.03 6270.1 180.45 6270 181.88 6269.9 183.31  
6269.8  
184.74 6269.7 186.17 6269.6 187.6 6269.5 189.02 6269.4 190.45  
6269.3  
191.88 6269.2 193.31 6269.1 194.74 6269 196.17 6268.9 197.59  
6268.8  
199.02 6268.7 254.84 6268.7 258.49 6268.6 262.14 6268.5 266.11  
6268.5  
272.78 6268.6 276.5 6268.7 277.44 6268.8 278.38 6268.9 281.85  
6269  
284.14 6269.1 286.42 6269.2 288.71 6269.3 290.99 6269.4 293.28  
6269.5  
295.56 6269.6 297.85 6269.7 300 6269.7  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.01 .013 168.52 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.01 168.52 100 100 100 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
176.21 300 6269.51 F  
Left Levee Station= 121.34 Elevation= 6273.03  
Right Levee Station= 171.6 Elevation= 6269.54  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6269.81 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.30 Wt. n-Val.  
0.013

W.S. Elev (ft) 6268.51 Reach Len. (ft) 100.01  
100.01 100.01  
Crit W.S. (ft) 6268.51 Flow Area (sq ft)  
89.57  
E.G. Slope (ft/ft) 0.001850 Area (sq ft)  
89.57  
Q Total (cfs) 820.02 Flow (cfs)  
820.02  
Top Width (ft) 33.50 Top Width (ft)  
33.50  
Vel Total (ft/s) 9.15 Avg. Vel. (ft/s)  
9.15  
Max Chl Dpth (ft) 4.41 Hydr. Depth (ft)  
2.67  
Conv. Total (cfs) 19064.6 Conv. (cfs)  
19064.6  
Length Wtd. (ft) 100.01 Wetted Per. (ft)  
35.25  
Min Ch El (ft) 6264.10 Shear (lb/sq ft)  
0.29  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
121.34 171.60  
Frctn Loss (ft) 0.10 Cum Volume (acre-ft) 0.04  
0.26 0.01  
C & E Loss (ft) 0.16 Cum SA (acres)

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

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 990

INPUT  
Description:  
Station Elevation Data num= 175  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev



0	6271.5	1.25	6271.5	14.06	6271.4	25.09	6271.3	32.78
6271.2								
39.93	6271.1	46.38	6271	52.82	6270.9	58.95	6270.8	62.24
6270.7								
74.21	6270.7	86.91	6270.6	87.78	6270.5	88.74	6270.4	89.79
6270.3								
90.83	6270.2	91.88	6270.1	92.92	6270	93.97	6269.9	95.02
6269.8								
96.06	6269.7	97.11	6269.6	98.15	6269.5	99.2	6269.4	100.25
6269.3								
101.29	6269.2	102.34	6269.1	103.39	6269	104.43	6268.9	105.48
6268.8								
106.52	6268.7	107.57	6268.6	108.62	6268.5	109.85	6268.4	111.35
6268.3								
112.85	6268.2	114.35	6268.1	115.86	6268	117.29	6267.9	118.15
6267.8								
119.02	6267.7	119.88	6267.6	120.74	6267.5	121.1	6267.4	121.3
6267.3								
121.51	6267.2	121.71	6267.1	121.89	6267	123.09	6266.9	128.09
6266.8								
133.09	6266.7	138	6266.6	138.2	6266.5	138.4	6266.4	138.6
6266.3								
138.8	6266.2	139	6266.1	139.2	6266	139.4	6265.9	139.6
6265.8								
139.8	6265.7	140	6265.6	140.2	6265.5	140.4	6265.4	140.6
6265.3								
140.8	6265.2	141	6265.1	141.2	6265	141.4	6264.9	141.6
6264.8								
141.8	6264.7	142	6264.6	142.2	6264.5	142.4	6264.4	142.6
6264.3								
142.8	6264.2	143	6264.1	143.2	6264	143.4	6263.9	143.6
6263.8								
143.8	6263.7	144	6263.6	144.2	6263.5	144.4	6263.4	144.6
6263.3								
144.8	6263.2	155.3	6263.2	155.6	6263.3	155.9	6263.4	156.21
6263.5								
156.51	6263.6	156.81	6263.7	157.12	6263.8	157.42	6263.9	157.72
6264								
158.03	6264.1	158.33	6264.2	158.63	6264.3	158.94	6264.4	159.24
6264.5								
159.54	6264.6	159.84	6264.7	160.15	6264.8	160.45	6264.9	160.75
6265								
161.05	6265.1	161.35	6265.2	161.65	6265.3	161.95	6265.4	162.25
6265.5								
162.55	6265.6	162.85	6265.7	163.15	6265.8	163.45	6265.9	163.75
6266								
164.05	6266.1	164.35	6266.2	164.65	6266.3	169	6266.4	173.05
6266.5								
173.74	6266.6	174.44	6266.7	175.14	6266.8	175.84	6266.9	176.48
6267								
176.86	6267.1	177.25	6267.2	177.63	6267.3	178.02	6267.4	178.4
6267.5								
178.79	6267.6	179.37	6267.7	179.96	6267.8	180.54	6267.9	181.12

6268								
181.71	6268.1	182.29	6268.2	182.87	6268.3	183.45	6268.4	184.04
6268.5								
184.46	6268.6	184.74	6268.7	185.03	6268.8	185.32	6268.9	185.61
6269								
185.9	6269.1	186.19	6269.2	186.48	6269.3	186.76	6269.4	187.05
6269.5								
187.36	6269.6	187.69	6269.7	188.01	6269.8	195.99	6269.9	215.85
6269.9								
218.42	6269.8	224.13	6269.7	227.95	6269.6	231.78	6269.5	235.6
6269.4								
239.43	6269.3	243.25	6269.2	247.08	6269.1	250.9	6269	254.72
6268.9								
258.55	6268.8	262.37	6268.7	266.2	6268.6	270.02	6268.5	277.32
6268.4								
283.18	6268.3	288.58	6268.2	293.13	6268.1	297.68	6268	300
6268								
Manning's n Values num= 3								
Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val
0	.03	138	.013	173.05	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	138	173.05	6.48	6.48	6.48			.1
.3								
Ineffective Flow num= 1								
Sta L	Sta R	Elev	Permanent					
215.58	300	6269.89	F					
Left Levee	Station=	46.79	Elevation=	6271.02				
Right Levee	Station=	187.52	Elevation=	6269.82				
CROSS SECTION OUTPUT Profile #Flow 1								
E.G. Elev (ft)	6269.30	Element						Left OB
Channel Right OB								
Vel Head (ft)	0.76	Wt. n-Val.						0.030
0.013	0.030							
W.S. Elev (ft)	6268.54	Reach Len. (ft)						6.48
6.48	6.48							
Crit W.S. (ft)	6267.78	Flow Area (sq ft)						35.96
134.30	11.59							
E.G. Slope (ft/ft)	0.000697	Area (sq ft)						35.96
134.30	11.59							
Q Total (cfs)	1037.00	Flow (cfs)						53.09
968.53	15.37							
Top Width (ft)	76.02	Top Width (ft)						29.81
35.05	11.16							
Vel Total (ft/s)	5.70	Avg. Vel. (ft/s)						1.48
7.21	1.33							
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)						1.21
3.83	1.04							



Conv. Total (cfs)	39276.7	Conv. (cfs)	2010.9
36683.5	582.3		
Length Wtd. (ft)	6.48	Wetted Per. (ft)	29.97
36.36	11.35		
Min Ch El (ft)	6263.20	Shear (lb/sq ft)	0.05
0.16	0.04		
Alpha	1.50	Stream Power (lb/ft s)	300.00
46.79	187.52		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02
1.31	0.00		
C & E Loss (ft)	0.06	Cum SA (acres)	0.02
0.40	0.00		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 989

INPUT  
Description:  
Station Elevation Data num= 182  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6271.3 11.68 6271.3 25.78 6271.2 33.47 6271.1 40.5  
6271  
46.95 6270.9 53.39 6270.8 57.56 6270.7 60.85 6270.6 64.15  
6270.5  
64.77 6270.5 65.97 6270.6 70.63 6270.6 87.28 6270.5 88.57  
6270.4  
89.45 6270.3 90.32 6270.2 91.19 6270.1 92.06 6270 92.93  
6269.9  
93.8 6269.8 94.67 6269.7 95.54 6269.6 96.41 6269.5 97.28  
6269.4  
98.15 6269.3 99.03 6269.2 99.9 6269.1 100.8 6269 101.85  
6268.9  
102.89 6268.8 103.94 6268.7 104.99 6268.6 106.03 6268.5 107.08  
6268.4  
108.12 6268.3 109.17 6268.2 110.55 6268.1 112.05 6268 113.55  
6267.9

115.05	6267.8	116.55	6267.7	118.06	6267.6	119.45	6267.5	120.31
6267.4								
120.87	6267.3	121.08	6267.2	121.28	6267.1	121.49	6267	121.69
6266.9								
124.85	6266.8	129.85	6266.7	134.85	6266.6	138.08	6266.5	138.28
6266.4								
138.48	6266.3	138.68	6266.2	138.88	6266.1	139.08	6266	139.28
6265.9								
139.48	6265.8	139.68	6265.7	139.88	6265.6	140.08	6265.5	140.28
6265.4								
140.48	6265.3	140.68	6265.2	140.88	6265.1	141.08	6265	141.28
6264.9								
141.48	6264.8	141.68	6264.7	141.88	6264.6	142.08	6264.5	142.28
6264.4								
142.48	6264.3	142.68	6264.2	142.88	6264.1	143.08	6264	143.28
6263.9								
143.48	6263.8	143.68	6263.7	143.88	6263.6	144.08	6263.5	144.28
6263.4								
144.48	6263.3	144.68	6263.2	144.88	6263.1	155.19	6263.1	155.49
6263.2								
155.79	6263.3	156.09	6263.4	156.39	6263.5	156.69	6263.6	156.99
6263.7								
157.29	6263.8	157.59	6263.9	157.89	6264	158.19	6264.1	158.49
6264.2								
158.79	6264.3	159.09	6264.4	159.39	6264.5	159.69	6264.6	159.99
6264.7								
160.29	6264.8	160.59	6264.9	160.89	6265	161.19	6265.1	161.49
6265.2								
161.79	6265.3	162.09	6265.4	162.39	6265.5	162.69	6265.6	162.99
6265.7								
163.29	6265.8	163.59	6265.9	163.89	6266	164.19	6266.1	164.49
6266.2								
164.79	6266.3	165.09	6266.4	165.39	6266.5	165.69	6266.6	165.99
6266.7								
166.29	6266.8	166.59	6266.9	166.89	6267	167.19	6267.1	167.49
6267.2								
167.79	6267.3	168.09	6267.4	168.39	6267.5	168.94	6267.6	169.64
6267.7								
170.34	6267.8	171.04	6267.9	171.74	6268	172.43	6268.1	173.13
6268.2								
173.83	6268.3	174.53	6268.4	175.23	6268.5	175.93	6268.6	176.63
6268.7								
177.33	6268.8	178.03	6268.9	178.73	6269	179.42	6269.1	180.12
6269.2								
180.69	6269.3	181.05	6269.4	181.43	6269.5	181.82	6269.6	182.2
6269.7								
182.59	6269.8	182.98	6269.9	191.39	6270	204.28	6270	206.71
6269.9								
208.92	6269.8	211.3	6269.7	213.88	6269.6	216.45	6269.5	219.02
6269.4								
228.83	6269.3	234.72	6269.2	238.8	6269.1	242.62	6269	246.44
6268.9								
250.27	6268.8	254.09	6268.7	257.92	6268.6	261.74	6268.5	265.57



6267.9			
299.54	6267.8	300	6267.8

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff Contr.
Expan.	138.08	173.13	43.52	43.52	43.52		.1

Ineffective Flow		num=	1	
Sta L	Sta R	Elev	Permanent	
205.11	300	6270.01	F	
Left Levee		Station=	87	Elevation= 6270.5
Right Levee		Station=	205.11	Elevation= 6270.03

E.G. Elev (ft)	6269.24	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.32	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6267.92	Reach Len. (ft)	43.52
43.52 43.52			
Crit W.S. (ft)	6267.92	Flow Area (sq ft)	22.59
105.92			
E.G. Slope (ft/ft)	0.001524	Area (sq ft)	22.59
105.92			
Q Total (cfs)	1037.00	Flow (cfs)	40.93
996.07			
Top Width (ft)	57.84	Top Width (ft)	24.77
33.07			
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	1.81
9.40			
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	0.91
3.20			
Conv. Total (cfs)	26564.5	Conv. (cfs)	1048.4
25516.1			
Length Wtd. (ft)	43.52	Wetted Per. (ft)	24.90
34.62			
Min Ch El (ft)	6263.10	Shear (lb/sq ft)	0.09
0.29			
Alpha	1.31	Stream Power (lb/ft s)	300.00
87.00 205.11			
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.02
1.29			
C & E Loss (ft)	0.02	Cum SA (acres)	0.01
0.39			

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 988

INPUT

Description:

Station	Elevation	Data	num=	232					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6270.3	0	6270.6	15.16	6270.6	28.64	6270.5	31.48	6270.4	34.31
6269.8	37.14	6270.2	40.61	6270.1	45.04	6270	49.48	6269.9	53.91
6269.3	58.35	6269.7	62.37	6269.6	65.67	6269.5	68.96	6269.4	72.26
6269.3	75.56	6269.2	78.85	6269.1	80.91	6269.1	82.11	6269.2	83.3
6269.7	84.5	6269.4	85.7	6269.5	86.9	6269.6	88.1	6269.7	90.42
6269.2	91.84	6269.6	93.22	6269.5	93.92	6269.4	94.63	6269.3	95.34
6268.7	96.05	6269.1	96.76	6269	97.47	6268.9	98.18	6268.8	98.89
6268.2	99.6	6268.6	100.31	6268.5	101.02	6268.4	101.73	6268.3	102.44
6267.7	103.13	6268.1	103.79	6268	104.44	6267.9	105.1	6267.8	105.76
6267.2	106.41	6267.6	107.07	6267.5	107.73	6267.4	108.39	6267.3	109.04
6267.2	109.7	6267.1	110.36	6267	110.94	6267	111.47	6267.1	112
6266.7	112.53	6267.3	113.06	6267.4	116.37	6267.4	117.85	6267.3	119.08
6266.7	120.24	6267.1	120.97	6267	121.56	6266.9	122.14	6266.8	122.72



123.3 6266.6 123.89 6266.5 124.47 6266.4 125.05 6266.3 125.63  
6266.2  
126.22 6266.1 126.79 6266 127.32 6265.9 127.91 6265.8 128.41  
6265.7  
128.69 6265.6 128.98 6265.5 129.26 6265.4 129.54 6265.3 129.83  
6265.2  
130.11 6265.1 130.39 6265 130.68 6264.9 130.96 6264.8 131.24  
6264.7  
131.52 6264.6 131.81 6264.5 132.09 6264.4 132.37 6264.3 132.66  
6264.2  
132.94 6264.1 133.22 6264 133.51 6263.9 133.79 6263.8 134.07  
6263.7  
134.36 6263.6 134.64 6263.5 134.92 6263.4 135.21 6263.3 135.49  
6263.2  
135.77 6263.1 136.06 6263 136.34 6262.9 136.62 6262.8 136.91  
6262.7  
137.17 6262.6 137.37 6262.5 137.57 6262.4 137.77 6262.3 137.97  
6262.2  
138.17 6262.1 138.37 6262 138.57 6261.9 138.77 6261.8 138.97  
6261.7  
139.17 6261.6 139.37 6261.5 139.57 6261.4 139.77 6261.3 139.97  
6261.2  
140.17 6261.1 140.37 6261 140.57 6260.9 140.77 6260.8 140.97  
6260.7  
141.17 6260.6 141.37 6260.5 141.57 6260.4 141.77 6260.3 141.97  
6260.2  
142.17 6260.1 142.37 6260 142.57 6259.9 142.77 6259.8 142.97  
6259.7  
143.17 6259.6 143.37 6259.5 143.57 6259.4 143.77 6259.3 143.97  
6259.2  
144.17 6259.1 144.37 6259 144.57 6258.9 144.77 6258.8 144.97  
6258.7  
155.04 6258.7 155.34 6258.8 155.64 6258.9 155.94 6259 156.24  
6259.1  
156.54 6259.2 156.84 6259.3 157.14 6259.4 157.44 6259.5 157.74  
6259.6  
158.04 6259.7 158.34 6259.8 158.64 6259.9 158.94 6260 159.21  
6260.1  
159.44 6260.2 159.68 6260.3 159.92 6260.4 160.16 6260.5 160.4  
6260.6  
160.63 6260.7 160.87 6260.8 161.11 6260.9 161.35 6261 161.58  
6261.1  
161.82 6261.2 162.06 6261.3 162.3 6261.4 162.54 6261.5 162.77  
6261.6  
163.01 6261.7 163.25 6261.8 163.49 6261.9 163.72 6262 163.96  
6262.1  
164.2 6262.2 164.44 6262.3 164.67 6262.4 164.91 6262.5 165.15  
6262.6  
165.39 6262.7 165.63 6262.8 165.86 6262.9 166.1 6263 166.34  
6263.1  
166.59 6263.2 166.88 6263.3 167.18 6263.4 167.48 6263.5 167.78  
6263.6  
168.08 6263.7 168.38 6263.8 168.68 6263.9 168.98 6264 169.28

6264.1  
169.58 6264.2 169.88 6264.3 170.18 6264.4 170.48 6264.5 170.78  
6264.6  
171.07 6264.7 171.37 6264.8 171.67 6264.9 171.97 6265 172.27  
6265.1  
172.57 6265.2 172.87 6265.3 173.17 6265.4 173.47 6265.5 173.77  
6265.6  
174.07 6265.7 174.37 6265.8 177.25 6265.9 182.25 6266 187.25  
6266.1  
214.46 6266.2 218.01 6266.3 221.57 6266.4 225.12 6266.5 228.67  
6266.6  
232.22 6266.7 235.77 6266.8 239.33 6266.9 245.92 6266.9 253.13  
6266.8  
277.3 6266.7 300 6266.7  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 133.22 .013 168.08 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 133.22 168.08 39.44 39.44 39.44 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
0 89.93 6269.72 F  
Left Levee Station= 91.19 Elevation= 6269.75  
Right Levee Station= 239.87 Elevation= 6266.89  
CROSS SECTION OUTPUT Profile #Flow 1  
E.G. Elev (ft) 6265.09 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.55 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6263.54 Reach Len. (ft) 39.44  
39.44 39.44  
Crit W.S. (ft) 6263.54 Flow Area (sq ft)  
103.92  
E.G. Slope (ft/ft) 0.001791 Area (sq ft)  
103.92  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 33.08 Top Width (ft)  
33.08  
Vel Total (ft/s) 9.98 Avg. Vel. (ft/s)  
9.98  
Max Chl Dpth (ft) 4.84 Hydr. Depth (ft)  
3.14  
Conv. Total (cfs) 24506.5 Conv. (cfs)  
24506.5  
Length Wtd. (ft) 39.44 Wetted Per. (ft)



35.07  
Min Ch El (ft) 6258.70 Shear (lb/sq ft)  
0.33  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
91.19 239.87  
Frctn Loss (ft) 0.07 Cum Volume (acre-ft) 0.01  
1.19  
C & E Loss (ft) 0.01 Cum SA (acres) 0.00  
0.36

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 987

INPUT  
Description:  
Station Elevation Data num= 283  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6270.5 5.82 6270.5 9.64 6270.4 13.16 6270.3 16.68  
6270.2  
20.19 6270.1 23.71 6270 27.23 6269.9 30.74 6269.8 34.26  
6269.7  
37.85 6269.6 42.3 6269.5 46.76 6269.4 51.22 6269.3 55.61  
6269.2  
59.93 6269.1 64.25 6269 68.45 6268.9 71.72 6268.8 74.99  
6268.7  
78.26 6268.6 81.53 6268.5 84.8 6268.4 88.08 6268.3 91.35  
6268.2  
94.62 6268.1 98.74 6268 100.58 6267.9 105.05 6267.9 107.62  
6268  
112.49 6268 113.63 6267.9 114.77 6267.8 115.91 6267.7 116.45  
6267.6  
116.65 6267.5 116.85 6267.4 117.05 6267.3 117.25 6267.2 117.43  
6267.1

117.61 6267 117.78 6266.9 117.95 6266.8 118.13 6266.7 118.31  
6266.6  
118.55 6266.5 118.78 6266.4 119.02 6266.3 119.25 6266.2 119.48  
6266.1  
119.72 6266 119.95 6265.9 120.17 6265.8 120.39 6265.7 120.6  
6265.6  
120.81 6265.5 121.03 6265.4 121.24 6265.3 121.46 6265.2 121.67  
6265.1  
121.88 6265 122.1 6264.9 122.31 6264.8 122.53 6264.7 122.74  
6264.6  
122.96 6264.5 123.17 6264.4 123.38 6264.3 123.6 6264.2 123.81  
6264.1  
124.03 6264 124.24 6263.9 124.45 6263.8 124.67 6263.7 124.88  
6263.6  
125.1 6263.5 125.31 6263.4 125.52 6263.3 125.74 6263.2 125.95  
6263.1  
126.17 6263 126.38 6262.9 126.6 6262.8 126.81 6262.7 127.02  
6262.6  
127.24 6262.5 127.45 6262.4 127.67 6262.3 127.88 6262.2 128.09  
6262.1  
128.31 6262 128.52 6261.9 128.74 6261.8 128.95 6261.7 129.17  
6261.6  
129.44 6261.5 129.73 6261.4 130.01 6261.3 130.29 6261.2 130.58  
6261.1  
130.86 6261 131.14 6260.9 131.43 6260.8 131.71 6260.7 131.99  
6260.6  
132.28 6260.5 132.56 6260.4 132.84 6260.3 133.13 6260.2 133.41  
6260.1  
133.69 6260 133.98 6259.9 134.26 6259.8 134.54 6259.7 134.83  
6259.6  
135.11 6259.5 135.39 6259.4 135.68 6259.3 135.96 6259.2 136.24  
6259.1  
136.47 6259 136.67 6258.9 136.87 6258.8 137.07 6258.7 137.27  
6258.6  
137.47 6258.5 137.67 6258.4 137.87 6258.3 138.07 6258.2 138.27  
6258.1  
138.47 6258 138.67 6257.9 138.87 6257.8 139.07 6257.7 139.27  
6257.6  
139.47 6257.5 139.67 6257.4 139.87 6257.3 140.07 6257.2 140.27  
6257.1  
140.47 6257 140.67 6256.9 140.87 6256.8 141.07 6256.7 141.27  
6256.6  
141.47 6256.5 141.67 6256.4 141.87 6256.3 142.07 6256.2 142.27  
6256.1  
142.47 6256 142.67 6255.9 142.87 6255.8 143.07 6255.7 143.27  
6255.6  
143.47 6255.5 143.67 6255.4 143.87 6255.3 144.07 6255.2 144.27  
6255.1  
144.47 6255 144.67 6254.9 144.87 6254.8 155.1 6254.8 155.3  
6254.9  
155.5 6255 155.7 6255.1 155.9 6255.2 156.1 6255.3 156.3  
6255.4  
156.5 6255.5 156.7 6255.6 156.9 6255.7 157.1 6255.8 157.3



6255.9								
157.5	6256	157.7	6256.1	157.9	6256.2	158.1	6256.3	158.3
6256.4								
158.5	6256.5	158.7	6256.6	158.9	6256.7	159.1	6256.8	159.3
6256.9								
159.5	6257	159.7	6257.1	159.9	6257.2	160.14	6257.3	160.37
6257.4								
160.61	6257.5	160.85	6257.6	161.09	6257.7	161.33	6257.8	161.56
6257.9								
161.8	6258	162.04	6258.1	162.28	6258.2	162.51	6258.3	162.75
6258.4								
162.99	6258.5	163.23	6258.6	163.47	6258.7	163.7	6258.8	163.94
6258.9								
164.18	6259	164.42	6259.1	164.65	6259.2	164.93	6259.3	165.23
6259.4								
165.53	6259.5	165.83	6259.6	166.13	6259.7	166.42	6259.8	166.72
6259.9								
167.02	6260	167.32	6260.1	167.62	6260.2	167.92	6260.3	168.22
6260.4								
168.52	6260.5	168.82	6260.6	169.12	6260.7	169.42	6260.8	169.72
6260.9								
170.02	6261	170.32	6261.1	170.61	6261.2	170.91	6261.3	171.21
6261.4								
171.51	6261.5	171.81	6261.6	172.11	6261.7	172.41	6261.8	172.71
6261.9								
173.01	6262	173.31	6262.1	173.61	6262.2	173.91	6262.3	174.21
6262.4								
174.82	6262.5	179.82	6262.6	184.82	6262.7	189.62	6262.8	191.62
6262.9								
193.63	6263	195.63	6263.1	197.63	6263.2	199.64	6263.3	201.64
6263.4								
203.65	6263.5	205.65	6263.6	207.65	6263.7	209.66	6263.8	211.66
6263.9								
213.67	6264	216.68	6264.1	220.23	6264.2	223.78	6264.3	227.33
6264.4								
230.89	6264.5	234.44	6264.6	237.99	6264.7	241.54	6264.8	245.1
6264.9								
248.65	6265	258.2	6265	259.08	6264.9	270.41	6264.8	284.82
6264.7								
285.84	6264.6	286.86	6264.5	287.96	6264.4	289.05	6264.3	289.66
6264.3								
291.32	6264.4	292.9	6264.5	294.42	6264.6	295.85	6264.7	297.2
6264.8								
298.5	6264.9	299.7	6265	300	6265			
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	127.02	.013	173.01	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	127.02	173.01		10.56	10.56	10.56		.1
.3								

Ineffective Flow	num=	1		
Sta L	Sta R	Elev	Permanent	
258.72	300	6265.02	F	
Left Levee	Station=	112.13	Elevation=	6268.07
Right Levee	Station=	248.25	Elevation=	6265.11
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)		6261.38	Element	Left OB
Channel Right OB				
Vel Head (ft)		1.60	Wt. n-Val.	
0.013				
W.S. Elev (ft)		6259.78	Reach Len. (ft)	10.56
10.56	10.56			
Crit W.S. (ft)		6259.78	Flow Area (sq ft)	
102.05				
E.G. Slope (ft/ft)		0.001842	Area (sq ft)	
102.05				
Q Total (cfs)		1037.00	Flow (cfs)	
1037.00				
Top Width (ft)		32.04	Top Width (ft)	
32.04				
Vel Total (ft/s)		10.16	Avg. Vel. (ft/s)	
10.16				
Max Chl Dpth (ft)		4.98	Hydr. Depth (ft)	
3.19				
Conv. Total (cfs)		24162.3	Conv. (cfs)	
24162.3				
Length Wtd. (ft)		10.56	Wetted Per. (ft)	
34.23				
Min Ch El (ft)		6254.80	Shear (lb/sq ft)	
0.34				
Alpha		1.00	Stream Power (lb/ft s)	300.00
112.13	248.25			
Frctn Loss (ft)		0.02	Cum Volume (acre-ft)	0.01
1.09				
C & E Loss (ft)		0.13	Cum SA (acres)	0.00
0.33				
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.				
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.				
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.				



CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 986

INPUT

Description:

Station	Elevation	Data	num=	338					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6269.7	.65	6269.7	1.86	6269.6	23.84	6269.6	41.05	
6269.5									
44.74	6269.4	47.36	6269.3	48.78	6269.2	53.11	6269.1	57.81	
6269									
62.51	6268.9	66.9	6268.8	71.23	6268.7	75.55	6268.6	79.18	
6268.5									
82.45	6268.4	85.72	6268.3	88.99	6268.2	94.38	6268.1	97.79	
6268									
99	6267.9	100.22	6267.8	101.92	6267.7	102.53	6267.7	103.06	
6267.8									
103.58	6267.9	104.51	6267.9	105.21	6267.8	105.91	6267.7	106.61	
6267.6									
107.35	6267.6	109.92	6267.7	112.2	6267.7	113.52	6267.6	115.96	
6267.5									
116.12	6267.4	116.28	6267.3	116.45	6267.2	116.61	6267.1	116.77	
6267									
116.93	6266.9	117.1	6266.8	117.26	6266.7	117.42	6266.6	117.58	
6266.5									
117.77	6266.4	117.98	6266.3	118.19	6266.2	118.4	6266.1	118.61	
6266									
118.81	6265.9	119.02	6265.8	119.23	6265.7	119.44	6265.6	119.65	
6265.5									
119.86	6265.4	120.07	6265.3	120.28	6265.2	120.49	6265.1	120.7	
6265									
120.9	6264.9	121.11	6264.8	121.32	6264.7	121.53	6264.6	121.74	
6264.5									
121.95	6264.4	122.16	6264.3	122.37	6264.2	122.58	6264.1	122.79	
6264									
122.99	6263.9	123.2	6263.8	123.41	6263.7	123.62	6263.6	123.83	
6263.5									
124.04	6263.4	124.25	6263.3	124.46	6263.2	124.67	6263.1	124.87	
6263									
125.08	6262.9	125.29	6262.8	125.5	6262.7	125.71	6262.6	125.92	
6262.5									
126.13	6262.4	126.34	6262.3	126.55	6262.2	126.76	6262.1	126.96	
6262									
127.17	6261.9	127.4	6261.8	127.63	6261.7	127.85	6261.6	128.08	
6261.5									
128.31	6261.4	128.54	6261.3	128.78	6261.2	129.01	6261.1	129.24	
6261									
129.48	6260.9	129.71	6260.8	129.94	6260.7	130.16	6260.6	130.37	
6260.5									

130.59	6260.4	130.8	6260.3	131.01	6260.2	131.23	6260.1	131.44	
6260									
131.66	6259.9	131.87	6259.8	132.08	6259.7	132.3	6259.6	132.51	
6259.5									
132.73	6259.4	132.94	6259.3	133.16	6259.2	133.37	6259.1	133.64	
6259									
133.92	6258.9	134.21	6258.8	134.49	6258.7	134.77	6258.6	135.06	
6258.5									
135.34	6258.4	135.62	6258.3	135.91	6258.2	136.17	6258.1	136.37	
6258									
136.57	6257.9	136.77	6257.8	136.97	6257.7	137.17	6257.6	137.37	
6257.5									
137.57	6257.4	137.77	6257.3	137.97	6257.2	138.17	6257.1	138.37	
6257									
138.57	6256.9	138.77	6256.8	138.97	6256.7	139.17	6256.6	139.37	
6256.5									
139.57	6256.4	139.77	6256.3	139.97	6256.2	140.17	6256.1	140.37	
6256									
140.57	6255.9	140.77	6255.8	140.97	6255.7	141.17	6255.6	141.37	
6255.5									
141.57	6255.4	141.77	6255.3	141.97	6255.2	142.17	6255.1	142.37	
6255									
142.57	6254.9	142.77	6254.8	142.97	6254.7	143.17	6254.6	143.37	
6254.5									
143.57	6254.4	143.77	6254.3	143.97	6254.2	144.17	6254.1	144.37	
6254									
144.57	6253.9	144.77	6253.8	144.97	6253.7	145.17	6253.6	145.37	
6254.1									
145.84	6254.3	145.86	6254.6	145.87	6254.7	147.42	6254.7	147.43	
6254.6									
147.45	6254.3	147.46	6254.1	147.48	6253.8	149.15	6253.8	149.17	
6254.1									
149.18	6254.3	149.2	6254.6	149.21	6254.7	150.76	6254.7	150.77	
6254.6									
150.79	6254.3	150.8	6254.1	150.82	6253.8	152.49	6253.8	152.51	
6254.1									
152.52	6254.3	152.54	6254.6	152.55	6254.7	154.1	6254.7	154.11	
6254.6									
154.13	6254.3	154.14	6254.1	154.16	6253.8	155.03	6253.7	155.23	
6253.8									
155.43	6253.9	155.63	6254	155.83	6254.1	156.03	6254.2	156.23	
6254.3									
156.43	6254.4	156.63	6254.5	156.83	6254.6	157.03	6254.7	157.23	
6254.8									
157.43	6254.9	157.63	6255	157.83	6255.1	158.03	6255.2	158.23	
6255.3									
158.43	6255.4	158.63	6255.5	158.83	6255.6	159.03	6255.7	159.23	
6255.8									
159.43	6255.9	159.63	6256	159.83	6256.1	160.03	6256.2	160.23	
6256.3									
160.43	6256.4	160.63	6256.5	160.83	6256.6	161.03	6256.7	161.23	
6256.8									
161.43	6256.9	161.63	6257	161.83	6257.1	162.03	6257.2	162.23	



257.3												
162.43	6257.4	162.66	6257.5	162.9	6257.6	163.14	6257.7	163.38				
6257.8												
163.61	6257.9	163.85	6258	164.09	6258.1	164.34	6258.2	164.63				
6258.3												
164.93	6258.4	165.23	6258.5	165.53	6258.6	165.83	6258.7	166.13				
6258.8												
166.43	6258.9	166.73	6259	167.03	6259.1	167.33	6259.2	167.63				
6259.3												
167.93	6259.4	168.23	6259.5	168.53	6259.6	168.82	6259.7	169.12				
6259.8												
169.42	6259.9	169.72	6260	170.02	6260.1	170.32	6260.2	170.62				
6260.3												
170.92	6260.4	171.22	6260.5	171.52	6260.6	171.82	6260.7	172.12				
6260.8												
172.42	6260.9	172.71	6261	173.01	6261.1	173.31	6261.2	173.61				
6261.3												
173.91	6261.4	174.21	6261.5	174.65	6261.6	179.62	6261.7	184.62				
6261.8												
189.66	6261.9	191.12	6261.9	193.08	6261.8	193.46	6261.8	194.8				
6261.9												
196.15	6262	197.49	6262.1	198.84	6262.2	200.18	6262.3	201.53				
6262.4												
202.87	6262.5	204.22	6262.6	205.6	6262.7	207.6	6262.8	209.61				
6262.9												
211.61	6263	213.61	6263.1	215.62	6263.2	217.62	6263.3	219.63				
6263.4												
221.63	6263.5	223.63	6263.6	225.64	6263.7	227.64	6263.8	230.14				
6263.9												
233.69	6264	237.25	6264.1	240.8	6264.2	244.35	6264.3	247.9				
6264.4												
251.46	6264.5	259.74	6264.5	260.62	6264.4	265.71	6264.3	278.7				
6264.2												
279.71	6264.1	280.73	6264	281.79	6263.9	282.89	6263.8	283.98				
6263.7												
284.71	6263.7	286.37	6263.8	287.98	6263.9	289.53	6264	291				
6264.1												
292.43	6264.2	293.78	6264.3	295.1	6264.4	296.32	6264.5	297.52				
6264.6												
298.61	6264.7	299.69	6264.8	300	6264.8							
Manning's n Values												
			num=	3								
Sta	n Val	Sta	n Val	Sta	n Val							
0	.03	127.17	.013	173.01	.03							
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.												
Expan.	127.17	173.01		6.48	6.48	6.48		.1				
.3												
Ineffective Flow			num=	1								
Sta L	Sta R	Elev	Permanent									
260.39	300	6264.57	F									
Left Levee			Station=	97.89	Elevation= 6268.05							

Right Levee	Station=	251.6	Elevation=	6264.48
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)	6260.59	Element	Left OB	
Channel Right OB				
Vel Head (ft)	1.16	Wt. n-Val.		
0.013				
W.S. Elev (ft)	6259.44	Reach Len. (ft)	6.48	
6.48	6.48			
Crit W.S. (ft)	6258.94	Flow Area (sq ft)		
120.18				
E.G. Slope (ft/ft)	0.001447	Area (sq ft)		
120.18				
Q Total (cfs)	1037.00	Flow (cfs)		
1037.00				
Top Width (ft)	35.39	Top Width (ft)		
35.39				
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)		
8.63				
Max Chl Dpth (ft)	5.74	Hydr. Depth (ft)		
3.40				
Conv. Total (cfs)	27263.1	Conv. (cfs)		
27263.1				
Length Wtd. (ft)	6.48	Wetted Per. (ft)		
42.98				
Min Ch El (ft)	6253.70	Shear (lb/sq ft)		
0.25				
Alpha	1.00	Stream Power (lb/ft s)	300.00	
97.89	251.60			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	
1.07				
C & E Loss (ft)	0.15	Cum SA (acres)	0.00	
0.32				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 985

INPUT











115.69 6267.2 115.88 6267.1 116.07 6267 116.26 6266.9 116.45  
6266.8  
116.63 6266.7 116.86 6266.6 117.11 6266.5 117.32 6266.4 117.53  
6266.3  
117.75 6266.2 117.96 6266.1 118.17 6266 118.38 6265.9 118.6  
6265.8  
118.81 6265.7 119.02 6265.6 119.23 6265.5 119.45 6265.4 119.66  
6265.3  
119.87 6265.2 120.08 6265.1 120.3 6265 120.51 6264.9 120.72  
6264.8  
120.93 6264.7 121.15 6264.6 121.36 6264.5 121.57 6264.4 121.78  
6264.3  
122 6264.2 122.21 6264.1 122.42 6264 122.63 6263.9 122.85  
6263.8  
123.06 6263.7 123.27 6263.6 123.48 6263.5 123.67 6263.4 123.87  
6263.3  
124.07 6263.2 124.27 6263.1 124.46 6263 124.66 6262.9 124.86  
6262.8  
125.06 6262.7 125.25 6262.6 125.45 6262.5 125.65 6262.4 125.85  
6262.3  
126.04 6262.2 126.24 6262.1 126.44 6262 126.64 6261.9 126.83  
6261.8  
127.03 6261.7 127.23 6261.6 127.43 6261.5 127.62 6261.4 127.82  
6261.3  
128.02 6261.2 128.22 6261.1 128.41 6261 128.61 6260.9 128.81  
6260.8  
129.02 6260.7 129.24 6260.6 129.46 6260.5 129.68 6260.4 129.9  
6260.3  
130.11 6260.2 130.33 6260.1 130.55 6260 130.77 6259.9 130.99  
6259.8  
131.21 6259.7 131.43 6259.6 131.64 6259.5 131.86 6259.4 132.08  
6259.3  
132.3 6259.2 132.52 6259.1 132.74 6259 132.96 6258.9 133.17  
6258.8  
133.39 6258.7 133.61 6258.6 133.83 6258.5 134.05 6258.4 134.27  
6258.3  
134.49 6258.2 134.7 6258.1 134.92 6258 135.14 6257.9 135.36  
6257.8  
135.58 6257.7 135.8 6257.6 136.01 6257.5 136.19 6257.4 136.37  
6257.3  
136.55 6257.2 136.72 6257.1 136.9 6257 137.08 6256.9 137.27  
6256.8  
137.47 6256.7 137.67 6256.6 137.87 6256.5 138.07 6256.4 138.27  
6256.3  
138.47 6256.2 138.67 6256.1 138.87 6256 139.07 6255.9 139.27  
6255.8  
139.47 6255.7 139.67 6255.6 139.87 6255.5 140.07 6255.4 140.27  
6255.3  
140.47 6255.2 140.67 6255.1 140.87 6255 141.07 6254.9 141.27  
6254.8  
141.47 6254.7 141.67 6254.6 141.87 6254.5 142.07 6254.4 142.27  
6254.3  
142.47 6254.2 142.67 6254.1 142.87 6254 143.07 6253.9 143.27

6253.8  
143.47 6253.7 143.67 6253.6 143.87 6253.5 144.07 6253.4 144.27  
6253.3  
144.47 6253.2 144.67 6253.1 144.87 6253 145.8 6253.2 145.82  
6253.7  
145.84 6254.2 145.86 6254.7 145.88 6255.2 145.89 6255.4 147.37  
6255.4  
147.39 6255.2 147.41 6254.7 147.43 6254.2 147.45 6253.7 147.47  
6253.2  
149.14 6253.2 149.16 6253.7 149.18 6254.2 149.2 6254.7 149.22  
6255.2  
149.23 6255.4 150.71 6255.4 150.73 6255.2 150.75 6254.7 150.77  
6254.2  
150.79 6253.7 150.81 6253.2 152.49 6253.2 152.51 6253.7 152.53  
6254.2  
152.55 6254.7 152.57 6255.2 152.58 6255.4 154.07 6255.4 154.08  
6255.2  
154.1 6254.7 154.12 6254.2 154.14 6253.7 154.16 6253.2 155.12  
6253  
155.33 6253.1 155.53 6253.2 155.73 6253.3 155.93 6253.4 156.13  
6253.5  
156.33 6253.6 156.53 6253.7 156.73 6253.8 156.93 6253.9 157.13  
6254  
157.33 6254.1 157.53 6254.2 157.73 6254.3 157.93 6254.4 158.13  
6254.5  
158.33 6254.6 158.53 6254.7 158.73 6254.8 158.93 6254.9 159.13  
6255  
159.33 6255.1 159.53 6255.2 159.73 6255.3 159.93 6255.4 160.13  
6255.5  
160.33 6255.6 160.53 6255.7 160.73 6255.8 160.93 6255.9 161.13  
6256  
161.33 6256.1 161.53 6256.2 161.73 6256.3 161.93 6256.4 162.13  
6256.5  
162.33 6256.6 162.53 6256.7 162.73 6256.8 162.93 6256.9 163.13  
6257  
163.33 6257.1 163.53 6257.2 163.73 6257.3 163.93 6257.4 164.2  
6257.5  
164.51 6257.6 164.81 6257.7 165.11 6257.8 165.42 6257.9 165.72  
6258  
166.02 6258.1 166.32 6258.2 166.63 6258.3 166.93 6258.4 167.23  
6258.5  
167.54 6258.6 167.84 6258.7 168.14 6258.8 168.45 6258.9 168.75  
6259  
169.05 6259.1 169.35 6259.2 169.66 6259.3 169.96 6259.4 170.26  
6259.5  
170.57 6259.6 170.87 6259.7 171.17 6259.8 171.48 6259.9 171.78  
6260  
172.08 6260.1 172.38 6260.2 172.69 6260.3 172.99 6260.4 173.29  
6260.5  
173.6 6260.6 173.9 6260.7 174.2 6260.8 174.59 6260.9 179.41  
6261  
184.08 6261.1 188.49 6261.2 193.72 6261.2 194.42 6261.1 195.13  
6261



195.84	6260.9	196.55	6260.8	197.26	6260.7	197.97	6260.6	198.68
6260.5								
199.39	6260.4	200.1	6260.3	200.81	6260.2	202.65	6260.1	203.51
6260.1								
204.86	6260.2	206.2	6260.3	207.55	6260.4	208.89	6260.5	210.24
6260.6								
211.58	6260.7	212.93	6260.8	214.27	6260.9	215.62	6261	216.96
6261.1								
218.31	6261.2	219.65	6261.3	221	6261.4	222.34	6261.5	223.69
6261.6								
225.03	6261.7	226.38	6261.8	227.72	6261.9	229.07	6262	230.42
6262.1								
231.76	6262.2	233.11	6262.3	234.45	6262.4	235.8	6262.5	237.14
6262.6								
238.49	6262.7	239.83	6262.8	241.18	6262.9	242.52	6263	243.87
6263.1								
245.21	6263.2	246.56	6263.3	248.36	6263.4	250.36	6263.5	252.37
6263.6								
255.91	6263.7	262.18	6263.7	263.06	6263.6	263.94	6263.5	268.88
6263.4								
269.9	6263.3	270.92	6263.2	271.93	6263.1	273.01	6263	274.1
6262.9								
275.2	6262.8	277.76	6262.8	279.42	6262.9	281.01	6263	282.56
6263.1								
284.09	6263.2	285.51	6263.3	286.94	6263.4	288.29	6263.5	289.6
6263.6								
290.89	6263.7	292.09	6263.8	293.28	6263.9	294.39	6264	295.47
6264.1								
296.5	6264.2	297.46	6264.3	298.41	6264.4	299.25	6264.5	300
6264.5								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	127.03	.013	172.99	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
127.03	172.99	10	10	10		.1

.3	Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent			
0	106.27	6267.94	F			
264.16	300	6263.55	F			
Left Levee	Station=	106.69	Elevation=	6268.09		
Right Levee	Station=	261.65	Elevation=	6263.74		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6260.41	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.78	Wt. n-Val.	
0.013			

W.S. Elev (ft)	6259.63	Reach Len. (ft)	10.00
10.00	10.00		
Crit W.S. (ft)	6258.48	Flow Area (sq ft)	
146.18			
E.G. Slope (ft/ft)	0.001045	Area (sq ft)	
146.18			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	39.29	Top Width (ft)	
39.29			
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)	
7.09			
Max Chl Dpth (ft)	6.63	Hydr. Depth (ft)	
3.72			
Conv. Total (cfs)	32086.6	Conv. (cfs)	
32086.6			
Length Wtd. (ft)	10.00	Wetted Per. (ft)	
54.93			
Min Ch El (ft)	6253.00	Shear (lb/sq ft)	
0.17			
Alpha	1.00	Stream Power (lb/ft s)	300.00
106.69	261.65		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
1.01			
C & E Loss (ft)	0.05	Cum SA (acres)	0.00
0.31			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 983

INPUT									
Description:									
Station	Elevation	Data	num=	366					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6269.5	38.52	6269.5	40.63	6269.4	42.74	6269.3	45.02	
6269.3									
45.56	6269.4	46.11	6269.5	46.65	6269.6	47.85	6269.6	49.17	
6269.5									
50.48	6269.4	51.8	6269.3	53.11	6269.2	54.43	6269.1	55.74	
6269									
57.42	6268.9	62.17	6268.8	66.92	6268.7	71.67	6268.6	76.42	



6268.5  
81.17 6268.4 87.35 6268.3 91.3 6268.2 92.52 6268.1 93.73  
6268  
94.95 6267.9 96.17 6267.8 97.38 6267.7 98.6 6267.6 99.81  
6267.5  
101.03 6267.4 103.23 6267.3 105.32 6267.3 105.84 6267.4 106.37  
6267.5  
106.9 6267.6 107.42 6267.7 107.95 6267.8 108.48 6267.9 109.01  
6268  
109.24 6268 109.94 6267.9 110.64 6267.8 112.57 6267.7 113.72  
6267.6  
114.05 6267.5 114.37 6267.4 114.69 6267.3 115.02 6267.2 115.34  
6267.1  
115.66 6267 115.99 6266.9 116.24 6266.8 116.44 6266.7 116.63  
6266.6  
116.83 6266.5 117.03 6266.4 117.23 6266.3 117.42 6266.2 117.62  
6266.1  
117.82 6266 118.02 6265.9 118.21 6265.8 118.41 6265.7 118.61  
6265.6  
118.81 6265.5 119 6265.4 119.2 6265.3 119.4 6265.2 119.6  
6265.1  
119.79 6265 119.99 6264.9 120.19 6264.8 120.39 6264.7 120.58  
6264.6  
120.78 6264.5 120.98 6264.4 121.18 6264.3 121.37 6264.2 121.57  
6264.1  
121.77 6264 121.97 6263.9 122.18 6263.8 122.4 6263.7 122.62  
6263.6  
122.84 6263.5 123.06 6263.4 123.28 6263.3 123.49 6263.2 123.71  
6263.1  
123.93 6263 124.15 6262.9 124.37 6262.8 124.59 6262.7 124.81  
6262.6  
125.02 6262.5 125.24 6262.4 125.46 6262.3 125.68 6262.2 125.9  
6262.1  
126.12 6262 126.34 6261.9 126.55 6261.8 126.77 6261.7 126.99  
6261.6  
127.21 6261.5 127.43 6261.4 127.65 6261.3 127.87 6261.2 128.08  
6261.1  
128.3 6261 128.52 6260.9 128.74 6260.8 128.96 6260.7 129.18  
6260.6  
129.4 6260.5 129.61 6260.4 129.83 6260.3 130.05 6260.2 130.27  
6260.1  
130.49 6260 130.71 6259.9 130.92 6259.8 131.14 6259.7 131.36  
6259.6  
131.58 6259.5 131.8 6259.4 132.02 6259.3 132.24 6259.2 132.45  
6259.1  
132.67 6259 132.89 6258.9 133.11 6258.8 133.33 6258.7 133.55  
6258.6  
133.77 6258.5 133.98 6258.4 134.2 6258.3 134.42 6258.2 134.64  
6258.1  
134.86 6258 135.08 6257.9 135.3 6257.8 135.51 6257.7 135.73  
6257.6  
135.95 6257.5 136.14 6257.4 136.32 6257.3 136.49 6257.2 136.67  
6257.1

136.85 6257 137.03 6256.9 137.2 6256.8 137.38 6256.7 137.56  
6256.6  
137.74 6256.5 137.91 6256.4 138.09 6256.3 138.27 6256.2 138.47  
6256.1  
138.67 6256 138.87 6255.9 139.07 6255.8 139.27 6255.7 139.47  
6255.6  
139.67 6255.5 139.87 6255.4 140.07 6255.3 140.27 6255.2 140.47  
6255.1  
140.67 6255 140.87 6254.9 141.07 6254.8 141.27 6254.7 141.47  
6254.6  
141.67 6254.5 141.87 6254.4 142.07 6254.3 142.27 6254.2 142.47  
6254.1  
142.67 6254 142.87 6253.9 143.07 6253.8 143.27 6253.7 143.47  
6253.6  
143.67 6253.5 143.87 6253.4 144.07 6253.3 144.27 6253.2 144.47  
6253.1  
144.68 6253 144.88 6252.9 155.11 6252.9 155.31 6253 155.52  
6253.1  
155.72 6253.2 155.92 6253.3 156.12 6253.4 156.32 6253.5 156.53  
6253.6  
156.73 6253.7 156.93 6253.8 157.13 6253.9 157.33 6254 157.53  
6254.1  
157.73 6254.2 157.93 6254.3 158.13 6254.4 158.33 6254.5 158.53  
6254.6  
158.73 6254.7 158.93 6254.8 159.13 6254.9 159.33 6255 159.53  
6255.1  
159.73 6255.2 159.93 6255.3 160.13 6255.4 160.33 6255.5 160.53  
6255.6  
160.73 6255.7 160.93 6255.8 161.13 6255.9 161.33 6256 161.53  
6256.1  
161.73 6256.2 161.93 6256.3 162.13 6256.4 162.33 6256.5 162.53  
6256.6  
162.73 6256.7 162.93 6256.8 163.13 6256.9 163.33 6257 163.53  
6257.1  
163.73 6257.2 163.93 6257.3 164.2 6257.4 164.51 6257.5 164.81  
6257.6  
165.11 6257.7 165.42 6257.8 165.72 6257.9 166.02 6258 166.32  
6258.1  
166.63 6258.2 166.93 6258.3 167.23 6258.4 167.54 6258.5 167.84  
6258.6  
168.14 6258.7 168.45 6258.8 168.75 6258.9 169.05 6259 169.35  
6259.1  
169.66 6259.2 169.96 6259.3 170.26 6259.4 170.57 6259.5 170.87  
6259.6  
171.17 6259.7 171.48 6259.8 171.78 6259.9 172.08 6260 172.38  
6260.1  
172.69 6260.2 172.99 6260.3 173.29 6260.4 173.6 6260.5 173.9  
6260.6  
174.2 6260.7 174.59 6260.8 179.41 6260.9 184.24 6261 189.15  
6261.1  
194.09 6261.2 194.1 6261.2 194.81 6261.1 195.52 6261 196.23  
6260.9  
196.94 6260.8 197.65 6260.7 198.35 6260.6 199.06 6260.5 199.77



6260.4  
200.48 6260.3 201.19 6260.2 201.9 6260.1 202.61 6260 203.32  
6259.9  
204.03 6259.8 204.74 6259.7 205.45 6259.6 206.41 6259.5 206.5  
6259.4  
206.6 6259.3 207.64 6259.2 209.05 6259.1 209.86 6259.1 211.22  
6259.2  
212.57 6259.3 213.93 6259.4 215.29 6259.5 216.65 6259.6 218.01  
6259.7  
219.37 6259.8 220.73 6259.9 222.09 6260 223.45 6260.1 224.81  
6260.2  
226.17 6260.3 227.52 6260.4 228.88 6260.5 230.24 6260.6 231.6  
6260.7  
232.96 6260.8 234.32 6260.9 235.68 6261 237.04 6261.1 238.4  
6261.2  
239.76 6261.3 241.11 6261.4 242.47 6261.5 243.83 6261.6 245.19  
6261.7  
246.55 6261.8 247.91 6261.9 249.27 6262 252.5 6262.1 258.88  
6262.2  
259.6 6262.3 262.03 6262.3 263.12 6262.2 264.32 6262.1 265.73  
6262  
267.14 6261.9 269.14 6261.9 270.89 6261.8 272.04 6261.8 272.96  
6261.9  
273.87 6262 274.78 6262.1 275.68 6262.2 276.48 6262.3 277.27  
6262.4  
278.07 6262.5 278.95 6262.6 280.46 6262.7 281.89 6262.8 283.32  
6262.9  
284.7 6263 286.01 6263.1 287.32 6263.2 288.56 6263.3 289.76  
6263.4  
290.95 6263.5 292.05 6263.6 293.13 6263.7 294.19 6263.8 295.15  
6263.9  
296.11 6264 297 6264.1 297.83 6264.2 298.66 6264.3 299.37  
6264.4  
300 6264.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 126.77 .013 172.99 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 126.77 172.99 20.18 20.18 20.18 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 106.69 6267.83 F  
194.64 300 6261.19 F  
Left Levee Station= 108.78 Elevation= 6267.98  
Right Levee Station= 194.22 Elevation= 6261.34  
  
CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6260.35 Element Left OB  
Channel Right OB  
Vel Head (ft) 0.60 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6259.75 Reach Len. (ft) 20.18  
20.18 20.18  
Crit W.S. (ft) 6257.91 Flow Area (sq ft)  
166.73  
E.G. Slope (ft/ft) 0.000491 Area (sq ft)  
166.73  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 40.29 Top Width (ft)  
40.29  
Vel Total (ft/s) 6.22 Avg. Vel. (ft/s)  
6.22  
Max Chl Dpth (ft) 6.85 Hydr. Depth (ft)  
4.14  
Conv. Total (cfs) 46798.2 Conv. (cfs)  
46798.2  
Length Wtd. (ft) 20.18 Wetted Per. (ft)  
43.33  
Min Ch El (ft) 6252.90 Shear (lb/sq ft)  
0.12  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
108.78 194.22  
Frctn Loss (ft) 0.02 Cum Volume (acre-ft) 0.01  
0.97  
C & E Loss (ft) 0.09 Cum SA (acres) 0.00  
0.30  
  
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.  
This may indicate the need for additional cross sections.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.  
  
CROSS SECTION  
  
RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 982  
  
INPUT  
Description:  
Station Elevation Data num= 384  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6269.7 13.22 6269.7 20.5 6269.6 38.81 6269.5 41.02



6269.5  
41.57 6269.6 42.11 6269.7 42.65 6269.8 43.2 6269.9 43.74  
6270  
44.28 6270.1 44.83 6270.2 45.37 6270.3 47.13 6270.3 48.44  
6270.2  
49.75 6270.1 51.07 6270 52.38 6269.9 53.7 6269.8 55.01  
6269.7  
56.33 6269.6 57.64 6269.5 58.96 6269.4 60.27 6269.3 61.59  
6269.2  
62.9 6269.1 64.22 6269 65.53 6268.9 66.84 6268.8 70.15  
6268.7  
74.91 6268.6 79.66 6268.5 85.83 6268.4 87.04 6268.3 88.26  
6268.2  
89.48 6268.1 90.69 6268 91.91 6267.9 93.12 6267.8 94.34  
6267.7  
95.55 6267.6 96.77 6267.5 97.99 6267.4 99.2 6267.3 100.42  
6267.2  
101.63 6267.1 104.2 6267 107.41 6267 107.94 6267.1 108.46  
6267.2  
108.99 6267.3 109.52 6267.4 110.05 6267.5 110.78 6267.5 111.59  
6267.4  
111.92 6267.3 112.24 6267.2 112.56 6267.1 112.89 6267 113.21  
6266.9  
113.53 6266.8 113.86 6266.7 114.18 6266.6 114.51 6266.5 114.83  
6266.4  
115.12 6266.3 115.39 6266.2 115.66 6266.1 115.93 6266 116.2  
6265.9  
116.47 6265.8 116.74 6265.7 117.01 6265.6 117.28 6265.5 117.54  
6265.4  
117.81 6265.3 118.08 6265.2 118.35 6265.1 118.62 6265 118.89  
6264.9  
119.16 6264.8 119.43 6264.7 119.7 6264.6 119.97 6264.5 120.24  
6264.4  
120.51 6264.3 120.78 6264.2 121.05 6264.1 121.31 6264 121.58  
6263.9  
121.85 6263.8 122.12 6263.7 122.39 6263.6 122.66 6263.5 122.93  
6263.4  
123.15 6263.3 123.37 6263.2 123.58 6263.1 123.8 6263 124.02  
6262.9  
124.24 6262.8 124.46 6262.7 124.68 6262.6 124.9 6262.5 125.11  
6262.4  
125.33 6262.3 125.55 6262.2 125.77 6262.1 125.99 6262 126.21  
6261.9  
126.43 6261.8 126.64 6261.7 126.86 6261.6 127.08 6261.5 127.3  
6261.4  
127.52 6261.3 127.74 6261.2 127.95 6261.1 128.17 6261 128.39  
6260.9  
128.61 6260.8 128.83 6260.7 129.05 6260.6 129.27 6260.5 129.48  
6260.4  
129.7 6260.3 129.92 6260.2 130.14 6260.1 130.36 6260 130.58  
6259.9  
130.8 6259.8 131.01 6259.7 131.23 6259.6 131.45 6259.5 131.67  
6259.4

131.89 6259.3 132.11 6259.2 132.33 6259.1 132.54 6259 132.76  
6258.9  
132.98 6258.8 133.2 6258.7 133.42 6258.6 133.64 6258.5 133.86  
6258.4  
134.07 6258.3 134.29 6258.2 134.51 6258.1 134.73 6258 134.95  
6257.9  
135.17 6257.8 135.39 6257.7 135.6 6257.6 135.82 6257.5 136.03  
6257.4  
136.21 6257.3 136.39 6257.2 136.57 6257.1 136.74 6257 136.92  
6256.9  
137.1 6256.8 137.28 6256.7 137.45 6256.6 137.63 6256.5 137.81  
6256.4  
137.99 6256.3 138.17 6256.2 138.34 6256.1 138.52 6256 138.7  
6255.9  
138.88 6255.8 139.05 6255.7 139.23 6255.6 139.41 6255.5 139.59  
6255.4  
139.76 6255.3 139.94 6255.2 140.12 6255.1 140.3 6255 140.48  
6254.9  
149.4 6254.8 149.42 6254.7 149.44 6254.2 149.46 6253.7 149.48  
6253.2  
149.5 6252.7 150 6252.75 150.5 6252.8 150.52 6253.2 150.54  
6253.7  
150.56 6254.2 150.58 6254.7 150.6 6254.8 159.53 6254.9 159.74  
6255  
159.94 6255.1 160.14 6255.2 160.34 6255.3 160.54 6255.4 160.74  
6255.5  
160.94 6255.6 161.14 6255.7 161.34 6255.8 161.54 6255.9 161.74  
6256  
161.94 6256.1 162.14 6256.2 162.34 6256.3 162.54 6256.4 162.74  
6256.5  
162.94 6256.6 163.14 6256.7 163.34 6256.8 163.54 6256.9 163.74  
6257  
163.94 6257.1 164.21 6257.2 164.51 6257.3 164.81 6257.4 165.12  
6257.5  
165.42 6257.6 165.72 6257.7 166.03 6257.8 166.33 6257.9 166.63  
6258  
166.94 6258.1 167.24 6258.2 167.54 6258.3 167.84 6258.4 168.15  
6258.5  
168.45 6258.6 168.75 6258.7 168.88 6258.74 169.06 6258.8 169.36  
6258.9  
169.66 6259 169.97 6259.1 170.27 6259.2 170.57 6259.3 170.88  
6259.4  
171.18 6259.5 171.48 6259.6 171.78 6259.7 172.09 6259.8 172.39  
6259.9  
172.69 6260 173 6260.1 173.3 6260.2 173.6 6260.3 173.91  
6260.4  
174.21 6260.5 174.68 6260.6 179.68 6260.7 184.68 6260.8 190.22  
6260.8  
190.96 6260.7 191.71 6260.6 192.45 6260.5 193.19 6260.4 193.94  
6260.3  
194.68 6260.2 195.43 6260.1 196.17 6260 196.91 6259.9 197.66  
6259.8  
198.4 6259.7 199.15 6259.6 199.89 6259.5 200.63 6259.4 201.38



6259.3											
202.12	6259.2	202.8	6259.1	203.46	6259	204.11	6258.9	204.76			
6258.8											
205.41	6258.7	206.06	6258.6	206.71	6258.5	207.8	6258.4	209.28			
6258.3											
210.76	6258.2	212.24	6258.1	213.71	6258	215.19	6257.9	216.66			
6257.8											
218.13	6257.7	219.59	6257.6	221.06	6257.5	222.52	6257.4	223.99			
6257.3											
225.45	6257.2	226.79	6257.1	228.19	6257	229.86	6256.9	231.89			
6256.8											
256.58	6256.8	256.59	6256.7	256.61	6256.2	256.63	6255.7	256.65			
6255.2											
256.67	6254.7	256.68	6254.6	256.87	6254.8	257.95	6256	258.18			
6254.7											
258.69	6255.9	259.93	6254.6	260.22	6254.5	260.59	6256.6	263.4			
6254.8											
263.41	6255.3	263.43	6255.8	263.45	6256.3	263.46	6256.8	263.48			
6257.3											
263.49	6257.8	265.58	6257.8	267.81	6257.9	268.6	6258	269.15			
6258.1											
269.67	6258.2	270.19	6258.3	270.71	6258.4	271.21	6258.5	271.71			
6258.6											
272.2	6258.7	272.7	6258.8	273.2	6258.9	273.69	6259	274.18			
6259.1											
274.66	6259.2	275.14	6259.3	275.62	6259.4	276.1	6259.5	276.59			
6259.6											
277.07	6259.7	277.55	6259.8	278.03	6259.9	278.52	6260	279			
6260.1											
279.48	6260.2	279.96	6260.3	280.44	6260.4	280.93	6260.5	281.42			
6260.6											
281.95	6260.7	282.49	6260.8	283.02	6260.9	283.56	6261	284.09			
6261.1											
284.62	6261.2	285.16	6261.3	285.69	6261.4	286.23	6261.5	286.76			
6261.6											
287.3	6261.7	287.83	6261.8	288.36	6261.9	288.9	6262	289.43			
6262.1											
289.97	6262.2	290.5	6262.3	291.04	6262.4	291.52	6262.5	291.91			
6262.6											
292.3	6262.7	292.7	6262.8	293.09	6262.9	293.48	6263	293.88			
6263.1											
294.27	6263.2	294.66	6263.3	295.05	6263.4	295.45	6263.5	295.84			
6263.6											
296.23	6263.7	296.62	6263.8	297.22	6263.9	297.86	6264	298.44			
6264.1											
299.01	6264.2	299.49	6264.3	299.92	6264.4	300	6264.4				
Manning's n Values num= 3											
Sta	n Val	Sta	n Val	Sta	n Val						
0	.03	134.73	.013	168.88	.03						
Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.						
Expan.											

134.73	168.88	2.95	2.95	2.95	.1
.3					
Ineffective Flow	num=	2			
Sta L	Sta R	Elev	Permanent		
0	110.04	6267.43	F		
190.45	300	6260.73	F		
Left Levee	Station=	110.04	Elevation=	6267.48	
Right Levee	Station=	190.03	Elevation=	6260.89	

CROSS SECTION OUTPUT Profile #Flow 1			
E.G. Elev (ft)	6260.24	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.52	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6258.72	Reach Len. (ft)	2.95
2.95 2.95			
Crit W.S. (ft)	6258.72	Flow Area (sq ft)	0.56
104.59			
E.G. Slope (ft/ft)	0.002055	Area (sq ft)	0.56
104.59			
Q Total (cfs)	1037.00	Flow (cfs)	0.60
1036.40			
Top Width (ft)	35.64	Top Width (ft)	1.57
34.07			
Vel Total (ft/s)	9.86	Avg. Vel. (ft/s)	1.06
9.91			
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)	0.36
3.07			
Conv. Total (cfs)	22874.2	Conv. (cfs)	13.2
22861.1			
Length Wtd. (ft)	2.95	Wetted Per. (ft)	1.72
39.55			
Min Ch El (ft)	6252.70	Shear (lb/sq ft)	0.04
0.34			
Alpha	1.01	Stream Power (lb/ft s)	300.00
110.04 190.03			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.91			
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.28			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.



CROSS SECTION

INPUT	Description:								
Station	Elevation	Data	num=	442					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev	0	6269.9	2.58	6269.9	13.86	6269.8	20.62	6269.7	26.7
6269.6	38.85	6269.5	40.28	6269.5	40.82	6269.6	41.37	6269.7	41.91
6269.8	42.45	6269.9	43	6270	43.54	6270.1	44.08	6270.2	44.63
6270.3	45.17	6270.4	45.71	6270.5	45.73	6270.5	47.05	6270.4	48.36
6270.3	49.68	6270.2	50.99	6270.1	52.31	6270	53.62	6269.9	54.94
6269.8	56.25	6269.7	57.56	6269.6	58.88	6269.5	60.19	6269.4	61.51
6269.3	62.82	6269.2	64.14	6269.1	65.45	6269	66.77	6268.9	68.08
6268.8	70.63	6268.7	75.38	6268.6	80.13	6268.5	85.38	6268.4	86.6
6268.3	87.82	6268.2	89.03	6268.1	90.25	6268	91.46	6267.9	92.68
6267.8	93.89	6267.7	95.11	6267.6	96.33	6267.5	97.54	6267.4	98.76
6267.3	99.97	6267.2	101.19	6267.1	102.53	6267	106.68	6266.9	107.42
6266.9	107.95	6267	108.47	6267.1	109	6267.2	109.53	6267.3	110.06
6267.4	110.56	6267.4	111.35	6267.3	111.69	6267.2	112.02	6267.1	112.34
6267	112.66	6266.9	112.99	6266.8	113.31	6266.7	113.64	6266.6	113.96
6266.5	114.28	6266.4	114.61	6266.3	114.91	6266.2	115.18	6266.1	115.45
6266	115.72	6265.9	115.98	6265.8	116.25	6265.7	116.52	6265.6	116.79
6265.5	117.06	6265.4	117.33	6265.3	117.6	6265.2	117.87	6265.1	118.14
6265	118.41	6264.9	118.68	6264.8	118.95	6264.7	119.22	6264.6	119.48
6264.5	119.75	6264.4	120.02	6264.3	120.29	6264.2	120.56	6264.1	120.83
6264	121.1	6263.9	121.37	6263.8	121.64	6263.7	121.91	6263.6	122.18

6263.5								
122.45	6263.4	122.72	6263.3	122.99	6263.2	123.25	6263.1	123.52
6263								
123.79	6262.9	124.06	6262.8	124.33	6262.7	124.6	6262.6	124.87
6262.5								
125.09	6262.4	125.31	6262.3	125.53	6262.2	125.75	6262.1	125.97
6262								
126.19	6261.9	126.41	6261.8	126.62	6261.7	126.84	6261.6	127.06
6261.5								
127.28	6261.4	127.5	6261.3	127.72	6261.2	127.94	6261.1	128.15
6261								
128.37	6260.9	128.59	6260.8	128.81	6260.7	129.03	6260.6	129.25
6260.5								
129.47	6260.4	129.68	6260.3	129.9	6260.2	130.12	6260.1	130.34
6260								
130.56	6259.9	130.78	6259.8	131	6259.7	131.21	6259.6	131.43
6259.5								
131.65	6259.4	131.87	6259.3	132.09	6259.2	132.31	6259.1	132.53
6259								
132.74	6258.9	132.96	6258.8	133.18	6258.7	133.4	6258.6	133.62
6258.5								
133.84	6258.4	134.06	6258.3	134.27	6258.2	134.49	6258.1	134.71
6258								
134.93	6257.9	135.15	6257.8	135.37	6257.7	135.58	6257.6	135.8
6257.5								
136.02	6257.4	136.2	6257.3	136.37	6257.2	136.55	6257.1	136.73
6257								
136.91	6256.9	137.08	6256.8	137.26	6256.7	137.44	6256.6	137.62
6256.5								
137.79	6256.4	137.97	6256.3	138.15	6256.2	138.33	6256.1	138.51
6256								
138.68	6255.9	138.86	6255.8	139.04	6255.7	139.22	6255.6	139.39
6255.5								
139.57	6255.4	139.75	6255.3	139.93	6255.2	140.12	6255.1	140.31
6255								
140.5	6254.9	140.7	6254.8	140.89	6254.7	141.08	6254.6	141.27
6254.5								
141.46	6254.4	141.65	6254.3	141.84	6254.2	142.03	6254.1	142.22
6254								
142.41	6253.9	142.6	6253.8	142.79	6253.7	142.98	6253.6	143.17
6253.5								
143.36	6253.4	143.56	6253.3	143.75	6253.2	143.93	6253.1	144.11
6253								
144.29	6252.9	144.47	6252.8	144.65	6252.7	144.82	6252.6	155.19
6252.6								
155.39	6252.7	155.58	6252.8	155.78	6252.9	155.98	6253	156.17
6253.1								
156.36	6253.2	156.55	6253.3	156.74	6253.4	156.93	6253.5	157.12
6253.6								
157.32	6253.7	157.51	6253.8	157.7	6253.9	157.89	6254	158.08
6254.1								
158.27	6254.2	158.46	6254.3	158.65	6254.4	158.84	6254.5	159.03
6254.6								



159.22	6254.7	159.41	6254.8	159.6	6254.9	159.79	6255	159.98
6255.1								
160.19	6255.2	160.4	6255.3	160.6	6255.4	160.8	6255.5	161
6255.6								
161.2	6255.7	161.4	6255.8	161.6	6255.9	161.8	6256	162
6256.1								
162.2	6256.2	162.4	6256.3	162.6	6256.4	162.8	6256.5	163
6256.6								
163.2	6256.7	163.4	6256.8	163.6	6256.9	163.8	6257	164
6257.1								
164.3	6257.2	164.6	6257.3	164.9	6257.4	165.21	6257.5	165.51
6257.6								
165.81	6257.7	166.12	6257.8	166.42	6257.9	166.72	6258	167.02
6258.1								
167.33	6258.2	167.63	6258.3	167.93	6258.4	168.24	6258.5	168.54
6258.6								
168.84	6258.7	169.05	6258.77	169.15	6258.8	169.45	6258.9	169.75
6259								
170.06	6259.1	170.36	6259.2	170.66	6259.3	170.96	6259.4	171.27
6259.5								
171.57	6259.6	171.87	6259.7	172.18	6259.8	172.48	6259.9	172.78
6260								
173.09	6260.1	173.39	6260.2	173.69	6260.3	173.99	6260.4	174.3
6260.5								
176.15	6260.6	181.15	6260.7	186.15	6260.8	190	6260.8	190.74
6260.7								
191.49	6260.6	192.23	6260.5	192.97	6260.4	193.72	6260.3	194.46
6260.2								
195.21	6260.1	195.95	6260	196.69	6259.9	197.44	6259.8	198.18
6259.7								
198.93	6259.6	199.67	6259.5	200.42	6259.4	201.16	6259.3	201.9
6259.2								
202.65	6259.1	203.39	6259	204.14	6258.9	204.88	6258.8	205.62
6258.7								
206.37	6258.6	207.11	6258.5	207.86	6258.4	208.51	6258.3	209.16
6258.2								
210.14	6258.1	211.62	6258	213.09	6257.9	214.56	6257.8	216.02
6257.7								
217.49	6257.6	218.95	6257.5	220.42	6257.4	221.88	6257.3	223.35
6257.2								
224.81	6257.1	226.27	6257	227.74	6256.9	229.06	6256.8	230.37
6256.7								
231.85	6256.6	233.51	6256.5	235.37	6256.4	237.83	6256.6	241.9
6256.5								
245.02	6256.4	251.83	6256.3	252.65	6256.2	252.76	6256.2	253.34
6256.1								
254.03	6256	255.3	6255.9	255.32	6255.8	255.33	6255.6	255.35
6255.3								
255.36	6255.1	255.39	6254.8	255.4	6254.6	257.21	6254.9	258.32
6256.1								
258.58	6254.4	260.53	6254.4	260.82	6255.8	262.19	6256.4	264.14
6254.6								
264.15	6254.9	264.16	6255.2	264.18	6255.7	264.2	6256.2	264.22

6256.7								
264.23	6256.9	265.25	6257	265.77	6257.1	266.31	6257.2	266.84
6257.3								
267.38	6257.4	267.91	6257.5	268.45	6257.6	268.98	6257.7	269.51
6257.8								
270.05	6257.9	270.58	6258	271.12	6258.1	271.65	6258.2	272.19
6258.3								
272.72	6258.4	273.26	6258.5	273.79	6258.6	274.32	6258.7	274.86
6258.8								
275.39	6258.9	275.93	6259	276.46	6259.1	277	6259.2	277.53
6259.3								
278.07	6259.4	278.6	6259.5	279.13	6259.6	279.67	6259.7	280.2
6259.8								
280.74	6259.9	281.27	6260	281.81	6260.1	282.34	6260.2	282.88
6260.3								
283.41	6260.4	283.94	6260.5	284.48	6260.6	285.01	6260.7	285.5
6260.8								
285.89	6260.9	286.28	6261	286.68	6261.1	287.07	6261.2	287.46
6261.3								
287.85	6261.4	288.25	6261.5	288.64	6261.6	289.03	6261.7	289.42
6261.8								
289.82	6261.9	290.21	6262	290.6	6262.1	291	6262.2	291.39
6262.3								
291.78	6262.4	292.17	6262.5	292.57	6262.6	292.96	6262.7	293.35
6262.8								
293.73	6262.9	294.11	6263	294.49	6263.1	294.87	6263.2	295.25
6263.3								
295.63	6263.4	296.01	6263.5	296.39	6263.6	296.77	6263.7	297.15
6263.8								
297.53	6263.9	297.95	6264	298.53	6264.1	299.03	6264.2	299.47
6264.3								
299.9	6264.4	300	6264.4					
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	134.71	.013	169.05	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	134.71	169.05	19.23	19.23	19.23			.1
.3								
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
0	108.36	6267.27	F					
190.03	300	6260.77	F					
Left Levee	Station=	112.13	Elevation=	6267.08				
Right Levee	Station=	188.77	Elevation=	6260.98				
CROSS SECTION OUTPUT Profile #Flow 1								
E.G. Elev (ft) 6259.29 Element Left OB								
Channel	Right OB							



Vel Head (ft)	1.65	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6257.64	Reach Len. (ft)	19.23
19.23	19.23		
Crit W.S. (ft)	6257.64	Flow Area (sq ft)	
100.46			
E.G. Slope (ft/ft)	0.001815	Area (sq ft)	
100.46			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	30.11	Top Width (ft)	
30.11			
Vel Total (ft/s)	10.32	Avg. Vel. (ft/s)	
10.32			
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)	
3.34			
Conv. Total (cfs)	24340.3	Conv. (cfs)	
24340.3			
Length Wtd. (ft)	19.23	Wetted Per. (ft)	
32.55			
Min Ch El (ft)	6252.60	Shear (lb/sq ft)	
0.35			
Alpha	1.00	Stream Power (lb/ft s)	300.00
112.13	188.77		
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01
0.90			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.28			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 980

INPUT  
 Description:  
 Station Elevation Data num= 469  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								

0	6270.7	.15	6270.7	6.35	6270.6	10.35	6270.5	13.74
6270.4								
17.03	6270.3	20.31	6270.2	23.59	6270.1	26.79	6270	29.94
6269.9								
33.08	6269.8	39.05	6269.8	40.29	6269.9	40.63	6270	40.91
6270.1								
41.08	6270.2	41.26	6270.3	41.43	6270.4	41.6	6270.5	41.78
6270.6								
41.95	6270.7	42.5	6270.8	43.04	6270.9	43.58	6271	44.13
6271.1								
45.92	6271.1	47.24	6271	48.55	6270.9	49.87	6270.8	51.18
6270.7								
52.5	6270.6	53.81	6270.5	55.13	6270.4	56.44	6270.3	57.76
6270.2								
59.07	6270.1	60.38	6270	61.7	6269.9	63.01	6269.8	64.33
6269.7								
65.64	6269.6	66.96	6269.5	68.27	6269.4	69.59	6269.3	70.9
6269.2								
72.22	6269.1	73.53	6269	74.85	6268.9	76.16	6268.8	77.48
6268.7								
78.79	6268.6	81.27	6268.5	82.48	6268.4	83.7	6268.3	84.92
6268.2								
86.13	6268.1	87.35	6268	88.56	6267.9	89.78	6267.8	90.99
6267.7								
92.21	6267.6	93.43	6267.5	94.64	6267.4	95.86	6267.3	97.07
6267.2								
98.29	6267.1	99.5	6267	100.72	6266.9	101.94	6266.8	104.03
6266.7								
108.19	6266.6	109.78	6266.6	110.25	6266.5	110.7	6266.4	110.89
6266.3								
111.09	6266.2	111.28	6266.1	111.47	6266	111.67	6265.9	111.86
6265.8								
112.05	6265.7	112.25	6265.6	112.44	6265.5	112.63	6265.4	112.83
6265.3								
113.02	6265.2	113.22	6265.1	113.41	6265	113.6	6264.9	113.85
6264.8								
114.15	6264.7	114.45	6264.6	114.75	6264.5	115.05	6264.4	115.35
6264.3								
115.64	6264.2	115.94	6264.1	116.24	6264	116.54	6263.9	116.84
6263.8								
117.14	6263.7	117.44	6263.6	117.73	6263.5	118.03	6263.4	118.33
6263.3								
118.63	6263.2	118.93	6263.1	119.23	6263	119.53	6262.9	119.82
6262.8								
120.12	6262.7	120.42	6262.6	120.72	6262.5	121.02	6262.4	121.32
6262.3								
121.62	6262.2	121.91	6262.1	122.21	6262	122.51	6261.9	122.81
6261.8								
123.11	6261.7	123.41	6261.6	123.71	6261.5	124	6261.4	124.3
6261.3								
124.6	6261.2	124.9	6261.1	125.2	6261	125.5	6260.9	125.8
6260.8								
126.09	6260.7	126.39	6260.6	126.69	6260.5	126.99	6260.4	127.29



6260.3								
127.59	6260.2	127.89	6260.1	128.18	6260	128.48	6259.9	128.78
6259.8								
129.08	6259.7	129.38	6259.6	129.68	6259.5	129.98	6259.4	130.27
6259.3								
130.57	6259.2	130.87	6259.1	131.16	6259	131.46	6258.9	131.75
6258.8								
132.04	6258.7	132.34	6258.6	132.63	6258.5	132.93	6258.4	133.22
6258.3								
133.51	6258.2	133.81	6258.1	134.1	6258	134.39	6257.9	134.69
6257.8								
134.98	6257.7	135.28	6257.6	135.57	6257.5	135.86	6257.4	136.1
6257.3								
136.27	6257.2	136.45	6257.1	136.63	6257	136.81	6256.9	136.99
6256.8								
137.17	6256.7	137.34	6256.6	137.52	6256.5	137.7	6256.4	137.88
6256.3								
138.06	6256.2	138.24	6256.1	138.41	6256	138.59	6255.9	138.77
6255.8								
138.95	6255.7	139.13	6255.6	139.3	6255.5	139.48	6255.4	139.66
6255.3								
139.84	6255.2	140.02	6255.1	140.2	6255	140.37	6254.9	140.55
6254.8								
140.73	6254.7	140.91	6254.6	141.09	6254.5	141.27	6254.4	141.44
6254.3								
141.62	6254.2	141.8	6254.1	141.98	6254	142.16	6253.9	142.34
6253.8								
142.51	6253.7	142.69	6253.6	142.87	6253.5	143.05	6253.4	143.23
6253.3								
143.41	6253.2	143.58	6253.1	143.76	6253	143.94	6252.9	144.12
6252.8								
144.3	6252.7	144.48	6252.6	144.66	6252.5	144.84	6252.4	155.18
6252.4								
155.37	6252.5	155.57	6252.6	155.76	6252.7	155.96	6252.8	156.16
6252.9								
156.35	6253	156.55	6253.1	156.75	6253.2	156.95	6253.3	157.15
6253.4								
157.35	6253.5	157.55	6253.6	157.75	6253.7	157.95	6253.8	158.15
6253.9								
158.35	6254	158.55	6254.1	158.75	6254.2	158.95	6254.3	159.15
6254.4								
159.35	6254.5	159.55	6254.6	159.75	6254.7	159.95	6254.8	160.15
6254.9								
160.35	6255	160.55	6255.1	160.75	6255.2	160.95	6255.3	161.15
6255.4								
161.35	6255.5	161.55	6255.6	161.75	6255.7	161.95	6255.8	162.15
6255.9								
162.35	6256	162.55	6256.1	162.75	6256.2	162.95	6256.3	163.15
6256.4								
163.35	6256.5	163.55	6256.6	163.75	6256.7	163.95	6256.8	164.22
6256.9								
164.52	6257	164.82	6257.1	165.11	6257.2	165.41	6257.3	165.71
6257.4								

166.01	6257.5	166.31	6257.6	166.61	6257.7	166.91	6257.8	167.21
6257.9								
167.51	6258	167.81	6258.1	168.1	6258.2	168.4	6258.3	168.7
6258.4								
169	6258.5	169.3	6258.6	169.6	6258.7	169.89	6258.8	170.19
6258.9								
170.49	6259	170.79	6259.1	171.08	6259.2	171.38	6259.3	171.68
6259.4								
171.91	6259.48	171.97	6259.5	172.27	6259.6	172.57	6259.7	172.87
6259.8								
173.16	6259.9	173.46	6260	173.76	6260.1	174.05	6260.2	174.35
6260.3								
177.03	6260.4	182.12	6260.5	187.24	6260.6	189.81	6260.6	190.51
6260.5								
191.22	6260.4	192.01	6260.3	192.8	6260.2	193.58	6260.1	194.37
6260								
195.16	6259.9	195.95	6259.8	196.74	6259.7	197.53	6259.6	198.32
6259.5								
199.11	6259.4	199.9	6259.3	200.69	6259.2	201.48	6259.1	202.27
6259								
203.06	6258.9	203.85	6258.8	204.64	6258.7	205.43	6258.6	206.22
6258.5								
207	6258.4	207.79	6258.3	208.58	6258.2	209.37	6258.1	210.16
6258								
210.95	6257.9	211.74	6257.8	212.53	6257.7	213.32	6257.6	214.11
6257.5								
214.9	6257.4	215.69	6257.3	216.48	6257.2	217.27	6257.1	218.06
6257								
218.85	6256.9	219.64	6256.8	220.43	6256.7	221.21	6256.6	222
6256.5								
222.79	6256.4	223.58	6256.3	224.42	6256.2	225.15	6256.1	225.88
6256								
227.21	6255.9	228.75	6255.8	230.3	6255.7	231.84	6255.6	233.39
6255.5								
234.93	6255.4	237.54	6255.3	240.24	6255.2	241.99	6255.1	243.73
6255								
245.48	6254.9	247.23	6254.8	248.98	6254.7	249.84	6254.6	249.95
6254.5								
250.06	6254.4	250.17	6254.3	250.28	6254.2	252.54	6254.2	252.65
6254.3								
252.76	6254.4	252.87	6254.5	252.98	6254.6	253.27	6254.7	254.92
6254.8								
257.2	6254.9	259.47	6255	261.75	6255.1	263.39	6255.2	264.64
6255.3								
265.88	6255.4	267.12	6255.5	267.66	6255.6	268.02	6255.7	268.37
6255.8								
268.73	6255.9	269.08	6256	269.44	6256.1	269.79	6256.2	270.15
6256.3								
270.5	6256.4	270.86	6256.5	271.21	6256.6	271.57	6256.7	271.92
6256.8								
272.28	6256.9	272.63	6257	272.99	6257.1	273.34	6257.2	273.69
6257.3								
274.05	6257.4	274.4	6257.5	274.76	6257.6	275.11	6257.7	275.47



6257.8								
275.82	6257.9	276.18	6258	276.53	6258.1	276.89	6258.2	277.24
6258.3								
277.6	6258.4	277.95	6258.5	278.31	6258.6	278.66	6258.7	279.02
6258.8								
279.37	6258.9	279.72	6259	280.08	6259.1	280.43	6259.2	280.79
6259.3								
281.14	6259.4	281.5	6259.5	281.85	6259.6	282.21	6259.7	282.56
6259.8								
282.92	6259.9	283.27	6260	283.63	6260.1	283.98	6260.2	284.34
6260.3								
284.69	6260.4	285.05	6260.5	285.4	6260.6	285.76	6260.7	286.11
6260.8								
286.46	6260.9	286.82	6261	287.17	6261.1	287.53	6261.2	287.88
6261.3								
288.24	6261.4	288.59	6261.5	288.95	6261.6	289.3	6261.7	289.66
6261.8								
290.01	6261.9	290.36	6262	290.71	6262.1	291.06	6262.2	291.41
6262.3								
291.77	6262.4	292.12	6262.5	292.47	6262.6	292.82	6262.7	293.17
6262.8								
293.52	6262.9	293.88	6263	294.23	6263.1	294.58	6263.2	294.93
6263.3								
295.28	6263.4	295.63	6263.5	295.99	6263.6	296.34	6263.7	296.69
6263.8								
297.04	6263.9	297.39	6264	297.74	6264.1	298.1	6264.2	298.45
6264.3								
298.8	6264.4	299.15	6264.5	299.79	6264.6	300	6264.6	

Manning's n Values			num=	3
Sta	n Val	Sta	n Val	Sta
0	.03	134.1	.013	171.91

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
	134.1	171.91		10	10	.1

.3						
Ineffective Flow		num=	1			
Sta L	Sta R	Elev	Permanent			
190.45	300	6260.62	F			
Left Levee	Station=	43.86	Elevation=	6271.1		
Right Levee	Station=	190.03	Elevation=	6260.62		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6259.10	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.65	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6257.46	Reach Len. (ft)	10.00
10.00			
Crit W.S. (ft)	6257.46	Flow Area (sq ft)	

100.70			
E.G. Slope (ft/ft)	0.001807	Area (sq ft)	
100.70			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	30.18	Top Width (ft)	
30.18			
Vel Total (ft/s)	10.30	Avg. Vel. (ft/s)	
10.30			
Max Chl Dpth (ft)	5.06	Hydr. Depth (ft)	
3.34			
Conv. Total (cfs)	24396.1	Conv. (cfs)	
24396.1			
Length Wtd. (ft)	10.00	Wetted Per. (ft)	
32.64			
Min Ch El (ft)	6252.40	Shear (lb/sq ft)	
0.35			
Alpha	1.00	Stream Power (lb/ft s)	300.00
43.86	190.03		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.86			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.27			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 979

INPUT									
Description:									
Station Elevation Data	num=	458							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6270.9	2.94	6270.9	6.1	6270.8	10.63	6270.8	14.03	
6270.9									
17.42	6271	20.82	6271.1	24.22	6271.2	27.61	6271.3	31.01	
6271.4									
34.4	6271.5	36.29	6271.5	44.55	6271.4	45.67	6271.3	46.79	



6271.2									
47.9	6271.1	49.02	6271	50.14	6270.9	51.26	6270.8	52.38	
6270.7									
53.49	6270.6	54.61	6270.5	55.73	6270.4	56.85	6270.3	57.96	
6270.2									
59.08	6270.1	60.2	6270	61.32	6269.9	62.44	6269.8	63.55	
6269.7									
64.67	6269.6	65.79	6269.5	66.91	6269.4	68.03	6269.3	69.14	
6269.2									
70.26	6269.1	71.38	6269	72.64	6268.9	74.22	6268.8	75.8	
6268.7									
77.38	6268.6	78.96	6268.5	80.55	6268.4	81.99	6268.3	83.34	
6268.2									
84.62	6268.1	85.84	6268	87.06	6267.9	88.27	6267.8	89.49	
6267.7									
90.7	6267.6	91.92	6267.5	93.13	6267.4	94.35	6267.3	95.57	
6267.2									
96.78	6267.1	98	6267	99.21	6266.9	100.43	6266.8	101.64	
6266.7									
102.86	6266.6	106.65	6266.5	108.91	6266.4	109.6	6266.3	110.55	
6266.2									
110.79	6266.1	110.98	6266	111.17	6265.9	111.36	6265.8	111.55	
6265.7									
111.75	6265.6	111.94	6265.5	112.13	6265.4	112.32	6265.3	112.51	
6265.2									
112.7	6265.1	112.89	6265	113.08	6264.9	113.33	6264.8	113.59	
6264.7									
113.85	6264.6	114.12	6264.5	114.38	6264.4	114.66	6264.3	114.96	
6264.2									
115.25	6264.1	115.55	6264	115.84	6263.9	116.13	6263.8	116.43	
6263.7									
116.72	6263.6	117.01	6263.5	117.31	6263.4	117.6	6263.3	117.9	
6263.2									
118.19	6263.1	118.48	6263	118.78	6262.9	119.07	6262.8	119.36	
6262.7									
119.66	6262.6	119.95	6262.5	120.24	6262.4	120.54	6262.3	120.83	
6262.2									
121.13	6262.1	121.42	6262	121.71	6261.9	122.01	6261.8	122.3	
6261.7									
122.59	6261.6	122.89	6261.5	123.18	6261.4	123.48	6261.3	123.77	
6261.2									
124.06	6261.1	124.36	6261	124.65	6260.9	124.94	6260.8	125.24	
6260.7									
125.53	6260.6	125.83	6260.5	126.12	6260.4	126.41	6260.3	126.71	
6260.2									
127	6260.1	127.29	6260	127.59	6259.9	127.88	6259.8	128.18	
6259.7									
128.47	6259.6	128.76	6259.5	129.06	6259.4	129.35	6259.3	129.64	
6259.2									
129.94	6259.1	130.23	6259	130.53	6258.9	130.82	6258.8	131.11	
6258.7									
131.41	6258.6	131.7	6258.5	131.99	6258.4	132.29	6258.3	132.58	
6258.2									

132.88	6258.1	133.17	6258	133.46	6257.9	133.76	6257.8	134.05	
6257.7									
134.34	6257.6	134.64	6257.5	134.93	6257.4	135.2	6257.3	135.38	
6257.2									
135.55	6257.1	135.73	6257	135.91	6256.9	136.09	6256.8	136.27	
6256.7									
136.45	6256.6	136.62	6256.5	136.8	6256.4	136.98	6256.3	137.16	
6256.2									
137.34	6256.1	137.52	6256	137.69	6255.9	137.87	6255.8	138.05	
6255.7									
138.23	6255.6	138.41	6255.5	138.58	6255.4	138.76	6255.3	138.94	
6255.2									
139.12	6255.1	139.3	6255	139.48	6254.9	139.65	6254.8	139.83	
6254.7									
140.01	6254.6	140.19	6254.5	140.37	6254.4	140.55	6254.3	140.72	
6254.2									
140.9	6254.1	141.08	6254	141.26	6253.9	141.44	6253.8	141.62	
6253.7									
141.79	6253.6	141.97	6253.5	142.15	6253.4	142.33	6253.3	142.52	
6253.2									
142.77	6253.1	143.02	6253	143.27	6252.9	143.52	6252.8	143.77	
6252.7									
144.02	6252.6	144.27	6252.5	144.52	6252.4	144.77	6252.3	155.27	
6252.3									
155.57	6252.4	155.87	6252.5	156.17	6252.6	156.47	6252.7	156.77	
6252.8									
157.07	6252.9	157.37	6253	157.63	6253.1	157.83	6253.2	158.03	
6253.3									
158.23	6253.4	158.43	6253.5	158.63	6253.6	158.83	6253.7	159.03	
6253.8									
159.23	6253.9	159.43	6254	159.63	6254.1	159.83	6254.2	160.03	
6254.3									
160.23	6254.4	160.43	6254.5	160.63	6254.6	160.83	6254.7	161.03	
6254.8									
161.23	6254.9	161.43	6255	161.63	6255.1	161.83	6255.2	162.03	
6255.3									
162.23	6255.4	162.43	6255.5	162.63	6255.6	162.83	6255.7	163.03	
6255.8									
163.23	6255.9	163.43	6256	163.63	6256.1	163.83	6256.2	164.03	
6256.3									
164.23	6256.4	164.43	6256.5	164.63	6256.6	164.83	6256.7	165.11	
6256.8									
165.41	6256.9	165.7	6257	166	6257.1	166.29	6257.2	166.59	
6257.3									
166.89	6257.4	167.18	6257.5	167.48	6257.6	167.77	6257.7	168.07	
6257.8									
168.36	6257.9	168.66	6258	168.95	6258.1	169.25	6258.2	169.54	
6258.3									
169.84	6258.4	170.13	6258.5	170.43	6258.6	170.72	6258.7	171.02	
6258.8									
171.32	6258.9	171.61	6259	171.91	6259.1	172.2	6259.2	172.37	
6259.26									
172.5	6259.3	172.79	6259.4	173.09	6259.5	173.38	6259.6	173.6	



6259.7  
173.8 6259.8 173.99 6259.9 174.19 6260 174.38 6260.1 176.46  
6260.2  
181.64 6260.3 186.82 6260.4 189.88 6260.4 190.58 6260.3 191.29  
6260.2  
191.99 6260.1 192.7 6260 193.4 6259.9 194.11 6259.8 194.81  
6259.7  
195.51 6259.6 196.22 6259.5 196.92 6259.4 197.63 6259.3 198.33  
6259.2  
199.04 6259.1 199.74 6259 200.45 6258.9 201.21 6258.8 202.03  
6258.7  
202.84 6258.6 203.66 6258.5 204.47 6258.4 205.3 6258.3 206.14  
6258.2  
206.98 6258.1 207.82 6258 208.66 6257.9 209.5 6257.8 210.35  
6257.7  
211.19 6257.6 212.03 6257.5 212.87 6257.4 213.71 6257.3 214.57  
6257.2  
215.43 6257.1 216.29 6257 217.15 6256.9 218.01 6256.8 218.87  
6256.7  
219.73 6256.6 220.59 6256.5 221.45 6256.4 222.31 6256.3 223.17  
6256.2  
224.03 6256.1 224.88 6256 225.74 6255.9 226.16 6256.1 226.6  
6255.8  
227.46 6255.7 228.32 6255.6 229.18 6255.5 230.04 6255.4 231.02  
6255.3  
232.84 6255.2 234.66 6255.1 236.07 6255 237.48 6254.9 238.88  
6254.8  
241.44 6254.7 243.96 6254.6 245.46 6254.5 245.57 6254.4 245.68  
6254.3  
245.79 6254.2 245.9 6254.1 248.24 6254.1 248.35 6254.2 248.46  
6254.3  
248.57 6254.4 248.68 6254.5 249.98 6254.6 252.26 6254.7 254.53  
6254.8  
256.8 6254.9 259.08 6255 261.35 6255.1 263.63 6255.2 265.9  
6255.3  
267.08 6255.4 267.44 6255.5 267.79 6255.6 268.14 6255.7 268.5  
6255.8  
268.85 6255.9 269.2 6256 269.56 6256.1 269.91 6256.2 270.26  
6256.3  
270.61 6256.4 270.96 6256.5 271.31 6256.6 271.67 6256.7 272.02  
6256.8  
272.37 6256.9 272.72 6257 273.07 6257.1 273.43 6257.2 273.78  
6257.3  
274.13 6257.4 274.48 6257.5 274.83 6257.6 275.18 6257.7 275.54  
6257.8  
275.89 6257.9 276.24 6258 276.59 6258.1 276.94 6258.2 277.29  
6258.3  
277.65 6258.4 278 6258.5 278.35 6258.6 278.7 6258.7 279.05  
6258.8  
279.4 6258.9 279.76 6259 280.11 6259.1 280.46 6259.2 280.81  
6259.3  
281.16 6259.4 281.51 6259.5 281.87 6259.6 282.22 6259.7 282.57  
6259.8

282.92 6259.9 283.27 6260 283.63 6260.1 283.98 6260.2 284.33  
6260.3  
284.68 6260.4 285.03 6260.5 285.38 6260.6 285.74 6260.7 286.09  
6260.8  
286.44 6260.9 286.79 6261 287.14 6261.1 287.49 6261.2 287.85  
6261.3  
288.2 6261.4 288.55 6261.5 288.9 6261.6 289.25 6261.7 289.6  
6261.8  
289.96 6261.9 290.31 6262 290.66 6262.1 291.01 6262.2 291.36  
6262.3  
291.71 6262.4 292.07 6262.5 292.42 6262.6 292.77 6262.7 293.12  
6262.8  
293.47 6262.9 293.83 6263 294.18 6263.1 294.53 6263.2 294.88  
6263.3  
295.23 6263.4 295.58 6263.5 295.94 6263.6 296.29 6263.7 296.64  
6263.8  
296.99 6263.9 297.34 6264 297.69 6264.1 298.05 6264.2 298.4  
6264.3  
298.75 6264.4 299.71 6264.5 300 6264.5  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 133.17 .013 172.37 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 133.17 172.37 9.51 9.51 9.51 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
190.45 300 6260.46 F  
Left Levee Station= 44.28 Elevation= 6271.44  
Right Levee Station= 189.19 Elevation= 6260.41  
CROSS SECTION OUTPUT Profile #Flow 1  
E.G. Elev (ft) 6258.76 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.64 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6257.12 Reach Len. (ft) 9.51  
9.51 9.51  
Crit W.S. (ft) 6257.12 Flow Area (sq ft)  
100.87  
E.G. Slope (ft/ft) 0.001808 Area (sq ft)  
100.87  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00  
Top Width (ft) 30.54 Top Width (ft)  
30.54  
Vel Total (ft/s) 10.28 Avg. Vel. (ft/s)  
10.28



Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	
3.30			
Conv. Total (cfs)	24386.7	Conv. (cfs)	
24386.7			
Length Wtd. (ft)	9.51	Wetted Per. (ft)	
32.79			
Min Ch El (ft)	6252.30	Shear (lb/sq ft)	
0.35			
Alpha	1.00	Stream Power (lb/ft s)	300.00
44.28	189.19		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.83			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.26			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 978

INPUT  
Description:  
Station Elevation Data num= 447  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev  
-30.34 6271.3 -23.86 6271.3 -14.08 6271.2 -4.29 6271.1 5.49  
6271  
15.07 6270.9 16.19 6270.8 17.3 6270.7 18.42 6270.6 19.54  
6270.5  
20.66 6270.4 21.77 6270.3 22.89 6270.2 24.01 6270.1 25.13  
6270  
26.25 6269.9 27.36 6269.8 28.48 6269.7 29.6 6269.6 30.72  
6269.5  
31.84 6269.4 33.25 6269.3 34.83 6269.2 36.41 6269.1 37.99  
6269  
39.57 6268.9 41.15 6268.8 42.73 6268.7 44.32 6268.6 45.9  
6268.5  
47.48 6268.4 49.06 6268.3 50.64 6268.2 52.22 6268.1 53.57  
6268

54.92	6267.9	56.28	6267.8	57.63	6267.7	58.93	6267.6	60.14
6267.5								
61.36	6267.4	62.58	6267.3	63.79	6267.2	65.01	6267.1	66.22
6267								
67.44	6266.9	68.65	6266.8	69.87	6266.7	71.09	6266.6	72.3
6266.5								
75.05	6266.4	77.42	6266.3	78.21	6266.2	79.15	6266.1	80.09
6266								
80.38	6265.9	80.57	6265.8	80.76	6265.7	80.95	6265.6	81.14
6265.5								
81.33	6265.4	81.52	6265.3	81.71	6265.2	81.9	6265.1	82.09
6265								
82.31	6264.9	82.57	6264.8	82.83	6264.7	83.1	6264.6	83.36
6264.5								
83.62	6264.4	83.88	6264.3	84.15	6264.2	84.41	6264.1	84.67
6264								
84.94	6263.9	85.2	6263.8	85.46	6263.7	85.72	6263.6	85.99
6263.5								
86.25	6263.4	86.51	6263.3	86.77	6263.2	87.04	6263.1	87.3
6263								
87.56	6262.9	87.83	6262.8	88.09	6262.7	88.38	6262.6	88.67
6262.5								
88.97	6262.4	89.26	6262.3	89.56	6262.2	89.85	6262.1	90.14
6262								
90.44	6261.9	90.73	6261.8	91.02	6261.7	91.32	6261.6	91.61
6261.5								
91.9	6261.4	92.2	6261.3	92.49	6261.2	92.79	6261.1	93.08
6261								
93.37	6260.9	93.67	6260.8	93.96	6260.7	94.25	6260.6	94.55
6260.5								
94.84	6260.4	95.14	6260.3	95.43	6260.2	95.72	6260.1	96.02
6260								
96.31	6259.9	96.6	6259.8	96.9	6259.7	97.19	6259.6	97.49
6259.5								
97.78	6259.4	98.07	6259.3	98.37	6259.2	98.66	6259.1	98.95
6259								
99.25	6258.9	99.54	6258.8	99.84	6258.7	100.13	6258.6	100.42
6258.5								
100.72	6258.4	101.01	6258.3	101.3	6258.2	101.6	6258.1	101.89
6258								
102.19	6257.9	102.48	6257.8	102.77	6257.7	103.07	6257.6	103.36
6257.5								
103.65	6257.4	103.95	6257.3	104.13	6257.2	104.31	6257.1	104.49
6257								
104.67	6256.9	104.84	6256.8	105.02	6256.7	105.2	6256.6	105.38
6256.5								
105.56	6256.4	105.74	6256.3	105.91	6256.2	106.09	6256.1	106.27
6256								
106.45	6255.9	106.63	6255.8	106.8	6255.7	106.98	6255.6	107.16
6255.5								
107.34	6255.4	107.52	6255.3	107.7	6255.2	107.87	6255.1	108.05
6255								
108.23	6254.9	108.41	6254.8	108.59	6254.7	108.77	6254.6	108.94



6254.5  
109.12 6254.4 109.3 6254.3 109.48 6254.2 109.7 6254.1 109.95  
6254  
110.2 6253.9 110.45 6253.8 110.7 6253.7 110.95 6253.6 111.2  
6253.5  
111.45 6253.4 111.7 6253.3 111.95 6253.2 112.2 6253.1 112.45  
6253  
112.7 6252.9 112.95 6252.8 113.2 6252.7 113.45 6252.6 113.7  
6252.5  
113.95 6252.4 114.2 6252.3 114.45 6252.2 124.92 6252.2 125.22  
6252.3  
125.52 6252.4 125.82 6252.5 126.12 6252.6 126.42 6252.7 126.72  
6252.8  
127.02 6252.9 127.32 6253 127.62 6253.1 127.92 6253.2 128.22  
6253.3  
128.52 6253.4 128.82 6253.5 129.12 6253.6 129.42 6253.7 129.72  
6253.8  
129.93 6253.9 130.13 6254 130.33 6254.1 130.53 6254.2 130.73  
6254.3  
130.93 6254.4 131.13 6254.5 131.33 6254.6 131.53 6254.7 131.73  
6254.8  
131.93 6254.9 132.13 6255 132.33 6255.1 132.53 6255.2 132.73  
6255.3  
132.93 6255.4 133.13 6255.5 133.33 6255.6 133.53 6255.7 133.73  
6255.8  
133.93 6255.9 134.13 6256 134.33 6256.1 134.53 6256.2 134.73  
6256.3  
134.93 6256.4 135.13 6256.5 135.33 6256.6 135.61 6256.7 135.91  
6256.8  
136.2 6256.9 136.5 6257 136.6 6257.03 136.79 6257.1 137.09  
6257.2  
137.38 6257.3 137.68 6257.4 137.98 6257.5 138.27 6257.6 138.57  
6257.7  
138.86 6257.8 139.16 6257.9 139.45 6258 139.75 6258.1 140.04  
6258.2  
140.34 6258.3 140.63 6258.4 140.93 6258.5 141.22 6258.6 141.52  
6258.7  
141.81 6258.8 142.06 6258.9 142.25 6259 142.45 6259.1 142.64  
6259.2  
142.83 6259.3 143.03 6259.4 143.22 6259.5 143.42 6259.6 143.61  
6259.7  
143.8 6259.8 144 6259.9 145.02 6260 150.2 6260.1 155.32  
6260.2  
159.7 6260.2 160.41 6260.1 161.11 6260 161.82 6259.9 162.52  
6259.8  
163.22 6259.7 163.93 6259.6 164.63 6259.5 165.34 6259.4 166.04  
6259.3  
166.75 6259.2 167.45 6259.1 168.16 6259 168.86 6258.9 169.57  
6258.8  
170.27 6258.7 170.97 6258.6 171.68 6258.5 172.38 6258.4 173.09  
6258.3  
173.79 6258.2 174.5 6258.1 175.2 6258 175.91 6257.9 176.61  
6257.8

177.32 6257.7 178.02 6257.6 178.72 6257.5 179.43 6257.4 180.13  
6257.3  
180.84 6257.2 181.54 6257.1 182.25 6257 182.95 6256.9 183.75  
6256.8  
184.57 6256.7 185.38 6256.6 185.81 6256.6 186.2 6256.5 187.01  
6256.4  
187.83 6256.3 188.65 6256.2 189.46 6256.1 190.28 6256 191.1  
6255.9  
191.91 6255.8 192.74 6255.7 193.58 6255.6 194.43 6255.5 195.27  
6255.4  
196.11 6255.3 196.95 6255.2 198.52 6255.1 200.31 6255 202.11  
6254.9  
203.9 6254.8 205.7 6254.7 207.5 6254.6 209.3 6254.5 211.1  
6254.4  
211.43 6254.3 211.53 6254.2 211.64 6254.1 211.75 6254 211.85  
6253.9  
213.98 6253.9 214.09 6254 214.19 6254.1 214.3 6254.2 214.41  
6254.3  
214.51 6254.4 216.82 6254.5 219.13 6254.6 221.46 6254.7 223.87  
6254.8  
226.5 6254.9 229.43 6255 232.36 6255.1 235.29 6255.2 236.42  
6255.3  
236.77 6255.4 237.12 6255.5 237.47 6255.6 237.82 6255.7 238.17  
6255.8  
238.52 6255.9 238.88 6256 239.23 6256.1 239.58 6256.2 239.93  
6256.3  
240.28 6256.4 240.63 6256.5 240.98 6256.6 241.33 6256.7 241.69  
6256.8  
242.04 6256.9 242.39 6257 242.74 6257.1 243.09 6257.2 243.44  
6257.3  
243.79 6257.4 244.15 6257.5 244.5 6257.6 244.85 6257.7 245.2  
6257.8  
245.55 6257.9 245.9 6258 246.25 6258.1 246.61 6258.2 246.96  
6258.3  
247.31 6258.4 247.66 6258.5 248.01 6258.6 248.36 6258.7 248.71  
6258.8  
249.07 6258.9 249.42 6259 249.77 6259.1 250.12 6259.2 250.47  
6259.3  
250.82 6259.4 251.17 6259.5 251.52 6259.6 251.88 6259.7 252.23  
6259.8  
252.58 6259.9 252.93 6260 253.28 6260.1 253.63 6260.2 253.98  
6260.3  
254.34 6260.4 254.69 6260.5 255.04 6260.6 255.39 6260.7 255.74  
6260.8  
256.09 6260.9 256.44 6261 256.8 6261.1 257.15 6261.2 257.5  
6261.3  
257.85 6261.4 258.2 6261.5 258.55 6261.6 258.9 6261.7 259.26  
6261.8  
259.61 6261.9 259.96 6262 260.31 6262.1 260.66 6262.2 261.01  
6262.3  
261.36 6262.4 261.71 6262.5 262.07 6262.6 262.42 6262.7 262.77  
6262.8  
263.12 6262.9 263.47 6263 263.82 6263.1 264.17 6263.2 264.53



6263.3  
264.88 6263.4 265.22 6263.5 265.57 6263.6 265.92 6263.7 266.27  
6263.8  
266.62 6263.9 266.96 6264 267.31 6264.1 267.66 6264.2 268.25  
6264.3  
269.24 6264.4 269.66 6264.4

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-30.34 .03 104.13 .013 136.6 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 104.13 136.6 11.26 11.26 11.26 .1  
.3

Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
160.11 269.66 6260.15 F  
Left Levee Station= 77.18 Elevation= 6266.33  
Right Levee Station= 159.69 Elevation= 6260.26

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6258.49	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.59	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6256.90	Reach Len. (ft)	11.26
11.26 11.26			
Crit W.S. (ft)	6256.90	Flow Area (sq ft)	
102.38			
E.G. Slope (ft/ft)	0.001775	Area (sq ft)	
102.38			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	31.51	Top Width (ft)	
31.51			
Vel Total (ft/s)	10.13	Avg. Vel. (ft/s)	
10.13			
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)	
3.25			
Conv. Total (cfs)	24611.0	Conv. (cfs)	
24611.0			
Length Wtd. (ft)	11.26	Wetted Per. (ft)	
33.57			
Min Ch El (ft)	6252.20	Shear (lb/sq ft)	
0.34			
Alpha	1.00	Stream Power (lb/ft s)	269.66
77.18 159.69			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.81			
C & E Loss (ft)	0.01	Cum SA (acres)	

0.25

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 977

INPUT  
Description:  
Station Elevation Data num= 443  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev  
0 6270.9 1.28 6270.9 7.94 6270.8 14.61 6270.7 21.27  
6270.6  
27.94 6270.5 36.02 6270.4 45.8 6270.3 47.63 6270.2 48.74  
6270.1  
49.86 6270 50.98 6269.9 52.45 6269.8 54.03 6269.7 55.61  
6269.6  
57.19 6269.5 58.78 6269.4 60.36 6269.3 61.94 6269.2 63.52  
6269.1  
65.1 6269 66.68 6268.9 68.26 6268.8 69.84 6268.7 71.42  
6268.6  
73.01 6268.5 74.59 6268.4 76.17 6268.3 77.75 6268.2 79.33  
6268.1  
80.91 6268 82.49 6267.9 84.07 6267.8 85.44 6267.7 86.79  
6267.6  
88.14 6267.5 89.5 6267.4 90.85 6267.3 92.2 6267.2 93.56  
6267.1  
94.87 6267 96.08 6266.9 97.3 6266.8 98.51 6266.7 99.73  
6266.6  
100.94 6266.5 102.16 6266.4 103.38 6266.3 106.28 6266.2 107.12  
6266.1  
108.06 6266 109 6265.9 109.94 6265.8 110.56 6265.7 110.75  
6265.6  
110.94 6265.5 111.13 6265.4 111.33 6265.3 111.52 6265.2 111.71  
6265.1  
111.9 6265 112.15 6264.9 112.41 6264.8 112.68 6264.7 112.94  
6264.6  
113.2 6264.5 113.46 6264.4 113.73 6264.3 113.99 6264.2 114.25



6264.1  
114.52 6264 114.78 6263.9 115.04 6263.8 115.3 6263.7 115.57  
6263.6  
115.83 6263.5 116.09 6263.4 116.36 6263.3 116.62 6263.2 116.88  
6263.1  
117.14 6263 117.41 6262.9 117.67 6262.8 117.93 6262.7 118.2  
6262.6  
118.46 6262.5 118.72 6262.4 118.98 6262.3 119.25 6262.2 119.51  
6262.1  
119.77 6262 120.04 6261.9 120.3 6261.8 120.56 6261.7 120.82  
6261.6  
121.09 6261.5 121.35 6261.4 121.61 6261.3 121.87 6261.2 122.14  
6261.1  
122.4 6261 122.66 6260.9 122.93 6260.8 123.19 6260.7 123.48  
6260.6  
123.78 6260.5 124.07 6260.4 124.37 6260.3 124.66 6260.2 124.95  
6260.1  
125.25 6260 125.54 6259.9 125.83 6259.8 126.13 6259.7 126.42  
6259.6  
126.72 6259.5 127.01 6259.4 127.3 6259.3 127.6 6259.2 127.89  
6259.1  
128.18 6259 128.48 6258.9 128.77 6258.8 129.07 6258.7 129.36  
6258.6  
129.65 6258.5 129.95 6258.4 130.24 6258.3 130.53 6258.2 130.83  
6258.1  
131.12 6258 131.42 6257.9 131.71 6257.8 132 6257.7 132.3  
6257.6  
132.59 6257.5 132.88 6257.4 133.18 6257.3 133.4 6257.2 133.58  
6257.1  
133.75 6257 133.93 6256.9 134.11 6256.8 134.29 6256.7 134.47  
6256.6  
134.65 6256.5 134.82 6256.4 135 6256.3 135.18 6256.2 135.36  
6256.1  
135.54 6256 135.72 6255.9 135.89 6255.8 136.07 6255.7 136.25  
6255.6  
136.43 6255.5 136.61 6255.4 136.79 6255.3 137.01 6255.2 137.26  
6255.1  
137.51 6255 137.76 6254.9 138.01 6254.8 138.26 6254.7 138.51  
6254.6  
138.76 6254.5 139.01 6254.4 139.26 6254.3 139.51 6254.2 139.76  
6254.1  
140.01 6254 140.26 6253.9 140.51 6253.8 140.76 6253.7 141.01  
6253.6  
141.26 6253.5 141.51 6253.4 141.76 6253.3 142.01 6253.2 142.26  
6253.1  
142.51 6253 142.76 6252.9 143.01 6252.8 143.26 6252.7 143.51  
6252.6  
143.76 6252.5 144.01 6252.4 144.26 6252.3 144.51 6252.2 144.76  
6252.1  
155.29 6252.1 155.59 6252.2 155.89 6252.3 156.19 6252.4 156.49  
6252.5  
156.79 6252.6 157.09 6252.7 157.39 6252.8 157.69 6252.9 157.99  
6253

158.29 6253.1 158.59 6253.2 158.89 6253.3 159.19 6253.4 159.49  
6253.5  
159.79 6253.6 160.09 6253.7 160.39 6253.8 160.69 6253.9 160.99  
6254  
161.29 6254.1 161.59 6254.2 161.89 6254.3 162.19 6254.4 162.49  
6254.5  
162.79 6254.6 163.09 6254.7 163.31 6254.8 163.51 6254.9 163.71  
6255  
163.91 6255.1 164.11 6255.2 164.31 6255.3 164.51 6255.4 164.71  
6255.5  
164.91 6255.6 165.11 6255.7 165.31 6255.8 165.51 6255.9 165.71  
6256  
165.91 6256.1 166.11 6256.2 166.31 6256.3 166.51 6256.4 166.71  
6256.5  
167 6256.6 167.3 6256.7 167.59 6256.8 167.89 6256.9 168.18  
6257  
168.48 6257.1 168.77 6257.2 169.07 6257.3 169.37 6257.4 169.66  
6257.5  
169.96 6257.6 170.01 6257.62 170.25 6257.7 170.55 6257.8 170.84  
6257.9  
171.06 6258 171.26 6258.1 171.45 6258.2 171.65 6258.3 171.84  
6258.4  
172.03 6258.5 172.23 6258.6 172.42 6258.7 172.62 6258.8 172.81  
6258.9  
173 6259 173.2 6259.1 173.39 6259.2 173.59 6259.3 173.78  
6259.4  
173.97 6259.5 174.17 6259.6 174.36 6259.7 175.98 6259.8 181.14  
6259.9  
186.14 6260 189.97 6260 190.68 6259.9 191.38 6259.8 192.09  
6259.7  
192.79 6259.6 193.5 6259.5 194.2 6259.4 194.91 6259.3 195.61  
6259.2  
196.32 6259.1 197.02 6259 197.72 6258.9 198.43 6258.8 199.13  
6258.7  
199.84 6258.6 200.54 6258.5 201.25 6258.4 201.95 6258.3 202.66  
6258.2  
203.36 6258.1 204.07 6258 204.77 6257.9 205.47 6257.8 206.18  
6257.7  
206.88 6257.6 207.59 6257.5 208.29 6257.4 209 6257.3 209.7  
6257.2  
210.41 6257.1 211.11 6257 211.82 6256.9 212.52 6256.8 213.22  
6256.7  
213.93 6256.6 214.63 6256.5 215.34 6256.4 216.04 6256.3 216.75  
6256.2  
217.45 6256.1 218.16 6256 218.86 6255.9 219.54 6256 219.57  
6255.8  
220.27 6255.7 220.97 6255.6 221.64 6255.5 222.28 6255.4 222.91  
6255.3  
223.55 6255.2 224.18 6255.1 225.03 6255 226.8 6254.9 228.57  
6254.8  
230.34 6254.7 232.1 6254.6 233.87 6254.5 235.63 6254.4 237.4  
6254.3  
238.51 6254.2 238.61 6254.1 238.71 6254 238.81 6253.9 238.92



6253.8								
241.08	6253.8	241.18	6253.9	241.28	6254	241.39	6254.1	241.49
6254.2								
243.15	6254.3	246.08	6254.4	249.01	6254.5	251.94	6254.6	254.87
6254.7								
257.8	6254.8	260.73	6254.9	261.72	6255	263.66	6255	266.07
6255.1								
266.43	6255.2	266.78	6255.3	267.13	6255.4	267.48	6255.5	267.83
6255.6								
268.18	6255.7	268.53	6255.8	268.89	6255.9	269.24	6256	269.59
6256.1								
269.94	6256.2	270.29	6256.3	270.64	6256.4	270.99	6256.5	271.35
6256.6								
271.7	6256.7	272.05	6256.8	272.4	6256.9	272.75	6257	273.1
6257.1								
273.45	6257.2	273.81	6257.3	274.16	6257.4	274.51	6257.5	274.86
6257.6								
275.21	6257.7	275.56	6257.8	275.91	6257.9	276.26	6258	276.62
6258.1								
276.97	6258.2	277.32	6258.3	277.67	6258.4	278.02	6258.5	278.37
6258.6								
278.72	6258.7	279.08	6258.8	279.43	6258.9	279.78	6259	280.13
6259.1								
280.48	6259.2	280.83	6259.3	281.18	6259.4	281.54	6259.5	281.89
6259.6								
282.24	6259.7	282.59	6259.8	282.94	6259.9	283.29	6260	283.64
6260.1								
284	6260.2	284.35	6260.3	284.7	6260.4	285.05	6260.5	285.4
6260.6								
285.75	6260.7	286.1	6260.8	286.45	6260.9	286.8	6261	287.15
6261.1								
287.5	6261.2	287.85	6261.3	288.19	6261.4	288.54	6261.5	288.89
6261.6								
289.24	6261.7	289.59	6261.8	289.93	6261.9	290.28	6262	290.63
6262.1								
290.98	6262.2	291.33	6262.3	291.67	6262.4	292.02	6262.5	292.37
6262.6								
292.72	6262.7	293.06	6262.8	293.41	6262.9	293.76	6263	294.11
6263.1								
294.46	6263.2	294.8	6263.3	295.15	6263.4	295.5	6263.5	295.85
6263.6								
296.2	6263.7	296.54	6263.8	296.89	6263.9	297.24	6264	297.63
6264.1								
298.62	6264.2	299.62	6264.3	300	6264.3			
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	133.75	.013	170.01	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	133.75	170.01		50	50	50		.1
.3								

Ineffective Flow	num=	1		
Sta L	Sta R	Elev	Permanent	
190.03	300	6259.93	F	
Left Levee	Station=	49.73	Elevation=	6270.1
Right Levee	Station=	188.77	Elevation=	6260.04
CROSS SECTION OUTPUT Profile #Flow 1				
E.G. Elev (ft)		6258.25	Element	Left OB
Channel Right OB				
Vel Head (ft)		1.56	Wt. n-Val.	
0.013				
W.S. Elev (ft)		6256.69	Reach Len. (ft)	50.00
50.00	50.00			
Crit W.S. (ft)		6256.69	Flow Area (sq ft)	
103.44				
E.G. Slope (ft/ft)		0.001800	Area (sq ft)	
103.44				
Q Total (cfs)		1037.00	Flow (cfs)	
1037.00				
Top Width (ft)		32.94	Top Width (ft)	
32.94				
Vel Total (ft/s)		10.03	Avg. Vel. (ft/s)	
10.03				
Max Chl Dpth (ft)		4.58	Hydr. Depth (ft)	
3.14				
Conv. Total (cfs)		24445.1	Conv. (cfs)	
24445.1				
Length Wtd. (ft)		50.00	Wetted Per. (ft)	
34.79				
Min Ch El (ft)		6252.10	Shear (lb/sq ft)	
0.33				
Alpha		1.00	Stream Power (lb/ft s)	300.00
49.73	188.77			
Frctn Loss (ft)		0.09	Cum Volume (acre-ft)	0.01
0.79				
C & E Loss (ft)		0.02	Cum SA (acres)	
0.24				
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.				
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.				
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.				



CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 976

INPUT  
Description:

Station	Elevation	Data	num=	429					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6268.7	4.23	6268.7	4.99	6268.6	5.75	6268.5	6.5	
6268.4									
22	6268.4	26.98	6268.5	31.96	6268.6	36.94	6268.7	38.49	
6268.8									
39.86	6268.8	41.59	6268.7	43.32	6268.6	45.05	6268.5	46.78	
6268.4									
48.51	6268.3	50.24	6268.2	51.97	6268.1	53.6	6268	55.16	
6267.9									
56.71	6267.8	58.27	6267.7	60.15	6267.6	62.16	6267.5	64.22	
6267.4									
66.31	6267.3	68.4	6267.2	70.49	6267.1	72.58	6267	74.66	
6266.9									
76.75	6266.8	78.84	6266.7	80.93	6266.6	83.02	6266.5	85.1	
6266.4									
87.19	6266.3	89.28	6266.2	91.37	6266.1	93.46	6266	97.27	
6265.9									
101.1	6265.8	104.94	6265.7	106.06	6265.6	106.71	6265.5	107.35	
6265.4									
108	6265.3	108.64	6265.2	109.27	6265.1	109.86	6265	109.99	
6264.9									
110.11	6264.8	110.24	6264.7	110.37	6264.6	110.98	6264.5	111.97	
6264.4									
112.2	6264.3	112.44	6264.2	112.68	6264.1	112.92	6264	113.16	
6263.9									
113.4	6263.8	113.64	6263.7	113.88	6263.6	114.12	6263.5	114.36	
6263.4									
114.59	6263.3	114.83	6263.2	115.07	6263.1	115.34	6263	115.6	
6262.9									
115.87	6262.8	116.13	6262.7	116.4	6262.6	116.66	6262.5	116.93	
6262.4									
117.19	6262.3	117.46	6262.2	117.72	6262.1	117.99	6262	118.26	
6261.9									
118.52	6261.8	118.79	6261.7	119.05	6261.6	119.32	6261.5	119.58	
6261.4									
119.85	6261.3	120.11	6261.2	120.38	6261.1	120.64	6261	120.91	
6260.9									
121.17	6260.8	121.44	6260.7	121.7	6260.6	121.97	6260.5	122.23	
6260.4									
122.5	6260.3	122.76	6260.2	123.03	6260.1	123.29	6260	123.56	
6259.9									
123.82	6259.8	124.09	6259.7	124.35	6259.6	124.62	6259.5	124.88	
6259.4									

125.15	6259.3	125.41	6259.2	125.68	6259.1	125.94	6259	126.21	
6258.9									
126.47	6258.8	126.74	6258.7	127	6258.6	127.27	6258.5	127.53	
6258.4									
127.8	6258.3	128.06	6258.2	128.33	6258.1	128.6	6258	128.86	
6257.9									
129.13	6257.8	129.39	6257.7	129.66	6257.6	129.92	6257.5	130.19	
6257.4									
130.45	6257.3	130.72	6257.2	130.98	6257.1	131.25	6257	131.51	
6256.9									
131.76	6256.8	132.01	6256.7	132.26	6256.6	132.51	6256.5	132.76	
6256.4									
133.01	6256.3	133.26	6256.2	133.51	6256.1	133.76	6256	134.01	
6255.9									
134.26	6255.8	134.51	6255.7	134.76	6255.6	135.01	6255.5	135.26	
6255.4									
135.51	6255.3	135.76	6255.2	136.01	6255.1	136.26	6255	136.51	
6254.9									
136.76	6254.8	137.01	6254.7	137.26	6254.6	137.51	6254.5	137.76	
6254.4									
138.01	6254.3	138.26	6254.2	138.51	6254.1	138.76	6254	139.01	
6253.9									
139.26	6253.8	139.51	6253.7	139.76	6253.6	140.01	6253.5	140.26	
6253.4									
140.51	6253.3	140.76	6253.2	141.01	6253.1	141.26	6253	141.51	
6252.9									
141.76	6252.8	142.01	6252.7	142.26	6252.6	142.51	6252.5	142.76	
6252.4									
143.01	6252.3	143.26	6252.2	143.51	6252.1	143.76	6252	144.01	
6251.9									
144.26	6251.8	144.51	6251.7	144.76	6251.6	155.29	6251.6	155.59	
6251.7									
155.89	6251.8	156.19	6251.9	156.49	6252	156.79	6252.1	157.09	
6252.2									
157.39	6252.3	157.69	6252.4	157.99	6252.5	158.29	6252.6	158.59	
6252.7									
158.89	6252.8	159.19	6252.9	159.49	6253	159.79	6253.1	160.09	
6253.2									
160.39	6253.3	160.69	6253.4	160.99	6253.5	161.29	6253.6	161.59	
6253.7									
161.89	6253.8	162.19	6253.9	162.49	6254	162.79	6254.1	163.09	
6254.2									
163.39	6254.3	163.69	6254.4	163.99	6254.5	164.29	6254.6	164.59	
6254.7									
164.89	6254.8	165.19	6254.9	165.49	6255	165.79	6255.1	166.09	
6255.2									
166.39	6255.3	166.69	6255.4	166.99	6255.5	167.29	6255.6	167.59	
6255.7									
167.89	6255.8	168.19	6255.9	168.49	6256	168.69	6256.1	168.88	
6256.2									
169.07	6256.3	169.27	6256.4	169.46	6256.5	169.66	6256.6	169.85	
6256.7									
170.04	6256.8	170.24	6256.9	170.43	6257	170.63	6257.1	170.82	



6257.2  
171.01 6257.3 171.18 6257.38 171.21 6257.4 171.4 6257.5 171.6  
6257.6  
171.79 6257.7 172 6257.8 172.24 6257.9 172.49 6258 172.73  
6258.1  
172.97 6258.2 173.21 6258.3 173.46 6258.4 173.7 6258.5 173.94  
6258.6  
174.18 6258.7 174.43 6258.8 177.98 6258.9 182.98 6259 189.51  
6259  
190.22 6258.9 190.94 6258.8 191.65 6258.7 192.36 6258.6 193.08  
6258.5  
193.79 6258.4 194.5 6258.3 195.22 6258.2 195.93 6258.1 196.64  
6258  
197.36 6257.9 198.07 6257.8 198.78 6257.7 199.5 6257.6 200.21  
6257.5  
200.92 6257.4 201.64 6257.3 202.35 6257.2 203.06 6257.1 203.78  
6257  
204.49 6256.9 205.2 6256.8 205.92 6256.7 206.63 6256.6 207.34  
6256.5  
208.06 6256.4 208.77 6256.3 209.48 6256.2 210.2 6256.1 210.91  
6256  
211.62 6255.9 212.34 6255.8 213.05 6255.7 213.76 6255.6 214.48  
6255.5  
215.19 6255.4 215.9 6255.3 216.62 6255.2 217.33 6255.1 218.05  
6255  
218.8 6254.9 219.55 6254.8 220.29 6254.7 221.04 6254.6 221.77  
6254.5  
222.44 6254.4 224.05 6254.3 226.08 6254.2 228.12 6254.1 230.14  
6254  
232.15 6253.9 233.41 6254 234.16 6253.8 236.06 6253.8 236.17  
6253.7  
238.08 6253.6 238.18 6253.5 238.28 6253.4 238.38 6253.3 238.48  
6253.2  
240.5 6253.4 240.67 6253.2 240.77 6253.3 240.87 6253.4 240.97  
6253.5  
241.07 6253.6 243.85 6253.7 246.69 6253.8 249.53 6253.9 252.33  
6254  
255.13 6254.1 257.89 6254.2 260.62 6254.3 263.37 6254.4 264.06  
6254.5  
264.41 6254.6 264.76 6254.7 265.11 6254.8 265.46 6254.9 265.8  
6255  
266.15 6255.1 266.5 6255.2 266.85 6255.3 267.2 6255.4 267.54  
6255.5  
267.89 6255.6 268.24 6255.7 268.59 6255.8 268.94 6255.9 269.28  
6256  
269.63 6256.1 269.98 6256.2 270.33 6256.3 270.68 6256.4 271.02  
6256.5  
271.37 6256.6 271.72 6256.7 272.07 6256.8 272.42 6256.9 272.76  
6257  
273.11 6257.1 273.46 6257.2 273.81 6257.3 274.16 6257.4 274.51  
6257.5  
274.85 6257.6 275.2 6257.7 275.55 6257.8 275.9 6257.9 276.25  
6258

276.59 6258.1 276.94 6258.2 277.29 6258.3 277.64 6258.4 277.98  
6258.5  
278.33 6258.6 278.68 6258.7 279.03 6258.8 279.38 6258.9 279.72  
6259  
280.07 6259.1 280.42 6259.2 280.77 6259.3 281.12 6259.4 281.46  
6259.5  
281.81 6259.6 282.16 6259.7 282.51 6259.8 282.86 6259.9 283.2  
6260  
283.55 6260.1 283.9 6260.2 284.25 6260.3 284.59 6260.4 284.94  
6260.5  
285.29 6260.6 285.64 6260.7 285.99 6260.8 286.33 6260.9 286.68  
6261  
287.03 6261.1 287.38 6261.2 287.73 6261.3 288.07 6261.4 288.42  
6261.5  
288.77 6261.6 289.12 6261.7 289.46 6261.8 289.81 6261.9 290.16  
6262  
290.51 6262.1 290.86 6262.2 291.2 6262.3 291.55 6262.4 291.9  
6262.5  
292.25 6262.6 292.6 6262.7 292.94 6262.8 293.29 6262.9 293.64  
6263  
293.99 6263.1 294.34 6263.2 294.71 6263.3 295.7 6263.4 296.69  
6263.5  
297.69 6263.6 298.68 6263.7 299.67 6263.8 300 6263.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131.25 .013 171.18 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131.25 171.18 50 50 50 .1  
  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
188.77 300 6259.01 F  
Left Levee Station= 40.09 Elevation= 6268.9  
Right Levee Station= 189.61 Elevation= 6258.91  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6257.67 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.48 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6256.19 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6256.19 Flow Area (sq ft)  
106.20  
E.G. Slope (ft/ft) 0.001803 Area (sq ft)  
106.20  
Q Total (cfs) 1037.00 Flow (cfs)  
1037.00



Top Width (ft)	35.57	Top Width (ft)	
Vel Total (ft/s)	9.76	Avg. Vel. (ft/s)	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)	
Conv. Total (cfs)	24422.0	Conv. (cfs)	
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
Min Ch El (ft)	6251.60	Shear (lb/sq ft)	
Alpha	1.00	Stream Power (lb/ft s)	300.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 975

INPUT									
Description:									
Station	Elevation	Data	num=	394					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6266.6	.89	6266.6	2.59	6266.5	6.55	6266.4	11.67	
19.4	6266.3	30.05	6266.2	36.51	6266.1	46.74	6266	63.04	
80.29	6265.8	90.31	6265.7	98	6265.6	100.65	6265.5	103.3	
105.96	6265.3	106.45	6265.2	106.74	6265.1	107.04	6265	107.33	
107.63	6264.8	107.92	6264.7	108.22	6264.6	108.51	6264.5	108.81	

109.11	6264.3	109.4	6264.2	109.7	6264.1	109.99	6264	110.29	
110.58	6263.8	110.88	6263.7	111.17	6263.6	111.47	6263.5	111.76	
112.06	6263.3	112.35	6263.2	112.65	6263.1	112.95	6263	113.24	
113.54	6262.8	113.83	6262.7	114.13	6262.6	114.42	6262.5	114.72	
115.01	6262.3	115.31	6262.2	115.6	6262.1	115.9	6262	116.2	
116.49	6261.8	116.79	6261.7	117.08	6261.6	117.38	6261.5	117.67	
117.97	6261.3	118.26	6261.2	118.56	6261.1	118.85	6261	119.15	
119.44	6260.8	119.74	6260.7	120.04	6260.6	120.34	6260.5	120.64	
120.94	6260.3	121.24	6260.2	121.55	6260.1	121.85	6260	122.15	
122.46	6259.8	122.76	6259.7	123.03	6259.6	123.3	6259.5	123.56	
123.83	6259.3	124.09	6259.2	124.36	6259.1	124.62	6259	124.89	
125.15	6258.8	125.42	6258.7	125.68	6258.6	125.95	6258.5	126.21	
126.48	6258.3	126.74	6258.2	127.01	6258.1	127.27	6258	127.54	
127.8	6257.8	128.07	6257.7	128.33	6257.6	128.6	6257.5	128.86	
129.13	6257.3	129.39	6257.2	129.66	6257.1	129.92	6257	130.19	
130.46	6256.8	130.72	6256.7	130.99	6256.6	131.25	6256.5	131.51	
131.76	6256.3	132.01	6256.2	132.26	6256.1	132.51	6256	132.76	
133.01	6255.8	133.26	6255.7	133.51	6255.6	133.76	6255.5	134.01	
134.26	6255.3	134.51	6255.2	134.76	6255.1	135.01	6255	135.26	
135.51	6254.8	135.76	6254.7	136.01	6254.6	136.26	6254.5	136.51	
136.76	6254.3	137.01	6254.2	137.26	6254.1	137.51	6254	137.76	
138.01	6253.8	138.26	6253.7	138.51	6253.6	138.76	6253.5	139.01	
139.26	6253.3	139.51	6253.2	139.76	6253.1	140.01	6253	140.26	
140.51	6252.8	140.76	6252.7	141.01	6252.6	141.26	6252.5	141.51	
141.76	6252.3	142.01	6252.2	142.26	6252.1	142.51	6252	142.76	
143.01	6251.8	143.26	6251.7	143.51	6251.6	143.76	6251.5	144.01	
144.26	6251.3	144.51	6251.2	144.76	6251.1	155.28	6251.1	155.58	



6251.2  
155.88 6251.3 156.18 6251.4 156.48 6251.5 156.78 6251.6 157.08  
6251.7  
157.38 6251.8 157.68 6251.9 157.98 6252 158.28 6252.1 158.58  
6252.2  
158.88 6252.3 159.18 6252.4 159.48 6252.5 159.78 6252.6 160.08  
6252.7  
160.38 6252.8 160.68 6252.9 160.98 6253 161.28 6253.1 161.58  
6253.2  
161.88 6253.3 162.18 6253.4 162.48 6253.5 162.78 6253.6 163.08  
6253.7  
163.38 6253.8 163.68 6253.9 163.98 6254 164.28 6254.1 164.58  
6254.2  
164.88 6254.3 165.18 6254.4 165.48 6254.5 165.78 6254.6 166.08  
6254.7  
166.38 6254.8 166.68 6254.9 166.98 6255 167.28 6255.1 167.58  
6255.2  
167.88 6255.3 168.18 6255.4 168.48 6255.5 168.73 6255.6 168.97  
6255.7  
169.21 6255.8 169.46 6255.9 169.7 6256 169.94 6256.1 170.18  
6256.2  
170.42 6256.3 170.65 6256.4 170.88 6256.5 171.11 6256.6 171.34  
6256.7  
171.57 6256.8 171.8 6256.9 172.03 6257 172.26 6257.1 172.42  
6257.17  
172.49 6257.2 172.71 6257.3 172.94 6257.4 173.17 6257.5 173.4  
6257.6  
173.63 6257.7 173.86 6257.8 174.09 6257.9 174.32 6258 189.98  
6258  
190.57 6257.9 191.17 6257.8 191.76 6257.7 192.36 6257.6 192.96  
6257.5  
193.55 6257.4 194.15 6257.3 194.75 6257.2 195.34 6257.1 195.94  
6257  
196.53 6256.9 197.13 6256.8 197.73 6256.7 198.32 6256.6 198.92  
6256.5  
199.51 6256.4 200.11 6256.3 200.71 6256.2 201.3 6256.1 201.9  
6256  
202.49 6255.9 203.09 6255.8 203.69 6255.7 204.28 6255.6 204.88  
6255.5  
205.47 6255.4 206.07 6255.3 206.67 6255.2 207.26 6255.1 207.86  
6255  
208.45 6254.9 209.05 6254.8 209.65 6254.7 210.21 6254.6 210.74  
6254.5  
211.27 6254.4 211.81 6254.3 212.34 6254.2 212.87 6254.1 213.4  
6254  
213.94 6253.9 214.45 6253.9 214.47 6253.8 215 6253.7 215.53  
6253.6  
216.07 6253.5 218.27 6253.4 220.85 6253.3 223.17 6253.2 226  
6253.1  
228.82 6253 230.37 6252.9 230.48 6252.8 230.58 6252.7 230.68  
6252.6  
230.79 6252.5 231.66 6253 232.96 6252.5 233.06 6252.6 233.17  
6252.7

233.2 6252.7 233.27 6252.8 233.37 6252.9 235.03 6253 238.76  
6253.1  
242.49 6253.2 245.31 6253.3 246.22 6253.3 249.96 6253.4 253.69  
6253.5  
256.95 6253.6 260.02 6253.7 261.71 6253.8 262.06 6253.9 262.41  
6254  
262.76 6254.1 263.11 6254.2 263.46 6254.3 263.81 6254.4 264.16  
6254.5  
264.51 6254.6 264.86 6254.7 265.21 6254.8 265.56 6254.9 265.91  
6255  
266.26 6255.1 266.61 6255.2 266.96 6255.3 267.31 6255.4 267.66  
6255.5  
268.01 6255.6 268.36 6255.7 268.71 6255.8 269.06 6255.9 269.41  
6256  
269.76 6256.1 270.11 6256.2 270.46 6256.3 270.81 6256.4 271.16  
6256.5  
271.51 6256.6 271.86 6256.7 272.21 6256.8 272.56 6256.9 272.91  
6257  
273.26 6257.1 273.61 6257.2 273.96 6257.3 274.31 6257.4 274.66  
6257.5  
275.01 6257.6 275.36 6257.7 275.71 6257.8 276.06 6257.9 276.41  
6258  
276.77 6258.1 277.12 6258.2 277.47 6258.3 277.82 6258.4 278.17  
6258.5  
278.52 6258.6 278.87 6258.7 279.22 6258.8 279.57 6258.9 279.92  
6259  
280.27 6259.1 280.62 6259.2 280.97 6259.3 281.32 6259.4 281.67  
6259.5  
282.02 6259.6 282.38 6259.7 282.73 6259.8 283.08 6259.9 283.43  
6260  
283.78 6260.1 284.13 6260.2 284.48 6260.3 284.84 6260.4 285.19  
6260.5  
285.54 6260.6 285.89 6260.7 286.24 6260.8 286.59 6260.9 286.94  
6261  
287.3 6261.1 287.65 6261.2 288 6261.3 288.35 6261.4 288.7  
6261.5  
289.05 6261.6 289.4 6261.7 289.76 6261.8 290.11 6261.9 290.46  
6262  
290.81 6262.1 291.16 6262.2 291.51 6262.3 292.03 6262.4 293.02  
6262.5  
294.01 6262.6 295 6262.7 295.99 6262.8 300 6262.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.92 .013 172.42 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.92 172.42 22.55 22.55 22.55 .1  
  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
189.61 300 6258 F



Left Levee Station= 105.43 Elevation= 6265.35  
Right Levee Station= 189.61 Elevation= 6258.09

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6257.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.68	Reach Len. (ft)	22.55
22.55 22.55			
Crit W.S. (ft)	6255.68	Flow Area (sq ft)	
105.88			
E.G. Slope (ft/ft)	0.001823	Area (sq ft)	
105.88			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.61	Top Width (ft)	
35.61			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24286.3	Conv. (cfs)	
24286.3			
Length Wtd. (ft)	22.55	Wetted Per. (ft)	
37.25			
Min Ch El (ft)	6251.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.43 189.61			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.54			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.16			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 974

INPUT

Description:

Station	Elevation	Data	num=	373					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
-36.1	6266.4	-34.2	6266.4	-32.49	6266.3	-30.79	6266.2	-29.08	
6266.1									
-27.38	6266	-25.67	6265.9	-16.94	6265.8	-6.87	6265.7	.13	
6265.6									
5.11	6265.5	8.1	6265.4	11.09	6265.3	25.97	6265.2	47.98	
6265.1									
59.67	6265	68.84	6264.9	69.15	6264.8	69.45	6264.7	69.76	
6264.6									
70.06	6264.5	70.37	6264.4	70.67	6264.3	70.98	6264.2	71.28	
6264.1									
71.59	6264	71.89	6263.9	72.19	6263.8	72.5	6263.7	72.8	
6263.6									
73.11	6263.5	73.41	6263.4	73.72	6263.3	74.02	6263.2	74.33	
6263.1									
74.63	6263	74.94	6262.9	75.24	6262.8	75.55	6262.7	75.85	
6262.6									
76.15	6262.5	76.46	6262.4	76.76	6262.3	77.07	6262.2	77.37	
6262.1									
77.68	6262	77.98	6261.9	78.29	6261.8	78.59	6261.7	78.9	
6261.6									
79.2	6261.5	79.5	6261.4	79.81	6261.3	80.11	6261.2	80.42	
6261.1									
80.72	6261	81.03	6260.9	81.33	6260.8	81.64	6260.7	81.94	
6260.6									
82.25	6260.5	82.55	6260.4	82.86	6260.3	83.16	6260.2	83.46	
6260.1									
83.77	6260	84.07	6259.9	84.38	6259.8	84.68	6259.7	84.99	
6259.6									
85.29	6259.5	85.6	6259.4	85.9	6259.3	86.21	6259.2	86.51	
6259.1									
86.81	6259	87.12	6258.9	87.42	6258.8	87.73	6258.7	88.03	
6258.6									
88.34	6258.5	88.64	6258.4	88.95	6258.3	89.25	6258.2	89.56	
6258.1									
89.86	6258	90.17	6257.9	90.47	6257.8	90.77	6257.7	91.08	
6257.6									
91.38	6257.5	91.69	6257.4	91.99	6257.3	92.3	6257.2	92.6	
6257.1									
92.91	6257	93.21	6256.9	93.52	6256.8	93.82	6256.7	94.12	
6256.6									
94.43	6256.5	94.73	6256.4	95.04	6256.3	95.34	6256.2	95.6	
6256.1									
95.85	6256	96.1	6255.9	96.35	6255.8	96.6	6255.7	96.85	
6255.6									
97.1	6255.5	97.35	6255.4	97.6	6255.3	97.85	6255.2	98.1	



6255.1  
98.35 6255 98.6 6254.9 98.85 6254.8 99.1 6254.7 99.35  
6254.6  
99.6 6254.5 99.85 6254.4 100.1 6254.3 100.35 6254.2 100.6  
6254.1  
100.85 6254 101.1 6253.9 101.35 6253.8 101.6 6253.7 101.85  
6253.6  
102.1 6253.5 102.35 6253.4 102.6 6253.3 102.85 6253.2 103.1  
6253.1  
103.35 6253 103.6 6252.9 103.85 6252.8 104.1 6252.7 104.35  
6252.6  
104.6 6252.5 104.85 6252.4 105.1 6252.3 105.35 6252.2 105.6  
6252.1  
105.85 6252 106.1 6251.9 106.35 6251.8 106.6 6251.7 106.85  
6251.6  
107.1 6251.5 107.35 6251.4 107.6 6251.3 107.85 6251.2 108.1  
6251.1  
108.35 6251 108.6 6250.9 108.85 6250.8 118.96 6250.8 119.26  
6250.9  
119.56 6251 119.86 6251.1 120.16 6251.2 120.46 6251.3 120.76  
6251.4  
121.06 6251.5 121.36 6251.6 121.66 6251.7 121.96 6251.8 122.26  
6251.9  
122.56 6252 122.86 6252.1 123.16 6252.2 123.46 6252.3 123.76  
6252.4  
124.06 6252.5 124.36 6252.6 124.66 6252.7 124.96 6252.8 125.26  
6252.9  
125.56 6253 125.86 6253.1 126.16 6253.2 126.46 6253.3 126.76  
6253.4  
127.06 6253.5 127.36 6253.6 127.66 6253.7 127.96 6253.8 128.26  
6253.9  
128.56 6254 128.86 6254.1 129.16 6254.2 129.46 6254.3 129.76  
6254.4  
130.06 6254.5 130.36 6254.6 130.66 6254.7 130.96 6254.8 131.26  
6254.9  
131.56 6255 131.86 6255.1 132.16 6255.2 132.47 6255.3 132.87  
6255.4  
133.26 6255.5 133.65 6255.6 134.05 6255.7 134.44 6255.8 134.83  
6255.9  
135.22 6256 135.62 6256.1 136.01 6256.2 136.4 6256.3 136.8  
6256.4  
137.19 6256.5 137.58 6256.6 137.97 6256.7 138.37 6256.8 153.49  
6256.8  
154.19 6256.7 154.88 6256.6 155.58 6256.5 156.24 6256.4 156.77  
6256.3  
157.3 6256.2 157.83 6256.1 158.36 6256 158.89 6255.9 159.45  
6255.8  
160.13 6255.7 160.48 6256 160.81 6255.6 161.49 6255.5 162.17  
6255.4  
162.85 6255.3 162.91 6255.8 163.53 6255.2 164.21 6255.1 164.89  
6255  
165.57 6254.9 166.24 6254.8 166.92 6254.7 167.6 6254.6 168.28  
6254.5

168.96 6254.4 169.64 6254.3 170.32 6254.2 171 6254.1 171.68  
6254  
172.36 6253.9 173.04 6253.8 173.72 6253.7 174.39 6253.6 175.07  
6253.5  
175.75 6253.4 176.43 6253.3 177.11 6253.2 177.79 6253.1 178.47  
6253  
181.55 6252.9 184.72 6252.8 187.88 6252.7 189.4 6252.6 189.5  
6252.5  
189.6 6252.4 189.7 6252.3 189.8 6252.2 191.91 6252.2 192.01  
6252.3  
192.11 6252.4 192.21 6252.5 192.22 6252.6 192.31 6252.6 193.56  
6252.7  
196.41 6252.8 199.27 6252.9 202.13 6253 204.99 6253.1 207.84  
6253.2  
210.7 6253.3 213.58 6253.4 216.46 6253.5 219.49 6253.6 222.87  
6253.7  
224.61 6253.8 224.98 6253.9 225.34 6254 225.71 6254.1 226.07  
6254.2  
226.44 6254.3 226.8 6254.4 227.16 6254.5 227.53 6254.6 227.89  
6254.7  
228.26 6254.8 228.62 6254.9 228.99 6255 229.35 6255.1 229.71  
6255.2  
230.08 6255.3 230.44 6255.4 230.81 6255.5 231.17 6255.6 231.54  
6255.7  
231.9 6255.8 232.27 6255.9 232.63 6256 232.99 6256.1 233.36  
6256.2  
233.72 6256.3 234.09 6256.4 234.45 6256.5 234.82 6256.6 235.18  
6256.7  
235.54 6256.8 235.91 6256.9 236.27 6257 236.64 6257.1 237  
6257.2  
237.37 6257.3 237.73 6257.4 238.09 6257.5 238.46 6257.6 238.82  
6257.7  
239.19 6257.8 239.55 6257.9 239.92 6258 240.28 6258.1 240.65  
6258.2  
241.02 6258.3 241.39 6258.4 241.75 6258.5 242.12 6258.6 242.49  
6258.7  
242.86 6258.8 243.23 6258.9 243.6 6259 243.97 6259.1 244.33  
6259.2  
244.7 6259.3 245.07 6259.4 245.44 6259.5 245.81 6259.6 246.18  
6259.7  
246.54 6259.8 246.91 6259.9 247.28 6260 247.65 6260.1 248.02  
6260.2  
248.39 6260.3 248.75 6260.4 249.12 6260.5 249.49 6260.6 249.86  
6260.7  
250.23 6260.8 250.6 6260.9 250.96 6261 251.33 6261.1 251.7  
6261.2  
252.07 6261.3 252.44 6261.4 252.81 6261.5 253.17 6261.6 253.54  
6261.7  
253.91 6261.8 254.28 6261.9 255.13 6262 256.12 6262.1 257.11  
6262.2  
258.1 6262.3 259.09 6262.4 263.9 6262.4

Manning's n Values num= 3



Sta	n Val	Sta	n Val	Sta	n Val
-36.1	.03	92.91	.013	138.37	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 92.91 138.37 19.92 19.92 19.92 .1

.3  
 Ineffective Flow num= 1  
 Sta L Sta R Elev Permanent  
 153.51 263.9 6256.67 F  
 Left Levee Station= 68.91 Elevation= 6264.88  
 Right Levee Station= 153.51 Elevation= 6256.85

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6256.92	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.45	Reach Len. (ft)	19.92
19.92 19.92			
Crit W.S. (ft)	6255.45	Flow Area (sq ft)	
106.50			
E.G. Slope (ft/ft)	0.001804	Area (sq ft)	
106.50			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24417.2	Conv. (cfs)	
24417.2			
Length Wtd. (ft)	19.92	Wetted Per. (ft)	
37.49			
Min Ch El (ft)	6250.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	263.90
68.91 153.51			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.49			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.15			

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

was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 973

INPUT  
 Description:  
 Station Elevation Data num= 390

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-32.18	6266.2	-29.67	6266.2	-26.39	6266.1	-24.69	6266	-22.99
6265.9								
-21.29	6265.8	-13.57	6265.7	-2.85	6265.6	1.97	6265.5	5.36
6265.4								
8.45	6265.3	11.39	6265.2	14.33	6265.1	17.27	6265	20.21
6264.9								
23.16	6264.8	34.13	6264.7	51.24	6264.6	67.2	6264.5	72.15
6264.4								
72.48	6264.3	72.81	6264.2	73.14	6264.1	73.47	6264	73.8
6263.9								
74.13	6263.8	74.46	6263.7	74.79	6263.6	75.12	6263.5	75.45
6263.4								
75.78	6263.3	76.11	6263.2	76.44	6263.1	76.77	6263	77.1
6262.9								
77.43	6262.8	77.76	6262.7	78.09	6262.6	78.42	6262.5	78.75
6262.4								
79.08	6262.3	79.41	6262.2	79.74	6262.1	80.07	6262	80.4
6261.9								
80.73	6261.8	81.05	6261.7	81.37	6261.6	81.69	6261.5	82.01
6261.4								
82.32	6261.3	82.64	6261.2	82.96	6261.1	83.28	6261	83.6
6260.9								
83.92	6260.8	84.24	6260.7	84.56	6260.6	84.87	6260.5	85.19
6260.4								
85.51	6260.3	85.83	6260.2	86.15	6260.1	86.47	6260	86.79
6259.9								
87.11	6259.8	87.42	6259.7	87.74	6259.6	88.06	6259.5	88.38
6259.4								
88.7	6259.3	89.02	6259.2	89.34	6259.1	89.66	6259	89.97
6258.9								
90.29	6258.8	90.61	6258.7	90.93	6258.6	91.25	6258.5	91.57
6258.4								
91.89	6258.3	92.21	6258.2	92.52	6258.1	92.84	6258	93.16
6257.9								
93.48	6257.8	93.8	6257.7	94.12	6257.6	94.44	6257.5	94.76



6257.4  
95.07 6257.3 95.39 6257.2 95.71 6257.1 96.03 6257 96.35  
6256.9  
96.67 6256.8 96.99 6256.7 97.31 6256.6 97.62 6256.5 97.94  
6256.4  
98.26 6256.3 98.58 6256.2 98.9 6256.1 99.22 6256 99.48  
6255.9  
99.73 6255.8 99.98 6255.7 100.23 6255.6 100.48 6255.5 100.73  
6255.4  
100.98 6255.3 101.23 6255.2 101.48 6255.1 101.73 6255 101.98  
6254.9  
102.23 6254.8 102.48 6254.7 102.73 6254.6 102.98 6254.5 103.23  
6254.4  
103.48 6254.3 103.73 6254.2 103.98 6254.1 104.23 6254 104.48  
6253.9  
104.73 6253.8 104.98 6253.7 105.23 6253.6 105.48 6253.5 105.73  
6253.4  
105.98 6253.3 106.23 6253.2 106.48 6253.1 106.73 6253 106.98  
6252.9  
107.23 6252.8 107.48 6252.7 107.73 6252.6 107.98 6252.5 108.23  
6252.4  
108.48 6252.3 108.73 6252.2 108.98 6252.1 109.23 6252 109.48  
6251.9  
109.73 6251.8 109.98 6251.7 110.23 6251.6 110.48 6251.5 110.73  
6251.4  
110.98 6251.3 111.23 6251.2 111.48 6251.1 111.73 6251 111.98  
6250.9  
112.23 6250.8 112.48 6250.7 112.73 6250.6 122.82 6250.6 123.12  
6250.7  
123.42 6250.8 123.73 6250.9 124.03 6251 124.33 6251.1 124.63  
6251.2  
124.93 6251.3 125.23 6251.4 125.53 6251.5 125.83 6251.6 126.13  
6251.7  
126.43 6251.8 126.73 6251.9 127.03 6252 127.33 6252.1 127.63  
6252.2  
127.94 6252.3 128.24 6252.4 128.54 6252.5 128.84 6252.6 129.14  
6252.7  
129.44 6252.8 129.74 6252.9 130.04 6253 130.34 6253.1 130.64  
6253.2  
130.93 6253.3 131.23 6253.4 131.53 6253.5 131.83 6253.6 132.13  
6253.7  
132.43 6253.8 132.73 6253.9 133.03 6254 133.33 6254.1 133.63  
6254.2  
133.93 6254.3 134.23 6254.4 134.53 6254.5 134.83 6254.6 135.13  
6254.7  
135.42 6254.8 135.72 6254.9 136.02 6255 136.34 6255.1 136.74  
6255.2  
137.14 6255.3 137.53 6255.4 137.93 6255.5 138.33 6255.6 138.73  
6255.7  
139.13 6255.8 139.52 6255.9 139.92 6256 140.3 6256.1 140.67  
6256.2  
141.03 6256.3 141.4 6256.4 141.76 6256.5 142.13 6256.6 157.52  
6256.6

158.14 6256.5 158.74 6256.4 159.35 6256.3 159.95 6256.2 160.56  
6256.1  
161.16 6256 161.77 6255.9 162.37 6255.8 162.97 6255.7 163.58  
6255.6  
164.18 6255.5 164.79 6255.4 165.39 6255.3 165.99 6255.2 166.6  
6255.1  
167.2 6255 167.81 6254.9 168.41 6254.8 169.01 6254.7 169.62  
6254.6  
170.22 6254.5 170.83 6254.4 171.43 6254.3 172.04 6254.2 172.64  
6254.1  
173.24 6254 173.85 6253.9 174.45 6253.8 175.06 6253.7 175.66  
6253.6  
176.28 6253.5 176.97 6253.4 177.66 6253.3 178.35 6253.2 179.04  
6253.1  
179.73 6253 180.42 6252.9 181.11 6252.8 181.8 6252.7 183.25  
6252.6  
184.35 6252.6 186.62 6252.5 188.78 6252.5 191.04 6252.4 192.75  
6252.3  
192.85 6252.2 192.95 6252.1 193.05 6252 193.15 6251.9 195.22  
6251.9  
195.32 6252 195.42 6252.1 195.52 6252.2 195.62 6252.3 196.1  
6252.4  
197.26 6252.5 198.54 6252.6 199.91 6252.7 201.33 6252.8 202.79  
6252.9  
205.51 6253 206.35 6253 206.64 6252.9 206.93 6252.8 207.22  
6252.7  
207.51 6252.6 209.91 6252.7 210.76 6252.6 213.29 6252.7 213.55  
6252.8  
213.81 6252.9 214.07 6253 214.33 6253.1 214.42 6253.1 214.82  
6253.2  
216.45 6253.3 219.57 6253.4 222.69 6253.5 223.03 6254.3 223.53  
6254.2  
224.03 6254.1 224.51 6254 225.19 6253.6 225.38 6253.7 225.44  
6253.8  
225.51 6253.9 225.58 6254 225.65 6254.1 225.72 6254.2 225.79  
6254.3  
227.13 6254.3 227.25 6254.4 228.62 6254.3 228.97 6254.4 229.32  
6254.5  
229.67 6254.6 230.02 6254.7 230.37 6254.8 230.78 6254.9 231.19  
6255  
231.61 6255.1 232.03 6255.2 232.44 6255.3 232.86 6255.4 233.28  
6255.5  
233.69 6255.6 234.11 6255.7 234.53 6255.8 234.94 6255.9 235.36  
6256  
235.78 6256.1 236.19 6256.2 236.61 6256.3 237.03 6256.4 237.44  
6256.5  
237.86 6256.6 238.28 6256.7 238.69 6256.8 239.11 6256.9 239.53  
6257  
239.94 6257.1 240.36 6257.2 240.78 6257.3 241.19 6257.4 241.61  
6257.5  
242.03 6257.6 242.44 6257.7 242.86 6257.8 243.27 6257.9 243.67  
6258  
244.07 6258.1 244.47 6258.2 244.87 6258.3 245.27 6258.4 245.67



E.G. Elev (ft)	6256.72	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.25	Reach Len. (ft)	7.53
7.53 7.53			
Crit W.S. (ft)	6255.25	Flow Area (sq ft)	
106.46			
E.G. Slope (ft/ft)	0.001805	Area (sq ft)	
106.46			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24405.7	Conv. (cfs)	
24405.7			

Length Wtd. (ft)	7.53	Wetted Per. (ft)	
37.48			
Min Ch El (ft)	6250.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	267.82
72.83 156.59			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.44			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.13			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 972

## INPUT

Description:

Station	Elevation	Data	num=	372				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-66.04	6266.1	-63.22	6266.1	-58.86	6266	-57.17	6265.9	-55.47
6265.8								
-51.5	6265.7	-40.89	6265.6	-33.49	6265.5	-30.79	6265.4	-28.26
6265.3								
-25.41	6265.2	-22.05	6265.1	-18.91	6265	-15.98	6264.9	-13.06
6264.8								
-10.13	6264.7	-7.21	6264.6	3.48	6264.5	18.96	6264.4	30.72
6264.3								
35.96	6264.2	38.29	6264.1	38.62	6264	38.95	6263.9	39.28
6263.8								
39.6	6263.7	39.93	6263.6	40.26	6263.5	40.59	6263.4	40.92
6263.3								
41.25	6263.2	41.58	6263.1	41.91	6263	42.24	6262.9	42.57
6262.8								
42.9	6262.7	43.23	6262.6	43.55	6262.5	43.88	6262.4	44.21
6262.3								
44.54	6262.2	44.87	6262.1	45.2	6262	45.53	6261.9	45.86
6261.8								



46.19	6261.7	46.52	6261.6	46.85	6261.5	47.17	6261.4	47.5
6261.3								
47.83	6261.2	48.16	6261.1	48.49	6261	48.82	6260.9	49.15
6260.8								
49.48	6260.7	49.81	6260.6	50.14	6260.5	50.47	6260.4	50.8
6260.3								
51.12	6260.2	51.45	6260.1	51.78	6260	52.11	6259.9	52.44
6259.8								
52.77	6259.7	53.1	6259.6	53.43	6259.5	53.76	6259.4	54.09
6259.3								
54.42	6259.2	54.75	6259.1	55.07	6259	55.4	6258.9	55.73
6258.8								
56.06	6258.7	56.39	6258.6	56.72	6258.5	57.05	6258.4	57.38
6258.3								
57.71	6258.2	58.04	6258.1	58.37	6258	58.7	6257.9	59.02
6257.8								
59.35	6257.7	59.68	6257.6	60.01	6257.5	60.34	6257.4	60.67
6257.3								
61	6257.2	61.35	6257.1	61.69	6257	62.03	6256.9	62.38
6256.8								
62.72	6256.7	63.06	6256.6	63.4	6256.5	63.75	6256.4	64.09
6256.3								
64.43	6256.2	64.78	6256.1	65.12	6256	65.45	6255.9	65.7
6255.8								
65.95	6255.7	66.2	6255.6	66.45	6255.5	66.7	6255.4	66.95
6255.3								
67.2	6255.2	67.45	6255.1	67.7	6255	67.95	6254.9	68.2
6254.8								
68.45	6254.7	68.7	6254.6	68.95	6254.5	69.2	6254.4	69.45
6254.3								
69.7	6254.2	69.96	6254.1	70.21	6254	70.46	6253.9	70.71
6253.8								
70.96	6253.7	71.21	6253.6	71.46	6253.5	71.71	6253.4	71.96
6253.3								
72.21	6253.2	72.46	6253.1	72.71	6253	72.96	6252.9	73.21
6252.8								
73.46	6252.7	73.71	6252.6	73.96	6252.5	74.21	6252.4	74.46
6252.3								
74.71	6252.2	74.96	6252.1	75.21	6252	75.46	6251.9	75.71
6251.8								
75.96	6251.7	76.21	6251.6	76.46	6251.5	76.71	6251.4	76.96
6251.3								
77.21	6251.2	77.46	6251.1	77.71	6251	77.96	6250.9	78.21
6250.8								
78.46	6250.7	78.71	6250.6	89.22	6250.6	89.52	6250.7	89.82
6250.8								
90.12	6250.9	90.42	6251	90.72	6251.1	91.02	6251.2	91.32
6251.3								
91.62	6251.4	91.92	6251.5	92.22	6251.6	92.52	6251.7	92.82
6251.8								
93.12	6251.9	93.42	6252	93.72	6252.1	94.03	6252.2	94.33
6252.3								
94.63	6252.4	94.93	6252.5	95.23	6252.6	95.53	6252.7	95.83

6252.8								
96.13	6252.9	96.43	6253	96.73	6253.1	97.03	6253.2	97.33
6253.3								
97.63	6253.4	97.93	6253.5	98.23	6253.6	98.53	6253.7	98.83
6253.8								
99.13	6253.9	99.44	6254	99.74	6254.1	100.04	6254.2	100.34
6254.3								
100.64	6254.4	100.94	6254.5	101.23	6254.6	101.53	6254.7	101.83
6254.8								
102.13	6254.9	102.43	6255	102.81	6255.1	103.17	6255.2	103.54
6255.3								
103.9	6255.4	104.27	6255.5	104.63	6255.6	105	6255.7	105.37
6255.8								
105.73	6255.9	106.1	6256	106.46	6256.1	106.83	6256.2	107.19
6256.3								
107.56	6256.4	107.93	6256.5	108.29	6256.6	123.7	6256.6	124.34
6256.5								
124.94	6256.4	125.55	6256.3	126.15	6256.2	126.76	6256.1	127.36
6256								
127.96	6255.9	128.57	6255.8	129.17	6255.7	129.78	6255.6	130.38
6255.5								
130.98	6255.4	131.59	6255.3	132.19	6255.2	132.8	6255.1	133.4
6255								
134.01	6254.9	134.61	6254.8	135.21	6254.7	135.82	6254.6	136.42
6254.5								
137.03	6254.4	137.63	6254.3	138.23	6254.2	138.84	6254.1	139.44
6254								
140.05	6253.9	140.65	6253.8	141.26	6253.7	141.86	6253.6	142.46
6253.5								
143.07	6253.4	143.67	6253.3	144.28	6253.2	144.88	6253.1	145.48
6253								
146.09	6252.9	146.69	6252.8	147.26	6252.7	147.82	6252.6	148.38
6252.5								
152.55	6252.4	156.94	6252.3	159.06	6252.2	159.16	6252.1	159.26
6252								
159.36	6251.9	159.46	6251.8	161.88	6251.8	162.3	6251.9	162.73
6252								
164.17	6252.1	164.29	6252.2	164.4	6252.3	164.52	6252.4	164.64
6252.5								
165.26	6252.6	165.75	6252.7	168.53	6252.7	170.45	6252.8	171.9
6252.8								
175.53	6252.9	178.46	6253	181.19	6253.1	183.92	6253.2	185.85
6253.4								
186.65	6253.3	189.38	6253.4	191.46	6253.5	191.86	6253.6	192.26
6253.7								
192.66	6253.8	193.06	6253.9	193.46	6254	193.86	6254.1	194.26
6254.2								
194.66	6254.3	195.06	6254.4	195.46	6254.5	195.86	6254.6	196.26
6254.7								
196.66	6254.8	197.06	6254.9	197.46	6255	197.87	6255.1	198.27
6255.2								
198.67	6255.3	199.07	6255.4	199.38	6255.5	199.47	6255.5	199.87
6255.6								



Manning's n Values		num=		3		
Sta	n Val	Sta	n Val	Sta	n Val	
-66.04	.03	62.38	.013	106.46	.03	
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.						
	62.38	106.46		12.38	12.38	12.38
						.1

CROSS SECTION OUTPUT Profile #Flow 1

Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.87	Top Width (ft)	
35.87			
Vel Total (ft/s)	9.78	Avg. Vel. (ft/s)	
9.78			
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	
2.96			
Conv. Total (cfs)	24240.3	Conv. (cfs)	
24240.3			
Length Wtd. (ft)	12.38	Wetted Per. (ft)	
37.50			
Min Ch El (ft)	6250.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	233.96
35.62 122.73			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.42			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.12			

CROSS SECTION

[illegible]



89.24	6264	94.22	6263.9	99.19	6263.8	104.17	6263.7	104.58
6263.6								
104.93	6263.5	105.27	6263.4	105.62	6263.3	105.96	6263.2	106.31
6263.1								
106.65	6263	106.99	6262.9	107.34	6262.8	107.68	6262.7	108.03
6262.6								
108.37	6262.5	108.72	6262.4	109.06	6262.3	109.41	6262.2	109.75
6262.1								
110.1	6262	110.44	6261.9	110.79	6261.8	111.13	6261.7	111.48
6261.6								
111.82	6261.5	112.17	6261.4	112.51	6261.3	112.86	6261.2	113.2
6261.1								
113.54	6261	113.89	6260.9	114.23	6260.8	114.58	6260.7	114.92
6260.6								
115.27	6260.5	115.61	6260.4	115.96	6260.3	116.3	6260.2	116.65
6260.1								
116.99	6260	117.34	6259.9	117.68	6259.8	118.03	6259.7	118.37
6259.6								
118.72	6259.5	119.06	6259.4	119.41	6259.3	119.75	6259.2	120.09
6259.1								
120.44	6259	120.78	6258.9	121.13	6258.8	121.47	6258.7	121.82
6258.6								
122.16	6258.5	122.51	6258.4	122.85	6258.3	123.2	6258.2	123.54
6258.1								
123.89	6258	124.23	6257.9	124.58	6257.8	124.92	6257.7	125.27
6257.6								
125.61	6257.5	125.96	6257.4	126.3	6257.3	126.65	6257.2	126.99
6257.1								
127.33	6257	127.67	6256.9	128.02	6256.8	128.36	6256.7	128.7
6256.6								
129.05	6256.5	129.39	6256.4	129.73	6256.3	130.07	6256.2	130.42
6256.1								
130.76	6256	131.1	6255.9	131.45	6255.8	131.71	6255.7	131.96
6255.6								
132.21	6255.5	132.46	6255.4	132.71	6255.3	132.96	6255.2	133.21
6255.1								
133.46	6255	133.71	6254.9	133.96	6254.8	134.21	6254.7	134.46
6254.6								
134.71	6254.5	134.96	6254.4	135.21	6254.3	135.46	6254.2	135.71
6254.1								
135.96	6254	136.21	6253.9	136.46	6253.8	136.71	6253.7	136.96
6253.6								
137.21	6253.5	137.46	6253.4	137.71	6253.3	137.96	6253.2	138.21
6253.1								
138.46	6253	138.71	6252.9	138.96	6252.8	139.21	6252.7	139.46
6252.6								
139.71	6252.5	139.96	6252.4	140.21	6252.3	140.46	6252.2	140.71
6252.1								
140.96	6252	141.21	6251.9	141.46	6251.8	141.71	6251.7	141.96
6251.6								
142.21	6251.5	142.46	6251.4	142.71	6251.3	142.96	6251.2	143.21
6251.1								
143.46	6251	143.71	6250.9	143.96	6250.8	144.21	6250.7	144.46

6250.6								
144.71	6250.5	144.96	6250.4	155.05	6250.4	155.35	6250.5	155.65
6250.6								
155.95	6250.7	156.25	6250.8	156.55	6250.9	156.85	6251	157.15
6251.1								
157.45	6251.2	157.75	6251.3	158.05	6251.4	158.35	6251.5	158.65
6251.6								
158.95	6251.7	159.25	6251.8	159.55	6251.9	159.85	6252	160.15
6252.1								
160.45	6252.2	160.75	6252.3	161.05	6252.4	161.35	6252.5	161.65
6252.6								
161.95	6252.7	162.25	6252.8	162.55	6252.9	162.85	6253	163.15
6253.1								
163.45	6253.2	163.75	6253.3	164.05	6253.4	164.35	6253.5	164.65
6253.6								
164.95	6253.7	165.25	6253.8	165.55	6253.9	165.85	6254	166.15
6254.1								
166.45	6254.2	166.75	6254.3	167.05	6254.4	167.35	6254.5	167.65
6254.6								
167.95	6254.7	168.25	6254.8	168.55	6254.9	168.88	6255	169.21
6255.1								
169.54	6255.2	169.87	6255.3	170.2	6255.4	170.53	6255.5	170.86
6255.6								
171.19	6255.7	171.39	6255.76	171.52	6255.8	171.85	6255.9	172.18
6256								
172.51	6256.1	172.84	6256.2	173.17	6256.3	173.5	6256.4	173.83
6256.5								
174.16	6256.6	174.49	6256.7	189.94	6256.7	190.64	6256.6	191.34
6256.5								
192.03	6256.4	192.64	6256.3	193.18	6256.2	193.72	6256.1	194.26
6256								
194.8	6255.9	195.34	6255.8	195.88	6255.7	196.42	6255.6	196.96
6255.5								
197.5	6255.4	198.04	6255.3	198.58	6255.2	199.12	6255.1	199.66
6255								
200.19	6254.9	200.73	6254.8	201.27	6254.7	201.81	6254.6	202.35
6254.5								
202.89	6254.4	203.43	6254.3	203.97	6254.2	204.51	6254.1	205.05
6254								
205.59	6253.9	206.13	6253.8	206.67	6253.7	207.21	6253.6	207.75
6253.5								
208.29	6253.4	208.82	6253.3	209.36	6253.2	209.9	6253.1	210.44
6253								
210.98	6252.9	211.52	6252.8	212.06	6252.7	212.6	6252.6	213.14
6252.5								
213.69	6252.4	213.81	6252.5	214.05	6253	214.25	6252.3	219.14
6252.2								
227.09	6252.1	227.2	6252	227.3	6251.9	227.41	6251.8	227.52
6251.7								
228.81	6252	229.91	6251.7	230.02	6251.8	230.14	6251.9	230.25
6252								
230.36	6252.1	233.98	6252.2	237.64	6252.3	241.29	6252.4	243.1
6252.5								



244.95	6252.5	247.6	6252.6	248.61	6252.6	251.9	6252.7	252.26
6252.7								
255.81	6252.8	257.71	6252.9	258.11	6253	258.5	6253.1	258.89
6253.2								
259.28	6253.3	259.68	6253.4	260.07	6253.5	260.46	6253.6	260.85
6253.7								
261.25	6253.8	261.64	6253.9	262.03	6254	262.42	6254.1	262.82
6254.2								
263.21	6254.3	263.6	6254.4	264	6254.5	264.39	6254.6	264.78
6254.7								
265.17	6254.8	265.57	6254.9	265.96	6255	266.35	6255.1	266.74
6255.2								
267.14	6255.3	267.53	6255.4	267.92	6255.5	268.31	6255.6	268.71
6255.7								
269.1	6255.8	269.49	6255.9	269.88	6256	270.28	6256.1	270.67
6256.2								
271.06	6256.3	271.45	6256.4	271.85	6256.5	272.24	6256.6	272.63
6256.7								
273.03	6256.8	273.42	6256.9	273.81	6257	274.2	6257.1	274.6
6257.2								
274.99	6257.3	275.38	6257.4	275.77	6257.5	276.17	6257.6	276.56
6257.7								
276.95	6257.8	277.34	6257.9	277.74	6258	278.13	6258.1	278.52
6258.2								
278.91	6258.3	279.31	6258.4	279.7	6258.5	280.09	6258.6	280.48
6258.7								
280.88	6258.8	281.27	6258.9	281.66	6259	282.05	6259.1	282.45
6259.2								
282.84	6259.3	283.23	6259.4	283.62	6259.5	284.02	6259.6	284.41
6259.7								
284.8	6259.8	285.19	6259.9	285.59	6260	285.98	6260.1	286.37
6260.2								
286.76	6260.3	287.16	6260.4	287.55	6260.5	287.94	6260.6	288.33
6260.7								
288.73	6260.8	289.12	6260.9	289.51	6261	290.7	6261.1	291.97
6261.2								
293.24	6261.3	294.5	6261.4	300	6261.4			

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	130.76	.013	171.39	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	130.76	171.39		37.63	37.63	.1

.3	Ineffective Flow	num=	1
Sta L	Sta R	Elev	Permanent
190.03	300	6256.59	F
Left Levee	Station=	103.33	Elevation= 6263.68
Right Levee	Station=	189.61	Elevation= 6256.72

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6256.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6255.06	Reach Len. (ft)	37.63
37.63 37.63			
Crit W.S. (ft)	6255.06	Flow Area (sq ft)	
106.74			
E.G. Slope (ft/ft)	0.001786	Area (sq ft)	
106.74			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.77	Top Width (ft)	
35.77			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24541.1	Conv. (cfs)	
24541.1			
Length Wtd. (ft)	37.63	Wetted Per. (ft)	
37.42			
Min Ch El (ft)	6250.40	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
103.33 189.61			
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.01
0.39			
C & E Loss (ft)	0.02	Cum SA (acres)	
0.11			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 970

INPUT







200.99	6255.2	201.44	6255.1	201.89	6255	202.33	6254.9	202.78
6254.8								
203.23	6254.7	203.68	6254.6	204.12	6254.5	204.57	6254.4	204.7
6254.7								
205.02	6254.3	205.46	6254.2	205.91	6254.1	206.36	6254	206.81
6253.9								
207.28	6253.8	207.75	6253.7	208.22	6253.6	208.69	6253.5	209.16
6253.4								
209.63	6253.3	210.1	6253.2	210.57	6253.1	210.65	6253.5	211.04
6253								
211.51	6252.9	211.98	6252.8	212.45	6252.7	212.92	6252.6	213.39
6252.5								
213.86	6252.4	214.33	6252.3	214.79	6252.2	215.26	6252.1	215.76
6252								
216.26	6251.9	228.9	6251.8	229.04	6251.7	229.18	6251.6	229.32
6251.5								
229.46	6251.4	232.25	6251.4	232.39	6251.5	232.49	6251.7	232.52
6251.6								
232.66	6251.7	232.8	6251.8	232.94	6251.9	240.6	6252	247.97
6252.1								
253.08	6252.2	256.52	6252.3	258.54	6252.4	258.94	6252.5	259.33
6252.6								
259.73	6252.7	260.12	6252.8	260.52	6252.9	260.91	6253	261.31
6253.1								
261.7	6253.2	262.1	6253.3	262.49	6253.4	262.89	6253.5	263.29
6253.6								
263.68	6253.7	264.08	6253.8	264.47	6253.9	264.87	6254	265.26
6254.1								
265.66	6254.2	266.05	6254.3	266.45	6254.4	266.84	6254.5	267.24
6254.6								
267.63	6254.7	268.03	6254.8	268.43	6254.9	268.82	6255	269.22
6255.1								
269.61	6255.2	270.01	6255.3	270.4	6255.4	270.8	6255.5	271.19
6255.6								
271.59	6255.7	271.98	6255.8	272.38	6255.9	272.77	6256	273.17
6256.1								
273.57	6256.2	273.96	6256.3	274.36	6256.4	274.75	6256.5	275.15
6256.6								
275.54	6256.7	275.94	6256.8	276.33	6256.9	276.73	6257	277.12
6257.1								
277.52	6257.2	277.91	6257.3	278.31	6257.4	278.7	6257.5	279.1
6257.6								
279.5	6257.7	279.89	6257.8	280.29	6257.9	280.68	6258	281.08
6258.1								
281.47	6258.2	281.87	6258.3	282.26	6258.4	282.66	6258.5	283.05
6258.6								
283.45	6258.7	283.84	6258.8	284.24	6258.9	284.64	6259	285.03
6259.1								
285.43	6259.2	285.82	6259.3	286.22	6259.4	286.61	6259.5	287.01
6259.6								
287.4	6259.7	287.79	6259.8	288.19	6259.9	288.58	6260	288.97
6260.1								
289.37	6260.2	289.76	6260.3	290.16	6260.4	291.22	6260.5	293.93

6260.6								
300	6260.6							
Manning's	n	Values	num=	3				
Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.03	132.5	.013	169.98	.03			
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	132.5	169.98		50	50	50		.1
.3								
Ineffective Flow	num=	1						
Sta L	Sta R	Elev	Permanent					
192.96	300	6257.47	F					
Left Levee	Station=	49.73	Elevation=	6264.69				
Right Levee	Station=	189.19	Elevation=	6257.47				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)	6256.17	Element						Left OB
Channel Right OB								
Vel Head (ft)	1.46	Wt. n-Val.						
0.013								
W.S. Elev (ft)	6254.71	Reach Len. (ft)						50.00
50.00	50.00							
Crit W.S. (ft)	6254.71	Flow Area (sq ft)						
106.85								
E.G. Slope (ft/ft)	0.001777	Area (sq ft)						
106.85								
Q Total (cfs)	1037.00	Flow (cfs)						
1037.00								
Top Width (ft)	35.74	Top Width (ft)						
35.74								
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)						
9.71								
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)						
2.99								
Conv. Total (cfs)	24598.0	Conv. (cfs)						
24598.0								
Length Wtd. (ft)	50.00	Wetted Per. (ft)						
37.38								
Min Ch El (ft)	6250.10	Shear (lb/sq ft)						
0.32								
Alpha	1.00	Stream Power (lb/ft s)						300.00
49.73	189.19							
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)						0.01
0.30								
C & E Loss (ft)	0.00	Cum SA (acres)						
0.08								



Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-0- RS: 969

## INPUT

Description:

Station	Elevation	Data	num=	251					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6264	2.64	6264	6.84	6263.9	11.04	6263.8	15.24	6263.7
19.44	6263.6	24.89	6263.5	29.66	6263.4	34.61	6263.3	39.56	6263.2
44.5	6263.1	49.45	6263	54.4	6262.9	59.35	6262.8	64.47	6262.7
69.43	6262.6	74.02	6262.5	78.62	6262.4	83.21	6262.3	87.14	6262.2
90.53	6262.1	93.93	6262	97.32	6261.9	100.71	6261.8	105.22	6261.7
106.35	6261.6	106.94	6261.6	107.3	6261.5	107.67	6261.4	108.04	6261.3
108.4	6261.2	108.77	6261.1	109.14	6261	109.5	6260.9	109.87	6260.8
110.24	6260.7	110.6	6260.6	110.97	6260.5	111.33	6260.4	111.7	6260.3
112.07	6260.2	112.43	6260.1	112.8	6260	113.17	6259.9	113.53	6259.8
113.9	6259.7	114.27	6259.6	114.63	6259.5	115	6259.4	115.36	6259.3
115.73	6259.2	116.1	6259.1	116.46	6259	116.83	6258.9	117.2	6258.8
117.56	6258.7	117.93	6258.6	118.3	6258.5	118.66	6258.4	119.03	6258.3
119.39	6258.2	119.76	6258.1	120.13	6258	120.49	6257.9	120.86	6257.8
121.23	6257.7	121.59	6257.6	121.96	6257.5	122.33	6257.4	122.69	6257.3
123.06	6257.2	123.42	6257.1	123.79	6257	124.16	6256.9	124.52	6256.8
124.89	6256.7	125.26	6256.6	125.62	6256.5	125.99	6256.4	126.36	6256.3

6256.3								
126.72	6256.2	127.09	6256.1	127.45	6256	127.82	6255.9	128.19
6255.8								
128.55	6255.7	128.92	6255.6	129.29	6255.5	129.65	6255.4	130.02
6255.3								
130.39	6255.2	130.75	6255.1	131.11	6255	131.12	6255	131.47
6254.9								
131.72	6254.8	131.97	6254.7	132.22	6254.6	132.47	6254.5	132.72
6254.4								
132.97	6254.3	133.22	6254.2	133.47	6254.1	133.72	6254	133.97
6253.9								
134.22	6253.8	134.47	6253.7	134.72	6253.6	134.97	6253.5	135.22
6253.4								
135.47	6253.3	135.72	6253.2	135.97	6253.1	136.22	6253	136.47
6252.9								
136.72	6252.8	136.97	6252.7	137.22	6252.6	137.48	6252.5	137.73
6252.4								
137.98	6252.3	138.23	6252.2	138.48	6252.1	138.73	6252	138.98
6251.9								
139.23	6251.8	139.48	6251.7	139.73	6251.6	139.98	6251.5	140.23
6251.4								
140.48	6251.3	140.73	6251.2	140.99	6251.1	141.24	6251	141.49
6250.9								
141.74	6250.8	141.99	6250.7	142.24	6250.6	142.49	6250.5	142.74
6250.4								
142.99	6250.3	143.24	6250.2	143.49	6250.1	143.74	6250	143.99
6249.9								
144.25	6249.8	144.5	6249.7	144.75	6249.6	155.21	6249.6	155.51
6249.7								
155.81	6249.8	156.11	6249.9	156.41	6250	156.71	6250.1	157.01
6250.2								
157.31	6250.3	157.61	6250.4	157.91	6250.5	158.21	6250.6	158.51
6250.7								
158.81	6250.8	159.11	6250.9	159.41	6251	159.71	6251.1	160.01
6251.2								
160.31	6251.3	160.61	6251.4	160.91	6251.5	161.21	6251.6	161.51
6251.7								
161.81	6251.8	162.11	6251.9	162.41	6252	162.71	6252.1	163.01
6252.2								
163.31	6252.3	163.61	6252.4	163.91	6252.5	164.21	6252.6	164.51
6252.7								
164.81	6252.8	165.11	6252.9	165.41	6253	165.71	6253.1	166.01
6253.2								
166.31	6253.3	166.61	6253.4	166.91	6253.5	167.21	6253.6	167.51
6253.7								
167.81	6253.8	168.11	6253.9	168.41	6254	168.71	6254.1	169.02
6254.2								
169.32	6254.3	169.62	6254.4	169.93	6254.5	170.23	6254.6	170.53
6254.7								
170.84	6254.8	171.14	6254.9	171.44	6255	171.48	6255.02	171.68
6255.1								
171.88	6255.2	172.08	6255.3	172.28	6255.4	172.48	6255.5	172.68
6255.6								



172.89	6255.7	173.09	6255.8	173.29	6255.9	173.49	6256	173.69
6256.1								
173.89	6256.2	174.09	6256.3	174.29	6256.4	181.87	6256.5	186.87
6256.6								
190	6256.7	191.15	6256.8	193.28	6256.9	196.33	6257	200.35
6257.1								
205.4	6257.2	211.85	6257.3	220.64	6257.4	238.15	6257.5	245.04
6257.6								
259.5	6257.7	273.95	6257.8	281.58	6257.9	282.39	6258	283.21
6258.1								
284.02	6258.2	284.84	6258.3	285.66	6258.4	286.5	6258.5	287.35
6258.6								
288.2	6258.7	289.06	6258.8	289.94	6258.9	290.75	6259	291.63
6259.1								
292.5	6259.2	293.38	6259.3	294.26	6259.4	295.13	6259.5	295.99
6259.6								
300	6259.6							

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .03 131.11 .013 171.48 .03		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
131.11	171.48	50	50	50	.1	
.3						
Left Levee	Station=	105.85	Elevation=	6261.73		
Right Levee	Station=	173.7	Elevation=	6256.46		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6255.68	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6254.22	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6254.22	Flow Area (sq ft)	
106.96			
E.G. Slope (ft/ft)	0.001780	Area (sq ft)	
106.96			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.89	Top Width (ft)	
35.89			
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)	
9.69			
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24580.2	Conv. (cfs)	
24580.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	

37.52			
Min Ch El (ft)	6249.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.85 173.70			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
0.18			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.04			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 968

INPUT  
Description:

Station	Elevation	Data	num=	248					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6263.5	2.29	6263.5	4.34	6263.4	6.47	6263.3	8.6	
6263.2									
10.72	6263.1	12.85	6263	14.98	6262.9	17.11	6262.8	19.26	
6262.7									
21.53	6262.6	23.81	6262.5	26.08	6262.4	29.13	6262.3	33.63	
6262.2									
38.13	6262.1	42.73	6262	70.63	6261.9	75.25	6261.8	79.86	
6261.7									
82.85	6261.7	83.83	6261.8	83.98	6261.8	86.85	6261.7	89.72	
6261.6									
91.59	6261.5	93.21	6261.4	94.82	6261.3	96.75	6261.2	98.92	
6261.1									
101.1	6261	103.69	6260.9	105.68	6260.8	107.35	6260.7	107.74	
6260.6									
108.12	6260.5	108.5	6260.4	108.88	6260.3	109.27	6260.2	109.65	
6260.1									
110.03	6260	110.42	6259.9	110.8	6259.8	111.18	6259.7	111.56	
6259.6									
111.95	6259.5	112.33	6259.4	112.71	6259.3	113.09	6259.2	113.48	
6259.1									
113.86	6259	114.24	6258.9	114.62	6258.8	115.01	6258.7	115.39	



6258.6								
115.77	6258.5	116.15	6258.4	116.54	6258.3	116.92	6258.2	117.3
6258.1								
117.69	6258	118.07	6257.9	118.45	6257.8	118.83	6257.7	119.22
6257.6								
119.6	6257.5	119.98	6257.4	120.36	6257.3	120.75	6257.2	121.13
6257.1								
121.51	6257	121.89	6256.9	122.28	6256.8	122.66	6256.7	123.04
6256.6								
123.42	6256.5	123.81	6256.4	124.19	6256.3	124.57	6256.2	124.96
6256.1								
125.34	6256	125.72	6255.9	126.1	6255.8	126.49	6255.7	126.87
6255.6								
127.25	6255.5	127.63	6255.4	128.02	6255.3	128.4	6255.2	128.78
6255.1								
129.16	6255	129.55	6254.9	129.93	6254.8	130.31	6254.7	130.69
6254.6								
131.08	6254.5	131.44	6254.4	131.69	6254.3	131.95	6254.2	132.2
6254.1								
132.45	6254	132.7	6253.9	132.95	6253.8	133.2	6253.7	133.45
6253.6								
133.7	6253.5	133.95	6253.4	134.2	6253.3	134.45	6253.2	134.7
6253.1								
134.95	6253	135.21	6252.9	135.46	6252.8	135.71	6252.7	135.96
6252.6								
136.21	6252.5	136.46	6252.4	136.71	6252.3	136.96	6252.2	137.21
6252.1								
137.46	6252	137.71	6251.9	137.96	6251.8	138.21	6251.7	138.47
6251.6								
138.72	6251.5	138.97	6251.4	139.22	6251.3	139.47	6251.2	139.72
6251.1								
139.97	6251	140.22	6250.9	140.47	6250.8	140.72	6250.7	140.97
6250.6								
141.22	6250.5	141.47	6250.4	141.73	6250.3	141.98	6250.2	142.23
6250.1								
142.48	6250	142.73	6249.9	142.98	6249.8	143.23	6249.7	143.48
6249.6								
143.73	6249.5	143.98	6249.4	144.23	6249.3	144.48	6249.2	144.73
6249.1								
155.18	6249.1	155.48	6249.2	155.78	6249.3	156.08	6249.4	156.38
6249.5								
156.68	6249.6	156.98	6249.7	157.28	6249.8	157.58	6249.9	157.88
6250								
158.18	6250.1	158.48	6250.2	158.78	6250.3	159.08	6250.4	159.38
6250.5								
159.68	6250.6	159.98	6250.7	160.28	6250.8	160.58	6250.9	160.88
6251								
161.18	6251.1	161.48	6251.2	161.78	6251.3	162.08	6251.4	162.38
6251.5								
162.68	6251.6	162.98	6251.7	163.28	6251.8	163.58	6251.9	163.88
6252								
164.18	6252.1	164.48	6252.2	164.78	6252.3	165.08	6252.4	165.38
6252.5								

165.68	6252.6	165.98	6252.7	166.28	6252.8	166.58	6252.9	166.88
6253								
167.18	6253.1	167.48	6253.2	167.78	6253.3	168.08	6253.4	168.38
6253.5								
168.68	6253.6	168.98	6253.7	169.28	6253.8	169.59	6253.9	169.89
6254								
169.91	6254.01	170.19	6254.1	170.5	6254.2	170.8	6254.3	171.1
6254.4								
171.41	6254.5	171.71	6254.6	172.01	6254.7	172.31	6254.8	172.62
6254.9								
172.92	6255	173.22	6255.1	173.53	6255.2	173.83	6255.3	174.13
6255.4								
174.41	6255.5	179.49	6255.6	184.48	6255.7	189.48	6255.8	194.21
6255.9								
198.77	6256	203.33	6256.1	207.89	6256.2	212.44	6256.3	217
6256.4								
221.56	6256.5	226.12	6256.6	230.68	6256.7	235.24	6256.8	239.8
6256.9								
244.36	6257	248.92	6257.1	253.48	6257.2	258.04	6257.3	262.6
6257.4								
267.85	6257.5	282.3	6257.6	289.42	6257.7	290.24	6257.8	291.05
6257.9								
291.88	6258	292.73	6258.1	293.58	6258.2	294.44	6258.3	295.31
6258.4								
296.19	6258.5	297.06	6258.6	300	6258.6			

Manning's	n	Values		num=	3		
Sta	n	Val	Sta	n	Val	Sta	n
0	.03	132.45		.013	169.91		.03
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff
Expan.							Contr.
	132.45	169.91		50	50	50	.1
.3							
Left Levee	Station=	83.65	Elevation=	6261.85			
Right Levee	Station=	274.63	Elevation=	6258.85			

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6255.18	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6253.72	Reach Len. (ft)	21.51
21.51	21.51		
Crit W.S. (ft)	6253.72	Flow Area (sq ft)	
106.85			
E.G. Slope (ft/ft)	0.001784	Area (sq ft)	
106.85			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.86	Top Width (ft)	







162.64	6251.1	162.94	6251.2	163.24	6251.3	163.54	6251.4	163.84
6251.5								
164.14	6251.6	164.44	6251.7	164.74	6251.8	165.04	6251.9	165.34
6252								
165.64	6252.1	165.94	6252.2	166.24	6252.3	166.54	6252.4	166.84
6252.5								
167.14	6252.6	167.44	6252.7	167.74	6252.8	168.04	6252.9	168.34
6253								
168.64	6253.1	168.94	6253.2	169.25	6253.3	169.55	6253.4	169.85
6253.5								
170.16	6253.6	170.46	6253.7	170.76	6253.8	171.07	6253.9	171.37
6254								
171.41	6254.01	171.67	6254.1	171.97	6254.2	172.28	6254.3	172.58
6254.4								
172.88	6254.5	173.19	6254.6	173.49	6254.7	173.79	6254.8	174.1
6254.9								
174.67	6255	179.67	6255.1	184.67	6255.2	189.66	6255.3	194.58
6255.4								
199.5	6255.5	204.41	6255.6	209.33	6255.7	214.24	6255.8	219.16
6255.9								
224.07	6256	228.99	6256.1	233.91	6256.2	238.82	6256.3	243.74
6256.4								
248.65	6256.5	253.57	6256.6	258.48	6256.7	263.4	6256.8	268.32
6256.9								
273.23	6257	277.93	6257.1	282.49	6257.2	287.05	6257.3	291.61
6257.4								
297.27	6257.5	298.12	6257.6	300	6257.6			

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	131.31	.013	171.41	.03

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff	Contr.
Expan.						
	131.31	171.41		50	50	50
.3						.1
Left Levee	Station=	75.27	Elevation=	6260.12		
Right Levee	Station=	176.21	Elevation=	6255.12		

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6254.32	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.31	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6253.01	Reach Len. (ft)	50.00
50.00			
Crit W.S. (ft)	6253.01	Flow Area (sq ft)	21.71
112.20			
E.G. Slope (ft/ft)	0.001599	Area (sq ft)	21.71
112.20			
Q Total (cfs)	1100.00	Flow (cfs)	46.33

1053.67			
Top Width (ft)	56.36	Top Width (ft)	19.30
37.06			
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)	2.13
9.39			
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)	1.12
3.03			
Conv. Total (cfs)	27510.0	Conv. (cfs)	1158.8
26351.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	19.41
38.10			
Min Ch El (ft)	6248.60	Shear (lb/sq ft)	0.11
0.29			
Alpha	1.25	Stream Power (lb/ft s)	300.00
75.27	176.21		
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.06
4.13	0.00		
C & E Loss (ft)	0.01	Cum SA (acres)	0.25
1.16	0.01		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 965

INPUT									
Description:									
Station	Elevation	Data	num=	264					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6259.6	46.46	6259.6	48.64	6259.7	50.38	6259.8	50.88	
6259.9									
51.38	6260	51.89	6260.1	52.39	6260.2	52.89	6260.3	53.39	
6260.4									
53.89	6260.5	54.4	6260.6	54.9	6260.7	55.4	6260.8	55.9	
6260.9									
56.4	6261	56.5	6261	56.88	6260.9	57.26	6260.8	58.11	
6260.7									
59.23	6260.6	60.35	6260.5	61.46	6260.4	62.58	6260.3	63.7	



6260.2								
64.82	6260.1	65.93	6260	67.05	6259.9	69.63	6259.8	72.09
6259.7								
73.5	6259.6	74.92	6259.5	76.33	6259.4	77.75	6259.3	79.16
6259.2								
80.58	6259.1	81.99	6259	83.41	6258.9	84.81	6258.8	85.63
6258.7								
86.46	6258.6	87.28	6258.5	88.1	6258.4	88.93	6258.3	89.08
6258.3								
89.77	6258.4	90.53	6258.5	91.38	6258.6	92.23	6258.7	93.08
6258.8								
93.93	6258.9	94.77	6259	95.62	6259.1	96.47	6259.2	97.32
6259.3								
98.16	6259.4	99.01	6259.5	99.86	6259.6	102.05	6259.7	104.64
6259.7								
106.06	6259.6	107.49	6259.5	108.22	6259.4	108.45	6259.3	108.68
6259.2								
108.91	6259.1	109.14	6259	109.36	6258.9	109.67	6258.8	110.19
6258.7								
110.71	6258.6	111.23	6258.5	111.75	6258.4	112.27	6258.3	112.8
6258.2								
113.32	6258.1	113.84	6258	114.36	6257.9	114.88	6257.8	115.37
6257.7								
115.68	6257.6	115.99	6257.5	116.3	6257.4	116.61	6257.3	116.91
6257.2								
117.22	6257.1	117.53	6257	117.84	6256.9	118.15	6256.8	118.46
6256.7								
118.76	6256.6	119.07	6256.5	119.38	6256.4	119.69	6256.3	120
6256.2								
120.3	6256.1	120.61	6256	120.92	6255.9	121.23	6255.8	121.54
6255.7								
121.84	6255.6	122.15	6255.5	122.46	6255.4	122.77	6255.3	123.08
6255.2								
123.39	6255.1	123.69	6255	124	6254.9	124.31	6254.8	124.62
6254.7								
124.93	6254.6	125.23	6254.5	125.54	6254.4	125.85	6254.3	126.16
6254.2								
126.47	6254.1	126.78	6254	127.08	6253.9	127.39	6253.8	127.7
6253.7								
128.01	6253.6	128.32	6253.5	128.62	6253.4	128.93	6253.3	129.24
6253.2								
129.55	6253.1	129.86	6253	130.17	6252.9	130.47	6252.8	130.78
6252.7								
131.09	6252.6	131.4	6252.5	131.7	6252.4	132	6252.3	132.3
6252.2								
132.6	6252.1	132.9	6252	133.2	6251.9	133.5	6251.8	133.81
6251.7								
134.11	6251.6	134.41	6251.5	134.71	6251.4	135.01	6251.3	135.31
6251.2								
135.61	6251.1	135.91	6251	136.21	6250.9	136.51	6250.8	136.81
6250.7								
137.11	6250.6	137.41	6250.5	137.71	6250.4	138.01	6250.3	138.31
6250.2								

138.61	6250.1	138.91	6250	139.21	6249.9	139.51	6249.8	139.81
6249.7								
140.11	6249.6	140.41	6249.5	140.71	6249.4	141.01	6249.3	141.31
6249.2								
141.61	6249.1	141.91	6249	142.21	6248.9	142.51	6248.8	142.81
6248.7								
143.11	6248.6	143.41	6248.5	143.71	6248.4	144.01	6248.3	144.31
6248.2								
144.61	6248.1	155.1	6248.1	155.4	6248.2	155.7	6248.3	156
6248.4								
156.3	6248.5	156.6	6248.6	156.9	6248.7	157.2	6248.8	157.5
6248.9								
157.8	6249	158.1	6249.1	158.4	6249.2	158.7	6249.3	159
6249.4								
159.3	6249.5	159.6	6249.6	159.9	6249.7	160.2	6249.8	160.5
6249.9								
160.8	6250	161.1	6250.1	161.4	6250.2	161.7	6250.3	162
6250.4								
162.3	6250.5	162.6	6250.6	162.9	6250.7	163.2	6250.8	163.5
6250.9								
163.8	6251	164.1	6251.1	164.4	6251.2	164.7	6251.3	165
6251.4								
165.3	6251.5	165.6	6251.6	165.9	6251.7	166.2	6251.8	166.5
6251.9								
166.8	6252	167.1	6252.1	167.4	6252.2	167.7	6252.3	168
6252.4								
168.3	6252.5	168.6	6252.6	168.91	6252.7	169.21	6252.8	169.51
6252.9								
169.82	6253	169.84	6253.01	170.12	6253.1	170.42	6253.2	170.73
6253.3								
171.03	6253.4	171.33	6253.5	171.63	6253.6	171.94	6253.7	172.24
6253.8								
172.54	6253.9	172.85	6254	173.15	6254.1	173.45	6254.2	173.76
6254.3								
174.06	6254.4	174.55	6254.5	179.55	6254.6	184.55	6254.7	189.55
6254.8								
194.99	6254.9	200.43	6255	205.87	6255.1	211.31	6255.2	216.75
6255.3								
222.2	6255.4	227.64	6255.5	233.08	6255.6	238.52	6255.7	243.96
6255.8								
249.4	6255.9	254.84	6256	261.61	6256.1	268.4	6256.2	275.19
6256.3								
281.98	6256.4	288.77	6256.5	295.56	6256.6	300	6256.6	
Manning's	n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	129.86	.013	169.84	.03			
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	129.86	169.84		50	50	50		.1
.3								
Ineffective Flow		num=	1					



Sta L Sta R Elev Permanent  
0 98.73 6259.63 F  
Left Levee Station= 104.59 Elevation= 6259.7  
Right Levee Station= 256.2 Elevation= 6256.16

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6254.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6252.74	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6252.74	Flow Area (sq ft)	
113.30			
E.G. Slope (ft/ft)	0.001793	Area (sq ft)	
113.30			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	38.38	Top Width (ft)	
38.38			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)	
2.95			
Conv. Total (cfs)	25977.7	Conv. (cfs)	
25977.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.88			
Min Ch El (ft)	6248.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
104.59 256.20			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
4.00 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
1.12 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 964

INPUT  
Description:  
Station Elevation Data num= 240  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6259.5 50.51 6259.5 58.79 6259.4 66.02 6259.3 71.28  
6259.3  
71.51 6259.4 73.06 6259.4 74.55 6259.3 76.04 6259.2 77.53  
6259.1  
79.02 6259 80.51 6258.9 81.85 6258.8 82.67 6258.7 83.49  
6258.6  
84.32 6258.5 85.14 6258.4 85.96 6258.3 86.79 6258.2 87.61  
6258.1  
88.43 6258 89.26 6257.9 90.08 6257.8 90.91 6257.7 91.57  
6257.7  
92.27 6257.8 92.96 6257.9 93.66 6258 94.36 6258.1 95.05  
6258.2  
95.75 6258.3 96.45 6258.4 97.15 6258.5 97.84 6258.6 98.54  
6258.7  
99.26 6258.8 100.11 6258.9 100.95 6259 101.8 6259.1 104.15  
6259.2  
106.12 6259.2 108.12 6259.1 110.11 6259 110.86 6258.9 111.16  
6258.8  
111.46 6258.7 111.75 6258.6 112.05 6258.5 112.35 6258.4 112.64  
6258.3  
112.94 6258.2 113.24 6258.1 113.53 6258 113.83 6257.9 114.13  
6257.8  
114.42 6257.7 114.72 6257.6 115.02 6257.5 115.31 6257.4 115.61  
6257.3  
115.91 6257.2 116.2 6257.1 116.5 6257 116.8 6256.9 117.09  
6256.8  
117.39 6256.7 117.69 6256.6 117.98 6256.5 118.28 6256.4 118.58  
6256.3  
118.87 6256.2 119.17 6256.1 119.47 6256 119.77 6255.9 120.07  
6255.8  
120.38 6255.7 120.68 6255.6 120.98 6255.5 121.29 6255.4 121.59  
6255.3  
121.89 6255.2 122.2 6255.1 122.5 6255 122.8 6254.9 123.11  
6254.8  
123.41 6254.7 123.72 6254.6 124.03 6254.5 124.33 6254.4 124.64  
6254.3  
124.95 6254.2 125.26 6254.1 125.57 6254 125.87 6253.9 126.22  
6253.8  
126.57 6253.7 126.82 6253.6 127.19 6253.5 127.46 6253.4 127.73  
6253.3  
128 6253.2 128.26 6253.1 128.53 6253 128.8 6252.9 129.1  
6252.8  
129.39 6252.7 129.67 6252.6 129.96 6252.5 130.25 6252.4 130.53



6252.3  
130.82 6252.2 131.11 6252.1 131.39 6252 131.69 6251.9 131.99  
6251.8  
132.29 6251.7 132.59 6251.6 132.89 6251.5 133.19 6251.4 133.49  
6251.3  
133.79 6251.2 134.09 6251.1 134.39 6251 134.69 6250.9 134.99  
6250.8  
135.29 6250.7 135.59 6250.6 135.89 6250.5 136.19 6250.4 136.49  
6250.3  
136.79 6250.2 137.09 6250.1 137.39 6250 137.69 6249.9 137.99  
6249.8  
138.29 6249.7 138.59 6249.6 138.89 6249.5 139.19 6249.4 139.49  
6249.3  
139.79 6249.2 140.09 6249.1 140.39 6249 140.69 6248.9 140.99  
6248.8  
141.29 6248.7 141.59 6248.6 141.89 6248.5 142.19 6248.4 142.49  
6248.3  
142.79 6248.2 143.09 6248.1 143.39 6248 143.69 6247.9 143.99  
6247.8  
144.29 6247.7 144.59 6247.6 155.01 6247.6 155.21 6247.7 155.41  
6247.8  
155.61 6247.9 155.85 6248 156.15 6248.1 156.45 6248.2 156.75  
6248.3  
157.05 6248.4 157.35 6248.5 157.65 6248.6 157.95 6248.7 158.25  
6248.8  
158.55 6248.9 158.85 6249 159.15 6249.1 159.45 6249.2 159.75  
6249.3  
160.05 6249.4 160.35 6249.5 160.65 6249.6 160.95 6249.7 161.25  
6249.8  
161.55 6249.9 161.85 6250 162.15 6250.1 162.45 6250.2 162.75  
6250.3  
163.05 6250.4 163.35 6250.5 163.65 6250.6 163.95 6250.7 164.25  
6250.8  
164.55 6250.9 164.85 6251 165.15 6251.1 165.45 6251.2 165.75  
6251.3  
166.05 6251.4 166.35 6251.5 166.65 6251.6 166.95 6251.7 167.25  
6251.8  
167.55 6251.9 167.85 6252 168.15 6252.1 168.9 6252.2 169.2  
6252.3  
169.5 6252.4 169.81 6252.5 170.11 6252.6 170.41 6252.7 170.71  
6252.8  
171.02 6252.9 171.32 6253 171.36 6253.01 171.62 6253.1 171.93  
6253.2  
172.23 6253.3 172.53 6253.4 172.84 6253.5 173.14 6253.6 173.44  
6253.7  
173.74 6253.8 174.05 6253.9 174.47 6254 179.47 6254.1 184.47  
6254.2  
189.47 6254.3 198.65 6254.4 207.85 6254.5 217.05 6254.6 226.25  
6254.7  
235.45 6254.8 244.65 6254.9 253.85 6255 262.34 6255.1 269.17  
6255.2  
275.99 6255.3 282.82 6255.4 289.65 6255.5 296.48 6255.6 300  
6255.6

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 128.53 .013 171.36 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 128.53 171.36 50 50 50 .1  
.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
0 101.24 6259.12 F  
Left Levee Station= 104.59 Elevation= 6259.22  
Right Levee Station= 254.95 Elevation= 6255.19

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6253.75	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.44	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6252.31	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6252.31	Flow Area (sq ft)	
114.09			
E.G. Slope (ft/ft)	0.001776	Area (sq ft)	
114.09			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	38.73	Top Width (ft)	
38.73			
Vel Total (ft/s)	9.64	Avg. Vel. (ft/s)	
9.64			
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	
2.95			
Conv. Total (cfs)	26104.4	Conv. (cfs)	
26104.4			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
40.28			
Min Ch El (ft)	6247.60	Shear (lb/sq ft)	
0.31			
Alpha	1.00	Stream Power (lb/ft s)	300.00
104.59 254.95			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.87 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
1.08 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth



6254.7								
122.58	6254.6	122.85	6254.5	123.12	6254.4	123.39	6254.3	123.65
6254.2								
123.92	6254.1	124.19	6254	124.47	6253.9	124.81	6253.8	125.1
6253.7								
125.39	6253.6	125.68	6253.5	125.96	6253.4	126.25	6253.3	126.54
6253.2								
126.82	6253.1	127.11	6253	127.4	6252.9	127.68	6252.8	127.97
6252.7								
128.26	6252.6	128.54	6252.5	128.83	6252.4	129.12	6252.3	129.41
6252.2								
129.69	6252.1	129.98	6252	130.27	6251.9	130.55	6251.8	130.84
6251.7								
131.13	6251.6	131.41	6251.5	131.71	6251.4	132.01	6251.3	132.31
6251.2								
132.61	6251.1	132.91	6251	133.21	6250.9	133.51	6250.8	133.81
6250.7								
134.11	6250.6	134.41	6250.5	134.71	6250.4	135.01	6250.3	135.31
6250.2								
135.61	6250.1	135.91	6250	136.21	6249.9	136.51	6249.8	136.81
6249.7								
137.11	6249.6	137.41	6249.5	137.71	6249.4	138.01	6249.3	138.31
6249.2								
138.61	6249.1	138.91	6249	139.21	6248.9	139.51	6248.8	139.81
6248.7								
140.11	6248.6	140.41	6248.5	140.71	6248.4	141.01	6248.3	141.31
6248.2								
141.61	6248.1	141.91	6248	142.21	6247.9	142.51	6247.8	142.81
6247.7								
143.11	6247.6	143.41	6247.5	143.71	6247.4	144.01	6247.3	144.31
6247.2								
144.61	6247.1	155.02	6247.1	155.22	6247.2	155.42	6247.3	155.62
6247.4								
155.82	6247.5	156.02	6247.6	156.22	6247.7	156.42	6247.8	156.62
6247.9								
156.82	6248	157.02	6248.1	157.22	6248.2	157.42	6248.3	157.72
6248.4								
158.02	6248.5	158.32	6248.6	158.62	6248.7	158.92	6248.8	159.22
6248.9								
159.52	6249	159.82	6249.1	160.12	6249.2	160.42	6249.3	160.72
6249.4								
161.02	6249.5	161.32	6249.6	161.62	6249.7	161.92	6249.8	162.22
6249.9								
162.52	6250	162.82	6250.1	163.12	6250.2	163.42	6250.3	163.72
6250.4								
164.02	6250.5	164.32	6250.6	164.62	6250.7	164.92	6250.8	165.22
6250.9								
165.52	6251	165.82	6251.1	166.12	6251.2	166.42	6251.3	166.72
6251.4								
167.02	6251.5	167.32	6251.6	167.62	6251.7	167.92	6251.8	168.22
6251.9								
169.43	6252	169.84	6252.06	170.12	6252.1	170.42	6252.2	170.72
6252.3								



171.03	6252.4	171.33	6252.5	171.63	6252.6	171.94	6252.7	172.24
6252.8								
172.54	6252.9	172.85	6253	173.15	6253.1	173.45	6253.2	173.75
6253.3								
174.06	6253.4	174.41	6253.5	179.41	6253.6	184.41	6253.7	189.41
6253.8								
198.53	6253.9	207.73	6254	216.93	6254.1	226.13	6254.2	235.33
6254.3								
248.64	6254.4	263.69	6254.5	278.74	6254.6	293.79	6254.7	300
6254.7								

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	129.98	.013
		169.84	.03

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	129.98	169.84		50	50	50		.1

.3								
Ineffective Flow	num=	1						
Sta L	Sta R	Elev	Permanent					
0	102.5	6258.36	F					
Left Levee	Station=	105.43	Elevation=	6258.46				
Right Levee	Station=	209.72	Elevation=	6254.02				

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6253.34	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.50	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6251.84	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6251.84	Flow Area (sq ft)	
111.93			
E.G. Slope (ft/ft)	0.001829	Area (sq ft)	
111.93			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	37.63	Top Width (ft)	
37.63			
Vel Total (ft/s)	9.83	Avg. Vel. (ft/s)	
9.83			
Max Chl Dpth (ft)	4.74	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	25723.4	Conv. (cfs)	
25723.4			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.26			
Min Ch El (ft)	6247.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00

105.43	209.72				
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05		
3.74	0.00				
C & E Loss (ft)	0.00	Cum SA (acres)	0.24		
1.03	0.01				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 962

INPUT										
Description:										
Station	Elevation	Data	num=	244						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev										
0	6257.6	58.01	6257.6	58.97	6257.7	59.61	6257.8	59.71		
6257.9										
59.8	6258	59.9	6258.1	59.99	6258.2	60.09	6258.3	60.19		
6258.4										
60.28	6258.5	60.38	6258.6	60.47	6258.7	60.57	6258.8	60.67		
6258.9										
61.02	6258.9	62.36	6258.8	63.7	6258.7	65.05	6258.6	66.62		
6258.5										
68.61	6258.4	70.59	6258.3	72.58	6258.2	74.56	6258.1	76.55		
6258										
78.53	6257.9	80.52	6257.8	82.17	6257.7	83.43	6257.6	84.69		
6257.5										
85.95	6257.4	87.21	6257.3	88.47	6257.2	89.73	6257.1	90.87		
6257										
91.82	6256.9	92.78	6256.8	93.73	6256.7	94.69	6256.6	96.65		
6256.6										
97.99	6256.7	99.04	6256.8	100.05	6256.9	101.05	6257	102.05		
6257.1										
103.05	6257.2	104.06	6257.3	105.06	6257.4	106.06	6257.5	107.06		
6257.6										
112.88	6257.6	113.15	6257.5	113.41	6257.4	113.68	6257.3	113.95		
6257.2										
114.22	6257.1	114.49	6257	114.75	6256.9	115.02	6256.8	115.29		



6256.7								
115.56	6256.6	115.83	6256.5	116.09	6256.4	116.36	6256.3	116.63
6256.2								
116.9	6256.1	117.17	6256	117.44	6255.9	117.7	6255.8	117.97
6255.7								
118.24	6255.6	118.51	6255.5	118.78	6255.4	119.04	6255.3	119.31
6255.2								
119.58	6255.1	119.85	6255	120.2	6254.9	120.53	6254.8	120.82
6254.7								
121.11	6254.6	121.4	6254.5	121.68	6254.4	121.97	6254.3	122.26
6254.2								
122.54	6254.1	122.83	6254	123.12	6253.9	123.4	6253.8	123.69
6253.7								
123.98	6253.6	124.26	6253.5	124.55	6253.4	124.84	6253.3	125.12
6253.2								
125.41	6253.1	125.7	6253	125.98	6252.9	126.27	6252.8	126.56
6252.7								
126.84	6252.6	127.13	6252.5	127.42	6252.4	127.7	6252.3	127.99
6252.2								
128.28	6252.1	128.56	6252	128.85	6251.9	129.14	6251.8	129.42
6251.7								
129.71	6251.6	130	6251.5	130.28	6251.4	130.57	6251.3	130.86
6251.2								
131.14	6251.1	131.43	6251	131.73	6250.9	132.03	6250.8	132.33
6250.7								
132.63	6250.6	132.93	6250.5	133.23	6250.4	133.53	6250.3	133.83
6250.2								
134.13	6250.1	134.43	6250	134.73	6249.9	135.03	6249.8	135.33
6249.7								
135.63	6249.6	135.93	6249.5	136.23	6249.4	136.53	6249.3	136.83
6249.2								
137.13	6249.1	137.43	6249	137.73	6248.9	138.03	6248.8	138.33
6248.7								
138.63	6248.6	138.93	6248.5	139.23	6248.4	139.53	6248.3	139.83
6248.2								
140.13	6248.1	140.43	6248	140.73	6247.9	141.03	6247.8	141.33
6247.7								
141.63	6247.6	141.93	6247.5	142.23	6247.4	142.53	6247.3	142.83
6247.2								
143.13	6247.1	143.43	6247	143.73	6246.9	144.03	6246.8	144.33
6246.7								
144.63	6246.6	155.03	6246.6	155.23	6246.7	155.43	6246.8	155.63
6246.9								
155.83	6247	156.03	6247.1	156.23	6247.2	156.43	6247.3	156.63
6247.4								
156.83	6247.5	157.03	6247.6	157.23	6247.7	157.43	6247.8	157.63
6247.9								
157.83	6248	158.03	6248.1	158.23	6248.2	158.43	6248.3	158.63
6248.4								
158.83	6248.5	159.03	6248.6	159.29	6248.7	159.59	6248.8	159.89
6248.9								
160.19	6249	160.49	6249.1	160.79	6249.2	161.09	6249.3	161.39
6249.4								

161.69	6249.5	161.99	6249.6	162.29	6249.7	162.59	6249.8	162.89
6249.9								
163.19	6250	163.49	6250.1	163.79	6250.2	164.09	6250.3	164.39
6250.4								
164.69	6250.5	164.99	6250.6	165.29	6250.7	165.59	6250.8	165.89
6250.9								
166.19	6251	166.49	6251.1	166.79	6251.2	167.09	6251.3	167.39
6251.4								
167.69	6251.5	167.99	6251.6	168.29	6251.7	169.79	6251.8	171.04
6251.9								
171.34	6252	171.44	6252.03	171.64	6252.1	171.95	6252.2	172.25
6252.3								
172.55	6252.4	172.85	6252.5	173.16	6252.6	173.46	6252.7	173.76
6252.8								
174.07	6252.9	174.37	6253	180.35	6253.1	185.65	6253.2	190.65
6253.3								
193.73	6253.3	196.42	6253.2	199.11	6253.1	203.57	6253.1	206.61
6253.2								
209.66	6253.3	212.7	6253.4	219.21	6253.5	233.34	6253.6	247.47
6253.7								
261.61	6253.8	275.76	6253.9	297.15	6254	300	6254	

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	128.56	.013
171.44	.03		
Bank Sta: Left		Right	Lengths: Left Channel
Expan.			Right
		128.56	171.44
		50	50
		50	
			.1
.3			
Ineffective Flow		num= 1	
Sta L	Sta R	Elev	Permanent
0	105.85	6257.63	F
Left Levee		Station=	112.97
Right Levee		Station=	192.54
		Elevation=	6257.63
		Elevation=	6253.38

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6252.92	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6251.43	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6251.43	Flow Area (sq ft)	
112.24			
E.G. Slope (ft/ft)	0.001794	Area (sq ft)	
112.24			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	37.25	Top Width (ft)	
37.25			



Vel Total (ft/s) 9.80 Avg. Vel. (ft/s)  
9.80  
Max Chl Dpth (ft) 4.82 Hydr. Depth (ft)  
3.01  
Conv. Total (cfs) 25969.3 Conv. (cfs)  
25969.3  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
38.97  
Min Ch El (ft) 6246.60 Shear (lb/sq ft)  
0.32  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
112.97 192.54  
Frctn Loss (ft) 0.09 Cum Volume (acre-ft) 0.05  
3.61 0.00  
C & E Loss (ft) 0.00 Cum SA (acres) 0.24  
0.99 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 961

INPUT  
Description:  
Station Elevation Data num= 334  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6257.6 33.9 6257.6 47.55 6257.7 49.43 6257.8 51.3  
6257.9  
53.17 6258 56.2 6258 62.04 6257.9 63.31 6257.8 64.57  
6257.7  
65.83 6257.6 67.09 6257.5 68.36 6257.4 69.62 6257.3 70.88  
6257.2  
72.14 6257.1 73.41 6257 77.85 6256.9 82.81 6256.8 85.67  
6256.7  
87.46 6256.6 89.08 6256.5 90.04 6256.4 90.99 6256.3 91.95  
6256.2  
92.91 6256.1 93.86 6256 94.82 6255.9 95.77 6255.8 96.73  
6255.7

97.63 6255.7 98.98 6255.8 100.32 6255.9 101.66 6256 103  
6256.1  
104.34 6256.2 105.68 6256.3 106.87 6256.4 107.88 6256.5 108.88  
6256.6  
110.85 6256.6 114.17 6256.5 114.43 6256.4 114.7 6256.3 114.97  
6256.2  
115.24 6256.1 115.57 6256 115.94 6255.9 116.25 6255.8 116.54  
6255.7  
116.83 6255.6 117.11 6255.5 117.4 6255.4 117.69 6255.3 117.97  
6255.2  
118.26 6255.1 118.55 6255 118.83 6254.9 119.12 6254.8 119.41  
6254.7  
119.7 6254.6 119.98 6254.5 120.27 6254.4 120.56 6254.3 120.84  
6254.2  
121.13 6254.1 121.42 6254 121.7 6253.9 121.99 6253.8 122.28  
6253.7  
122.56 6253.6 122.85 6253.5 123.14 6253.4 123.42 6253.3 123.71  
6253.2  
124 6253.1 124.28 6253 124.57 6252.9 124.86 6252.8 125.14  
6252.7  
125.43 6252.6 125.72 6252.5 126 6252.4 126.29 6252.3 126.58  
6252.2  
126.86 6252.1 127.15 6252 127.44 6251.9 127.72 6251.8 128.01  
6251.7  
128.3 6251.6 128.58 6251.5 128.87 6251.4 129.16 6251.3 129.44  
6251.2  
129.73 6251.1 130.02 6251 130.3 6250.9 130.59 6250.8 130.88  
6250.7  
131.16 6250.6 131.45 6250.5 131.75 6250.4 132.05 6250.3 132.35  
6250.2  
132.65 6250.1 132.95 6250 133.25 6249.9 133.55 6249.8 133.85  
6249.7  
134.15 6249.6 134.45 6249.5 134.75 6249.4 135.05 6249.3 135.35  
6249.2  
135.65 6249.1 135.95 6249 136.25 6248.9 136.55 6248.8 136.85  
6248.7  
137.15 6248.6 137.45 6248.5 137.75 6248.4 138.05 6248.3 138.35  
6248.2  
138.65 6248.1 138.95 6248 139.25 6247.9 139.55 6247.8 139.85  
6247.7  
140.15 6247.6 140.45 6247.5 140.75 6247.4 141.05 6247.3 141.35  
6247.2  
141.65 6247.1 141.95 6247 142.25 6246.9 142.55 6246.8 142.85  
6246.7  
143.15 6246.6 143.45 6246.5 143.75 6246.4 144.05 6246.3 144.35  
6246.2  
144.65 6246.1 155.04 6246.1 155.24 6246.2 155.44 6246.3 155.64  
6246.4  
155.84 6246.5 156.04 6246.6 156.24 6246.7 156.44 6246.8 156.64  
6246.9  
156.84 6247 157.04 6247.1 157.24 6247.2 157.44 6247.3 157.64  
6247.4  
157.84 6247.5 158.04 6247.6 158.24 6247.7 158.44 6247.8 158.64



6247.9  
158.84 6248 159.04 6248.1 159.24 6248.2 159.44 6248.3 159.64  
6248.4  
159.84 6248.5 160.04 6248.6 160.24 6248.7 160.44 6248.8 160.64  
6248.9  
160.86 6249 161.16 6249.1 161.46 6249.2 161.76 6249.3 162.06  
6249.4  
162.36 6249.5 162.66 6249.6 162.96 6249.7 163.26 6249.8 163.56  
6249.9  
163.86 6250 164.16 6250.1 164.46 6250.2 164.76 6250.3 165.06  
6250.4  
165.36 6250.5 165.66 6250.6 165.96 6250.7 166.26 6250.8 166.56  
6250.9  
166.86 6251 167.16 6251.1 167.46 6251.2 167.76 6251.3 168.06  
6251.4  
168.36 6251.5 169.86 6251.58 170.16 6251.6 171.96 6251.7 172.26  
6251.8  
172.56 6251.9 172.86 6252 173.17 6252.1 173.47 6252.2 173.77  
6252.3  
174.08 6252.4 174.38 6252.5 180.91 6252.6 187.33 6252.7 189.69  
6252.7  
190.24 6252.6 190.8 6252.5 191.35 6252.4 191.9 6252.3 192.46  
6252.2  
193.01 6252.1 193.57 6252 194.12 6251.9 194.67 6251.8 195.23  
6251.7  
195.78 6251.6 196.34 6251.5 196.89 6251.4 197.44 6251.3 198  
6251.2  
198.55 6251.1 199.11 6251 199.66 6250.9 200.21 6250.8 200.77  
6250.7  
201.32 6250.6 201.87 6250.5 202.43 6250.4 202.98 6250.3 203.54  
6250.2  
204.09 6250.1 204.64 6250 205.2 6249.9 205.8 6249.8 206.84  
6249.7  
207.89 6249.6 209.9 6249.5 212.1 6249.4 212.57 6249.4 212.86  
6249.5  
213.15 6249.6 213.25 6249.3 214.35 6249.2 215.53 6249.1 216.81  
6249  
218.15 6248.9 219.67 6248.8 221.17 6248.7 222.43 6248.6 223.69  
6248.5  
225.17 6248.4 227.25 6248.3 229.88 6248.2 232.7 6248.2 234.16  
6248.3  
234.48 6249 235.16 6248.9 235.62 6248.4 235.84 6248.8 236.51  
6248.7  
237.08 6248.5 237.19 6248.6 238.94 6248.5 245.36 6248.4 251.78  
6248.3  
258.45 6248.3 259.03 6249.2 259.35 6249.1 259.91 6249 260.25  
6248.9  
260.66 6248.4 260.86 6248.8 261.47 6248.7 262.05 6248.5 262.08  
6248.6  
263.39 6248.6 264.39 6248.7 265.23 6248.8 266.13 6248.9 267.04  
6249  
267.89 6249.1 268.6 6249.2 269.31 6249.3 270.02 6249.4 270.72  
6249.5

271.41 6249.6 272.03 6249.7 272.66 6249.8 273.28 6249.9 273.87  
6250  
274.43 6250.1 275 6250.2 275.56 6250.3 276.12 6250.4 276.68  
6250.5  
277.25 6250.6 277.82 6250.7 278.4 6250.8 278.92 6250.9 279.44  
6251  
279.95 6251.1 280.46 6251.2 280.97 6251.3 281.48 6251.4 281.99  
6251.5  
282.5 6251.6 283.01 6251.7 283.52 6251.8 284.02 6251.9 284.5  
6252  
284.98 6252.1 285.46 6252.2 285.93 6252.3 286.41 6252.4 286.88  
6252.5  
287.36 6252.6 287.83 6252.7 288.31 6252.8 288.78 6252.9 289.26  
6253  
292.78 6253.1 296.67 6253.2 299.51 6253.3 300 6253.3

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 130.02 .013 169.86 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 130.02 169.86 50 50 50 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 107.1 6256.46 F  
190.03 300 6252.49 F  
Left Levee Station= 113.81 Elevation= 6256.53  
Right Levee Station= 189.61 Elevation= 6252.76

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft) 6252.47 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.50 Wt. n-Val.  
0.013  
W.S. Elev (ft) 6250.98 Reach Len. (ft) 50.00  
50.00 50.00  
Crit W.S. (ft) 6250.98 Flow Area (sq ft)  
112.08  
E.G. Slope (ft/ft) 0.001774 Area (sq ft)  
112.08  
Q Total (cfs) 1100.00 Flow (cfs)  
1100.00  
Top Width (ft) 36.70 Top Width (ft)  
36.70  
Vel Total (ft/s) 9.81 Avg. Vel. (ft/s)  
9.81  
Max Chl Dpth (ft) 4.88 Hydr. Depth (ft)  
3.05  
Conv. Total (cfs) 26119.3 Conv. (cfs)



26119.3  
Length Wtd. (ft) 50.00 Wetted Per. (ft)  
38.50  
Min Ch El (ft) 6246.10 Shear (lb/sq ft)  
0.32  
Alpha 1.00 Stream Power (lb/ft s) 300.00  
113.81 189.61  
Frctn Loss (ft) 0.09 Cum Volume (acre-ft) 0.05  
3.48 0.00  
C & E Loss (ft) 0.01 Cum SA (acres) 0.24  
0.95 0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 960

INPUT  
Description:  
Station Elevation Data num= 399  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6254.2 .12 6254.2 5.46 6254.1 10.8 6254 26.21  
6253.9  
32.83 6253.8 39.45 6253.7 46.07 6253.6 56.98 6253.5 59.77  
6253.5  
60.01 6253.6 60.24 6253.7 60.47 6253.8 60.71 6253.9 60.94  
6254  
61.17 6254.1 62.37 6254.1 65.04 6254 67.16 6253.9 69.02  
6253.8  
70.72 6253.7 72.26 6253.6 73.8 6253.5 75.39 6253.4 76.95  
6253.3  
78.4 6253.2 79.77 6253.1 81.08 6253 82.34 6252.9 83.56  
6252.8  
84.75 6252.7 88.6 6252.7 91.19 6252.6 97.11 6252.5 97.66  
6252.5  
98.33 6252.6 99 6252.7 99.67 6252.8 100.29 6252.9 100.79  
6253  
101.29 6253.1 101.79 6253.2 102.29 6253.3 102.79 6253.4 103.29

6253.5  
103.79 6253.6 104.29 6253.7 104.79 6253.8 105.29 6253.9 105.79  
6254  
106.29 6254.1 106.79 6254.2 107.29 6254.3 107.79 6254.4 108.3  
6254.5  
108.8 6254.6 109.3 6254.7 109.8 6254.8 110.3 6254.9 110.8  
6255  
111.3 6255.1 111.8 6255.2 113.03 6255.3 115.32 6255.3 115.8  
6255.2  
116.29 6255.1 116.78 6255 117.26 6254.9 117.71 6254.8 117.99  
6254.7  
118.28 6254.6 118.57 6254.5 118.85 6254.4 119.14 6254.3 119.43  
6254.2  
119.71 6254.1 120 6254 120.29 6253.9 120.57 6253.8 120.86  
6253.7  
121.15 6253.6 121.43 6253.5 121.72 6253.4 122.01 6253.3 122.3  
6253.2  
122.58 6253.1 122.87 6253 123.16 6252.9 123.44 6252.8 123.73  
6252.7  
124.02 6252.6 124.3 6252.5 124.59 6252.4 124.88 6252.3 125.16  
6252.2  
125.45 6252.1 125.74 6252 126.02 6251.9 126.31 6251.8 126.6  
6251.7  
126.88 6251.6 127.17 6251.5 127.46 6251.4 127.74 6251.3 128.03  
6251.2  
128.32 6251.1 128.6 6251 128.89 6250.9 129.18 6250.8 129.46  
6250.7  
129.75 6250.6 130.04 6250.5 130.32 6250.4 130.61 6250.3 130.9  
6250.2  
131.18 6250.1 131.47 6250 131.77 6249.9 132.07 6249.8 132.37  
6249.7  
132.67 6249.6 132.97 6249.5 133.27 6249.4 133.57 6249.3 133.87  
6249.2  
134.17 6249.1 134.47 6249 134.77 6248.9 135.07 6248.8 135.37  
6248.7  
135.67 6248.6 135.97 6248.5 136.27 6248.4 136.57 6248.3 136.87  
6248.2  
137.17 6248.1 137.47 6248 137.77 6247.9 138.07 6247.8 138.37  
6247.7  
138.67 6247.6 138.97 6247.5 139.27 6247.4 139.57 6247.3 139.87  
6247.2  
140.17 6247.1 140.47 6247 140.77 6246.9 141.07 6246.8 141.37  
6246.7  
141.67 6246.6 141.97 6246.5 142.27 6246.4 142.57 6246.3 142.87  
6246.2  
143.17 6246.1 143.47 6246 143.77 6245.9 144.07 6245.8 144.37  
6245.7  
144.67 6245.6 155.05 6245.6 155.25 6245.7 155.45 6245.8 155.65  
6245.9  
155.85 6246 156.05 6246.1 156.25 6246.2 156.45 6246.3 156.65  
6246.4  
156.85 6246.5 157.05 6246.6 157.25 6246.7 157.45 6246.8 157.65  
6246.9



157.85	6247	158.05	6247.1	158.25	6247.2	158.45	6247.3	158.65
6247.4								
158.85	6247.5	159.05	6247.6	159.25	6247.7	159.45	6247.8	159.65
6247.9								
159.85	6248	160.05	6248.1	160.25	6248.2	160.45	6248.3	160.65
6248.4								
160.85	6248.5	161.05	6248.6	161.25	6248.7	161.45	6248.8	161.65
6248.9								
161.85	6249	162.05	6249.1	162.25	6249.2	162.45	6249.3	162.73
6249.4								
163.03	6249.5	163.33	6249.6	163.63	6249.7	163.93	6249.8	164.23
6249.9								
164.53	6250	164.83	6250.1	165.13	6250.2	165.43	6250.3	165.73
6250.4								
166.03	6250.5	166.33	6250.6	166.63	6250.7	166.93	6250.8	167.23
6250.9								
167.53	6251	167.83	6251.1	168.13	6251.2	168.33	6251.24	168.61
6251.3								
170.52	6251.4	172.44	6251.5	173.18	6251.6	173.48	6251.7	173.78
6251.8								
174.09	6251.9	174.39	6252	180.65	6252.1	187.4	6252.2	189.63
6252.2								
190.05	6252.1	190.47	6252	190.89	6251.9	191.31	6251.8	191.72
6251.7								
192.14	6251.6	192.56	6251.5	192.98	6251.4	193.4	6251.3	193.82
6251.2								
194.22	6251.1	194.62	6251	195.03	6250.9	195.45	6250.8	195.87
6250.7								
196.28	6250.6	196.7	6250.5	197.13	6250.4	197.56	6250.3	197.99
6250.2								
198.42	6250.1	198.85	6250	199.28	6249.9	199.71	6249.8	200.14
6249.7								
200.57	6249.6	201	6249.5	201.43	6249.4	201.86	6249.3	202.29
6249.2								
202.72	6249.1	203.15	6249	203.58	6248.9	204.01	6248.8	204.44
6248.7								
204.87	6248.6	205.3	6248.5	205.73	6248.4	206.16	6248.3	206.59
6248.2								
207.02	6248.1	207.45	6248	207.88	6247.9	208.31	6247.8	208.74
6247.7								
209.17	6247.6	209.59	6247.5	210.02	6247.4	210.45	6247.3	210.88
6247.2								
211.31	6247.1	211.74	6247	212.17	6246.9	212.6	6246.8	213.03
6246.7								
213.46	6246.6	215.88	6246.5	218.49	6246.4	221.39	6246.3	224.75
6246.2								
228.4	6246.1	232.21	6246	235.39	6246	236.12	6245.9	239.88
6245.8								
241.55	6245.9	241.59	6245.4	241.64	6245.7	241.82	6245.6	242.01
6245.5								
242.09	6245.5	242.2	6245.4	242.39	6245.3	242.59	6245.6	243.09
6245.7								
243.19	6245.8	244.19	6245.3	246.36	6245.3	246.56	6245.4	246.61

6245.8								
246.67	6245.6	246.77	6245.5	246.98	6245.6	247.19	6245.7	247.24
6245.5								
247.72	6245.8	248.14	6245.9	248.3	6245.7	252.79	6245.9	253.57
6246								
258.34	6246	258.67	6246.1	263.89	6246.1	265.17	6246.2	268.08
6246.2								
268.82	6246.3	269.79	6246.3	270.74	6246.4	271.17	6246.4	271.38
6246.5								
271.6	6246.6	271.82	6246.7	272.04	6246.8	272.25	6246.9	272.58
6247								
272.93	6247.1	273.29	6247.2	273.65	6247.3	274	6247.4	274.36
6247.5								
274.72	6247.6	275.07	6247.7	275.43	6247.8	275.78	6247.9	276.14
6248								
276.5	6248.1	276.85	6248.2	277.21	6248.3	277.57	6248.4	277.92
6248.5								
278.28	6248.6	278.66	6248.7	279.05	6248.8	279.45	6248.9	279.85
6249								
280.25	6249.1	280.65	6249.2	281.05	6249.3	281.45	6249.4	281.85
6249.5								
282.25	6249.6	282.65	6249.7	283.05	6249.8	283.45	6249.9	283.85
6250								
284.25	6250.1	284.5	6250.2	284.73	6250.3	284.95	6250.4	285.17
6250.5								
285.39	6250.6	285.61	6250.7	285.84	6250.8	286.06	6250.9	286.28
6251								
286.5	6251.1	286.72	6251.2	286.95	6251.3	287.17	6251.4	287.47
6251.5								
287.95	6251.6	288.44	6251.7	288.93	6251.8	289.42	6251.9	289.9
6252								
290.39	6252.1	290.88	6252.2	291.37	6252.3	291.85	6252.4	292.34
6252.5								
292.83	6252.6	293.32	6252.7	293.81	6252.8	294.29	6252.9	294.78
6253								
295.36	6253.1	296.3	6253.2	297.25	6253.3	300	6253.3	
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	131.47	.013	168.33	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	131.47	168.33		50	50	50		.1
.3								
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
0	112.13	6255.33	F					
190.03	300	6252.12	F					
Left Levee	Station=	115.48	Elevation=	6255.3				
Right Levee	Station=	187.94	Elevation=	6252.18				

CROSS SECTION OUTPUT Profile #Flow 1



E.G. Elev (ft)	6252.02	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6250.47	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6250.47	Flow Area (sq ft)	0.31
110.06			
E.G. Slope (ft/ft)	0.001738	Area (sq ft)	0.31
110.06			
Q Total (cfs)	1100.00	Flow (cfs)	0.24
1099.76			
Top Width (ft)	35.80	Top Width (ft)	1.34
34.46			
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)	0.75
9.99			
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	0.23
3.19			
Conv. Total (cfs)	26389.4	Conv. (cfs)	5.7
26383.8			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.42
36.24			
Min Ch El (ft)	6245.60	Shear (lb/sq ft)	0.02
0.33			
Alpha	1.01	Stream Power (lb/ft s)	300.00
115.48 187.94			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.35 0.00			
C & E Loss (ft)	0.02	Cum SA (acres)	0.24
0.91 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 959

INPUT

Description:									
Station	Elevation	Data	num=	373					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6254.6	13.02	6254.6	25.77	6254.5	33.92	6254.5	34.3	
6254.6									
34.68	6254.7	35.06	6254.8	35.44	6254.9	35.82	6255	36.2	
6255.1									
36.58	6255.2	36.96	6255.3	38.2	6255.4	39.93	6255.5	46.4	
6255.5									
63.21	6255.4	65.32	6255.3	66.61	6255.2	67.58	6255.1	68.55	
6255									
69.52	6254.9	70.49	6254.8	71.46	6254.7	72.44	6254.6	73.5	
6254.5									
74.56	6254.4	75.62	6254.3	76.69	6254.2	77.75	6254.1	78.81	
6254									
79.87	6253.9	80.93	6253.8	82	6253.7	83.06	6253.6	84.12	
6253.5									
85.18	6253.4	86.24	6253.3	87.31	6253.2	88.37	6253.1	89.43	
6253									
90.49	6252.9	91.56	6252.8	92.62	6252.7	93.68	6252.6	94.74	
6252.5									
95.8	6252.4	96.87	6252.3	97.93	6252.2	98.99	6252.1	100.05	
6252									
101.55	6252	102.21	6252.1	102.87	6252.2	103.53	6252.3	104.19	
6252.4									
104.85	6252.5	105.51	6252.6	106.17	6252.7	106.83	6252.8	107.48	
6252.9									
108.17	6253	109.25	6253.1	110.32	6253.2	111.4	6253.3	112.47	
6253.4									
113.55	6253.5	114.62	6253.6	116.58	6253.6	117.09	6253.5	117.59	
6253.4									
118.1	6253.3	118.61	6253.2	119.12	6253.1	119.63	6253	120.14	
6252.9									
120.64	6252.8	121.34	6252.7	121.83	6252.6	122.31	6252.5	122.8	
6252.4									
123.29	6252.3	123.75	6252.2	124.03	6252.1	124.32	6252	124.61	
6251.9									
124.9	6251.8	125.18	6251.7	125.47	6251.6	125.76	6251.5	126.04	
6251.4									
126.33	6251.3	126.62	6251.2	126.9	6251.1	127.19	6251	127.48	
6250.9									
127.76	6250.8	128.05	6250.7	128.34	6250.6	128.62	6250.5	128.91	
6250.4									
129.2	6250.3	129.48	6250.2	129.77	6250.1	130.06	6250	130.34	
6249.9									
130.63	6249.8	130.92	6249.7	131.2	6249.6	131.49	6249.5	131.79	
6249.4									
132.09	6249.3	132.39	6249.2	132.69	6249.1	132.99	6249	133.29	
6248.9									
133.59	6248.8	133.89	6248.7	134.19	6248.6	134.49	6248.5	134.79	
6248.4									
135.09	6248.3	135.39	6248.2	135.69	6248.1	135.99	6248	136.29	



6247.9  
136.59 6247.8 136.89 6247.7 137.19 6247.6 137.49 6247.5 137.79  
6247.4  
138.09 6247.3 138.39 6247.2 138.69 6247.1 138.99 6247 139.29  
6246.9  
139.59 6246.8 139.89 6246.7 140.19 6246.6 140.49 6246.5 140.79  
6246.4  
141.09 6246.3 141.39 6246.2 141.69 6246.1 141.99 6246 142.29  
6245.9  
142.59 6245.8 142.89 6245.7 143.19 6245.6 143.49 6245.5 143.79  
6245.4  
144.09 6245.3 144.39 6245.2 144.69 6245.1 155.06 6245.1 155.26  
6245.2  
155.47 6245.3 155.67 6245.4 155.87 6245.5 156.07 6245.6 156.27  
6245.7  
156.47 6245.8 156.67 6245.9 156.87 6246 157.07 6246.1 157.27  
6246.2  
157.47 6246.3 157.67 6246.4 157.87 6246.5 158.07 6246.6 158.27  
6246.7  
158.47 6246.8 158.67 6246.9 158.87 6247 159.07 6247.1 159.27  
6247.2  
159.47 6247.3 159.67 6247.4 159.87 6247.5 160.07 6247.6 160.27  
6247.7  
160.47 6247.8 160.67 6247.9 160.87 6248 161.07 6248.1 161.27  
6248.2  
161.47 6248.3 161.67 6248.4 161.87 6248.5 162.07 6248.6 162.27  
6248.7  
162.47 6248.8 162.67 6248.9 162.87 6249 163.07 6249.1 163.27  
6249.2  
163.47 6249.3 163.67 6249.4 163.87 6249.5 164.07 6249.6 164.3  
6249.7  
164.6 6249.8 164.9 6249.9 165.2 6250 165.5 6250.1 165.8  
6250.2  
166.1 6250.3 166.4 6250.4 166.7 6250.5 167 6250.6 167.3  
6250.7  
167.6 6250.8 167.9 6250.9 168.2 6251 168.97 6251.1 169.88  
6251.15  
170.89 6251.2 172.81 6251.3 174.1 6251.4 174.4 6251.5 179.79  
6251.6  
185.5 6251.7 189.75 6251.7 190.17 6251.6 190.59 6251.5 191  
6251.4  
191.42 6251.3 191.84 6251.2 192.26 6251.1 192.68 6251 193.1  
6250.9  
193.52 6250.8 193.94 6250.7 194.36 6250.6 194.77 6250.5 195.19  
6250.4  
195.61 6250.3 196.03 6250.2 196.45 6250.1 196.87 6250 197.29  
6249.9  
197.71 6249.8 198.13 6249.7 198.54 6249.6 198.96 6249.5 199.38  
6249.4  
199.8 6249.3 200.22 6249.2 200.64 6249.1 201.06 6249 201.48  
6248.9  
201.9 6248.8 202.35 6248.7 202.81 6248.6 203.27 6248.5 203.73  
6248.4

204.2 6248.3 204.66 6248.2 205.12 6248.1 205.58 6248 206.04  
6247.9  
206.5 6247.8 206.96 6247.7 207.42 6247.6 207.88 6247.5 208.34  
6247.4  
208.81 6247.3 209.27 6247.2 209.73 6247.1 210.19 6247 210.65  
6246.9  
211.11 6246.8 211.57 6246.7 212.03 6246.6 212.49 6246.5 212.95  
6246.4  
213.42 6246.3 215.5 6246.2 217.96 6246.1 220.41 6246 222.86  
6245.9  
225.33 6245.8 227.82 6245.7 230.31 6245.6 232.76 6245.5 232.86  
6245.4  
232.97 6245.3 233.07 6245.2 233.17 6245.1 234.82 6245 235.32  
6245  
235.42 6245.1 235.52 6245.2 235.62 6245.3 235.72 6245.4 235.87  
6245.5  
238.49 6245.6 241.11 6245.7 243.73 6245.8 246.35 6245.9 248.93  
6246  
251.51 6246.1 254.08 6246.2 256.66 6246.3 259.24 6246.4 261.81  
6246.5  
264.39 6246.6 266.97 6246.7 269.54 6246.8 272.12 6246.9 272.62  
6247  
273.01 6247.1 273.4 6247.2 273.79 6247.3 274.18 6247.4 274.57  
6247.5  
274.96 6247.6 275.35 6247.7 275.74 6247.8 276.13 6247.9 276.52  
6248  
276.91 6248.1 277.3 6248.2 277.68 6248.3 278.07 6248.4 278.46  
6248.5  
278.85 6248.6 279.24 6248.7 279.63 6248.8 280.02 6248.9 280.41  
6249  
280.8 6249.1 281.19 6249.2 281.58 6249.3 281.97 6249.4 282.36  
6249.5  
282.75 6249.6 283.14 6249.7 283.53 6249.8 283.92 6249.9 284.31  
6250  
284.7 6250.1 285.09 6250.2 285.48 6250.3 285.87 6250.4 286.26  
6250.5  
286.65 6250.6 287.03 6250.7 287.43 6250.8 287.83 6250.9 288.23  
6251  
288.63 6251.1 289.03 6251.2 289.43 6251.3 289.83 6251.4 290.23  
6251.5  
290.63 6251.6 291.03 6251.7 291.43 6251.8 291.83 6251.9 292.23  
6252  
292.63 6252.1 293.03 6252.2 293.44 6252.3 293.84 6252.4 294.24  
6252.5  
294.64 6252.6 295.04 6252.7 295.44 6252.8 295.84 6252.9 296.24  
6253  
296.34 6253 298.21 6252.9 300 6252.9  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 130.06 .013 169.88 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.



Expan. 130.06 169.88 50 50 50 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 113.39 6253.58 F  
190.45 300 6251.6 F  
Left Levee Station= 114.64 Elevation= 6253.67  
Right Levee Station= 189.19 Elevation= 6251.72

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6251.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6249.98	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6249.98	Flow Area (sq ft)	
110.20			
E.G. Slope (ft/ft)	0.001776	Area (sq ft)	
110.20			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.02	Top Width (ft)	
35.02			
Vel Total (ft/s)	9.98	Avg. Vel. (ft/s)	
9.98			
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)	
3.15			
Conv. Total (cfs)	26102.7	Conv. (cfs)	
26102.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
36.94			
Min Ch El (ft)	6245.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00
114.64 189.19			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.22 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.24
0.87 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 958

INPUT  
Description:  
Station Elevation Data num= 299  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6252.5 7.05 6252.5 10.29 6252.4 13.53 6252.3 16.77  
6252.2  
20.02 6252.1 23.26 6252 26.5 6251.9 29.74 6251.8 63.58  
6251.8  
67.44 6251.7 74.95 6251.6 82.46 6251.5 89.97 6251.4 97.48  
6251.3  
98.92 6251.2 100.36 6251.1 101.83 6251 103.29 6250.9 104.76  
6250.8  
106.23 6250.7 107.69 6250.6 109.16 6250.5 109.98 6250.7 110.08  
6250.5  
111.17 6250.6 113.06 6250.7 114.9 6250.8 116.75 6250.9 117.76  
6250.9  
119.13 6250.8 120.5 6250.7 121.88 6250.6 123.25 6250.5 124.62  
6250.4  
126 6250.3 126.73 6250.2 127.24 6250.1 127.75 6250 128.26  
6249.9  
128.76 6249.8 129.31 6249.7 129.79 6249.6 130.08 6249.5 130.36  
6249.4  
130.65 6249.3 130.94 6249.2 131.22 6249.1 131.51 6249 131.81  
6248.9  
132.11 6248.8 132.41 6248.7 132.71 6248.6 133.01 6248.5 133.31  
6248.4  
133.61 6248.3 133.91 6248.2 134.21 6248.1 134.51 6248 134.81  
6247.9  
135.11 6247.8 135.41 6247.7 135.71 6247.6 136.01 6247.5 136.31  
6247.4  
136.61 6247.3 136.91 6247.2 137.21 6247.1 137.51 6247 137.81  
6246.9  
138.11 6246.8 138.41 6246.7 138.71 6246.6 139.01 6246.5 139.31  
6246.4  
139.61 6246.3 139.91 6246.2 140.21 6246.1 140.51 6246 140.81  
6245.9  
141.11 6245.8 141.41 6245.7 141.71 6245.6 142.01 6245.5 142.31  
6245.4  
142.61 6245.3 142.91 6245.2 143.21 6245.1 143.51 6245 143.81  
6244.9  
144.11 6244.8 144.41 6244.7 144.71 6244.6 155.08 6244.6 155.28  
6244.7



155.48 6244.8 155.68 6244.9 155.88 6245 156.08 6245.1 156.28  
6245.2 156.48 6245.3 156.68 6245.4 156.88 6245.5 157.08 6245.6 157.28  
6245.7 157.48 6245.8 157.68 6245.9 157.88 6246 158.08 6246.1 158.28  
6246.2 158.48 6246.3 158.68 6246.4 158.88 6246.5 159.08 6246.6 159.28  
6246.7 159.48 6246.8 159.68 6246.9 159.88 6247 160.08 6247.1 160.28  
6247.2 160.48 6247.3 160.68 6247.4 160.88 6247.5 161.08 6247.6 161.28  
6247.7 161.48 6247.8 161.68 6247.9 161.88 6248 162.08 6248.1 162.28  
6248.2 162.48 6248.3 162.68 6248.4 162.88 6248.5 163.08 6248.6 163.28  
6248.7 163.48 6248.8 163.68 6248.9 163.88 6249 164.08 6249.1 164.28  
6249.2 164.48 6249.3 164.68 6249.4 164.88 6249.5 165.08 6249.6 165.28  
6249.7 165.48 6249.8 165.68 6249.9 165.88 6250 166.17 6250.1 166.47  
6250.2 166.77 6250.3 167.07 6250.4 167.37 6250.5 167.67 6250.6 167.97  
6250.7 168.27 6250.8 168.35 6250.81 169.34 6250.9 171.25 6251 173  
6251.1 174.02 6251.2 181.94 6251.3 187.63 6251.4 189.65 6251.4 190.12  
6251.3 190.59 6251.2 191.06 6251.1 191.53 6251 192 6250.9 192.47  
6250.8 192.94 6250.7 193.41 6250.6 193.88 6250.5 194.35 6250.4 194.82  
6250.3 195.29 6250.2 195.76 6250.1 196.23 6250 196.7 6249.9 197.17  
6249.8 197.64 6249.7 198.11 6249.6 198.58 6249.5 199.05 6249.4 199.52  
6249.3 199.99 6249.2 200.46 6249.1 200.93 6249 201.4 6248.9 201.87  
6248.8 202.34 6248.7 202.81 6248.6 203.29 6248.5 203.76 6248.4 204.23  
6248.3 204.71 6248.2 205.18 6248.1 205.66 6248 206.13 6247.9 206.61  
6247.8 207.08 6247.7 207.56 6247.6 208.03 6247.5 208.51 6247.4 208.98  
6247.3 209.46 6247.2 209.93 6247.1 210.41 6247 210.88 6246.9 211.36  
6246.8 211.83 6246.7 212.31 6246.6 212.78 6246.5 213.26 6246.4 214.79  
6246.3 217.45 6246.2 220.11 6246.1 222.77 6246 225.42 6245.9 228.08  
6245.8 230.74 6245.7 233.36 6245.6 235.97 6245.5 238.59 6245.4 241.13  
6245.3 242.55 6245.2 242.65 6245.1 242.75 6245 242.85 6244.9 242.95

6244.8  
245.07 6244.8 245.17 6244.9 245.27 6245 245.37 6245.1 245.46  
6245.2 246.89 6245.3 249.4 6245.4 251.91 6245.5 254.42 6245.6 256.93  
6245.7 259.45 6245.8 261.96 6245.9 264.47 6246 266.98 6246.1 269.49  
6246.2 272 6246.3 273.53 6246.4 273.93 6246.5 274.33 6246.6 274.74  
6246.7 275.14 6246.8 275.54 6246.9 275.95 6247 276.35 6247.1 276.75  
6247.2 277.15 6247.3 277.56 6247.4 277.96 6247.5 278.36 6247.6 278.76  
6247.7 279.17 6247.8 279.57 6247.9 279.97 6248 280.38 6248.1 280.78  
6248.2 281.18 6248.3 281.58 6248.4 281.99 6248.5 282.39 6248.6 282.79  
6248.7 283.19 6248.8 283.6 6248.9 283.91 6249.6 284 6249 284.4  
6249.1 284.81 6249.2 285.21 6249.3 285.61 6249.4 286.01 6249.5 286.42  
6249.6 286.82 6249.7 287.22 6249.8 287.63 6249.9 288.03 6250 288.43  
6250.1 288.83 6250.2 289.24 6250.3 289.64 6250.4 290.04 6250.5 290.5  
6250.6 291.1 6250.7 291.69 6250.8 292.29 6250.9 293.45 6251 295.03  
6251.1 296.22 6251.2 297.69 6251.3 299.16 6251.4 300 6251.4  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131.51 .013 168.35 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131.51 168.35 50 50 50 .1  
.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 116.32 6250.89 F  
190.03 300 6251.19 F  
Left Levee Station= 117.57 Elevation= 6250.94  
Right Levee Station= 189.19 Elevation= 6251.25  
  
CROSS SECTION OUTPUT Profile #Flow 1  
  
E.G. Elev (ft) 6251.04 Element Left OB  
Channel Right OB  
Vel Head (ft) 1.59 Wt. n-Val. 0.030  
0.013  
W.S. Elev (ft) 6249.44 Reach Len. (ft) 50.00  
50.00 50.00



Crit W.S. (ft)	6249.44	Flow Area (sq ft)	0.28
108.61 E.G. Slope (ft/ft)	0.001742	Area (sq ft)	0.28
108.61 Q Total (cfs)	1100.00	Flow (cfs)	0.21
1099.79 Top Width (ft)	34.53	Top Width (ft)	1.27
33.26 Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)	0.73
10.13 Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	0.22
3.27 Conv. Total (cfs)	26356.9	Conv. (cfs)	5.0
26352.0 Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.35
35.12 Min Ch El (ft)	6244.60	Shear (lb/sq ft)	0.02
0.34 Alpha	1.00	Stream Power (lb/ft s)	300.00
117.57 189.19 Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.10 0.00 C & E Loss (ft)	0.01	Cum SA (acres)	0.24
0.83 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 957

INPUT									
Description:									
Station	Elevation	Data	num=	322					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev	0	6250.9	3.24	6250.9	15.11	6250.8	23.82	6250.7	32.94
6250.6	42.06	6250.5	56.55	6250.5	60.36	6250.6	64.17	6250.7	75.25
6250.8									

78.56	6250.9	81.09	6251	83.61	6251.1	85.53	6251.2	87.32	
6251.3									
89.11	6251.4	90.9	6251.5	92.69	6251.6	94.48	6251.7	96.27	
6251.8									
98.06	6251.9	99.85	6252	101.64	6252.1	103.43	6252.2	105.21	
6252.3									
107	6252.4	108.79	6252.5	110.58	6252.6	112.12	6252.7	112.95	
6252.8									
113.78	6252.9	114.61	6253	115.44	6253.1	116.27	6253.2	116.51	
6253.2									
116.71	6253.1	116.91	6253	117.11	6252.9	117.31	6252.8	117.51	
6252.7									
117.71	6252.6	117.91	6252.5	118.11	6252.4	118.31	6252.3	118.55	
6252.2									
118.85	6252.1	119.15	6252	119.45	6251.9	119.74	6251.8	120.04	
6251.7									
120.34	6251.6	120.64	6251.5	120.93	6251.4	121.23	6251.3	121.53	
6251.2									
121.83	6251.1	122.13	6251	122.42	6250.9	122.72	6250.8	123.02	
6250.7									
123.32	6250.6	123.68	6250.5	124.07	6250.4	124.47	6250.3	124.86	
6250.2									
125.25	6250.1	125.65	6250	126.04	6249.9	126.44	6249.8	126.83	
6249.7									
127.23	6249.6	127.62	6249.5	128.01	6249.4	128.41	6249.3	128.8	
6249.2									
129.2	6249.1	129.59	6249	129.98	6248.9	130.38	6248.8	130.77	
6248.7									
131.17	6248.6	131.53	6248.5	131.83	6248.4	132.13	6248.3	132.43	
6248.2									
132.73	6248.1	133.03	6248	133.33	6247.9	133.63	6247.8	133.93	
6247.7									
134.23	6247.6	134.53	6247.5	134.83	6247.4	135.13	6247.3	135.43	
6247.2									
135.73	6247.1	136.03	6247	136.33	6246.9	136.63	6246.8	136.93	
6246.7									
137.23	6246.6	137.53	6246.5	137.83	6246.4	138.13	6246.3	138.43	
6246.2									
138.73	6246.1	139.03	6246	139.33	6245.9	139.63	6245.8	139.93	
6245.7									
140.23	6245.6	140.53	6245.5	140.83	6245.4	141.13	6245.3	141.43	
6245.2									
141.73	6245.1	142.03	6245	142.33	6244.9	142.63	6244.8	142.93	
6244.7									
143.23	6244.6	143.53	6244.5	143.83	6244.4	144.13	6244.3	144.43	
6244.2									
144.73	6244.1	155.09	6244.1	155.29	6244.2	155.49	6244.3	155.69	
6244.4									
155.89	6244.5	156.09	6244.6	156.29	6244.7	156.49	6244.8	156.69	
6244.9									
156.89	6245	157.09	6245.1	157.29	6245.2	157.49	6245.3	157.69	
6245.4									
157.89	6245.5	158.09	6245.6	158.29	6245.7	158.49	6245.8	158.69	



6245.9								
158.89	6246	159.09	6246.1	159.29	6246.2	159.49	6246.3	159.69
6246.4								
159.89	6246.5	160.09	6246.6	160.29	6246.7	160.49	6246.8	160.69
6246.9								
160.89	6247	161.09	6247.1	161.29	6247.2	161.49	6247.3	161.69
6247.4								
161.89	6247.5	162.09	6247.6	162.29	6247.7	162.49	6247.8	162.69
6247.9								
162.89	6248	163.09	6248.1	163.29	6248.2	163.49	6248.3	163.69
6248.4								
163.89	6248.5	164.09	6248.6	164.29	6248.7	164.49	6248.8	164.69
6248.9								
164.89	6249	165.09	6249.1	165.29	6249.2	165.49	6249.3	165.69
6249.4								
165.89	6249.5	166.09	6249.6	166.29	6249.7	166.49	6249.8	166.69
6249.9								
166.89	6250	167.09	6250.1	167.29	6250.2	167.49	6250.3	167.74
6250.4								
168.04	6250.5	168.34	6250.6	169.7	6250.7	169.9	6250.72	170.83
6250.8								
171.85	6250.9	172.87	6251	173.89	6251.1	188.46	6251.2	189.59
6251.2								
190.06	6251.1	190.53	6251	191	6250.9	191.47	6250.8	191.93
6250.7								
192.4	6250.6	192.87	6250.5	193.34	6250.4	193.81	6250.3	194.28
6250.2								
194.75	6250.1	195.22	6250	195.69	6249.9	196.16	6249.8	196.63
6249.7								
197.1	6249.6	197.57	6249.5	198.04	6249.4	198.51	6249.3	198.98
6249.2								
199.45	6249.1	199.92	6249	200.39	6248.9	200.86	6248.8	201.31
6248.7								
201.65	6248.6	202.09	6248.5	202.55	6248.4	203.01	6248.3	203.47
6248.2								
203.93	6248.1	204.39	6248	204.85	6247.9	205.31	6247.8	205.77
6247.7								
206.23	6247.6	206.69	6247.5	207.15	6247.4	207.61	6247.3	208.07
6247.2								
208.53	6247.1	208.99	6247	209.45	6246.9	209.91	6246.8	210.37
6246.7								
210.83	6246.6	211.29	6246.5	211.75	6246.4	212.21	6246.3	212.67
6246.2								
213.13	6246.1	213.95	6246	216.35	6245.9	218.75	6245.8	221.16
6245.7								
223.56	6245.6	225.96	6245.5	228.35	6245.4	230.74	6245.3	233.13
6245.2								
235.57	6245.1	238.02	6245	238.26	6244.9	238.35	6244.8	238.45
6244.7								
238.55	6244.6	238.65	6244.5	240.68	6244.5	240.78	6244.6	240.88
6244.7								
240.98	6244.8	241.08	6244.9	241.33	6245	243.92	6245.1	246.51
6245.2								

249.1	6245.3	251.71	6245.4	254.36	6245.5	257.01	6245.6	259.65
6245.7								
262.28	6245.8	264.91	6245.9	267.54	6246	270.17	6246.1	272.8
6246.2								
274.54	6246.3	274.83	6246.4	275.12	6246.5	275.4	6246.6	275.69
6246.7								
275.98	6246.8	276.27	6246.9	276.58	6247	276.89	6247.1	277.2
6247.2								
277.51	6247.3	279.53	6247.4	282.8	6247.5	286.07	6247.6	289.34
6247.7								
292.61	6247.8	292.72	6247.9	293.18	6247.9	293.55	6248	293.92
6248.1								
294.3	6248.2	294.67	6248.3	295.04	6248.4	295.41	6248.5	295.79
6248.6								
296.16	6248.7	296.53	6248.8	296.9	6248.9	297.28	6249	297.65
6249.1								
298.02	6249.2	298.39	6249.3	298.76	6249.4	299.14	6249.5	299.51
6249.6								
299.88	6249.7	300	6249.7					
Manning's	n	Values		num=	3			
Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.03	129.59		.013	169.9		.03	
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right		Coeff Contr.
Expan.								
	129.59	169.9		50	50	50		.1
.3								
Ineffective Flow		num=	2					
Sta L	Sta R	Elev	Permanent					
0	115.48	6253.12	F					
190.03	300	6250.8	F					
Left Levee	Station=	115.9	Elevation=	6253.2				
Right Levee	Station=	189.61	Elevation=	6250.72				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)		6250.53	Element				Left OB	
Channel Right OB								
Vel Head (ft)		1.57	Wt. n-Val.					
0.013								
W.S. Elev (ft)		6248.96	Reach Len. (ft)				50.00	
50.00	50.00							
Crit W.S. (ft)		6248.96	Flow Area (sq ft)					
109.52								
E.G. Slope (ft/ft)		0.001816	Area (sq ft)					
109.52								
Q Total (cfs)		1100.00	Flow (cfs)					
1100.00								
Top Width (ft)		35.07	Top Width (ft)					
35.07								
Vel Total (ft/s)		10.04	Avg. Vel. (ft/s)					







128.51	6248.2	128.75	6248.3	128.99	6248.4	129.22	6248.5	129.46
6248.6								
129.7	6248.7	129.93	6248.8	130.17	6248.9	130.4	6249	130.64
6249.1								
130.88	6249.2	131.11	6249.3	131.35	6249.4	132.06	6249.5	134.41
6249.55								
137.06	6249.6	152.67	6249.6	153.33	6249.5	153.99	6249.4	154.66
6249.3								
155.32	6249.2	155.98	6249.1	156.65	6249	157.31	6248.9	157.97
6248.8								
158.64	6248.7	159.3	6248.6	159.96	6248.5	160.62	6248.4	161.28
6248.3								
161.94	6248.2	162.6	6248.1	163.27	6248	163.93	6247.9	164.59
6247.8								
165.25	6247.7	165.91	6247.6	166.57	6247.5	167.23	6247.4	167.89
6247.3								
168.56	6247.2	169.22	6247.1	169.88	6247	170.54	6246.9	171.2
6246.8								
171.86	6246.7	172.52	6246.6	173.18	6246.5	173.84	6246.4	174.51
6246.3								
175.17	6246.2	175.83	6246.1	176.49	6246	178.67	6245.9	181.16
6245.8								
183.64	6245.7	186.13	6245.6	188.61	6245.5	191.09	6245.4	193.57
6245.3								
196.05	6245.2	198.53	6245.1	201.01	6245	203.49	6244.9	205.97
6244.8								
207.42	6244.7	207.52	6244.6	207.62	6244.5	207.72	6244.4	207.82
6244.3								
209.96	6244.3	210.06	6244.4	210.16	6244.5	210.26	6244.6	210.36
6244.7								
211.9	6244.8	214.46	6244.9	217.02	6245	219.59	6245.1	222.15
6245.2								
223.99	6245.3	224.71	6245.3	227.27	6245.4	229.82	6245.5	232.37
6245.6								
234.93	6245.7	237.48	6245.8	241.16	6245.9	245.73	6246	247.84
6246.1								
248.35	6246.2	248.86	6246.3	249.37	6246.4	249.88	6246.5	250.39
6246.6								
250.9	6246.7	251.41	6246.8	251.93	6246.9	252.44	6247	252.95
6247.1								
253.01	6247.7	253.46	6247.2	253.97	6247.3	254.48	6247.4	254.99
6247.5								
255.5	6247.6	256.01	6247.7	256.38	6247.8	256.53	6247.8	257.04
6247.9								
257.55	6248	258.06	6248.1	258.57	6248.2	259.08	6248.3	259.59
6248.4								
260.1	6248.5	260.61	6248.6	261.13	6248.7	261.64	6248.8	262.15
6248.9								
262.66	6249	263.1	6249					
Manning's n Values								
num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
-36.9	.03	92.43	.013	134.41	.03			

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	92.43	134.41		50	50	50		.1
.3								
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
-36.9	81.09	6251.92	F					
156.48	263.1	6249.05	F					
Left Levee	Station=		82.77	Elevation=	6251.9			
Right Levee	Station=		152.71	Elevation=	6249.62			

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.96	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.52	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6248.44	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6248.44	Flow Area (sq ft)	
111.21			
E.G. Slope (ft/ft)	0.001768	Area (sq ft)	
111.21			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.85	Top Width (ft)	
35.85			
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)	
9.89			
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	
3.10			
Conv. Total (cfs)	26161.8	Conv. (cfs)	
26161.8			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
37.66			
Min Ch El (ft)	6243.60	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	263.10
82.77 152.71			
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.05
2.85 0.00			
C & E Loss (ft)	0.09	Cum SA (acres)	0.24
0.75 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated



water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 955

INPUT									
Description:									
Station	Elevation	Data	num=	344					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6249.4	.42	6249.4	2.42	6249.3	4.43	6249.2	6.43	
6249.1	8.31	6249	10.46	6248.9	31.24	6248.8	32.32	6248.7	32.47
6248.6	33.43	6248.5	50.66	6248.5	50.74	6248.6	50.81	6248.7	50.89
6248.8	50.96	6248.9	51.04	6249	51.11	6249.1	51.19	6249.2	51.99
6249.3	60.14	6249.3	82.6	6249.2	105.05	6249.1	108.53	6249.1	108.63
6249.2	108.72	6249.3	108.82	6249.4	108.91	6249.5	109.08	6249.6	110.52
6249.7	111.95	6249.8	112.97	6249.9	113.51	6250	114.05	6250.1	114.59
6250.2	115.13	6250.3	115.67	6250.4	116.21	6250.5	116.75	6250.6	117.29
6250.7	117.83	6250.8	118.37	6250.9	118.91	6251	119.46	6251.1	120
6251.2	120.54	6251.3	120.73	6251.3	121.01	6251.2	121.3	6251.1	121.58
6251	121.87	6250.9	122.16	6250.8	122.44	6250.7	122.73	6250.6	123.01
6250.5	123.3	6250.4	123.58	6250.3	123.87	6250.2	124.15	6250.1	124.44
6250	124.72	6249.9	125.01	6249.8	125.29	6249.7	125.58	6249.6	125.86
6249.5	126.15	6249.4	126.43	6249.3	126.72	6249.2	127	6249.1	127.29
6249	127.57	6248.9	127.86	6248.8	128.14	6248.7	128.43	6248.6	128.72
6248.5	129	6248.4	129.29	6248.3	129.57	6248.2	129.86	6248.1	130.14
6248	130.43	6247.9	130.71	6247.8	131	6247.7	131.28	6247.6	131.57
6247.5	131.87	6247.4	132.17	6247.3	132.47	6247.2	132.77	6247.1	133.07
6247									

133.37	6246.9	133.67	6246.8	133.97	6246.7	134.27	6246.6	134.57	
6246.5									
134.87	6246.4	135.17	6246.3	135.47	6246.2	135.77	6246.1	136.07	
6246									
136.37	6245.9	136.67	6245.8	136.97	6245.7	137.27	6245.6	137.57	
6245.5									
137.87	6245.4	138.17	6245.3	138.47	6245.2	138.77	6245.1	139.07	
6245									
139.37	6244.9	139.67	6244.8	139.97	6244.7	140.27	6244.6	140.57	
6244.5									
140.87	6244.4	141.17	6244.3	141.47	6244.2	141.77	6244.1	142.07	
6244									
142.37	6243.9	142.67	6243.8	142.97	6243.7	143.27	6243.6	143.57	
6243.5									
143.87	6243.4	144.17	6243.3	144.47	6243.2	144.77	6243.1	155.12	
6243.1									
155.34	6243.2	155.56	6243.3	155.77	6243.4	155.99	6243.5	156.21	
6243.6									
156.43	6243.7	156.64	6243.8	156.86	6243.9	157.08	6244	157.3	
6244.1									
157.51	6244.2	157.71	6244.3	157.92	6244.4	158.13	6244.5	158.33	
6244.6									
158.54	6244.7	158.75	6244.8	158.96	6244.9	159.16	6245	159.37	
6245.1									
159.58	6245.2	159.78	6245.3	159.98	6245.4	160.18	6245.5	160.38	
6245.6									
160.58	6245.7	160.78	6245.8	160.98	6245.9	161.18	6246	161.38	
6246.1									
161.58	6246.2	161.78	6246.3	161.98	6246.4	162.18	6246.5	162.38	
6246.6									
162.58	6246.7	162.78	6246.8	162.98	6246.9	163.18	6247	163.38	
6247.1									
163.58	6247.2	163.78	6247.3	163.98	6247.4	164.18	6247.5	164.38	
6247.6									
164.58	6247.7	164.78	6247.8	164.98	6247.9	165.18	6248	165.38	
6248.1									
165.58	6248.2	165.78	6248.3	165.98	6248.4	166.18	6248.5	166.38	
6248.6									
166.58	6248.7	166.78	6248.8	166.98	6248.9	167.18	6249	167.38	
6249.1									
167.58	6249.2	167.78	6249.3	167.98	6249.4	168.18	6249.5	168.38	
6249.6									
168.71	6249.7	169.15	6249.8	169.58	6249.9	170.02	6250	170.45	
6250.1									
170.89	6250.2	171.32	6250.3	171.76	6250.4	172.19	6250.5	189.87	
6250.5									
190.31	6250.4	190.76	6250.3	191.2	6250.2	191.64	6250.1	192.08	
6250									
192.52	6249.9	192.96	6249.8	193.4	6249.7	193.84	6249.6	194.29	
6249.5									
194.73	6249.4	195.17	6249.3	195.61	6249.2	196.05	6249.1	196.49	
6249									
196.93	6248.9	197.38	6248.8	197.57	6249.6	197.82	6248.7	198.26	



6248.6								
198.7	6248.5	199.14	6248.4	199.58	6248.3	200.02	6248.2	200.46
6248.1								
200.91	6248	201.35	6247.9	201.79	6247.8	201.9	6248.1	202.23
6247.7								
202.67	6247.6	203.11	6247.5	203.55	6247.4	204.03	6247.3	204.68
6247.2								
205.33	6247.1	205.98	6247	206.63	6246.9	207.28	6246.8	207.93
6246.7								
208.58	6246.6	209.22	6246.5	209.87	6246.4	210.52	6246.3	211.17
6246.2								
211.82	6246.1	212.47	6246	213.12	6245.9	214.57	6245.8	217.16
6245.7								
219.75	6245.6	222.35	6245.5	224.94	6245.4	227.53	6245.3	230.14
6245.2								
232.76	6245.1	235.38	6245	238.01	6244.9	240.63	6244.8	243.21
6244.7								
245.79	6244.6	248.37	6244.5	248.7	6244.4	248.8	6244.3	248.9
6244.2								
249	6244.1	249.1	6244	251.15	6244	251.25	6244.1	251.35
6244.2								
251.45	6244.3	251.55	6244.4	251.57	6244.6	251.84	6244.5	254.27
6244.6								
256.71	6244.7	259.14	6244.8	261.58	6244.9	264.01	6245	266.45
6245.1								
268.88	6245.2	271.32	6245.3	273.75	6245.4	276.19	6245.5	276.96
6245.6								
277.4	6245.7	277.83	6245.8	278.26	6245.9	278.69	6246	279.12
6246.1								
279.55	6246.2	279.98	6246.3	280.41	6246.4	280.85	6246.5	281.28
6246.6								
281.71	6246.7	282.14	6246.8	282.57	6246.9	283	6247	283.43
6247.1								
283.86	6247.2	284.29	6247.3	284.73	6247.4	285.16	6247.5	285.59
6247.6								
286.02	6247.7	286.45	6247.8	286.88	6247.9	287.31	6248	287.74
6248.1								
288.17	6248.2	288.61	6248.3	289.04	6248.4	289.47	6248.5	289.9
6248.6								
290.33	6248.7	290.76	6248.8	291.19	6248.9	291.62	6249	292.06
6249.1								
292.49	6249.2	292.92	6249.3	293.35	6249.4	293.78	6249.5	294.21
6249.6								
294.64	6249.7	295.07	6249.8	295.5	6249.9	295.94	6250	296.37
6250.1								
296.8	6250.2	297.23	6250.3	297.66	6250.4	298.09	6250.5	298.52
6250.6								
298.95	6250.7	299.38	6250.8	299.82	6250.9	300	6250.9	
Manning's n Values num= 3								
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	130.14	.013	169.58	.03			

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

130.14	169.58	50	50	50	.1
--------	--------	----	----	----	----

.3					
Ineffective Flow	num=	2			
Sta L	Sta R	Elev	Permanent		
0	118.83	6251.23	F		
190.87	300	6249.99	F		
Left Levee	Station=	120.51	Elevation=	6251.3	
Right Levee	Station=	189.61	Elevation=	6250.08	

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.57	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.22	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6248.35	Reach Len. (ft)	50.00
50.00	50.00		
Crit W.S. (ft)	6247.93	Flow Area (sq ft)	0.17
124.19			
E.G. Slope (ft/ft)	0.001227	Area (sq ft)	0.17
124.19			
Q Total (cfs)	1100.00	Flow (cfs)	0.09
1099.91			
Top Width (ft)	36.74	Top Width (ft)	1.00
35.74			
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)	0.52
8.86			
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)	0.17
3.47			
Conv. Total (cfs)	31397.8	Conv. (cfs)	2.6
31395.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.06
37.75			
Min Ch El (ft)	6243.10	Shear (lb/sq ft)	0.01
0.25			
Alpha	1.00	Stream Power (lb/ft s)	300.00
120.51	189.61		
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.05
2.71	0.00		
C & E Loss (ft)	0.12	Cum SA (acres)	0.24
0.71	0.01		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION



INPUT	Description:								
Station	Elevation	Data	num=	344					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6248.9	1.18	6248.9	3.07	6248.8	4.93	6248.7	6.78	
6248.6									
8.63	6248.5	10.48	6248.4	12.33	6248.3	14.18	6248.2	16.03	
6248.1									
17.88	6248	19.73	6247.9	21.57	6247.8	23.42	6247.7	25.27	
6247.6									
33.66	6247.6	35.65	6247.7	37.64	6247.8	39.62	6247.9	41.61	
6248									
43.6	6248.1	45.59	6248.2	47.58	6248.3	49.56	6248.4	50.95	
6248.5									
51.36	6248.6	51.78	6248.7	52.19	6248.8	57.28	6248.8	67.38	
6248.7									
105.39	6248.6	105.58	6248.6	105.78	6248.7	105.89	6248.8	105.99	
6248.9									
106.1	6249	115.98	6249.1	117.05	6249.2	118.12	6249.3	119.19	
6249.4									
120.26	6249.5	121.33	6249.6	121.95	6249.6	122.35	6249.5	122.75	
6249.4									
123.16	6249.3	123.56	6249.2	123.97	6249.1	124.37	6249	124.77	
6248.9									
125.18	6248.8	125.58	6248.7	125.99	6248.6	126.39	6248.5	126.79	
6248.4									
127.2	6248.3	127.6	6248.2	128	6248.1	128.41	6248	128.81	
6247.9									
129.22	6247.8	129.62	6247.7	129.91	6247.6	130.19	6247.5	130.47	
6247.4									
130.75	6247.3	131.03	6247.2	131.31	6247.1	131.59	6247	131.89	
6246.9									
132.19	6246.8	132.49	6246.7	132.79	6246.6	133.09	6246.5	133.39	
6246.4									
133.69	6246.3	133.99	6246.2	134.29	6246.1	134.59	6246	134.89	
6245.9									
135.19	6245.8	135.49	6245.7	135.79	6245.6	136.09	6245.5	136.39	
6245.4									
136.69	6245.3	136.99	6245.2	137.29	6245.1	137.59	6245	137.89	
6244.9									
138.19	6244.8	138.49	6244.7	138.79	6244.6	139.09	6244.5	139.39	
6244.4									
139.69	6244.3	139.99	6244.2	140.29	6244.1	140.59	6244	140.89	
6243.9									
141.19	6243.8	141.49	6243.7	141.79	6243.6	142.09	6243.5	142.39	
6243.4									
142.69	6243.3	142.99	6243.2	143.29	6243.1	143.59	6243	143.89	
6242.9									
144.19	6242.8	144.49	6242.7	144.79	6242.6	155.12	6242.6	155.33	

6242.7									
155.53	6242.8	155.73	6242.9	155.93	6243	156.14	6243.1	156.34	
6243.2									
156.54	6243.3	156.74	6243.4	156.95	6243.5	157.15	6243.6	157.35	
6243.7									
157.55	6243.8	157.75	6243.9	157.96	6244	158.16	6244.1	158.36	
6244.2									
158.56	6244.3	158.77	6244.4	158.97	6244.5	159.17	6244.6	159.37	
6244.7									
159.58	6244.8	159.78	6244.9	159.98	6245	160.18	6245.1	160.39	
6245.2									
160.59	6245.3	160.79	6245.4	160.99	6245.5	161.2	6245.6	161.4	
6245.7									
161.6	6245.8	161.8	6245.9	162	6246	162.21	6246.1	162.41	
6246.2									
162.61	6246.3	162.81	6246.4	163.02	6246.5	163.22	6246.6	163.42	
6246.7									
163.62	6246.8	163.83	6246.9	164.03	6247	164.23	6247.1	164.43	
6247.2									
164.64	6247.3	164.84	6247.4	165.04	6247.5	165.24	6247.6	165.45	
6247.7									
165.65	6247.8	165.85	6247.9	166.05	6248	166.25	6248.1	166.46	
6248.2									
166.66	6248.3	166.86	6248.4	167.07	6248.5	167.27	6248.6	167.48	
6248.7									
167.68	6248.8	167.89	6248.9	168.09	6249	168.3	6249.1	168.51	
6249.2									
168.84	6249.3	169.16	6249.4	169.49	6249.5	169.82	6249.6	170.16	
6249.7									
170.51	6249.8	170.87	6249.9	171.23	6250	171.26	6250.01	171.58	
6250.1									
171.94	6250.2	172.3	6250.3	172.65	6250.4	173.01	6250.5	173.36	
6250.6									
173.72	6250.7	174.08	6250.8	174.43	6250.9	180.76	6251	189.88	
6251									
190.3	6250.9	190.72	6250.8	191.14	6250.7	191.56	6250.6	191.98	
6250.5									
192.39	6250.4	192.81	6250.3	193.23	6250.2	193.65	6250.1	194.07	
6250									
194.49	6249.9	194.91	6249.8	195.33	6249.7	195.75	6249.6	196.17	
6249.5									
196.58	6249.4	197	6249.3	197.42	6249.2	197.84	6249.1	198.26	
6249									
198.68	6248.9	199.1	6248.8	199.52	6248.7	199.94	6248.6	200.36	
6248.5									
200.78	6248.4	201.19	6248.3	201.61	6248.2	202.03	6248.1	202.45	
6248									
202.57	6248.1	202.87	6247.9	203.29	6247.8	203.71	6247.7	204.13	
6247.6									
204.55	6247.5	204.97	6247.4	205.38	6247.3	205.8	6247.2	206.22	
6247.1									
206.64	6247	207.06	6246.9	207.48	6246.8	207.9	6246.7	208.32	
6246.6									



208.74	6246.5	209.16	6246.4	209.57	6246.3	209.99	6246.2	210.41		
6246.1										
210.83	6246	211.22	6245.9	211.61	6245.8	212	6245.7	212.39		
6245.6										
212.79	6245.5	213.18	6245.4	213.96	6245.3	216.58	6245.2	219.2		
6245.1										
221.83	6245	224.41	6244.9	226.98	6244.8	229.56	6244.7	232.14		
6244.6										
234.72	6244.5	237.3	6244.4	239.88	6244.3	241.51	6244.2	241.61		
6244.1										
241.71	6244	241.81	6243.9	241.91	6243.8	246.55	6243.8	246.68		
6243.9										
246.8	6244	246.92	6244.1	247.05	6244.2	251.26	6244.3	254.05		
6244.4										
256.85	6244.5	260.06	6244.6	264.8	6244.7	269.54	6244.8	274.28		
6244.9										
277.8	6245	278.18	6245.1	278.55	6245.2	278.92	6245.3	279.3		
6245.4										
279.67	6245.5	280.05	6245.6	280.42	6245.7	280.8	6245.8	281.17		
6245.9										
281.54	6246	281.92	6246.1	282.29	6246.2	282.67	6246.3	283.04		
6246.4										
283.42	6246.5	283.79	6246.6	284.17	6246.7	284.54	6246.8	284.91		
6246.9										
285.29	6247	285.66	6247.1	286.04	6247.2	286.41	6247.3	286.79		
6247.4										
287.16	6247.5	287.53	6247.6	287.91	6247.7	288.28	6247.8	288.66		
6247.9										
289.03	6248	289.41	6248.1	289.78	6248.2	290.15	6248.3	290.53		
6248.4										
290.9	6248.5	291.28	6248.6	291.65	6248.7	292.03	6248.8	292.4		
6248.9										
292.78	6249	293.15	6249.1	293.52	6249.2	293.9	6249.3	294.27		
6249.4										
294.65	6249.5	295.02	6249.6	295.4	6249.7	295.77	6249.8	296.17		
6249.9										
296.6	6250	297.04	6250.1	297.47	6250.2	297.91	6250.3	298.34		
6250.4										
298.78	6250.5	299.21	6250.6	299.65	6250.7	300	6250.7			
Manning's n Values										
num= 3										
Sta	n Val	Sta	n Val	Sta	n Val					
0	.03	128.41	.013	171.26	.03					
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.										
Expan.		128.41	171.26	34.26	34.26	34.26	.1			
.3										
Ineffective Flow			num= 2							
Sta L	Sta R	Elev	Permanent							
0	5.33	6248.71	F							
189.19	300	6249.59	F							
Left Levee		Station=	121.34	Elevation= 6249.64						

Right Levee	Station= 189.19	Elevation= 6249.64												
CROSS SECTION OUTPUT Profile #Flow 1														
E.G. Elev (ft)	6249.40	Element	Left OB											
Channel Right OB														
Vel Head (ft)	0.82	Wt. n-Val.	0.030											
0.013														
W.S. Elev (ft)	6248.58	Reach Len. (ft)	34.26											
34.26 34.26														
Crit W.S. (ft)	6247.46	Flow Area (sq ft)	0.68											
151.24														
E.G. Slope (ft/ft)	0.000712	Area (sq ft)	0.68											
151.24														
Q Total (cfs)	1100.00	Flow (cfs)	0.39											
1099.61														
Top Width (ft)	41.17	Top Width (ft)	2.35											
38.82														
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)	0.57											
7.27														
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)	0.29											
3.90														
Conv. Total (cfs)	41224.9	Conv. (cfs)	14.6											
41210.3														
Length Wtd. (ft)	34.26	Wetted Per. (ft)	2.42											
41.09														
Min Ch El (ft)	6242.60	Shear (lb/sq ft)	0.01											
0.16														
Alpha	1.01	Stream Power (lb/ft s)	300.00											
121.34 189.19														
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.05											
2.55 0.00														
C & E Loss (ft)	0.05	Cum SA (acres)	0.23											
0.66 0.01														
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.														
CROSS SECTION														
RIVER: SC01														
REACH: Sand Creek-DS-1			RS: 953											
INPUT														
Description:														
Station Elevation Data	num= 354													
Sta Elev Sta Elev Sta Elev Sta Elev Sta														
Elev														
0 6248.8 .66 6248.8 2.56 6248.7 4.46 6248.6 6.36														



6248.5  
8.26 6248.4 10.16 6248.3 12.06 6248.2 13.96 6248.1 15.85  
6248  
17.75 6247.9 19.65 6247.8 21.55 6247.7 23.45 6247.6 40.6  
6247.6  
42.15 6247.7 43.7 6247.8 45.25 6247.9 46.8 6248 48.35  
6248.1  
49.91 6248.2 51.26 6248.3 52.56 6248.4 101.13 6248.4 101.34  
6248.5  
101.58 6248.6 102.1 6248.7 104.64 6248.8 106.39 6248.8 107.91  
6248.7  
109.42 6248.6 110.94 6248.5 112.45 6248.4 114.32 6248.3 117.89  
6248.2  
121.46 6248.1 122.97 6248 123.58 6247.9 124.18 6247.8 124.79  
6247.7  
125.4 6247.6 126.01 6247.5 126.65 6247.4 127.36 6247.3 128.06  
6247.2  
128.76 6247.1 129.46 6247 130.17 6246.9 130.87 6246.8 131.53  
6246.7  
131.83 6246.6 132.13 6246.5 132.43 6246.4 132.73 6246.3 133.03  
6246.2  
133.33 6246.1 133.63 6246 133.93 6245.9 134.23 6245.8 134.53  
6245.7  
134.83 6245.6 135.13 6245.5 135.43 6245.4 135.73 6245.3 136.03  
6245.2  
136.33 6245.1 136.63 6245 136.93 6244.9 137.23 6244.8 137.53  
6244.7  
137.83 6244.6 138.13 6244.5 138.43 6244.4 138.73 6244.3 139.03  
6244.2  
139.33 6244.1 139.63 6244 139.93 6243.9 140.23 6243.8 140.53  
6243.7  
140.83 6243.6 141.13 6243.5 141.43 6243.4 141.73 6243.3 142.03  
6243.2  
142.33 6243.1 142.63 6243 142.93 6242.9 143.18 6243.4 143.23  
6242.8  
143.53 6242.7 143.83 6242.6 144.13 6242.5 144.43 6242.4 144.73  
6242.3  
155.18 6242.3 155.39 6242.4 155.6 6242.5 155.8 6242.6 156.01  
6242.7  
156.21 6242.8 156.42 6242.9 156.62 6243 156.83 6243.1 157.03  
6243.2  
157.24 6243.3 157.44 6243.4 157.65 6243.5 157.85 6243.6 158.06  
6243.7  
158.26 6243.8 158.47 6243.9 158.68 6244 158.88 6244.1 159.09  
6244.2  
159.29 6244.3 159.5 6244.4 159.7 6244.5 159.91 6244.6 160.11  
6244.7  
160.32 6244.8 160.52 6244.9 160.73 6245 160.93 6245.1 161.14  
6245.2  
161.34 6245.3 161.55 6245.4 161.75 6245.5 161.96 6245.6 162.17  
6245.7  
162.37 6245.8 162.58 6245.9 162.78 6246 162.99 6246.1 163.19  
6246.2

163.4 6246.3 163.6 6246.4 163.81 6246.5 164.01 6246.6 164.22  
6246.7  
164.42 6246.8 164.63 6246.9 164.83 6247 165.04 6247.1 165.24  
6247.2  
165.45 6247.3 165.66 6247.4 165.86 6247.5 166.07 6247.6 166.27  
6247.7  
166.48 6247.8 166.68 6247.9 166.89 6248 167.09 6248.1 167.3  
6248.2  
167.5 6248.3 167.71 6248.4 167.91 6248.5 168.12 6248.6 168.32  
6248.7  
168.54 6248.8 168.85 6248.9 169.15 6249 169.36 6249.07 169.45  
6249.1  
169.75 6249.2 170.06 6249.3 170.36 6249.4 170.66 6249.5 170.96  
6249.6  
171.27 6249.7 171.57 6249.8 171.87 6249.9 172.18 6250 172.48  
6250.1  
172.78 6250.2 173.08 6250.3 173.39 6250.4 173.69 6250.5 173.99  
6250.6  
174.29 6250.7 176.08 6250.8 181.05 6250.9 186.01 6251 189.94  
6251  
190.26 6250.9 190.58 6250.8 190.89 6250.7 191.21 6250.6 191.53  
6250.5  
191.85 6250.4 192.17 6250.3 192.49 6250.2 192.81 6250.1 193.13  
6250  
193.45 6249.9 193.77 6249.8 194.09 6249.7 194.41 6249.6 194.73  
6249.5  
195.05 6249.4 195.37 6249.3 195.69 6249.2 196.02 6249.1 196.37  
6249  
196.71 6248.9 197.06 6248.8 197.41 6248.7 197.76 6248.6 198.1  
6248.5  
198.45 6248.4 198.8 6248.3 199.14 6248.2 199.49 6248.1 199.84  
6248  
200.18 6247.9 200.53 6247.8 200.88 6247.7 201.23 6247.6 201.57  
6247.5  
201.92 6247.4 202.27 6247.3 202.61 6247.2 202.96 6247.1 203.31  
6247  
203.65 6246.9 204 6246.8 204.35 6246.7 204.7 6246.6 205.04  
6246.5  
205.39 6246.4 205.74 6246.3 206.08 6246.2 206.43 6246.1 206.78  
6246  
207.12 6245.9 207.47 6245.8 207.82 6245.7 208.24 6245.6 208.73  
6245.5  
209.24 6245.4 209.25 6245.5 210.25 6245.2 210.76 6245.1 211.26  
6245  
211.33 6245 211.34 6245.1 211.36 6245.2 212.41 6244.9 212.49  
6244.8  
212.56 6244.7 212.64 6244.6 212.71 6244.5 212.77 6244.4 212.78  
6244.2  
212.8 6243.7 212.82 6243.2 212.84 6242.7 212.86 6242.2 212.9  
6241.8  
213.06 6241.8 213.31 6241.9 213.55 6242 213.8 6242.1 214.05  
6242.2  
214.29 6242.3 214.54 6242.4 214.78 6242.5 215.03 6242.6 215.27



6242.7								
215.52	6242.8	215.77	6242.9	216.01	6243	216.26	6243.1	216.52
6243.2								
216.83	6243.3	217.44	6243.5	218.25	6243.6	218.42	6243.7	218.59
6243.8								
218.76	6243.9	218.94	6244	222.21	6244.1	225.65	6244.2	232.55
6244.4								
235.89	6244.5	239.43	6244.6	242.96	6244.7	246.5	6244.8	250.03
6244.9								
253.56	6245	257.1	6245.1	260.1	6245.2	262.68	6245.3	266.78
6245.4								
271.15	6245.5	271.91	6245.8	271.99	6245.6	272.71	6245.7	273.18
6245.9								
273.4	6245.8	274.09	6245.9	274.78	6246	275.45	6246.1	276.09
6246.2								
276.69	6246.3	277.28	6246.4	277.87	6246.5	278.46	6246.6	279.05
6246.7								
279.64	6246.8	280.2	6246.9	280.76	6247	281.31	6247.1	281.85
6247.2								
282.09	6247.3	282.14	6247.4	282.37	6247.3	282.89	6247.4	283.41
6247.5								
283.93	6247.6	284.45	6247.7	284.97	6247.8	285.5	6247.9	286.02
6248								
286.55	6248.1	287.07	6248.2	287.58	6248.3	288.07	6248.4	288.56
6248.5								
289.06	6248.6	289.55	6248.7	290.04	6248.8	290.53	6248.9	291.02
6249								
291.51	6249.1	292	6249.2	292.49	6249.3	292.98	6249.4	293.47
6249.5								
293.95	6249.6	294.43	6249.7	294.91	6249.8	295.38	6249.9	295.85
6250								
296.31	6250.1	296.78	6250.2	297.25	6250.3	297.72	6250.4	298.19
6250.5								
298.66	6250.6	299.13	6250.7	299.6	6250.8	300	6250.8	
Manning's n Values			num=	3				
Sta	n Val	Sta	n Val	Sta	n Val			
0	.03	129.46	.013	169.36	.03			
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	
Expan.								
	129.46	169.36		15.74	15.74	15.74	.1	
.3								
Ineffective Flow			num=	2				
Sta L	Sta R	Elev	Permanent					
0	5.33	6248.55	F					
190.45	300	6248.92	F					
Left Levee	Station=	105.43	Elevation=	6248.84				
Right Levee	Station=	173.7	Elevation=	6250.84				
CROSS SECTION OUTPUT	Profile #Flow 1							

E.G. Elev (ft)	6249.33	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.65	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6248.68	Reach Len. (ft)	15.74
15.74 15.74			
Crit W.S. (ft)	6247.17	Flow Area (sq ft)	13.36
167.37			
E.G. Slope (ft/ft)	0.000511	Area (sq ft)	13.36
167.37			
Q Total (cfs)	1100.00	Flow (cfs)	10.95
1089.05			
Top Width (ft)	60.07	Top Width (ft)	21.25
38.82			
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	0.82
6.51			
Max Chl Dpth (ft)	6.88	Hydr. Depth (ft)	0.63
4.31			
Conv. Total (cfs)	48666.3	Conv. (cfs)	484.5
48181.8			
Length Wtd. (ft)	15.74	Wetted Per. (ft)	21.34
41.87			
Min Ch El (ft)	6242.30	Shear (lb/sq ft)	0.02
0.13			
Alpha	1.13	Stream Power (lb/ft s)	300.00
105.43 173.70			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04
2.43 0.00			
C & E Loss (ft)	0.10	Cum SA (acres)	0.22
0.63 0.01			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-1 RS: 952

INPUT

Description:

Station		Elevation	Data	num= 296					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
6248.5	0	6248.8	1.04	6248.8	3.29	6248.7	5.19	6248.6	7.09
8.99	6248.4	10.89	6248.3	12.79	6248.2	14.69	6248.1	16.59	



6248  
18.49 6247.9 20.39 6247.8 22.29 6247.7 24.2 6247.6 44.35  
6247.6  
45.86 6247.7 47.38 6247.8 48.9 6247.9 50.41 6248 52.52  
6248.1  
53.98 6248.2 54.41 6248.3 55.51 6248.4 86.44 6248.4 86.61  
6248.5  
86.8 6248.6 87.03 6248.7 89.03 6248.8 91.53 6248.9 94.03  
6249  
96.53 6249.1 99.03 6249.2 101.52 6249.3 104.02 6249.4 106.52  
6249.5  
109.02 6249.6 111.52 6249.7 113 6249.7 114.54 6249.6 116.09  
6249.5  
117.64 6249.4 119.15 6249.3 119.79 6249.2 120.42 6249.1 121.06  
6249  
121.69 6248.9 122.33 6248.8 122.96 6248.7 123.23 6248.6 123.48  
6248.5  
123.73 6248.4 123.98 6248.3 124.23 6248.2 124.48 6248.1 124.73  
6248  
124.98 6247.9 125.22 6247.8 125.47 6247.7 125.72 6247.6 125.97  
6247.5  
126.22 6247.4 126.47 6247.3 126.72 6247.2 126.97 6247.1 127.22  
6247  
127.46 6246.9 127.71 6246.8 127.96 6246.7 128.21 6246.6 128.46  
6246.5  
128.71 6246.4 128.96 6246.3 129.21 6246.2 129.46 6246.1 129.71  
6246  
129.95 6245.9 130.2 6245.8 130.45 6245.7 130.7 6245.6 130.95  
6245.5  
131.2 6245.4 131.45 6245.3 131.7 6245.2 131.95 6245.1 132.19  
6245  
132.44 6244.9 132.67 6244.8 132.9 6244.7 133.14 6244.6 133.37  
6244.5  
133.6 6244.4 133.83 6244.3 134.07 6244.2 134.3 6244.1 134.53  
6244  
134.76 6243.9 135 6243.8 135.23 6243.7 135.46 6243.6 135.69  
6243.5  
135.93 6243.4 136.16 6243.3 136.39 6243.2 136.62 6243.1 136.86  
6243  
137.11 6242.9 137.36 6242.8 137.62 6242.7 137.88 6242.6 138.14  
6242.5  
138.4 6242.4 138.65 6242.3 138.91 6242.2 160.14 6242.2 160.35  
6242.3  
160.56 6242.4 160.78 6242.5 161 6242.6 161.22 6242.7 161.43  
6242.8  
161.64 6242.9 161.86 6243 162.07 6243.1 162.28 6243.2 162.5  
6243.3  
162.71 6243.4 162.93 6243.5 163.15 6243.6 163.59 6243.8 163.81  
6243.9  
164.03 6244 164.25 6244.1 164.47 6244.2 164.68 6244.3 164.9  
6244.4  
165.12 6244.5 165.34 6244.6 165.56 6244.7 165.78 6244.8 166  
6244.9

166.22 6245 166.44 6245.1 166.66 6245.2 166.88 6245.3 167.1  
6245.4  
167.32 6245.5 167.54 6245.6 167.76 6245.7 167.97 6245.8 168.19  
6245.9  
168.41 6246 168.63 6246.1 168.85 6246.2 169.07 6246.3 169.29  
6246.4  
169.51 6246.5 169.73 6246.6 169.95 6246.7 170.17 6246.8 170.39  
6246.9  
170.61 6247 170.83 6247.1 171.04 6247.2 171.26 6247.3 171.48  
6247.4  
171.7 6247.5 171.92 6247.6 172.14 6247.7 172.36 6247.8 172.58  
6247.9  
172.8 6248 173.02 6248.1 173.24 6248.2 173.46 6248.3 173.68  
6248.4  
173.9 6248.5 174.11 6248.6 174.33 6248.7 174.55 6248.8 174.77  
6248.9  
174.99 6249 175.21 6249.1 175.43 6249.2 175.65 6249.3 175.77  
6249.35  
175.87 6249.4 176.09 6249.5 176.31 6249.6 176.53 6249.7 176.75  
6249.8  
176.97 6249.9 177.19 6250 177.4 6250.1 177.62 6250.2 177.84  
6250.3  
178.06 6250.4 178.28 6250.5 178.5 6250.6 178.72 6250.7 178.94  
6250.8  
181.43 6250.9 191.11 6251 197.5 6251 197.88 6250.9 198.27  
6250.8  
198.65 6250.7 199.04 6250.6 199.42 6250.5 199.8 6250.4 200.19  
6250.3  
200.57 6250.2 200.99 6250.1 201.42 6250 201.85 6249.9 202.28  
6249.8  
202.72 6249.7 203.15 6249.6 203.58 6249.5 204.03 6249.4 204.55  
6249.3  
205.06 6249.2 205.57 6249.1 206.09 6249 206.73 6248.9 207.37  
6248.8  
208.08 6248.7 208.97 6248.6 210.16 6248.5 210.88 6248.6 211.93  
6248.7  
213.03 6248.8 213.39 6248.4 213.97 6248.9 215.11 6249 216.2  
6249.1  
217.9 6249.2 219.37 6248.3 219.4 6248.3 219.65 6249.3 222.84  
6248.4  
233.6 6248.4 234.07 6248.3 234.69 6248.5 235.79 6248.6 236.88  
6248.7  
237.98 6248.8 238.87 6248.2 239.07 6248.9 240.17 6249 243.68  
6248.1  
248.49 6248 254.25 6248 255.25 6248.1 256.25 6248.2 257.25  
6248.3  
257.76 6248.1 258.24 6248.4 259.24 6248.5 260.24 6248.6 261.24  
6248.7  
261.28 6248.2 262.89 6248.8 264 6248.9 264.28 6248.2 264.65  
6248.2  
267.02 6248.3 268.85 6248.4 270.38 6248.5 271.85 6248.6 273.03  
6248.7  
274.22 6248.8 275.32 6248.9 276.29 6249 277.27 6249.1 278.24



6249.2  
279.12 6249.3 279.95 6249.4 280.79 6249.5 281.62 6249.6 282.45  
6249.7  
283.22 6249.8 283.95 6249.9 284.68 6250 285.41 6250.1 286.13  
6250.2  
286.86 6250.3 287.57 6250.4 288.5 6250.4 290.96 6250.3 293.43  
6250.2  
295.89 6250.1 298.2 6250 299.2 6250 299.2 6250.53 299.47  
6250.5  
300 6250.5

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 124.73 .013 175.77 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 124.73 175.77 11.7 11.7 11.7 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 8.26 6248.48 F  
197.15 300 6249.79 F  
Left Levee Station= 112.97 Elevation= 6249.66  
Right Levee Station= 196.73 Elevation= 6249.9

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6249.23	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.31	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6248.91	Reach Len. (ft)	11.70
11.70 11.70			
Crit W.S. (ft)	6246.00	Flow Area (sq ft)	1.13
245.44			
E.G. Slope (ft/ft)	0.000197	Area (sq ft)	1.13
245.44			
Q Total (cfs)	1100.00	Flow (cfs)	0.39
1099.61			
Top Width (ft)	53.19	Top Width (ft)	3.12
50.07			
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	0.34
4.48			
Max Chl Dpth (ft)	6.71	Hydr. Depth (ft)	0.36
4.90			
Conv. Total (cfs)	78290.1	Conv. (cfs)	27.7
78262.3			
Length Wtd. (ft)	11.70	Wetted Per. (ft)	3.27
52.67			
Min Ch El (ft)	6242.20	Shear (lb/sq ft)	0.00
0.06			

Alpha	1.01	Stream Power (lb/ft s)	300.00
112.97 196.73			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04
2.35 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.22
0.62 0.01			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 951

INPUT  
Description:  
Station Elevation Data num= 233  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6248.7 .89 6248.7 3.39 6248.6 5.87 6248.5 8.26  
6248.4  
10.65 6248.3 12.94 6248.2 15.24 6248.1 17.28 6248 19.18  
6247.9  
21.09 6247.8 22.99 6247.7 24.89 6247.6 47.75 6247.6 49.28  
6247.7  
52.19 6247.8 54.36 6247.9 54.8 6248 55.23 6248.1 55.67  
6248.2  
56.1 6248.3 58.64 6248.4 75.94 6248.4 76.11 6248.5 76.28  
6248.6  
76.47 6248.7 77.9 6248.8 80.37 6248.9 82.84 6249 85.3  
6249.1  
87.77 6249.2 90.24 6249.3 92.71 6249.4 95.18 6249.5 98.56  
6249.6  
102.14 6249.7 105.72 6249.8 109.31 6249.9 111.97 6249.9 112.89  
6249.8  
113.8 6249.7 114.56 6249.6 115.2 6249.5 115.83 6249.4 116.46  
6249.3  
117.1 6249.2 117.73 6249.1 118.36 6249 118.84 6248.9 119.25  
6248.8  
119.65 6248.7 120.06 6248.6 120.46 6248.5 120.87 6248.4 121.27  
6248.3  
121.68 6248.2 122.08 6248.1 122.49 6248 122.89 6247.9 123.3  
6247.8  
123.61 6247.7 123.85 6247.6 124.08 6247.5 124.31 6247.4 124.54  
6247.3  
124.77 6247.2 125.01 6247.1 125.24 6247 125.47 6246.9 125.7  
6246.8  
125.93 6246.7 126.17 6246.6 126.4 6246.5 126.63 6246.4 126.86  
6246.3



127.09	6246.2	127.33	6246.1	127.56	6246	127.79	6245.9	128.03
6245.8								
128.29	6245.7	128.55	6245.6	128.8	6245.5	129.06	6245.4	129.22
6245.5								
129.32	6245.3	129.58	6245.2	129.83	6245.1	130.09	6245	130.35
6244.9								
130.6	6244.8	130.86	6244.7	131.12	6244.6	131.38	6244.5	131.63
6244.4								
131.89	6244.3	132.15	6244.2	132.4	6244.1	132.66	6244	132.92
6243.9								
133.18	6243.8	133.43	6243.7	133.69	6243.6	133.95	6243.5	134.2
6243.4								
134.46	6243.3	134.72	6243.2	134.98	6243.1	135.23	6243	135.49
6242.9								
135.75	6242.8	136	6242.7	136.26	6242.6	136.52	6242.5	136.78
6242.4								
137.03	6242.3	137.29	6242.2	137.55	6242.1	162.15	6242.1	162.41
6242.2								
162.67	6242.3	162.93	6242.4	163.19	6242.5	163.45	6242.6	163.71
6242.7								
163.97	6242.8	164.23	6242.9	164.49	6243	164.75	6243.1	165.01
6243.2								
165.27	6243.3	165.52	6243.4	165.78	6243.5	166.04	6243.6	166.3
6243.7								
166.56	6243.8	166.82	6243.9	167.08	6244	167.34	6244.1	167.6
6244.2								
167.86	6244.3	168.12	6244.4	168.38	6244.5	168.64	6244.6	168.89
6244.7								
169.15	6244.8	169.41	6244.9	169.67	6245	169.93	6245.1	170.19
6245.2								
170.45	6245.3	170.71	6245.4	170.97	6245.5	171.23	6245.6	171.49
6245.7								
171.75	6245.8	172.01	6245.9	172.27	6246	172.52	6246.1	172.78
6246.2								
173.04	6246.3	173.3	6246.4	173.56	6246.5	173.82	6246.6	174.08
6246.7								
174.34	6246.8	174.6	6246.9	174.86	6247	175.12	6247.1	175.38
6247.2								
175.64	6247.3	175.89	6247.4	176.15	6247.5	176.41	6247.6	176.67
6247.7								
176.93	6247.8	177.19	6247.9	177.45	6248	177.71	6248.1	177.97
6248.2								
178.23	6248.3	178.49	6248.4	178.75	6248.5	179.01	6248.6	179.27
6248.7								
179.52	6248.8	179.78	6248.9	180.04	6249	180.22	6249.07	180.3
6249.1								
180.56	6249.2	180.82	6249.3	181.08	6249.4	181.34	6249.5	181.62
6249.6								
182.14	6249.7	182.65	6249.8	183.17	6249.9	183.68	6250	184.19
6250.1								
184.71	6250.2	185.22	6250.3	185.74	6250.4	186.29	6250.5	186.86
6250.6								
187.43	6250.7	188.01	6250.8	195.73	6250.9	216.8	6251	216.92

6251								
223.77	6250.9	227.73	6250.8	231.69	6250.7	235.66	6250.6	239.62
6250.5								
243.59	6250.4	247.55	6250.3	251.52	6250.2	255.54	6250.1	259.58
6250								
263.66	6249.9	267.91	6249.8	272.15	6249.7	276.39	6249.6	280.64
6249.5								
284.88	6249.4	289.12	6249.3	293.37	6249.2	297.6	6249.1	298.61
6249.1								
298.61	6249.46	299.83	6249.4	300	6249.4			
Manning's n Values num= 3								
Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val	Sta n Val
0	.03	122.49	.013	180.22	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	122.49	180.22	27.44	27.44	27.44			.1
.3								
Ineffective Flow num= 2	Sta L	Sta R	Elev	Permanent				
	0	1.98	6248.7	F				
	263.74	300	6251.25	F				
Left Levee	Station=	111.71	Elevation=	6249.89				
Right Levee	Station=	219.77	Elevation=	6251				
CROSS SECTION OUTPUT Profile #Flow 1								
E.G. Elev (ft)	6249.20	Element						Left OB
Channel Right OB								
Vel Head (ft)	0.22	Wt. n-Val.						0.030
0.013								
W.S. Elev (ft)	6248.97	Reach Len. (ft)						27.44
27.44	27.44							
Crit W.S. (ft)	6245.61	Flow Area (sq ft)						1.92
289.19								
E.G. Slope (ft/ft)	0.000136	Area (sq ft)						1.92
289.19								
Q Total (cfs)	1100.00	Flow (cfs)						0.67
1099.33								
Top Width (ft)	61.48	Top Width (ft)						4.00
57.48								
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)						0.35
3.80								
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)						0.48
5.03								
Conv. Total (cfs)	94356.6	Conv. (cfs)						57.2
94299.4								
Length Wtd. (ft)	27.44	Wetted Per. (ft)						4.12
60.02								
Min Ch El (ft)	6242.10	Shear (lb/sq ft)						0.00
0.04								



INPUT									
Description:									
Station	Elevation	Data	num=	255					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6249.2	8.43	6249.2	16.42	6249.1	22.67	6249	28.22	
6248.9	33.39	6248.8	38.26	6248.7	42.87	6248.6	47.48	6248.5	52.08
6248.4	66.43	6248.3	69.58	6248.2	72.73	6248.1	75.88	6248	79.03
6247.9	82.18	6247.8	85.33	6247.7	88.48	6247.6	105.48	6247.6	107.05
6247.7	108.63	6247.8	110.21	6247.9	111.78	6248	113.3	6248	113.41
6248.1	113.53	6248.2	113.64	6248.3	113.76	6248.4	116.31	6248.4	120.29
6248.3	124.27	6248.2	128.25	6248.1	133.73	6248.1	136.25	6248.2	138.76
6248.3	141.27	6248.4	143.78	6248.5	146.3	6248.6	148.85	6248.7	155.27
6248.7	158.06	6248.6	160.85	6248.5	163.64	6248.4	165.54	6248.3	165.81
6248.2	166.08	6248.1	166.36	6248	166.63	6247.9	166.9	6247.8	167.17
6247.7	167.45	6247.6	167.72	6247.5	167.99	6247.4	168.26	6247.3	168.54
6247.2	168.81	6247.1	169.08	6247	169.35	6246.9	169.63	6246.8	169.9
6246.7	169.92	6246.7	170.17	6246.6	170.44	6246.5	170.72	6246.4	170.99
6246.3	171.26	6246.2	171.53	6246.1	171.8	6246	172.08	6245.9	172.35

6245.8								
172.62	6245.7	172.89	6245.6	173.17	6245.5	173.44	6245.4	173.71
6245.3								
173.98	6245.2	174.26	6245.1	174.53	6245	174.8	6244.9	175.07
6244.8								
175.34	6244.7	175.59	6244.6	175.84	6244.5	176.09	6244.4	176.34
6244.3								
176.59	6244.2	176.84	6244.1	177.09	6244	177.34	6243.9	177.59
6243.8								
177.84	6243.7	178.09	6243.6	178.34	6243.5	178.59	6243.4	178.84
6243.3								
179.09	6243.2	179.34	6243.1	179.59	6243	179.84	6242.9	180.09
6242.8								
180.34	6242.7	180.58	6242.6	180.82	6242.5	181.07	6242.4	181.31
6242.3								
181.55	6242.2	181.8	6242.1	182.04	6242	217.25	6242	217.57
6242.1								
217.86	6242.2	218.14	6242.3	218.29	6242.7	218.43	6242.4	218.72
6242.5								
219.01	6242.6	219.3	6242.7	219.59	6242.8	219.76	6243	219.87
6242.9								
220.16	6243	220.45	6243.1	220.74	6243.2	221.03	6243.3	221.31
6243.4								
221.6	6243.5	221.89	6243.6	222.18	6243.7	222.47	6243.8	222.75
6243.9								
223.04	6244	223.33	6244.1	223.61	6244.2	223.88	6244.3	224.14
6244.4								
224.41	6244.5	224.67	6244.6	224.94	6244.7	225.2	6244.8	225.47
6244.9								
225.73	6245	226	6245.1	226.24	6245.2	226.26	6245.2	226.53
6245.3								
226.8	6245.4	227.06	6245.5	227.33	6245.6	227.59	6245.7	227.76
6246.1								
227.86	6245.8	228.12	6245.9	228.36	6245.99	228.39	6246	228.65
6246.1								
228.92	6246.2	229.18	6246.3	229.45	6246.4	229.71	6246.5	229.98
6246.6								
230.24	6246.7	230.43	6247	230.51	6246.8	230.77	6246.9	231.04
6247								
231.31	6247.1	231.57	6247.2	231.84	6247.3	232.1	6247.4	232.37
6247.5								
232.63	6247.6	232.9	6247.7	233.16	6247.8	233.43	6247.9	233.69
6248								
233.96	6248.1	234.22	6248.2	234.49	6248.3	234.75	6248.4	235.02
6248.5								
235.29	6248.6	235.55	6248.7	235.82	6248.8	236.08	6248.9	236.35
6249								
236.61	6249.1	236.88	6249.2	237.14	6249.3	237.41	6249.4	237.67
6249.5								
237.97	6249.6	239.22	6249.7	240.48	6249.8	241.73	6249.9	242.99
6249.9								
244.24	6249.8	245.49	6249.7	246.74	6249.6	247.98	6249.5	249.23
6249.4								



CROSS SECTION OUTPUT    Profile #Flow 1			
E.G. Elev (ft)	6249.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.13	Wt. n-Val.	0.030
0.013    0.030			
W.S. Elev (ft)	6249.04	Reach Len. (ft)	97.99
97.99    97.99			
Crit W.S. (ft)	6247.11	Flow Area (sq ft)	122.55
355.21    12.28			
E.G. Slope (ft/ft)	0.000061	Area (sq ft)	122.55
355.21    12.28			

[illegible]



66.43 6248.3 69.58 6248.2 72.73 6248.1 75.88 6248 79.03  
6247.9 82.18 6247.8 85.33 6247.7 88.48 6247.6 105.48 6247.6 107.05  
6247.7 108.63 6247.8 110.21 6247.9 111.78 6248 113.3 6248 113.41  
6248.1 113.53 6248.2 113.64 6248.3 113.76 6248.4 116.31 6248.4 120.29  
6248.3 124.27 6248.2 128.25 6248.1 133.73 6248.1 136.25 6248.2 138.76  
6248.3 141.27 6248.4 143.78 6248.5 146.3 6248.6 148.85 6248.7 155.27  
6248.7 158.06 6248.6 160.85 6248.5 163.64 6248.4 165.54 6248.3 165.81  
6248.2 166.08 6248.1 166.36 6248 166.63 6247.9 166.9 6247.8 167.17  
6247.7 167.45 6247.6 167.72 6247.5 167.99 6247.4 168.26 6247.3 168.54  
6247.2 168.81 6247.1 169.08 6247 169.35 6246.9 169.63 6246.8 169.9  
6246.7 169.92 6246.7 170.17 6246.6 170.44 6246.5 170.72 6246.4 170.99  
6246.3 171.26 6246.2 171.53 6246.1 171.8 6246 172.08 6245.9 172.35  
6245.8 172.62 6245.7 172.89 6245.6 173.17 6245.5 173.44 6245.4 173.71  
6245.3 173.98 6245.2 174.26 6245.1 174.53 6245 174.8 6244.9 175.07  
6244.8 175.34 6244.7 175.59 6244.6 175.84 6244.5 176.09 6244.4 176.34  
6244.3 176.59 6244.2 176.84 6244.1 177.09 6244 177.34 6243.9 177.59  
6243.8 177.84 6243.7 178.09 6243.6 178.34 6243.5 178.59 6243.4 178.84  
6243.3 179.09 6243.2 179.34 6243.1 179.59 6243 179.84 6242.9 180.09  
6242.8 180.34 6242.7 180.58 6242.6 180.82 6242.5 181.07 6242.4 181.31  
6242.3 181.55 6242.2 181.8 6242.1 182.04 6242 217.25 6242 217.57  
6242.1 217.86 6242.2 218.14 6242.3 218.29 6242.7 218.43 6242.4 218.72  
6242.5 219.01 6242.6 219.3 6242.7 219.59 6242.8 219.76 6243 219.87  
6242.9 220.16 6243 220.45 6243.1 220.74 6243.2 221.03 6243.3 221.31  
6243.4 221.6 6243.5 221.89 6243.6 222.18 6243.7 222.47 6243.8 222.75  
6243.9 223.04 6244 223.33 6244.1 223.61 6244.2 223.88 6244.3 224.14  
6244.4 224.41 6244.5 224.67 6244.6 224.94 6244.7 225.2 6244.8 225.47  
6244.9 225.73 6245 226 6245.1 226.24 6245.2 226.26 6245.2 226.53

6245.3 226.8 6245.4 227.06 6245.5 227.33 6245.6 227.59 6245.7 227.76  
6246.1 227.86 6245.8 228.12 6245.9 228.36 6245.99 228.39 6246 228.65  
6246.1 228.92 6246.2 229.18 6246.3 229.45 6246.4 229.71 6246.5 229.98  
6246.6 230.24 6246.7 230.43 6247 230.51 6246.8 230.77 6246.9 231.04  
6247 231.31 6247.1 231.57 6247.2 231.84 6247.3 232.1 6247.4 232.37  
6247.5 232.63 6247.6 232.9 6247.7 233.16 6247.8 233.43 6247.9 233.69  
6248 233.96 6248.1 234.22 6248.2 234.49 6248.3 234.75 6248.4 235.02  
6248.5 235.29 6248.6 235.55 6248.7 235.82 6248.8 236.08 6248.9 236.35  
6249 236.61 6249.1 236.88 6249.2 237.14 6249.3 237.41 6249.4 237.67  
6249.5 237.97 6249.6 239.22 6249.7 240.48 6249.8 241.73 6249.9 242.99  
6249.9 244.24 6249.8 245.49 6249.7 246.74 6249.6 247.98 6249.5 249.23  
6249.4 250.48 6249.3 251.72 6249.2 252.97 6249.1 253.06 6247.6 253.62  
6249 254.14 6248.9 254.67 6248.8 255.19 6248.7 255.72 6248.6 256.24  
6248.5 256.77 6248.4 257.29 6248.3 257.82 6248.2 258.35 6248.1 258.87  
6248 259.4 6247.9 259.92 6247.8 260.45 6247.7 263.86 6247.6 267.59  
6247.5 270.82 6247.4 271.32 6247.4 275.06 6247.3 279.67 6247.2 280.8  
6247.4 281.11 6247.3 281.42 6247.2 282.67 6247.2 286.47 6247.3 290.27  
6247.4 290.42 6247.5 297.84 6247.5 308.3 6247.6 314.67 6247.7 317.29  
6247.8 319.91 6247.9 322.52 6248 327.2 6248.1 330.06 6248.2 332.8  
6248.3 335.49 6248.4 337.85 6248.5 339.94 6248.6 349.29 6248.5 352.22  
6248.4 355.14 6248.3 358.06 6248.2 375.36 6248.1 377.01 6248 378.67  
6247.9 380.43 6247.8 382.22 6247.7 386.33 6247.7 397.18 6247.8 400  
6247.8  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 171.8 .013 228.36 .03  
  
Bank Sta: Left Right Coeff Contr. Expan.  
171.8 228.36 .1 .3  
Ineffective Flow num= 4



Sta L	Sta R	Elev	Permanent						
167.86	179.01	6247.1	F						
184.59	192.65	6247.1	F						
198.23	214.34	6247.1	F						
219.91	229.83	6247.1	F						
Left Levee	Station=	154.53	Elevation=	6248.7					
Right Levee	Station=	242.21	Elevation=	6249.96					
Downstream	Deck/Roadway	Coordinates							
num=	9								
Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord	
5.61	6248	0	5.61	6248	0	73.45	6248	0	
182.55	6247	0	194.99	6247	0	198.01	6247	0	
220.69	6247	0	347.15	6247	0	409.4	6247	0	
Downstream	Bridge	Cross Section Data							
Station	Elevation	Data	num=	241					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev	0	6249.3	1.53	6249.3	16.17	6249.2	28.39	6249.1	40.61
6249	52.83	6248.9	65.06	6248.8	77.28	6248.7	89.5	6248.6	101.72
6248.5	113.94	6248.4	126.17	6248.3	138.06	6248.2	145.74	6248.1	146.57
6248	147.91	6247.9	149.01	6247.8	150.1	6247.7	151.21	6247.6	152.31
6247.5	153.42	6247.4	154.53	6247.3	155.63	6247.2	156.74	6247.1	157.85
6247	158.96	6246.9	160.07	6246.8	161.18	6246.7	162.29	6246.6	163.4
6246.5	164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38
6246	166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45
6245.5	167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52
6245	168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6
6244.5	169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67
6244	170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75
6243.5	171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83
6243	173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92
6242.5	174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02
6242	175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1
6241.5	176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18
6241									

177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26	
6240.5	178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34
6240	179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74
6239.5	200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25
6239.6	217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55
6240.1	225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96
6240.6	256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92
6240.2	258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22
6239.7	261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67
6239.2	271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5
6239.6	274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23
6240.1	276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96
6240.6	279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24
6241.1	292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25
6241.6	297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8
6242.1	307	6242.2	308.11	6242.3	309.12	6242.4	310.01	6242.5	310.89
6242.6	311.68	6242.7	312.45	6242.8	313.17	6242.9	313.88	6243	314.55
6243.1	315.21	6243.2	315.83	6243.3	316.44	6243.4	317.05	6243.5	317.62
6243.6	318.19	6243.7	318.76	6243.8	319.29	6243.9	319.82	6244	320.35
6244.1	320.86	6244.2	321.36	6244.3	321.87	6244.4	322.37	6244.5	322.84
6244.6	323.31	6244.7	323.79	6244.8	324.27	6244.9	324.71	6245	325.17
6245.1	325.62	6245.2	326.07	6245.3	326.51	6245.4	326.94	6245.5	327.38
6245.6	327.81	6245.7	328.24	6245.8	328.66	6245.9	329.07	6246	329.49
6246.1	329.9	6246.2	330.32	6246.3	330.87	6246.4	333.78	6246.5	336.6
6246.6	339.34	6246.7	344.79	6246.8	346.32	6246.9	347.86	6247	349.39
6247.1	350.73	6247.2	352.07	6247.3	354.42	6247.4	357.6	6247.5	360.77
6247.6	363.85	6247.7	366.98	6247.8	380.36	6247.8	381	6247.9	385.21



6248  
385.74 6248 385.82 6247.9 385.9 6247.8 385.98 6247.7 386.06  
6247.6  
386.15 6247.5 394.93 6247.5 397.25 6247.6 399.66 6247.7 402.21  
6247.8  
405.14 6247.9 408.18 6248 411.21 6248.1 416.26 6248.2 421.39  
6248.3  
426.53 6248.4 431.58 6248.5 435.85 6248.6 440.11 6248.7 446.02  
6248.8  
462.41 6248.8

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 166.38 .013 329.07 .03

Bank Sta: Left Right Coeff Contr. Expan.  
166.38 329.07 .1 .3

Ineffective Flow num= 4  
Sta L Sta R Elev Permanent  
154.72 180.75 6247.14 F  
185.71 194.38 6247.14 F  
199.34 250.16 6247.14 F  
255.11 344.35 6247.14 F

Left Levee Station= 145.97 Elevation= 6248.02  
Right Levee Station= 385.22 Elevation= 6248

Upstream Embankment side slope = 1 horiz. to 1.0 vertical  
Downstream Embankment side slope = 2 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins =  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Culverts = 3

Culvert Name Shape Rise Span  
Culvert #1 Circular 4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
FHWA Scale # 1 - Headwall  
Solution Criteria = Highest U.S. EG  
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
Coef Exit Loss Coef  
1 1 90 .024 .024 0 .5  
1  
Upstream Elevation = 6241.91  
Centerline Station = 217.23  
Downstream Elevation = 6240.16  
Centerline Station = 252.53

Culvert Name Shape Rise Span  
Culvert #2 Circular 4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert

FHWA Scale # 1 - Headwall  
Solution Criteria = Highest U.S. EG  
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
Coef Exit Loss Coef  
3.64 90 .024 .024 0 .5  
1  
Upstream Elevation = 6242.06  
Centerline Station = 195.75  
Downstream Elevation = 6239.73  
Centerline Station = 197.35

Culvert Name Shape Rise Span  
Culvert #3 Circular 4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
FHWA Scale # 1 - Headwall  
Solution Criteria = Highest U.S. EG  
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss  
Coef Exit Loss Coef  
3.9 90 .024 .024 0 .5  
1  
Upstream Elevation = 6242.32  
Centerline Station = 182.04  
Downstream Elevation = 6240.12  
Centerline Station = 183.71

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #1

Q Culv Group (cfs)	67.74	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.39
Q Barrel (cfs)	67.74	Culv Vel DS (ft/s)	5.39
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6241.91
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.16
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.23
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.64	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6245.91	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.16	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.49	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #2

Q Culv Group (cfs)	67.53	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.37
Q Barrel (cfs)	67.53	Culv Vel DS (ft/s)	5.37
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.06
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6239.73
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68



W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.77	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.06	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6243.73	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT Profile #Flow 1 Culv Group: Culvert #3

Q Culv Group (cfs)	67.62	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.38
Q Barrel (cfs)	67.62	Culv Vel DS (ft/s)	5.38
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.32
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.12
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6246.04	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.32	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.12	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-1 RS: 949

INPUT

Description:

Station	Elevation	Data	num=	241					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6249.3	1.53	6249.3	16.17	6249.2	28.39	6249.1	40.61	
6249									
52.83	6248.9	65.06	6248.8	77.28	6248.7	89.5	6248.6	101.72	
6248.5									
113.94	6248.4	126.17	6248.3	138.06	6248.2	145.74	6248.1	146.57	
6248									
147.91	6247.9	149.01	6247.8	150.1	6247.7	151.21	6247.6	152.31	
6247.5									
153.42	6247.4	154.53	6247.3	155.63	6247.2	156.74	6247.1	157.85	
6247									

158.96	6246.9	160.07	6246.8	161.18	6246.7	162.29	6246.6	163.4	
6246.5									
164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38	
6246									
166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45	
6245.5									
167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52	
6245									
168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6	
6244.5									
169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67	
6244									
170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75	
6243.5									
171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83	
6243									
173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92	
6242.5									
174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02	
6242									
175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1	
6241.5									
176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18	
6241									
177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26	
6240.5									
178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34	
6240									
179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74	
6239.5									
200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25	
6239.6									
217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55	
6240.1									
225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96	
6240.6									
256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92	
6240.2									
258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22	
6239.7									
261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67	
6239.2									
271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5	
6239.6									
274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23	
6240.1									
276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96	
6240.6									
279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24	
6241.1									
292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25	
6241.6									
297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8	



6242.1  
307 6242.2 308.11 6242.3 309.12 6242.4 310.01 6242.5 310.89  
6242.6  
311.68 6242.7 312.45 6242.8 313.17 6242.9 313.88 6243 314.55  
6243.1  
315.21 6243.2 315.83 6243.3 316.44 6243.4 317.05 6243.5 317.62  
6243.6  
318.19 6243.7 318.76 6243.8 319.29 6243.9 319.82 6244 320.35  
6244.1  
320.86 6244.2 321.36 6244.3 321.87 6244.4 322.37 6244.5 322.84  
6244.6  
323.31 6244.7 323.79 6244.8 324.27 6244.9 324.71 6245 325.17  
6245.1  
325.62 6245.2 326.07 6245.3 326.51 6245.4 326.94 6245.5 327.38  
6245.6  
327.81 6245.7 328.24 6245.8 328.66 6245.9 329.07 6246 329.49  
6246.1  
329.9 6246.2 330.32 6246.3 330.87 6246.4 333.78 6246.5 336.6  
6246.6  
339.34 6246.7 344.79 6246.8 346.32 6246.9 347.86 6247 349.39  
6247.1  
350.73 6247.2 352.07 6247.3 354.42 6247.4 357.6 6247.5 360.77  
6247.6  
363.85 6247.7 366.98 6247.8 380.36 6247.8 381 6247.9 385.21  
6248  
385.74 6248 385.82 6247.9 385.9 6247.8 385.98 6247.7 386.06  
6247.6  
386.15 6247.5 394.93 6247.5 397.25 6247.6 399.66 6247.7 402.21  
6247.8  
405.14 6247.9 408.18 6248 411.21 6248.1 416.26 6248.2 421.39  
6248.3  
426.53 6248.4 431.58 6248.5 435.85 6248.6 440.11 6248.7 446.02  
6248.8  
462.41 6248.8

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 166.38 .013 329.07 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 166.38 329.07 143.6 143.6 143.6 .1  
.3

Ineffective Flow num= 4  
Sta L Sta R Elev Permanent  
154.72 180.75 6247.14 F  
185.71 194.38 6247.14 F  
199.34 250.16 6247.14 F  
255.11 344.35 6247.14 F

Left Levee Station= 145.97 Elevation= 6248.02  
Right Levee Station= 385.22 Elevation= 6248

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6248.25	Element	Left OB
Channel Right OB			
Vel Head (ft)	2.74	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6245.51	Reach Len. (ft)	143.60
143.60 143.60			
Crit W.S. (ft)	6245.51	Flow Area (sq ft)	
82.78			
E.G. Slope (ft/ft)	0.001370	Area (sq ft)	
743.70			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	159.57	Top Width (ft)	
159.57			
Vel Total (ft/s)	13.29	Avg. Vel. (ft/s)	
13.29			
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	
5.57			
Conv. Total (cfs)	29717.5	Conv. (cfs)	
29717.5			
Length Wtd. (ft)	143.60	Wetted Per. (ft)	
14.87			
Min Ch El (ft)	6239.20	Shear (lb/sq ft)	
0.48			
Alpha	1.00	Stream Power (lb/ft s)	462.41
145.97 385.22			
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	
1.41			
C & E Loss (ft)	0.38	Cum SA (acres)	
0.32			

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

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION



RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 948

INPUT

Description:

Station	Elevation	Data	num=	218					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6247.7	19.86	6247.7	37.29	6247.6	91.94	6247.5	94.02	
6247.4									
96.56	6247.4	96.65	6247.5	96.74	6247.6	96.82	6247.7	96.91	
6247.8									
97	6247.9	97.05	6247.9	97.27	6247.8	98.86	6247.7	100.65	
6247.6									
101.78	6247.5	103.19	6247.4	104.44	6247.3	105.78	6247.2	107.35	
6247.1									
108.58	6247	110.16	6246.9	111.78	6246.8	113.16	6246.7	114.83	
6246.6									
116.49	6246.5	118.15	6246.4	119.78	6246.3	120.02	6246.2	120.26	
6246.1									
120.5	6246	120.74	6245.9	120.97	6245.8	121.21	6245.7	121.44	
6245.6									
121.67	6245.5	121.9	6245.4	122.14	6245.3	122.37	6245.2	122.6	
6245.1									
122.84	6245	123.07	6244.9	123.3	6244.8	123.54	6244.7	123.76	
6244.6									
123.99	6244.5	124.21	6244.4	124.43	6244.3	124.66	6244.2	124.89	
6244.1									
125.12	6244	125.35	6243.9	125.57	6243.8	125.8	6243.7	126.03	
6243.6									
126.26	6243.5	126.48	6243.4	126.7	6243.3	126.91	6243.2	127.13	
6243.1									
127.35	6243	127.57	6242.9	127.78	6242.8	128	6242.7	128.21	
6242.6									
128.43	6242.5	128.64	6242.4	128.86	6242.3	129.07	6242.2	129.29	
6242.1									
129.51	6242	129.73	6241.9	129.95	6241.8	130.17	6241.7	130.39	
6241.6									
130.62	6241.5	130.83	6241.4	131.05	6241.3	131.26	6241.2	131.47	
6241.1									
131.69	6241	131.9	6240.9	132.11	6240.8	132.33	6240.7	132.54	
6240.6									
132.75	6240.5	132.97	6240.4	133.18	6240.3	133.39	6240.2	133.6	
6240.1									
133.82	6240	134.03	6239.9	134.25	6239.8	134.47	6239.7	134.68	
6239.6									
134.89	6239.5	135.1	6239.4	135.3	6239.3	135.51	6239.2	135.72	
6239.1									
135.93	6239.3	136.14	6238.9	136.35	6238.8	156.69	6238.8	156.9	
6238.9									
157.11	6239	157.32	6239.1	157.53	6239.2	157.74	6239.3	157.95	
6239.4									

158.16	6239.5	158.37	6239.6	158.58	6239.7	158.79	6239.8	159	
6239.9									
159.21	6240	159.41	6240.1	159.62	6240.2	159.83	6240.3	160.04	
6240.4									
160.25	6240.5	160.46	6240.6	160.66	6240.7	160.87	6240.8	161.08	
6240.9									
161.29	6241	161.5	6241.1	161.71	6241.2	161.92	6241.3	162.12	
6241.4									
162.33	6241.5	162.54	6241.6	162.74	6241.7	162.95	6241.8	163.16	
6241.9									
163.36	6242	163.57	6242.1	163.77	6242.2	163.98	6242.3	164.19	
6242.4									
164.39	6242.5	164.6	6242.6	164.8	6242.7	165.01	6242.8	165.22	
6242.9									
165.42	6243	165.63	6243.1	165.84	6243.2	166.04	6243.3	166.25	
6243.4									
166.46	6243.5	166.66	6243.6	166.87	6243.7	167.07	6243.8	167.28	
6243.9									
167.48	6244	167.69	6244.1	167.89	6244.2	168.09	6244.3	168.3	
6244.4									
168.5	6244.5	168.71	6244.6	168.91	6244.7	169.12	6244.8	169.32	
6244.9									
169.52	6245	169.73	6245.1	169.93	6245.2	170.14	6245.3	170.34	
6245.4									
170.55	6245.5	170.75	6245.6	170.96	6245.7	171.16	6245.8	171.36	
6245.9									
171.57	6246	171.77	6246.1	171.98	6246.2	172.18	6246.3	172.39	
6246.4									
173.2	6246.5	174.29	6246.6	175.38	6246.7	176.47	6246.8	177.56	
6246.9									
178.63	6247	179.73	6247.1	180.89	6247.2	182.05	6247.3	183.21	
6247.4									
184.36	6247.5	185.52	6247.6	189.36	6247.7	193.38	6247.8	197.73	
6247.9									
202.55	6248	207.78	6248	207.88	6247.9	207.98	6247.8	208.09	
6247.7									
208.2	6247.6	209.55	6247.5	212.3	6247.5	216.4	6247.6	220.51	
6247.7									
257.02	6247.7	259.18	6247.8	261.66	6247.9	264.27	6248	266.87	
6248.1									
269.48	6248.2	272.27	6248.3	275.37	6248.4	281.83	6248.5	287.18	
6248.6									
292.54	6248.7	297.89	6248.8	300	6248.8				
Manning's	n Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
0	.03	120.5	.013	171.57	.03				
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	
Expan.									
	120.5	171.57		0	0	0		.1	
.3									
Ineffective Flow		num=	2						



Sta L	Sta R	Elev	Permanent
0	97.05	6247.91	F
208.04	300	6248	F

Left Levee Station= 96.63 Elevation= 6247.86  
Right Levee Station= 207.62 Elevation= 6248.06

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6244.22	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6242.73	Reach Len. (ft)	
Crit W.S. (ft)	6242.73	Flow Area (sq ft)	
112.41			
E.G. Slope (ft/ft)	0.001785	Area (sq ft)	
112.41			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	36.93	Top Width (ft)	
36.93			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)	
3.04			
Conv. Total (cfs)	26034.1	Conv. (cfs)	
26034.1			
Length Wtd. (ft)		Wetted Per. (ft)	
38.97			
Min Ch El (ft)	6238.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
96.63	207.62		
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:EXCH

Reach	River Sta.	n1	n2	n3
-------	------------	----	----	----

EX CHANNEL	1000	.03	.013	.03
EX CHANNEL	999	.03	.03	.03

River:EXOF

Reach	River Sta.	n1	n2	n3
EX OVERFLOW	1001	.03	.013	.03
EX OVERFLOW	1000	.03	.013	.03

River:OVFL

Reach	River Sta.	n1	n2	n3
Overflow Channel	1000	.03	.016	.03
Overflow Channel	999	.03	.016	.03
Overflow Ch-DS-0	998	.03	.013	.03
Overflow Ch-DS-0	997	.03	.033	.03
Overflow Ch-DS-0	996	.03	.033	.03

River:SC01

Reach	River Sta.	n1	n2	n3
Sand Creek	998	.03	.013	.03
Sand Creek	993	.03	.013	.03
Sand Creek-DS-0	992	.03	.013	.03
Sand Creek-DS-0	991	.03	.013	.03
Sand Creek-DS-0	990	.03	.013	.03
Sand Creek-DS-0	989	.03	.013	.03
Sand Creek-DS-0	988	.03	.013	.03
Sand Creek-DS-0	987	.03	.013	.03
Sand Creek-DS-0	986	.03	.013	.03
Sand Creek-DS-0	985	.03	.013	.03
Sand Creek-DS-0	984	.03	.013	.03
Sand Creek-DS-0	983	.03	.013	.03
Sand Creek-DS-0	982	.03	.013	.03
Sand Creek-DS-0	981	.03	.013	.03
Sand Creek-DS-0	980	.03	.013	.03
Sand Creek-DS-0	979	.03	.013	.03
Sand Creek-DS-0	978	.03	.013	.03
Sand Creek-DS-0	977	.03	.013	.03
Sand Creek-DS-0	976	.03	.013	.03
Sand Creek-DS-0	975	.03	.013	.03
Sand Creek-DS-0	974	.03	.013	.03
Sand Creek-DS-0	973	.03	.013	.03
Sand Creek-DS-0	972	.03	.013	.03
Sand Creek-DS-0	971	.03	.013	.03
Sand Creek-DS-0	970	.03	.013	.03



Sand Creek-DS-0-	969	.03	.013	.03
Sand Creek-DS-0-	968	.03	.013	.03
Sand Creek-DS-1	966	.03	.013	.03
Sand Creek-DS-1	965	.03	.013	.03
Sand Creek-DS-1	964	.03	.013	.03
Sand Creek-DS-1	963	.03	.013	.03
Sand Creek-DS-1	962	.03	.013	.03
Sand Creek-DS-1	961	.03	.013	.03
Sand Creek-DS-1	960	.03	.013	.03
Sand Creek-DS-1	959	.03	.013	.03
Sand Creek-DS-1	958	.03	.013	.03
Sand Creek-DS-1	957	.03	.013	.03
Sand Creek-DS-1	956	.03	.013	.03
Sand Creek-DS-1	955	.03	.013	.03
Sand Creek-DS-1	954	.03	.013	.03
Sand Creek-DS-1	953	.03	.013	.03
Sand Creek-DS-1	952	.03	.013	.03
Sand Creek-DS-1	951	.03	.013	.03
Sand Creek-DS-1	950	.03	.013	.03
Sand Creek-DS-1	949.5	Culvert		
Sand Creek-DS-1	949	.03	.013	.03
Sand Creek-DS-1	948	.03	.013	.03

#### SUMMARY OF REACH LENGTHS

River: EXCH

Reach	River Sta.	Left	Channel	Right
EX CHANNEL	1000	284.89	284.89	284.89
EX CHANNEL	999	0	0	0

River: EXOF

Reach	River Sta.	Left	Channel	Right
EX OVERFLOW	1001	138.8	138.8	138.8
EX OVERFLOW	1000	0	0	0

River: OVFL

Reach	River Sta.	Left	Channel	Right
Overflow Channel	1000	24.16	24.16	24.16
Overflow Channel	999	0	0	0
Overflow Ch-DS-0	998	132.75	132.75	132.75
Overflow Ch-DS-0	997	24.72	24.72	24.72

Overflow Ch-DS-0 996 0 0 0

River: SC01

Reach	River Sta.	Left	Channel	Right
Sand Creek	998	33.99	33.99	33.99
Sand Creek	993	40.51	40.51	40.51
Sand Creek-DS-0	992	11.58	11.58	11.58
Sand Creek-DS-0	991	100	100	100
Sand Creek-DS-0-	990	6.48	6.48	6.48
Sand Creek-DS-0-	989	43.52	43.52	43.52
Sand Creek-DS-0-	988	39.44	39.44	39.44
Sand Creek-DS-0-	987	10.56	10.56	10.56
Sand Creek-DS-0-	986	6.48	6.48	6.48
Sand Creek-DS-0-	985	10.39	10.39	10.39
Sand Creek-DS-0-	984	10	10	10
Sand Creek-DS-0-	983	20.18	20.18	20.18
Sand Creek-DS-0-	982	2.95	2.95	2.95
Sand Creek-DS-0-	981	19.23	19.23	19.23
Sand Creek-DS-0-	980	10	10	10
Sand Creek-DS-0-	979	9.51	9.51	9.51
Sand Creek-DS-0-	978	11.26	11.26	11.26
Sand Creek-DS-0-	977	50	50	50
Sand Creek-DS-0-	976	50	50	50
Sand Creek-DS-0-	975	22.55	22.55	22.55
Sand Creek-DS-0-	974	19.92	19.92	19.92
Sand Creek-DS-0-	973	7.53	7.53	7.53
Sand Creek-DS-0-	972	12.38	12.38	12.38
Sand Creek-DS-0-	971	37.63	37.63	37.63
Sand Creek-DS-0-	970	50	50	50
Sand Creek-DS-0-	969	50	50	50
Sand Creek-DS-0-	968	50	50	50
Sand Creek-DS-1	966	50	50	50
Sand Creek-DS-1	965	50	50	50
Sand Creek-DS-1	964	50	50	50
Sand Creek-DS-1	963	50	50	50
Sand Creek-DS-1	962	50	50	50
Sand Creek-DS-1	961	50	50	50
Sand Creek-DS-1	960	50	50	50
Sand Creek-DS-1	959	50	50	50
Sand Creek-DS-1	958	50	50	50
Sand Creek-DS-1	957	50	50	50
Sand Creek-DS-1	956	50	50	50
Sand Creek-DS-1	955	50	50	50
Sand Creek-DS-1	954	34.26	34.26	34.26
Sand Creek-DS-1	953	15.74	15.74	15.74
Sand Creek-DS-1	952	11.7	11.7	11.7
Sand Creek-DS-1	951	27.44	27.44	27.44
Sand Creek-DS-1	950	97.99	97.99	97.99
Sand Creek-DS-1	949.5	Culvert		
Sand Creek-DS-1	949	143.6	143.6	143.6



Sand Creek-DS-1	948	0	0	0
-----------------	-----	---	---	---

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS  
River: EXCH

Reach	River Sta.	Contr.	Expan.
EX CHANNEL	1000	.1	.3
EX CHANNEL	999	.1	.3

River: EXOF

Reach	River Sta.	Contr.	Expan.
EX OVERFLOW	1001	.1	.3
EX OVERFLOW	1000	.1	.3

River: OVFL

Reach	River Sta.	Contr.	Expan.
Overflow Channel	1000	.1	.3
Overflow Channel	999	.1	.3
Overflow Ch-DS-0	998	.1	.3
Overflow Ch-DS-0	997	.1	.3
Overflow Ch-DS-0	996	.1	.3

River: SC01

Reach	River Sta.	Contr.	Expan.
Sand Creek	998	.1	.3
Sand Creek	993	.1	.3
Sand Creek-DS-0	992	.1	.3
Sand Creek-DS-0	991	.1	.3
Sand Creek-DS-0-	990	.1	.3
Sand Creek-DS-0-	989	.1	.3
Sand Creek-DS-0-	988	.1	.3
Sand Creek-DS-0-	987	.1	.3
Sand Creek-DS-0-	986	.1	.3
Sand Creek-DS-0-	985	.1	.3
Sand Creek-DS-0-	984	.1	.3
Sand Creek-DS-0-	983	.1	.3
Sand Creek-DS-0-	982	.1	.3
Sand Creek-DS-0-	981	.1	.3

Sand Creek-DS-0-	980	.1	.3
Sand Creek-DS-0-	979	.1	.3
Sand Creek-DS-0-	978	.1	.3
Sand Creek-DS-0-	977	.1	.3
Sand Creek-DS-0-	976	.1	.3
Sand Creek-DS-0-	975	.1	.3
Sand Creek-DS-0-	974	.1	.3
Sand Creek-DS-0-	973	.1	.3
Sand Creek-DS-0-	972	.1	.3
Sand Creek-DS-0-	971	.1	.3
Sand Creek-DS-0-	970	.1	.3
Sand Creek-DS-0-	969	.1	.3
Sand Creek-DS-0-	968	.1	.3
Sand Creek-DS-1	966	.1	.3
Sand Creek-DS-1	965	.1	.3
Sand Creek-DS-1	964	.1	.3
Sand Creek-DS-1	963	.1	.3
Sand Creek-DS-1	962	.1	.3
Sand Creek-DS-1	961	.1	.3
Sand Creek-DS-1	960	.1	.3
Sand Creek-DS-1	959	.1	.3
Sand Creek-DS-1	958	.1	.3
Sand Creek-DS-1	957	.1	.3
Sand Creek-DS-1	956	.1	.3
Sand Creek-DS-1	955	.1	.3
Sand Creek-DS-1	954	.1	.3
Sand Creek-DS-1	953	.1	.3
Sand Creek-DS-1	952	.1	.3
Sand Creek-DS-1	951	.1	.3
Sand Creek-DS-1	950	.1	.3
Sand Creek-DS-1	949.5	Culvert	
Sand Creek-DS-1	949	.1	.3
Sand Creek-DS-1	948	.1	.3



## **Amendment Appendix**



## USBR Type III Drop and Stilling Basin

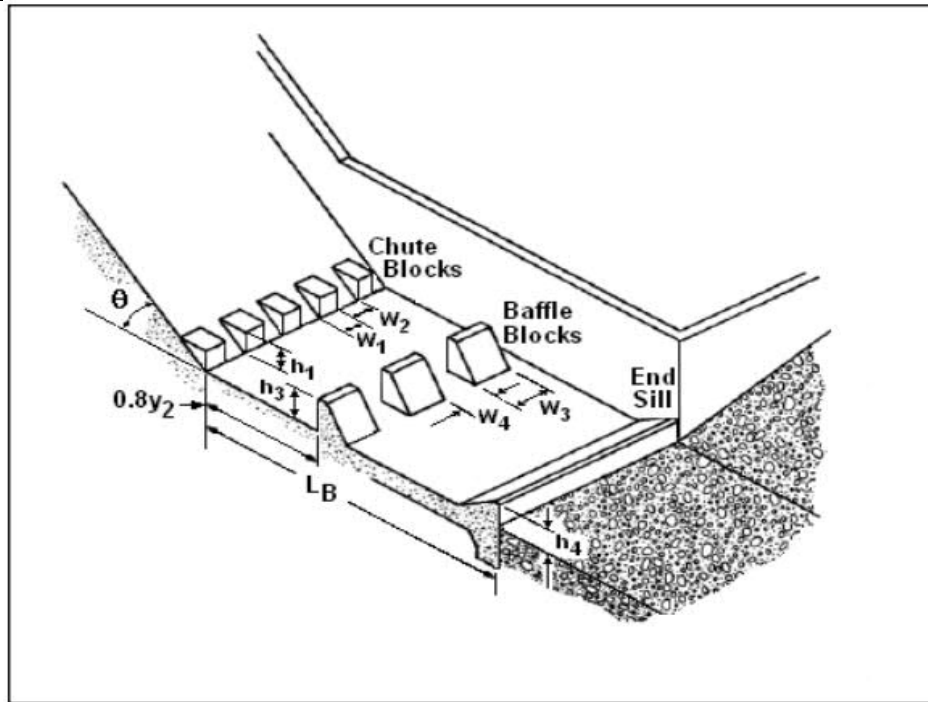
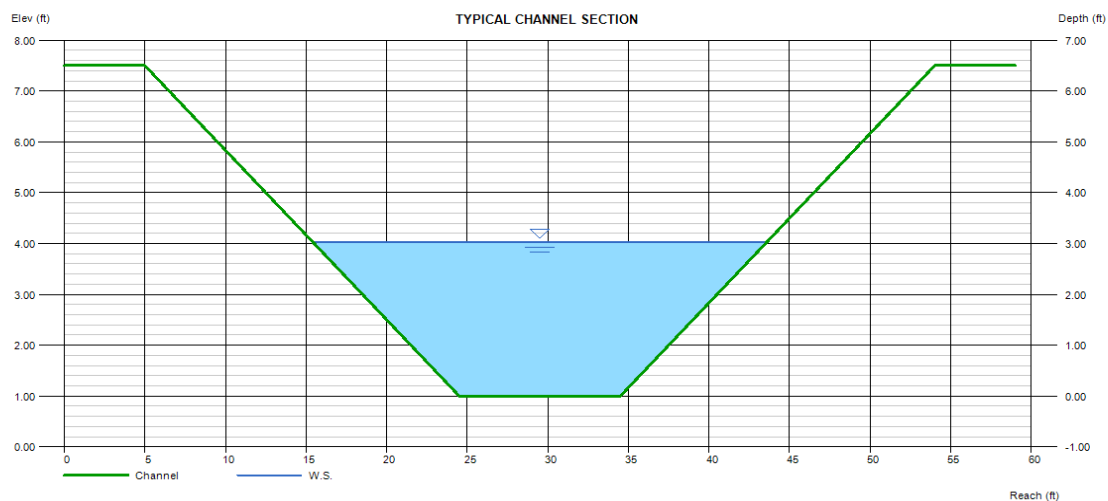


Figure 8.3. USBR Type III Stilling Basin

### Design of Energy Dissipators for Culverts and Channels

#### Upstream Channel Parameters

Channel Flow (Q)	1037 cfs
Channel Bottom Width	10 ft
Sill Slopes (Z:1)	1
Channel Total Depth	6.5 ft
Channel Depth (y1)	3.02 ft
Drop Crest Width	35 ft
Upstream Slope	1.00%





## USBR Type III Drop and Stilling Basin (cont...)

### FHWA Criteria Checks

Unit Discharge Over Crest	29.63	cfs/ft	Limit=200 cfs/ft
Transition Slope (St)	7.43%	> as $\Theta$	4.25 °
Velocity Entering Basin(V)	37.98	ft/s	Limit=60 ft/s
Channel Depth Entering Basin (d)	1.78	ft	
Transition Length (St)	160	ft	
Basin Width (Wb)	10	ft	

### Basin Parameter Calculations

$$\text{Froude Number entering Basin: } \frac{V}{(gd)^{1/2}} = 5.016687$$

Determine  $L_b/Y_2$  value from FHWA Table 8.2

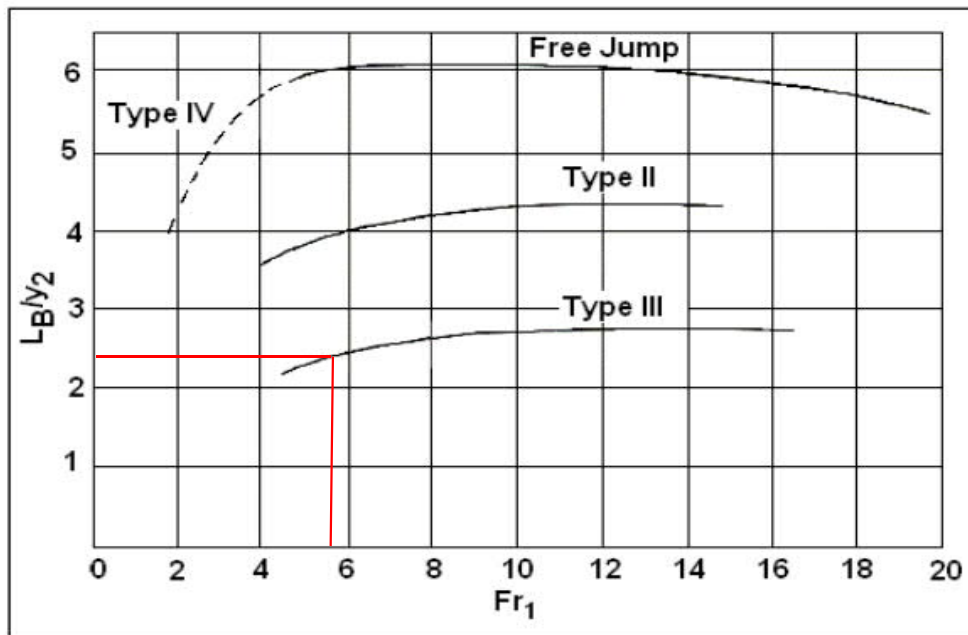


Figure 8.2. Length of Hydraulic Jump on a Horizontal Floor

$L_b/Y_2$ : 2.5      Conservative Approximation

Calculate  $Y_2$

$$Y_2: \frac{C * y_0}{2} (\sqrt{1 + 8Fr} - 1) = 11.76983 \text{ ft}$$

Length of Basin ( $L_b$ ): 29.4245754 ft

$$\text{Length of Basin Floor to Sill Top (Lt): } \frac{L_T(S_T - S_o) - L_b * S_o}{S_s + S_o} = 10.0947 \text{ ft}$$



# USBR Type III Drop and Stilling Basin (cont...)

## Basin Element Sizing

Determine Number of Chute Blocks ( $N_c$ ):	$\frac{W_b}{2y_1}$	=	2.81 → 3
Chute Block Width and Spacing ( $W_1$ & $W_2$ ):	$\frac{W_b}{2N_c}$	=	1.666667
Baffle Block Height( $h_3$ ):	$y_1(0.168 * Fr + 0.58)$		2.53259 ft
Number of Baffle Blocks ( $N_b$ )	$\frac{W_b}{1.5h_3}$	=	2.632351 → 3
Baffle Width and Spacing ( $W_3$ & $W_4$ )	$\frac{W_b}{2N_b}$	=	1.666667
End Sill Height ( $h_4$ )	$y_1(0.0536 * Fr + 1.04)$		2.329832 ft
0.8*Y2			9.41586412 ft

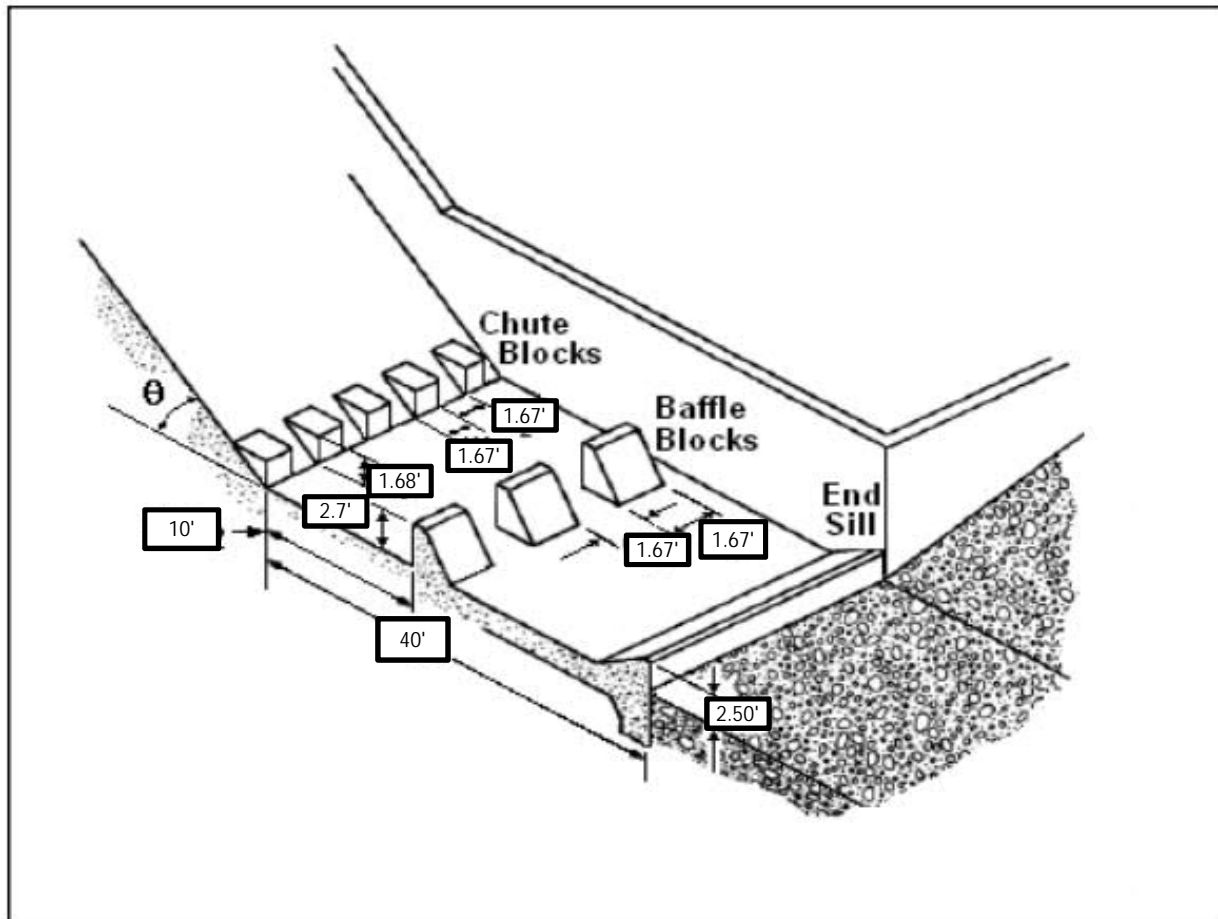
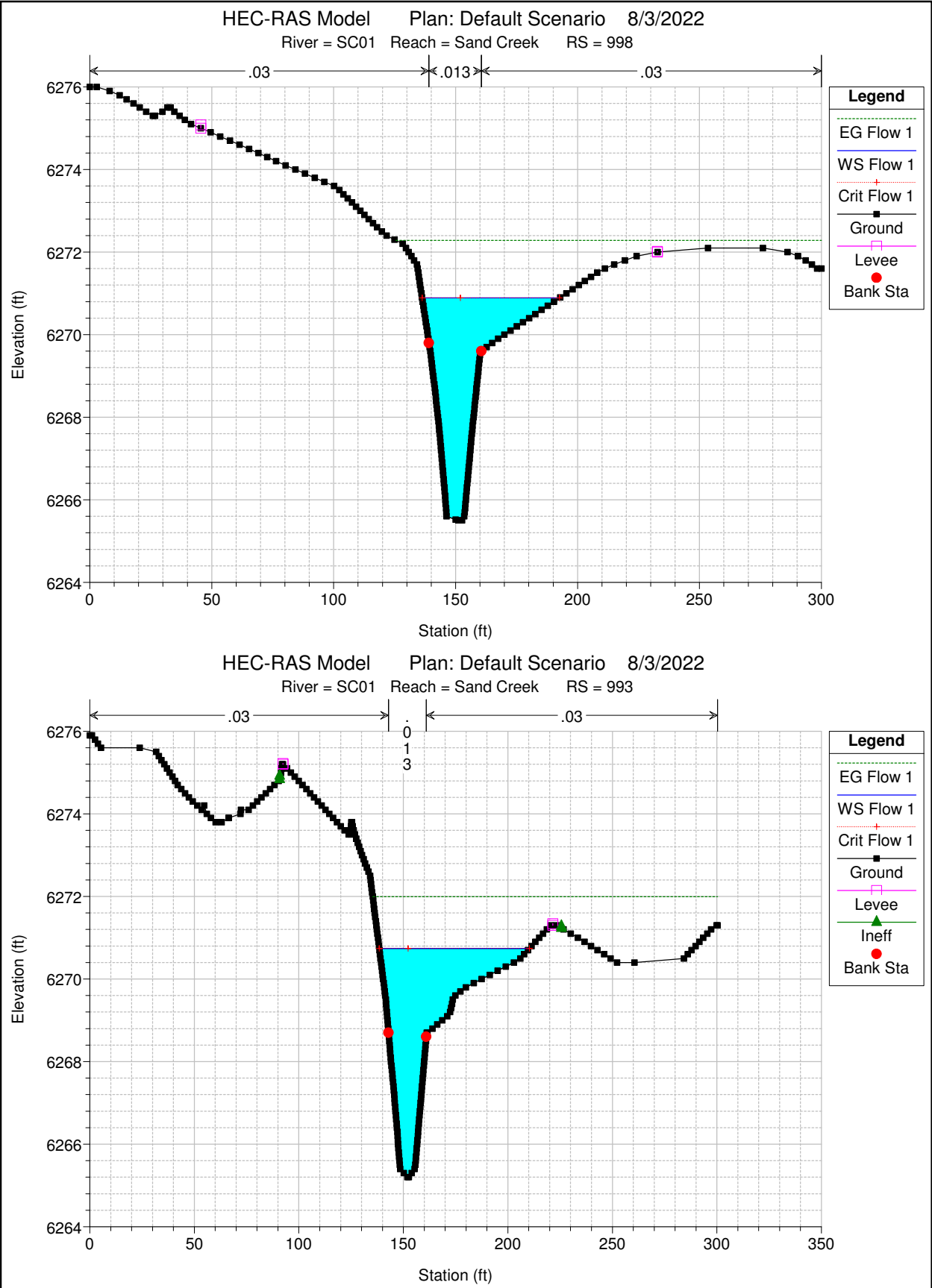


Figure 8.3. USBR Type III Stilling Basin





HEC-RAS Model    Plan: Default Scenario    8/3/2022

River = SC01    Reach = Sand Creek    RS = 993

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

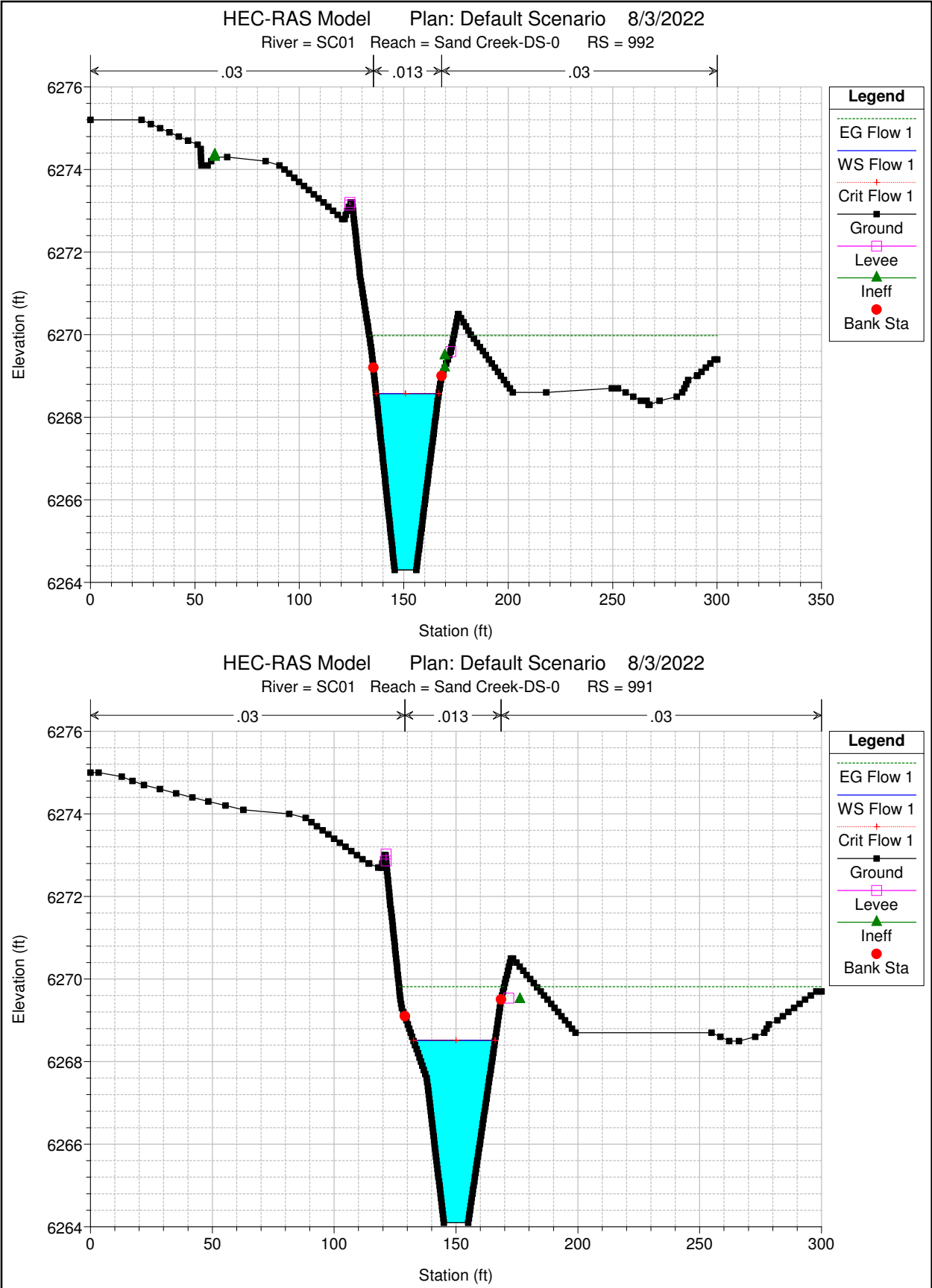
Ground

Levee

Ineff

Bank Sta





Elevation (ft)

6276

6274

6272

6270

6268

6266

6264

0

50

100

150

200

250

300

← .03 →

← .013 →

← .03 →

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

Ground

Levee

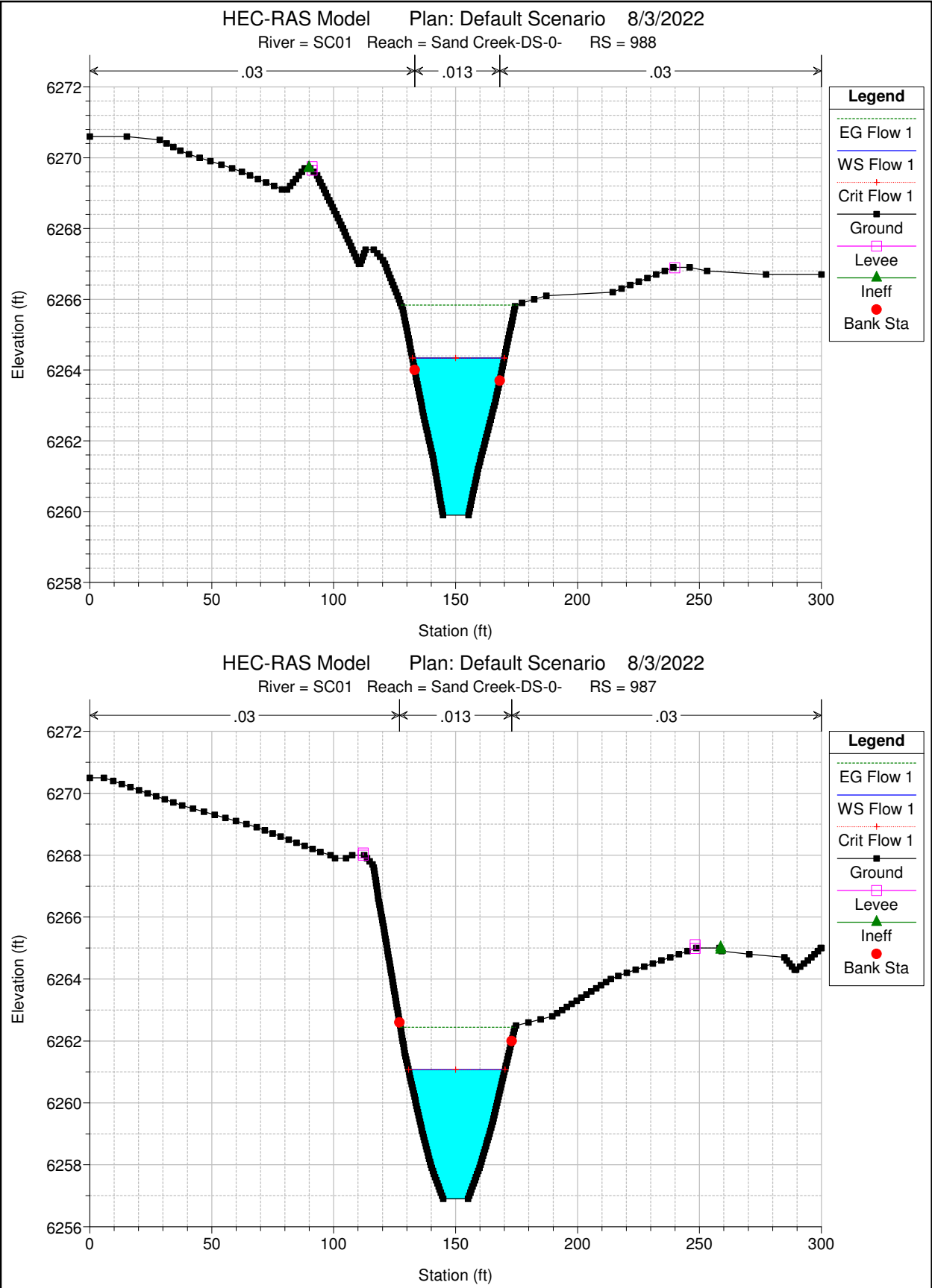
Ineff

Bank Sta









HEC-RAS Model    Plan: Default Scenario    8/3/2022

River = SC01    Reach = Sand Creek-DS-0-    RS = 987

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

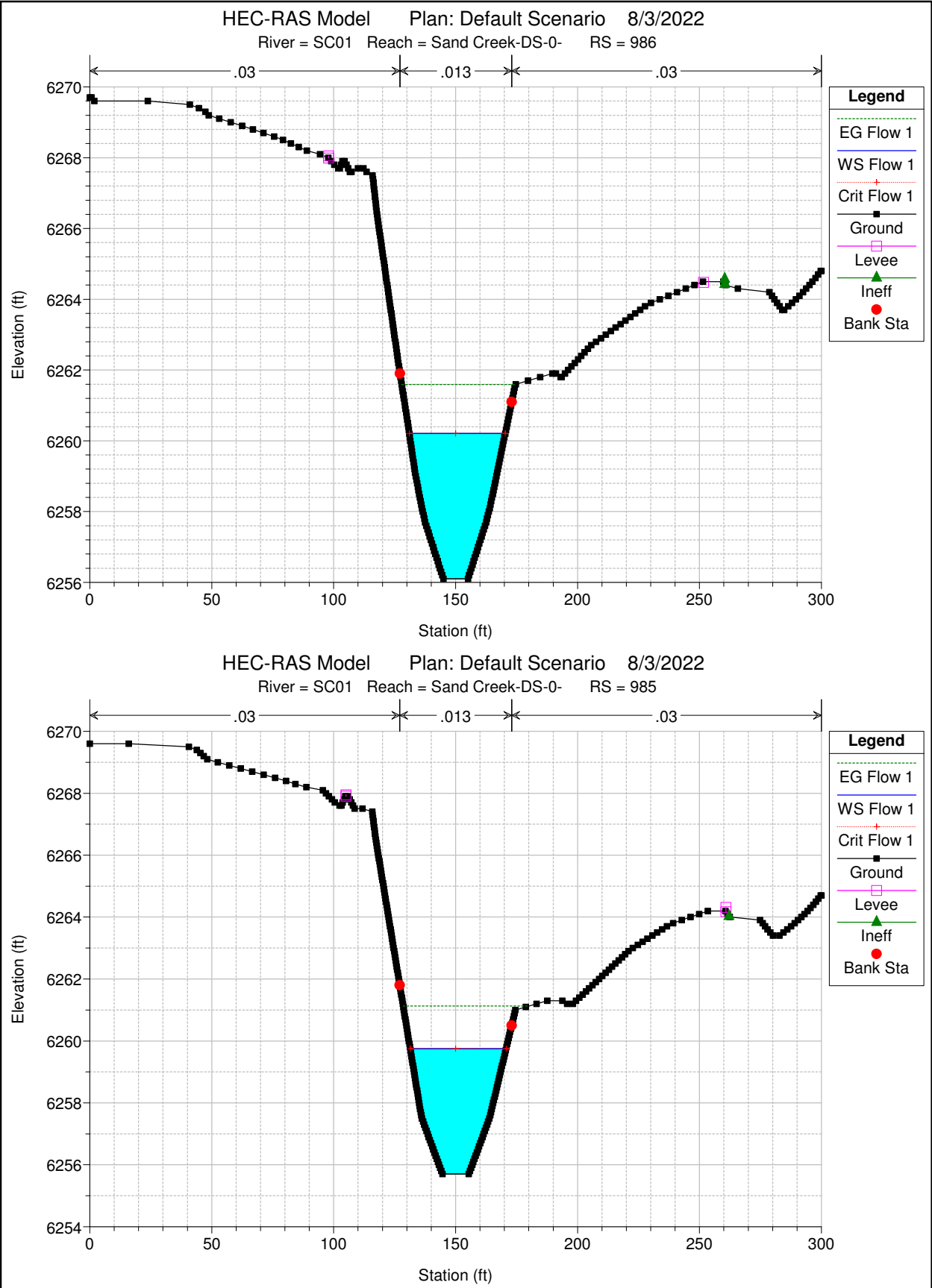
Ground

Levee

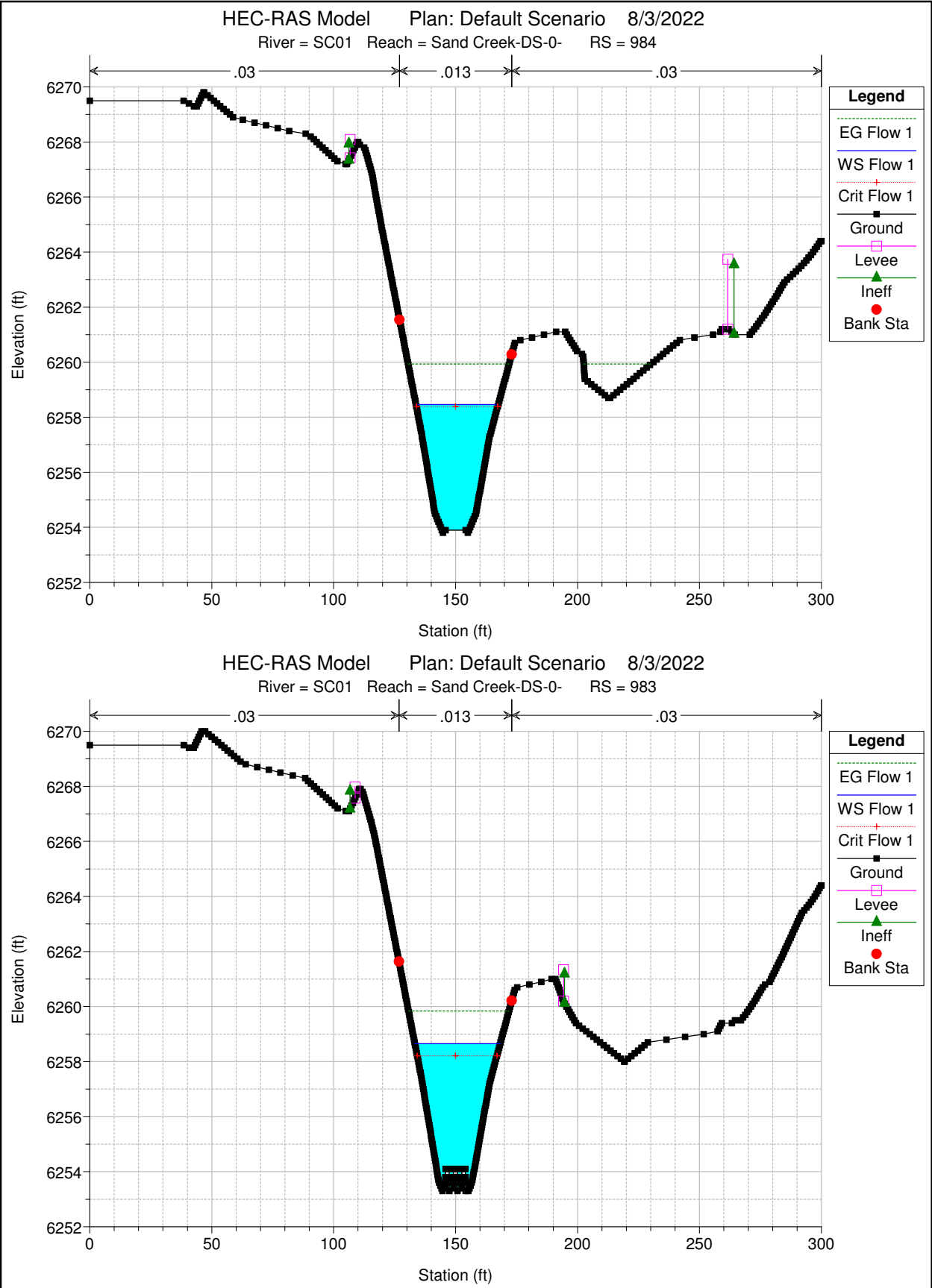
Ineff

Bank Sta

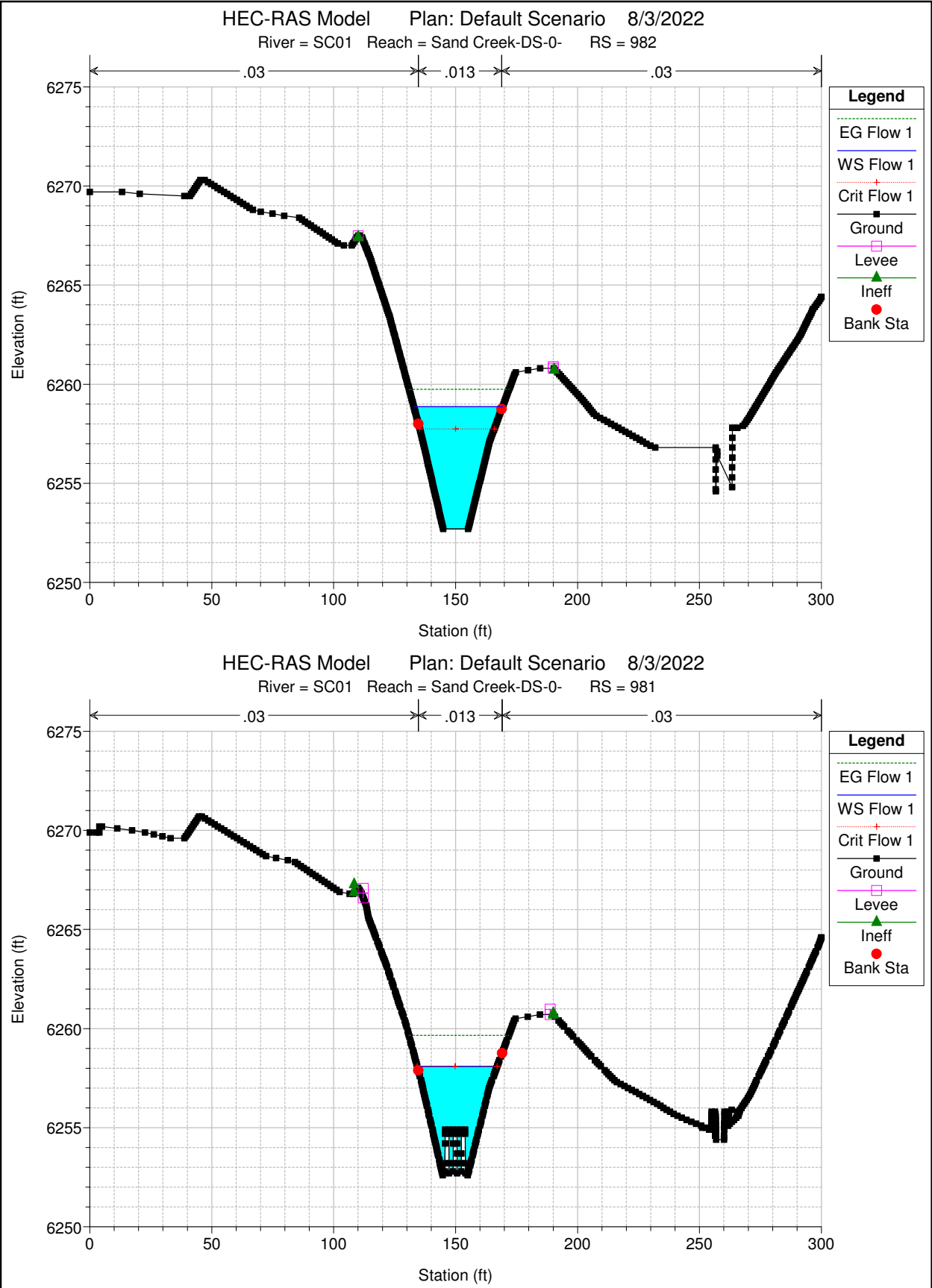












HEC-RAS Model    Plan: Default Scenario    8/3/2022

River = SC01    Reach = Sand Creek-DS-0-    RS = 981

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

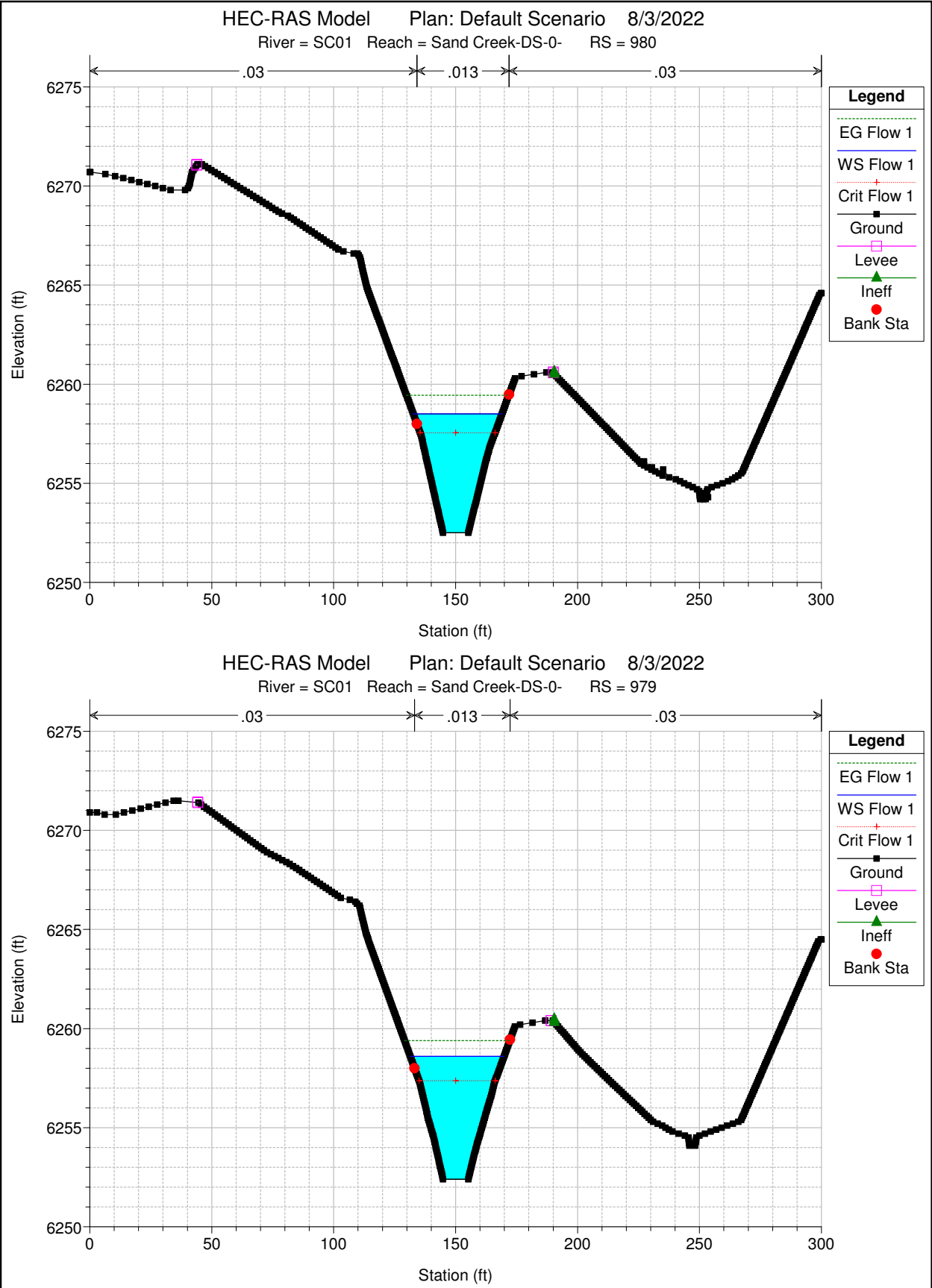
Ground

Levee

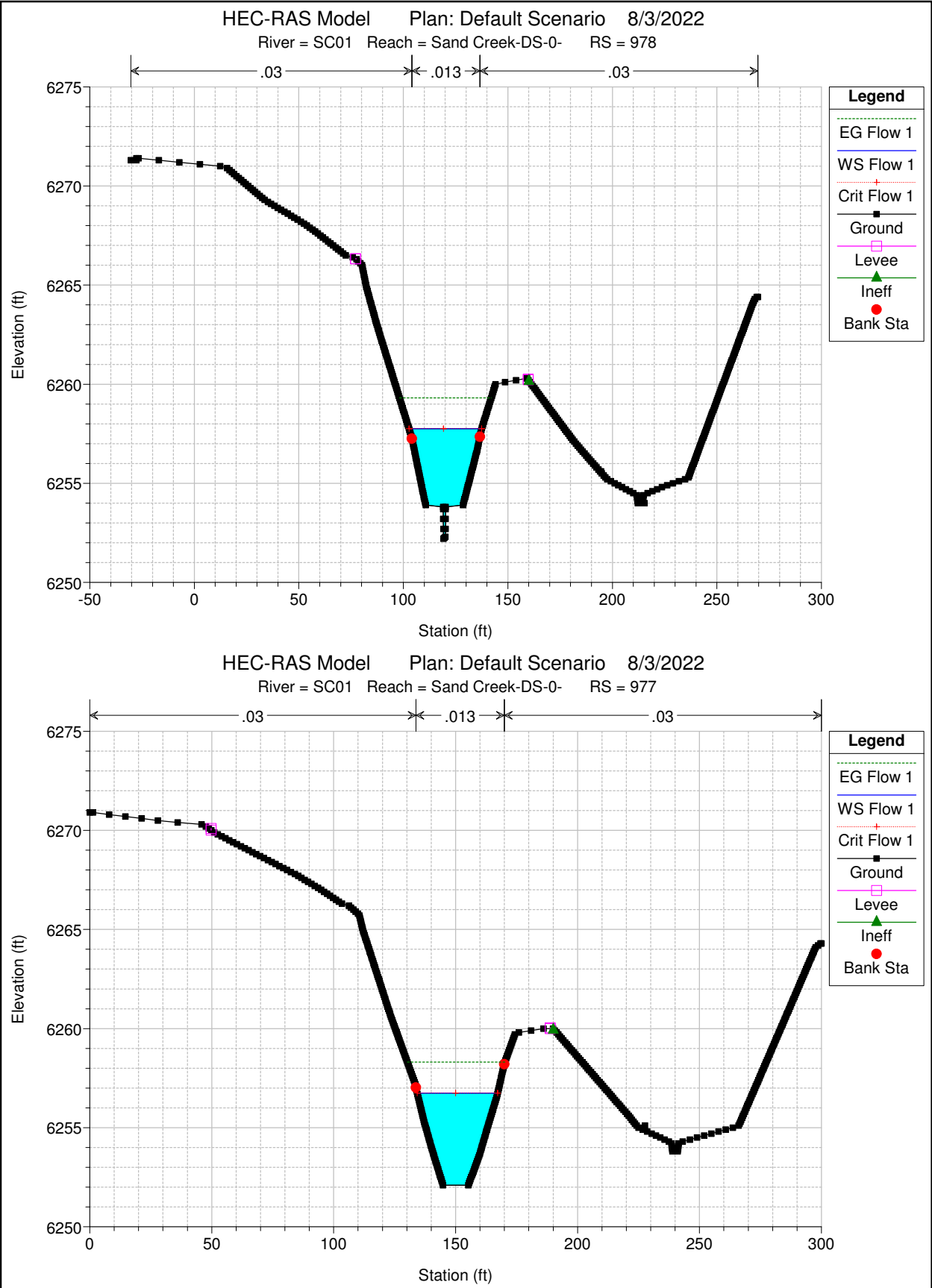
Ineff

Bank Sta





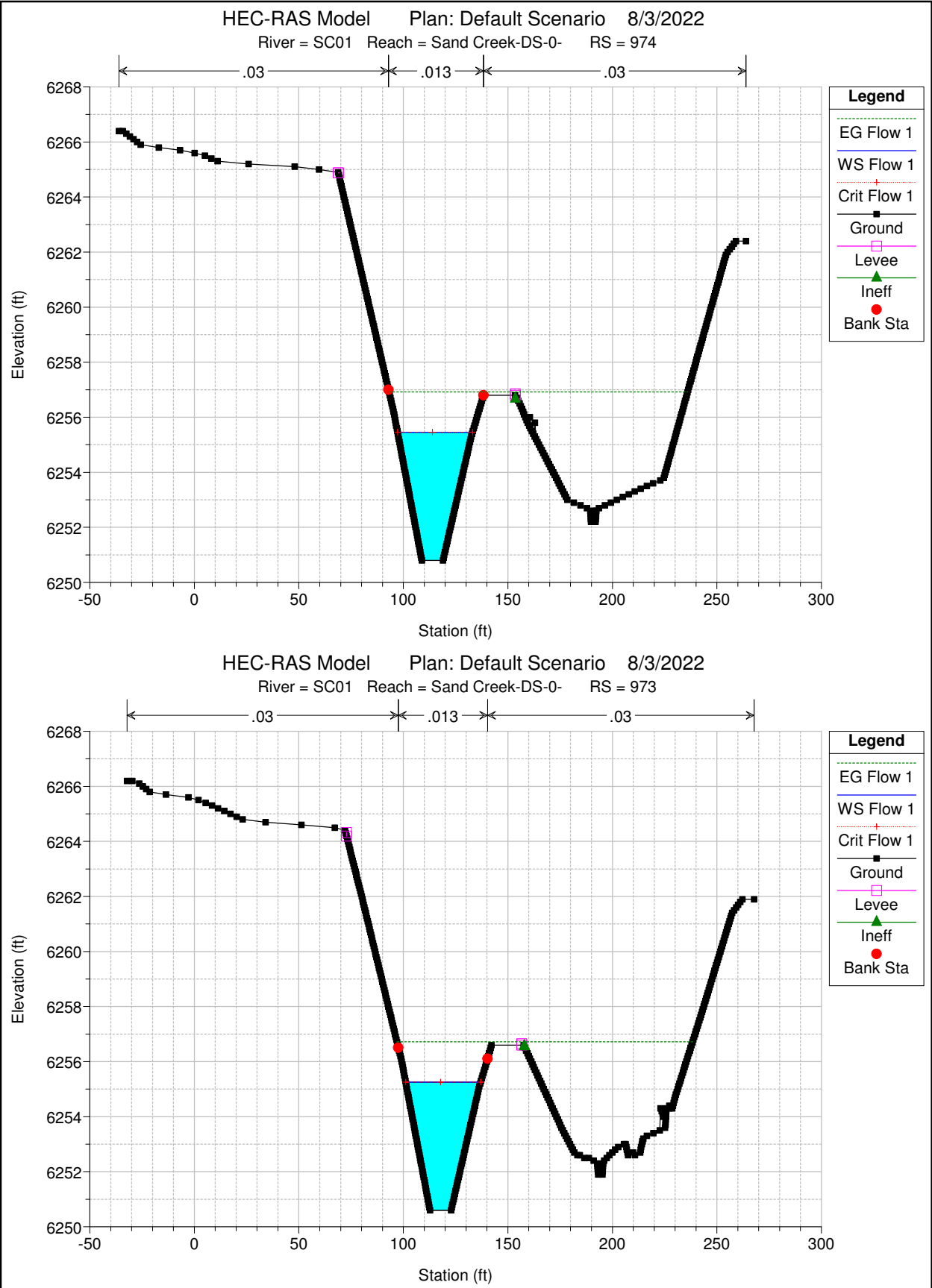




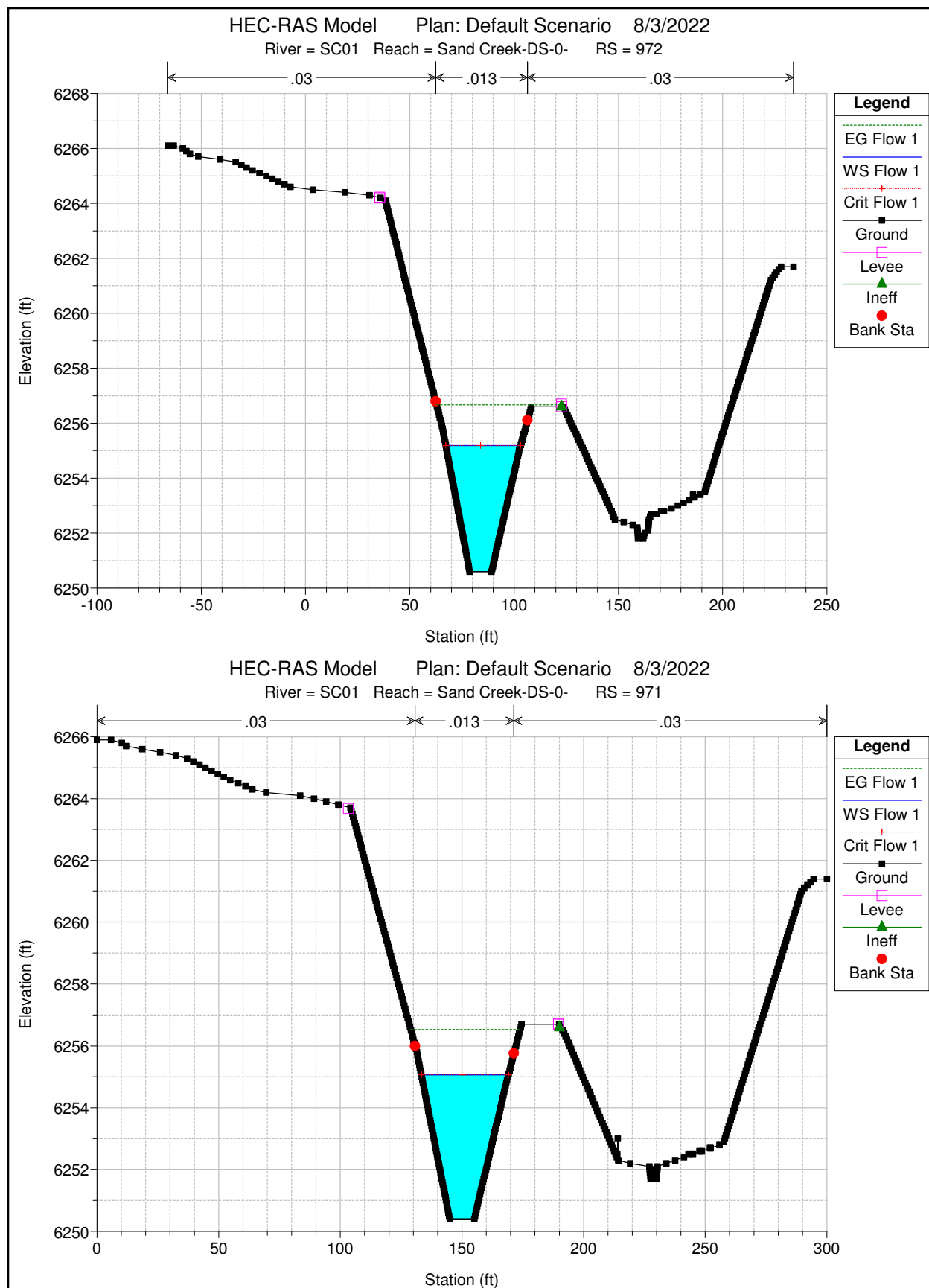




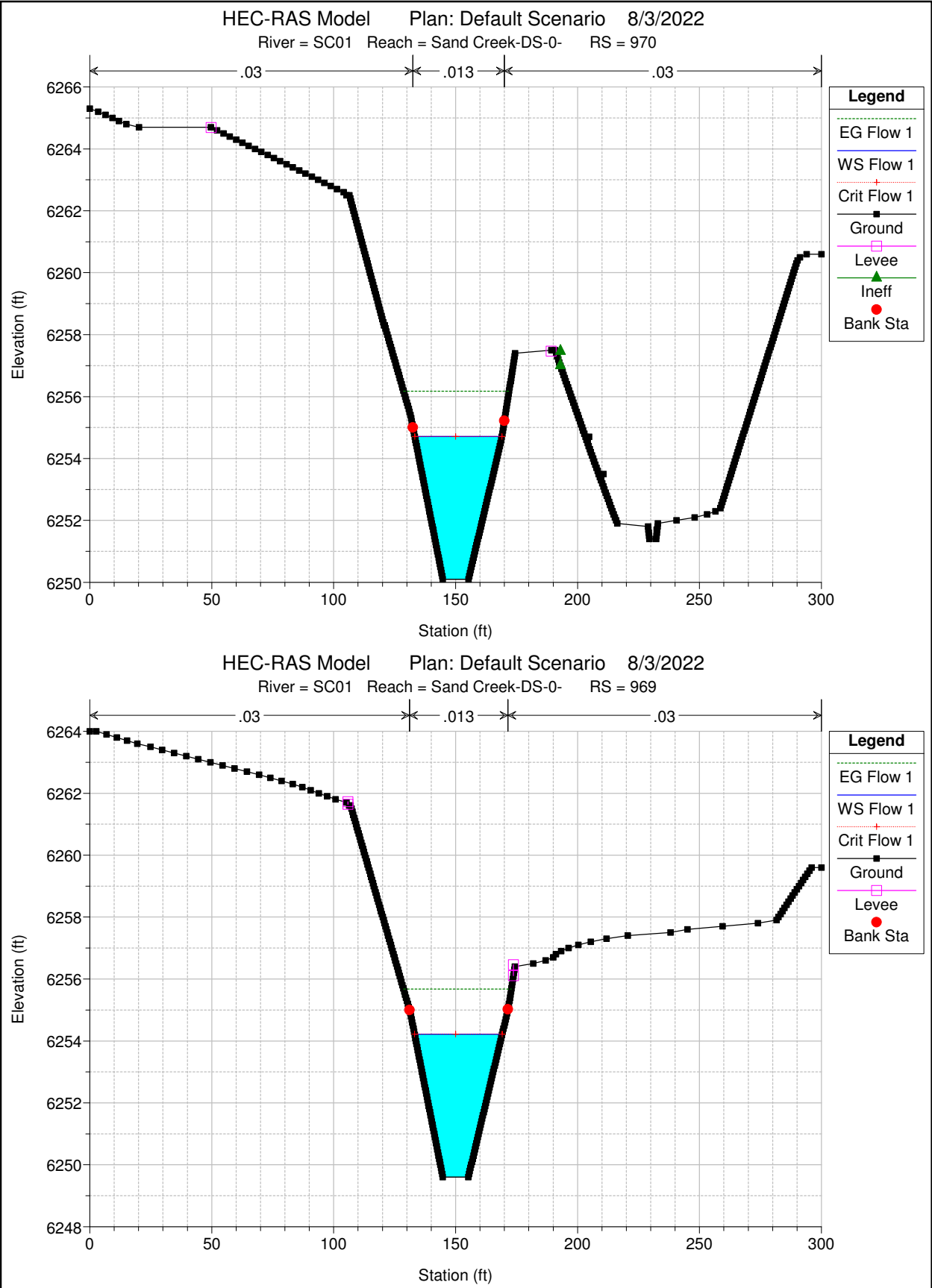












HEC-RAS Model    Plan: Default Scenario    8/3/2022

River = SC01    Reach = Sand Creek-DS-0-    RS = 969

Elevation (ft)

Station (ft)

Legend

EG Flow 1

WS Flow 1

Crit Flow 1

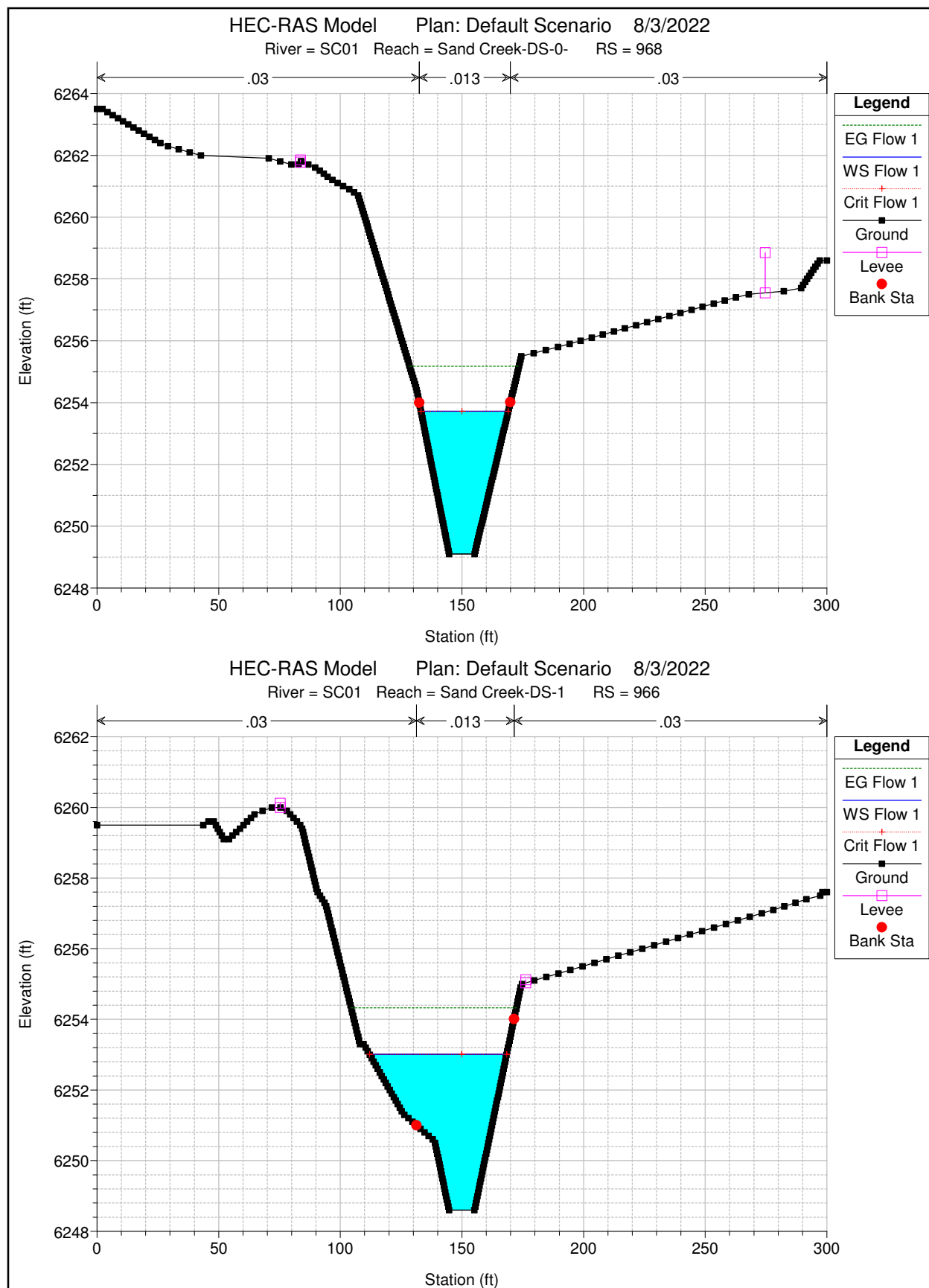
Ground

Levee

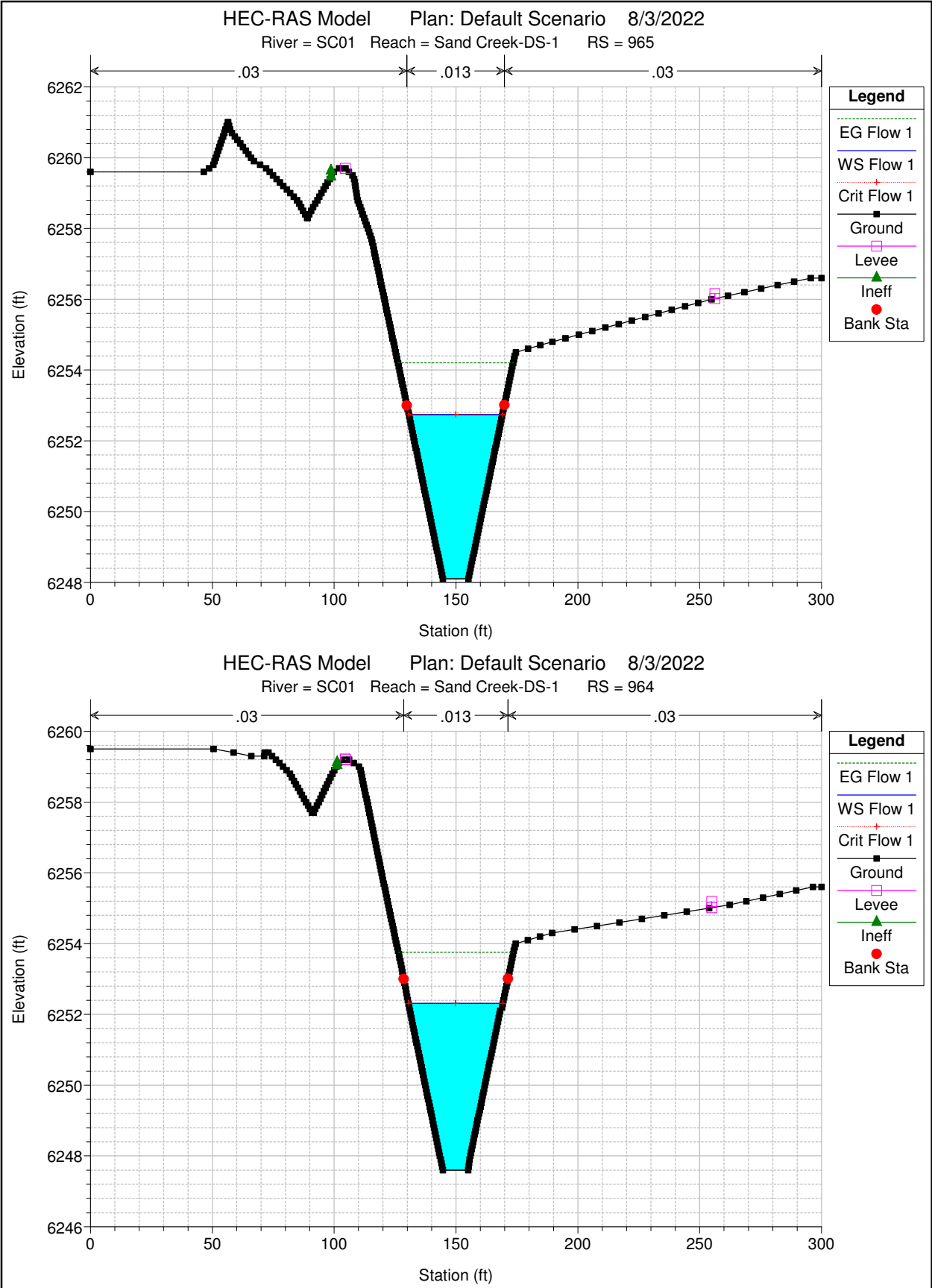
Ineff

Bank Sta

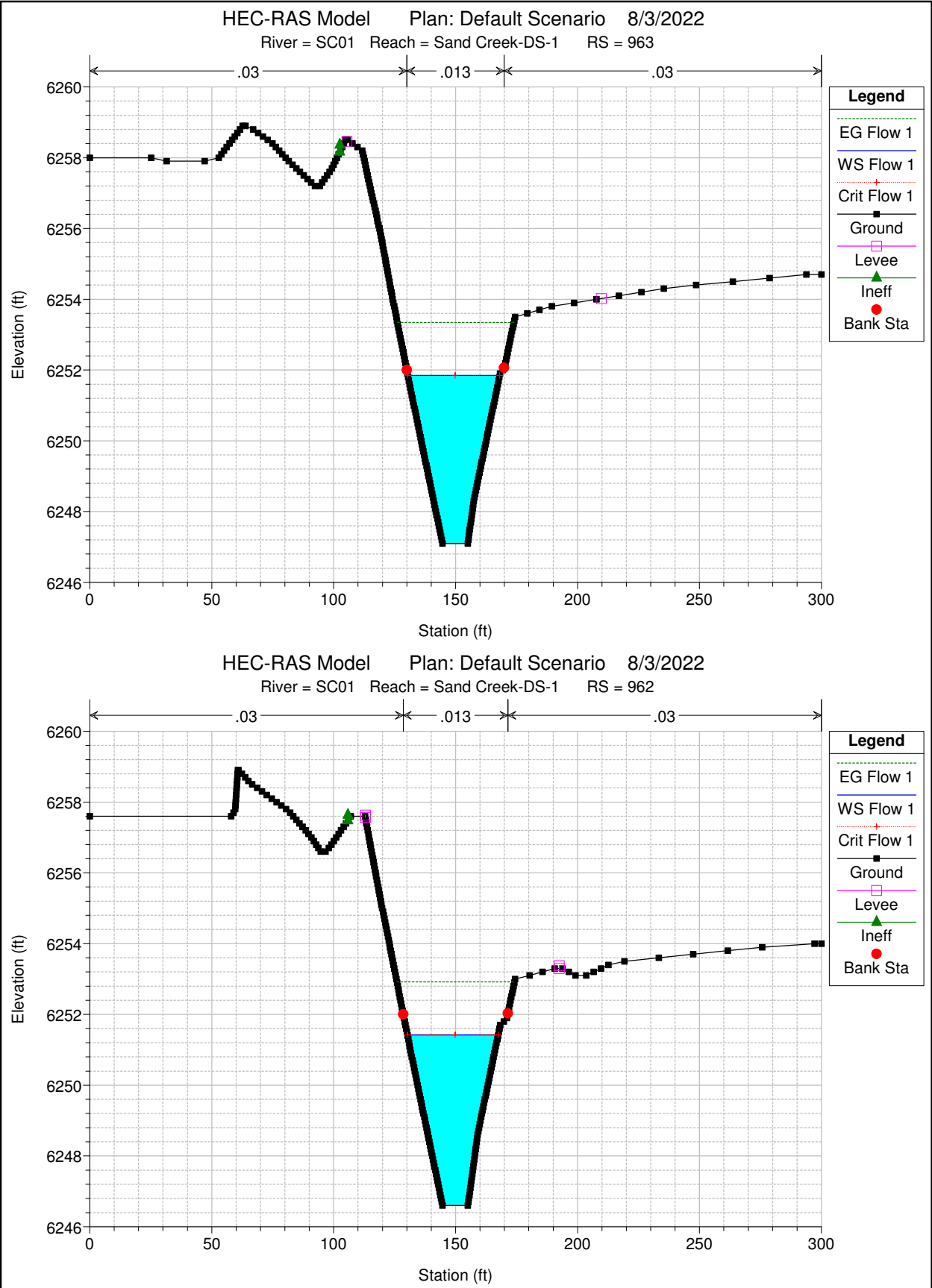




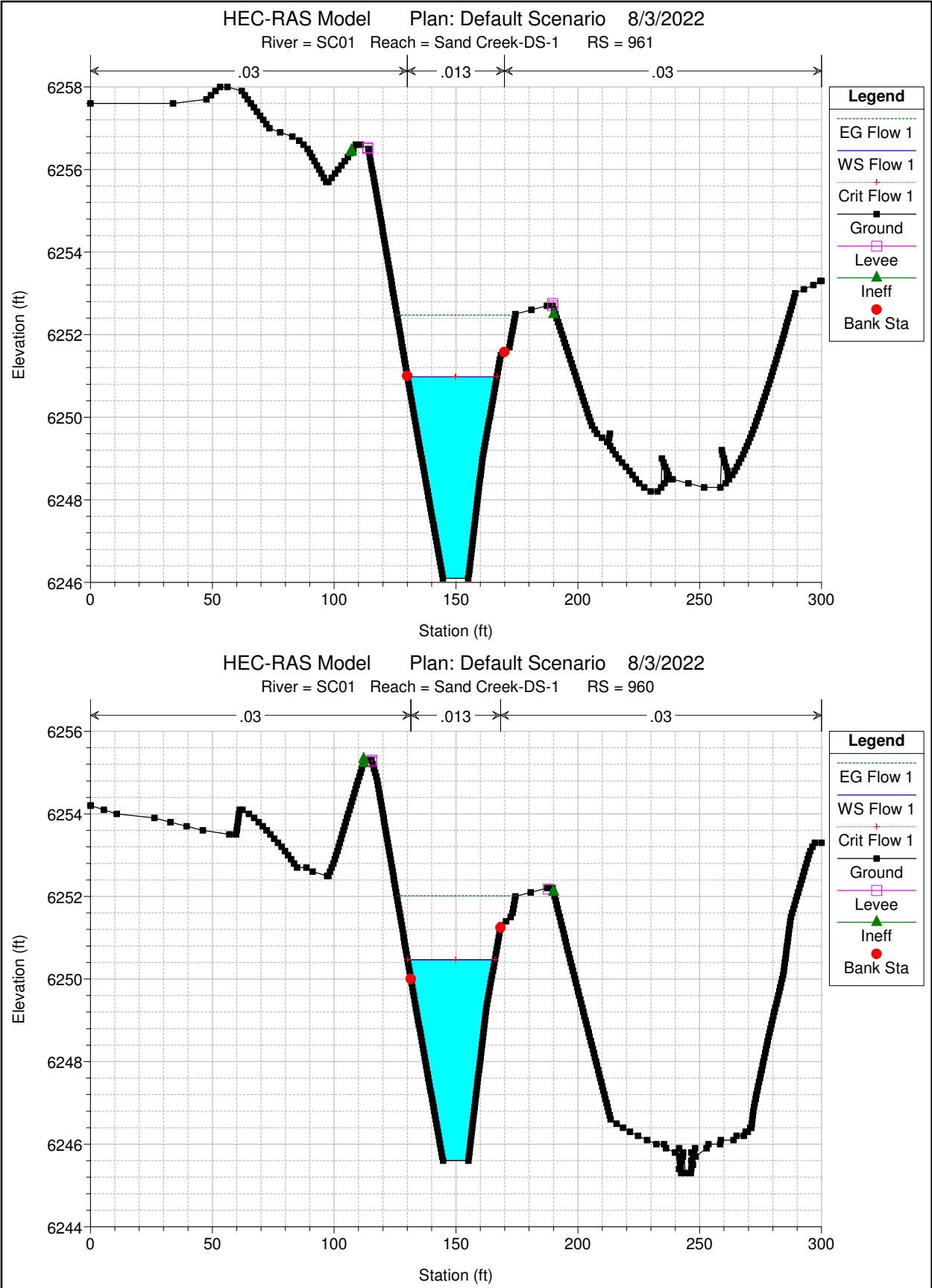




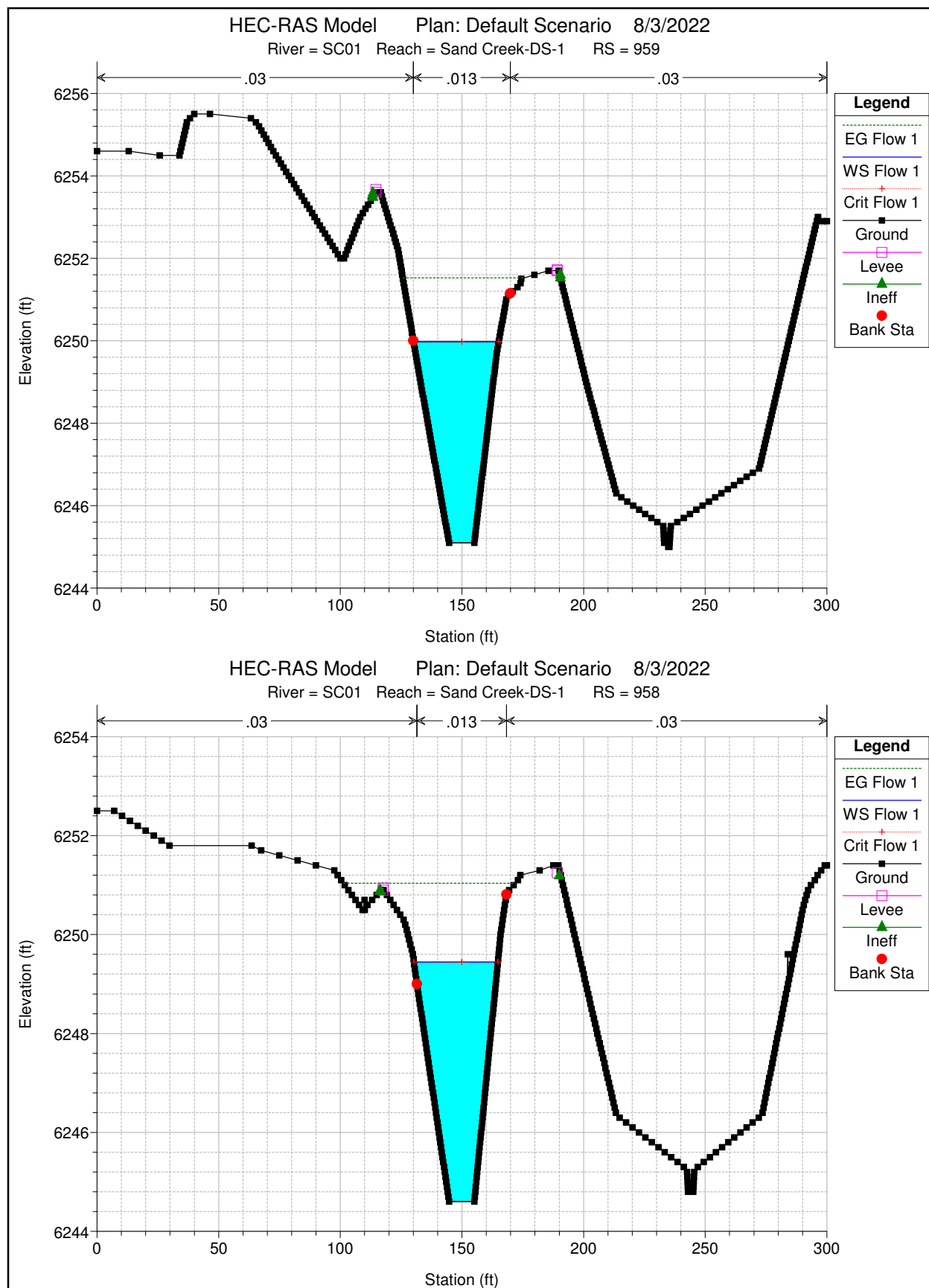








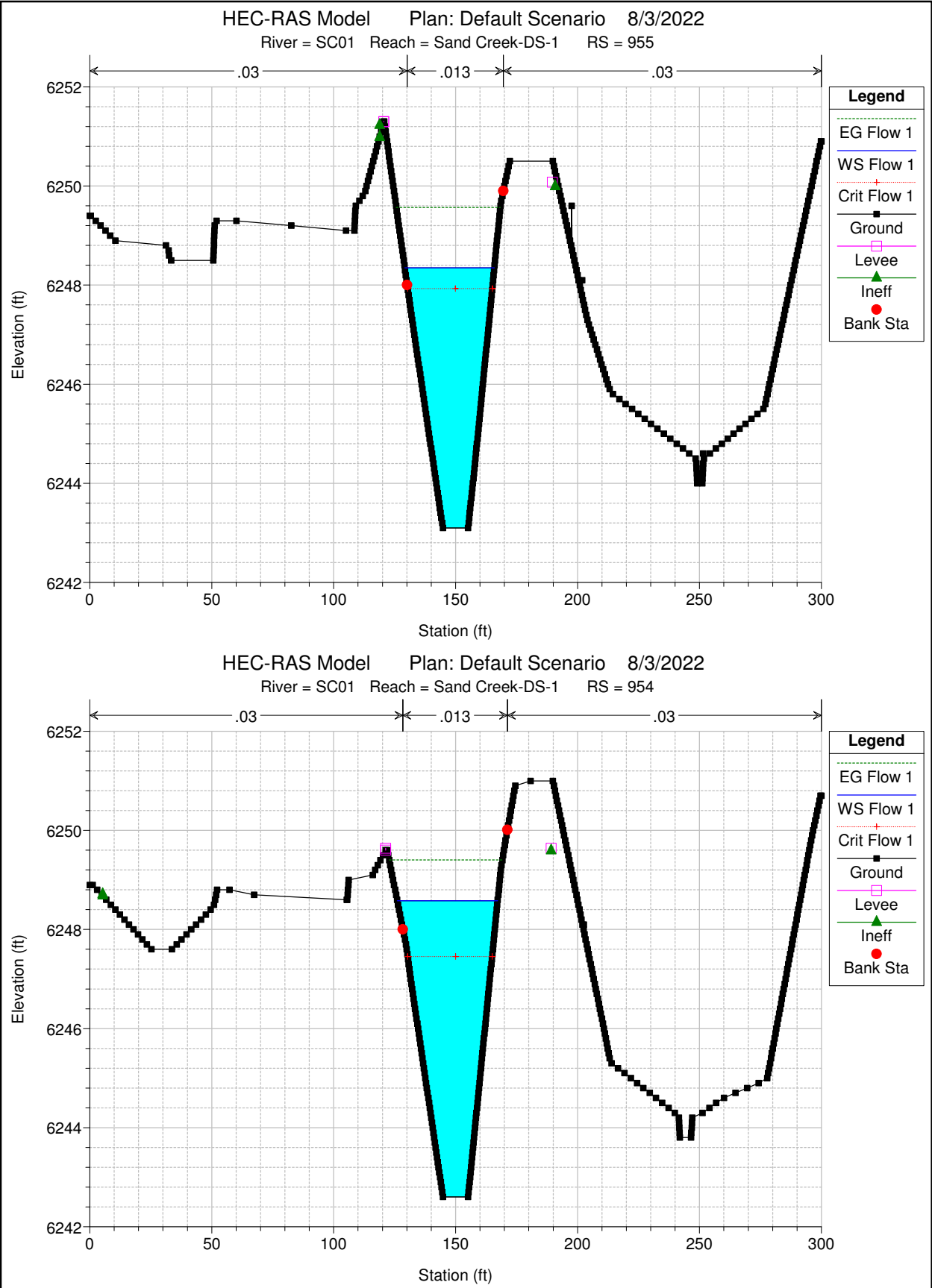




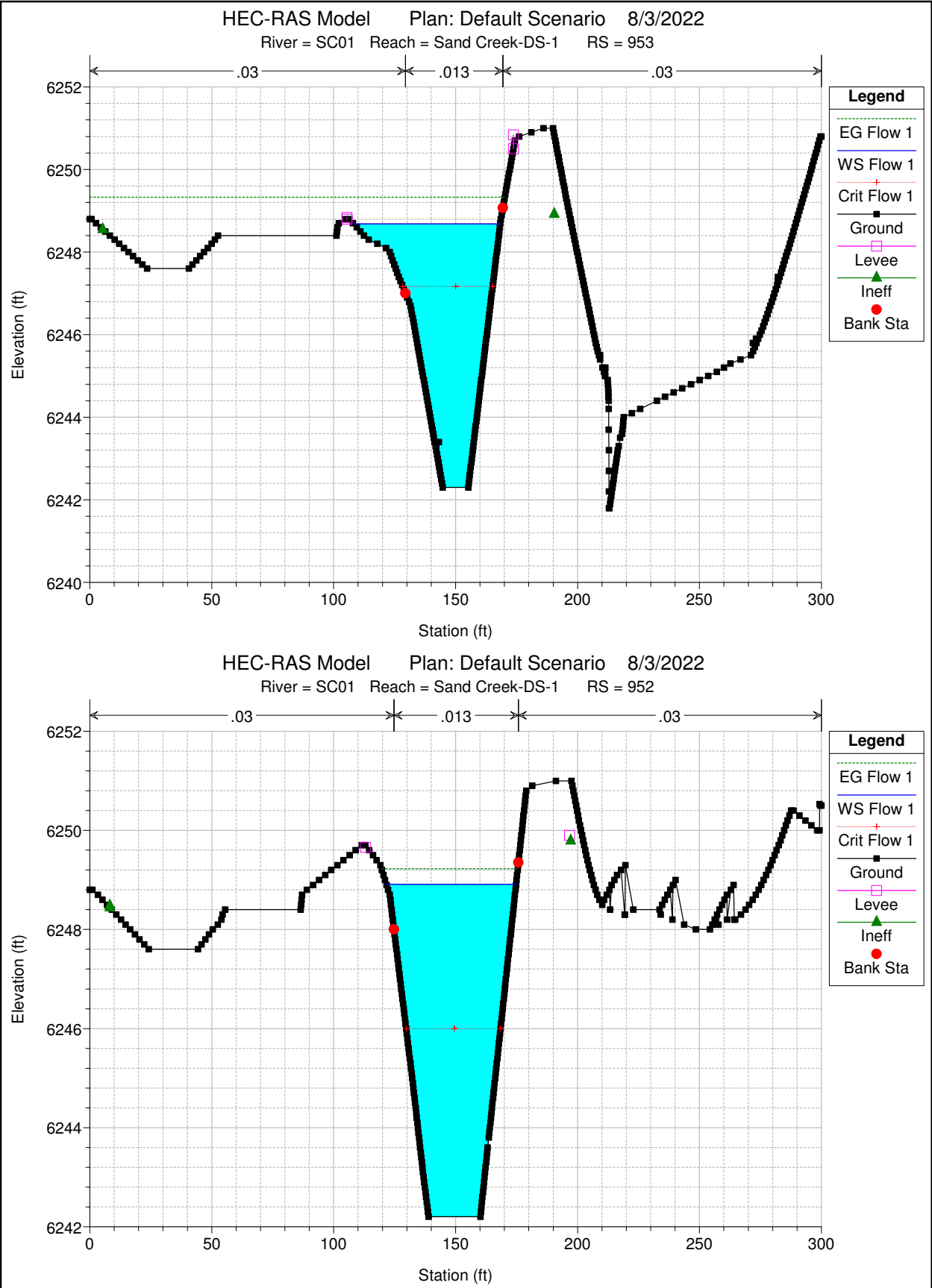








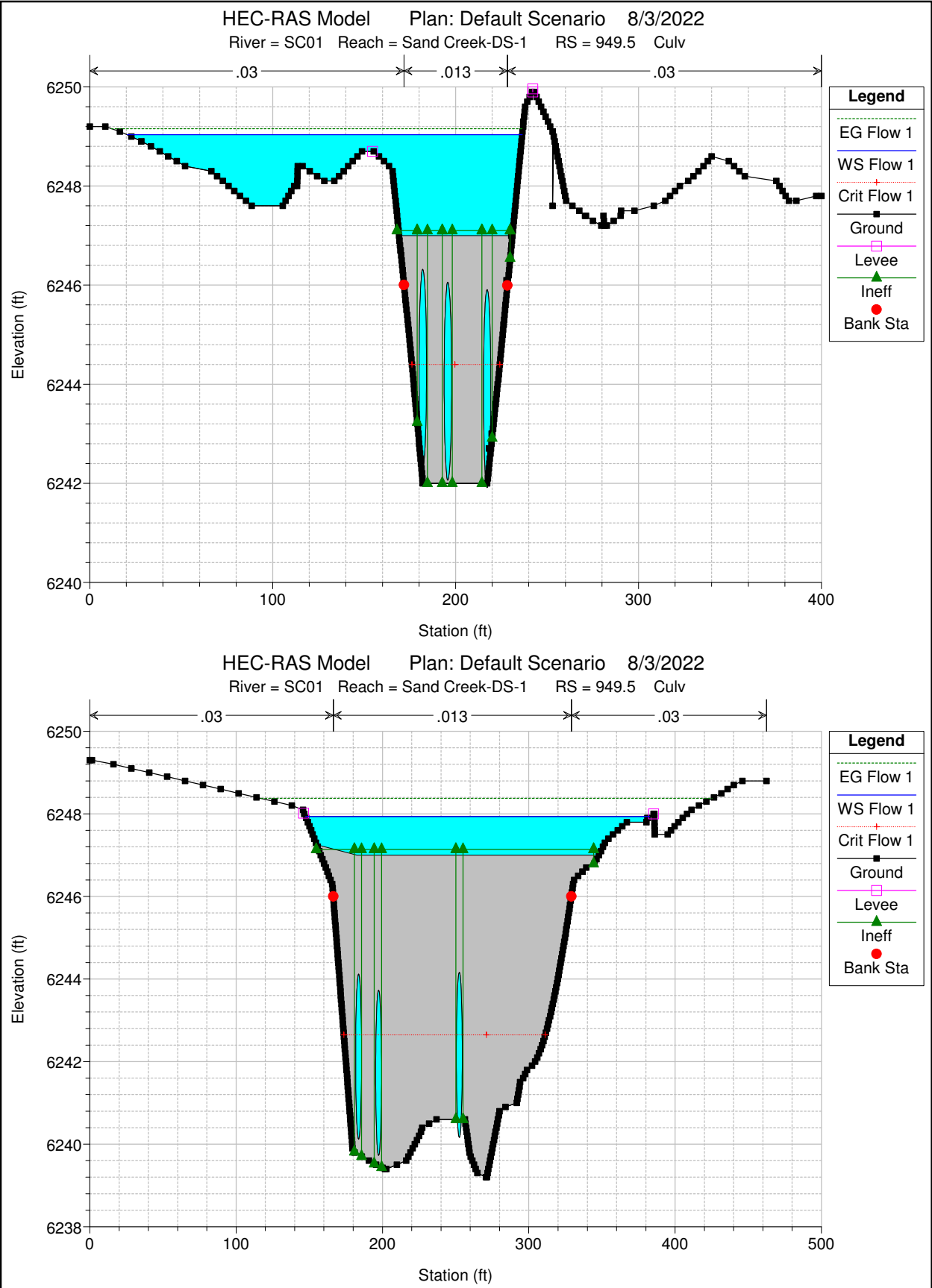




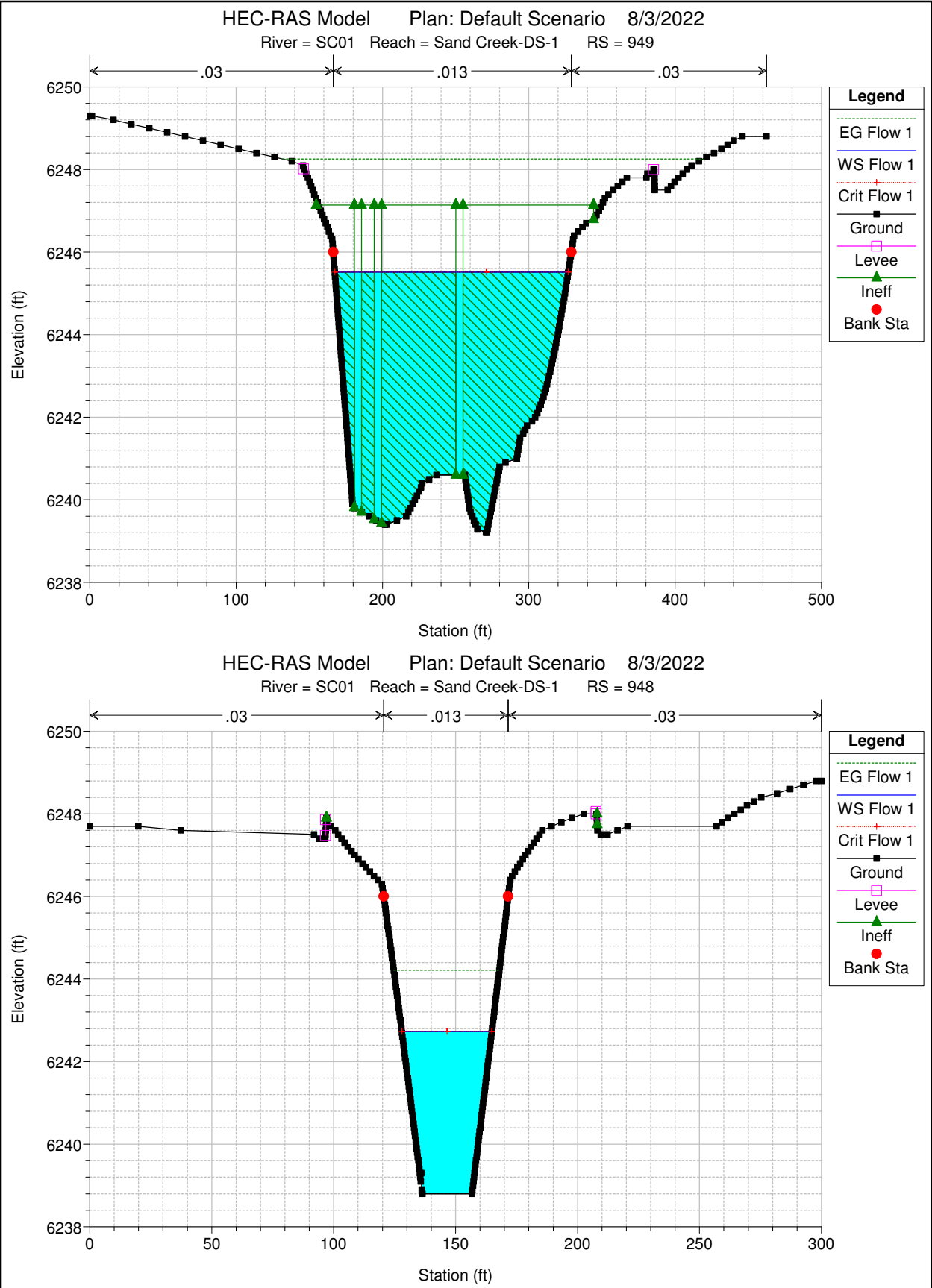






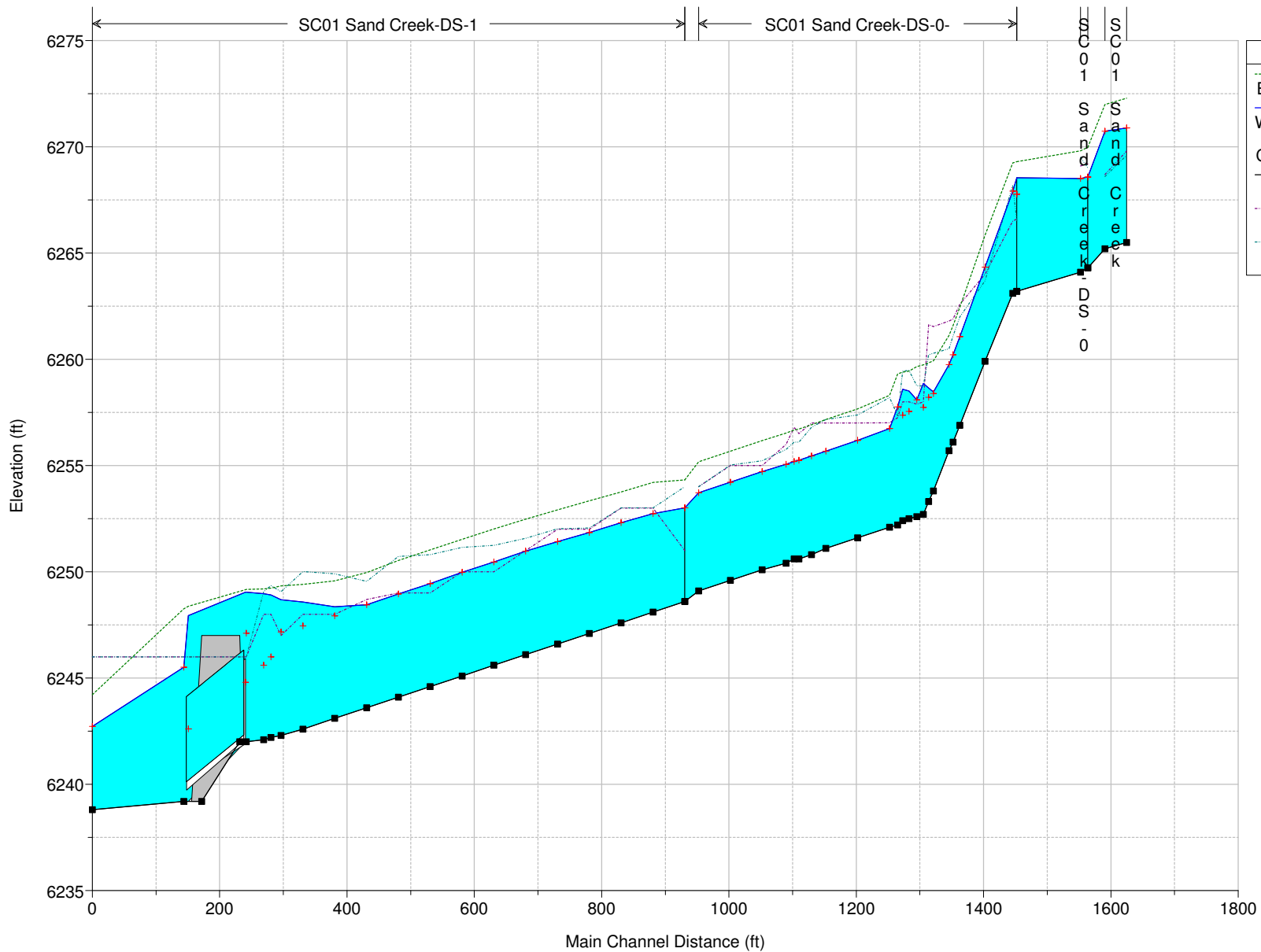








HEC-RAS Model Plan: Default Scenario 8/3/2022





HEC-RAS Plan: Default Scenario Profile: Flow 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	998	Flow 1	820.00	6265.50	6270.89	6270.89	6272.28	0.001362	9.64	103.80	56.32	0.87
Sand Creek	993	Flow 1	820.00	6265.20	6270.74	6270.74	6272.00	0.001080	9.43	128.24	71.77	0.79
Sand Creek-DS-0	992	Flow 1	820.02	6264.30	6268.57	6268.57	6269.98	0.001829	9.51	86.27	30.02	0.99
Sand Creek-DS-0	991	Flow 1	820.02	6264.10	6268.51	6268.51	6269.81	0.001850	9.15	89.57	33.50	0.99
Sand Creek-DS-0	990	Flow 1	1037.00	6263.20	6268.54	6267.78	6269.30	0.000697	7.21	181.85	76.02	0.65
Sand Creek-DS-0	989	Flow 1	1037.00	6263.10	6267.92	6267.92	6269.24	0.001524	9.40	128.51	57.84	0.93
Sand Creek-DS-0	988	Flow 1	1037.00	6259.90	6264.34	6264.34	6265.84	0.001768	9.82	106.31	37.75	0.99
Sand Creek-DS-0	987	Flow 1	1037.00	6256.90	6261.07	6261.07	6262.45	0.001807	9.42	110.06	39.56	1.00
Sand Creek-DS-0	986	Flow 1	1037.00	6256.10	6260.21	6260.21	6261.59	0.001807	9.44	109.84	39.35	1.00
Sand Creek-DS-0	985	Flow 1	1037.00	6255.70	6259.75	6259.75	6261.13	0.001786	9.41	110.26	39.34	0.99
Sand Creek-DS-0	984	Flow 1	1037.00	6253.80	6258.46	6258.39	6259.93	0.001694	9.75	106.38	33.71	0.97
Sand Creek-DS-0	983	Flow 1	1037.00	6253.30	6258.65	6258.21	6259.84	0.001444	8.74	118.69	34.98	0.84
Sand Creek-DS-0	982	Flow 1	1037.00	6252.70	6258.86	6257.74	6259.74	0.000742	7.52	138.70	36.39	0.66
Sand Creek-DS-0	981	Flow 1	1037.00	6252.60	6258.09	6258.09	6259.66	0.002717	10.04	103.36	32.76	0.99
Sand Creek-DS-0	980	Flow 1	1037.00	6252.50	6258.51	6257.55	6259.45	0.000857	7.78	133.57	36.40	0.70
Sand Creek-DS-0	979	Flow 1	1037.00	6252.40	6258.60	6257.37	6259.40	0.000698	7.19	144.73	38.42	0.64
Sand Creek-DS-0	978	Flow 1	1037.00	6252.20	6257.76	6257.76	6259.31	0.001939	10.01	104.09	34.75	0.99
Sand Creek-DS-0	977	Flow 1	1037.00	6252.10	6256.75	6256.75	6258.30	0.001795	10.02	103.48	32.90	1.00
Sand Creek-DS-0	976	Flow 1	1037.00	6251.60	6256.19	6256.19	6257.67	0.001803	9.76	106.20	35.57	1.00
Sand Creek-DS-0	975	Flow 1	1037.00	6251.10	6255.68	6255.68	6257.17	0.001823	9.79	105.88	35.61	1.00
Sand Creek-DS-0	974	Flow 1	1037.00	6250.80	6255.45	6255.45	6256.92	0.001804	9.74	106.50	35.84	1.00
Sand Creek-DS-0	973	Flow 1	1037.00	6250.60	6255.25	6255.25	6256.72	0.001805	9.74	106.46	35.84	1.00
Sand Creek-DS-0	972	Flow 1	1037.00	6250.60	6255.19	6255.19	6256.67	0.001830	9.78	106.04	35.87	1.00
Sand Creek-DS-0	971	Flow 1	1037.00	6250.40	6255.06	6255.06	6256.53	0.001786	9.71	106.74	35.77	0.99
Sand Creek-DS-0	970	Flow 1	1037.00	6250.10	6254.71	6254.71	6256.17	0.001777	9.71	106.85	35.74	0.99
Sand Creek-DS-0	969	Flow 1	1037.00	6249.60	6254.22	6254.22	6255.68	0.001780	9.69	106.96	35.89	0.99
Sand Creek-DS-0	968	Flow 1	1037.00	6249.10	6253.72	6253.72	6255.18	0.001784	9.71	106.85	35.86	0.99
Sand Creek-DS-1	966	Flow 1	1100.00	6248.60	6253.01	6253.01	6254.32	0.001599	9.39	133.91	56.36	0.95
Sand Creek-DS-1	965	Flow 1	1100.00	6248.10	6252.74	6252.74	6254.20	0.001793	9.71	113.30	38.38	1.00
Sand Creek-DS-1	964	Flow 1	1100.00	6247.60	6252.31	6252.31	6253.75	0.001776	9.64	114.09	38.73	0.99
Sand Creek-DS-1	963	Flow 1	1100.00	6247.10	6251.84	6251.84	6253.34	0.001829	9.83	111.93	37.63	1.00
Sand Creek-DS-1	962	Flow 1	1100.00	6246.60	6251.43	6251.43	6252.92	0.001794	9.80	112.24	37.25	1.00
Sand Creek-DS-1	961	Flow 1	1100.00	6246.10	6250.98	6250.98	6252.47	0.001774	9.81	112.08	36.70	0.99
Sand Creek-DS-1	960	Flow 1	1100.00	6245.60	6250.47	6250.47	6252.02	0.001738	9.99	110.37	35.80	0.99
Sand Creek-DS-1	959	Flow 1	1100.00	6245.10	6249.98	6249.98	6251.53	0.001776	9.98	110.20	35.02	0.99
Sand Creek-DS-1	958	Flow 1	1100.00	6244.60	6249.44	6249.44	6251.04	0.001742	10.13	108.89	34.53	0.99
Sand Creek-DS-1	957	Flow 1	1100.00	6244.10	6248.96	6248.96	6250.53	0.001816	10.04	109.52	35.07	1.00
Sand Creek-DS-1	956	Flow 1	1100.00	6243.60	6248.44	6248.44	6249.96	0.001768	9.89	111.21	35.85	0.99
Sand Creek-DS-1	955	Flow 1	1100.00	6243.10	6248.35	6247.93	6249.57	0.001227	8.86	124.36	36.74	0.84
Sand Creek-DS-1	954	Flow 1	1100.00	6242.60	6248.58	6247.46	6249.40	0.000712	7.27	151.93	41.17	0.65
Sand Creek-DS-1	953	Flow 1	1100.00	6242.30	6248.68	6247.17	6249.33	0.000511	6.51	180.73	60.07	0.55
Sand Creek-DS-1	952	Flow 1	1100.00	6242.20	6248.91	6246.00	6249.23	0.000197	4.48	246.57	53.19	0.36
Sand Creek-DS-1	951	Flow 1	1100.00	6242.10	6248.97	6245.61	6249.20	0.000136	3.80	291.11	61.48	0.30
Sand Creek-DS-1	950	Flow 1	1100.00	6242.00	6249.04	6247.11	6249.17	0.000061	2.96	490.03	216.00	0.21
Sand Creek-DS-1	949.5		Culvert									
Sand Creek-DS-1	949	Flow 1	1100.00	6239.20	6245.51	6245.51	6248.25	0.001370	13.29	82.78	159.57	0.99
Sand Creek-DS-1	948	Flow 1	1100.00	6238.80	6242.73	6242.73	6244.22	0.001785	9.79	112.41	36.93	0.99















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

```
X   X   XXXXXX   XXXX   XXXX   XX   XXXX
X   X   X       X   X       X   X   X   X   X
X   X   X       X       X   X   X   X   X
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   X
X   X   XXXXXX   XXXX   X   X   X   X   XXXXX
```

#### PROJECT DATA

Project Title: HEC-RAS Model  
Project File : Updated 08-24-2021 Proposed Model (8% slope).prj  
Run Date and Time: 8/3/2022 7:58:41 AM

#### Project in English units

##### Project Description:

CRS Info=<Spatial Reference> <CoordinateSystem WKT="PROJCS[&quot;WGS 84 /  
World  
Mercator&quot;, GEOGCS[&quot;WGS  
84&quot;, DATUM[&quot;WGS\_1984&quot;, SPHEROID[&quot;WGS  
84&quot;, 6378137, 298.257223563, AUTHORITY[&quot;EPSG&quot;, &quot;7030&quot;]], A  
UT  
HORITY[&quot;EPSG&quot;, &quot;6326&quot;]], PRIMEM[&quot;Greenwich&quot;, 0, AUTH  
ORITY[&quot;EPSG&quot;, &quot;8901&quot;]], UNIT[&quot;degree&quot;, 0.017453292519  
94  
33, AUTHORITY[&quot;EPSG&quot;, &quot;9122&quot;]], AUTHORITY[&quot;EPSG&quot;, &q  
uo  
t; 4326&quot;]], PROJECTION[&quot;Mercator\_1SP&quot;], PARAMETER[&quot;central\_me  
ri  
di an&quot;, 0], PARAMETER[&quot;scale\_factor&quot;, 1], PARAMETER[&quot;false\_east  
in  
g&quot;, 0], PARAMETER[&quot;false\_northing&quot;, 0], UNIT[&quot;International  
Foot&quot;, 0.3048], AXIS[&quot;Eastings&quot;, EAST], AXIS[&quot;Northings&quot;, NO  
RT  
H]]" AcadCode="" /> <Registration OffsetX="0" OffsetY="0" OffsetZ="0"  
ScaleX="1" ScaleY="1" ScaleZ="1" /></Spatial Reference>

#### PLAN DATA

Plan Title: Default Scenario  
Plan File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model  
(8% slope).p01

Geometry Title: Default Geometry  
Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021  
Proposed Model (8% slope).g01

Flow Title : Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021  
Proposed Model (8% slope).f01

Plan Description:  
Default Scenario

#### Plan Summary Information:

Number of:	Cross Sections =	55	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

#### Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.33
Flow tolerance factor	=	0.001

#### Computation Options

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

#### FLOW DATA

Flow Title: Default Steady Flow  
Flow File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model  
(8% slope).f01

#### Flow Data (cfs)

River	Reach	RS	Flow 1
EXCH	EX CHANNEL	1000	63
EXOF	EX OVERFLOW	1001	42
OVFL	Overflow Channel 1000		217
OVFL	Overflow Ch-DS-0998		175
SC01	Sand Creek	998	820



SC01	Sand Creek-DS-0	992	862
SC01	Sand Creek-DS-0	990	1037
SC01	Sand Creek-DS-1	966	1100

#### Boundary Conditions

River	Reach	Profile	Upstream
	Downstream		
SC01	Sand Creek-DS-1	Flow 1	Critical

#### GEOMETRY DATA

Geometry Title: Default Geometry  
 Geometry File : X:\2510000.all\2517400\GeoHecRas\Updated 08-24-2021 Proposed Model (8% slope).g01

#### Reach Connection Table

River Boundary	Reach	Upstream Boundary	Downstream
EXCH	EX CHANNEL		Junc-DS02
EXOF	EX OVERFLOW	Junc-DS01	EXOF-SC
OVFL	OverFlow Channel		Junc-DS01
OVFL	OverFlow Ch-DS-0	Junc-DS01	OF-SC
SC01	Sand Creek		EXOF-SC
SC01	Sand Creek-DS-0	EXOF-SC	OF-SC
SC01	Sand Creek-DS-0-	OF-SC	Junc-DS02
SC01	Sand Creek-DS-1	Junc-DS02	

#### JUNCTION INFORMATION

Name: Junc-DS01  
 Description:  
 Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
OVFL	0	OverFlow Channel	to OVFL	OverFlow Ch-DS-0
OVFL	0	OverFlow Channel	to EXOF	EX OVERFLOW
				255.09
				209.74

Name: EXOF-SC  
 Description:  
 Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	0	Sand Creek	to SC01	Sand Creek-DS-0
EXOF	0	EX OVERFLOW	to SC01	Sand Creek-DS-0
				26.69
				47.45

Name: OF-SC  
 Description:  
 Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	0	Sand Creek-DS-0	to SC01	Sand Creek-DS-0-
OVFL	0	OverFlow Ch-DS-0	to SC01	Sand Creek-DS-0-
				100.01
				41.97

Name: Junc-DS02  
 Description:  
 Energy computation Method

Length across River	Junction Reach	Tributary River	Reach	Length
Angle				
SC01	0	Sand Creek-DS-0-	to SC01	Sand Creek-DS-1
EXCH	0	EX CHANNEL	to SC01	Sand Creek-DS-1
				21.51
				0

#### CROSS SECTION

RIVER: EXCH  
 REACH: EX CHANNEL RS: 1000



INPUT  
Description:  
Station Elevation Data num= 78  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
Elev  
0 6261.8 1.46 6261.8 3.02 6261.7 4.57 6261.6 5  
6261.5  
5.14 6261.4 5.29 6261.3 5.43 6261.2 5.58 6261.1 5.72  
6261  
5.87 6260.9 6.01 6260.8 6.16 6260.7 6.3 6260.6 6.45  
6260.5  
6.59 6260.4 6.75 6260.3 6.93 6260.2 7.11 6260.1 7.29  
6260  
7.47 6259.9 7.64 6259.8 7.82 6259.7 8 6259.6 8.53  
6259.5  
9.15 6259.4 9.77 6259.3 10.4 6259.2 11.2 6259.1 12.62  
6259  
19.64 6259 19.81 6259.1 19.98 6259.2 20.15 6259.3 20.32  
6259.4  
20.49 6259.5 20.66 6259.6 20.85 6259.7 21.03 6259.8 21.21  
6259.9  
21.39 6260 21.57 6260.1 21.76 6260.2 21.94 6260.3 22.12  
6260.4  
22.3 6260.5 22.49 6260.6 22.67 6260.7 22.85 6260.8 23.03  
6260.9  
23.22 6261 23.41 6261.1 23.6 6261.2 23.8 6261.3 23.99  
6261.4  
24.19 6261.5 24.38 6261.6 24.54 6261.7 24.7 6261.8 24.86  
6261.9  
25.02 6262 25.18 6262.1 25.34 6262.2 25.5 6262.3 25.66  
6262.4  
25.83 6262.5 25.99 6262.6 26.15 6262.7 26.31 6262.8 26.47  
6262.9  
26.63 6263 26.79 6263.1 26.95 6263.2 27.11 6263.3 27.27  
6263.4  
27.44 6263.5 27.95 6263.6 28.88 6263.6  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 5 .013 23.99 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 5 23.99 284.89 284.89 284.89 .1  
.3

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft) 6260.46 Element Left OB  
Channel Right OB  
Vel Head (ft) 0.43 Wt. n-Val.  
0.013  
W. S. Elev (ft) 6260.04 Reach Len. (ft) 284.89

284.89 284.89  
Crit W. S. (ft) 6260.04 Flow Area (sq ft)  
12.01  
E. G. Slope (ft/ft) 0.002746 Area (sq ft)  
12.01  
Q Total (cfs) 63.00 Flow (cfs)  
63.00  
Top Width (ft) 14.23 Top Width (ft)  
14.23  
Vel Total (ft/s) 5.24 Avg. Vel. (ft/s)  
5.24  
Max Chl Dpth (ft) 1.04 Hydr. Depth (ft)  
0.84  
Conv. Total (cfs) 1202.3 Conv. (cfs)  
1202.3  
Length Wtd. (ft) 284.89 Wetted Per. (ft)  
14.66  
Min Ch El (ft) 6259.00 Shear (lb/sq ft)  
0.14  
Alpha 1.00 Stream Power (lb/ft s) 28.88  
0.00 0.00  
Frctn Loss (ft) 0.10 Cum Volume (acre-ft)  
0.24  
C & E Loss (ft) 0.12 Cum SA (acres)  
0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.  
This may indicate the need for additional cross sections.  
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

#### CROSS SECTION

RIVER: EXCH  
REACH: EX CHANNEL RS: 999

INPUT  
Description:  
Station Elevation Data num= 196  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev



0	6256.3	.04	6256.3	.34	6256.2	.63	6256.1	.93
6256	1.22	6255.9	1.52	6255.8	1.81	6255.7	2.1	6255.6
6255.5	2.52	6255.4	2.73	6255.3	2.94	6255.2	3.15	6255.1
6255	3.56	6254.9	3.77	6254.8	3.98	6254.7	4.19	6254.6
6254.5	4.61	6254.4	4.82	6254.3	5.03	6254.2	5.24	6254.1
6254	5.65	6253.9	5.86	6253.8	6.07	6253.7	6.28	6253.6
6253.5	6.7	6253.4	6.91	6253.3	7.11	6253.2	7.32	6253.1
6253	7.74	6252.9	7.95	6252.8	8.16	6252.7	8.37	6252.6
6252.5	8.79	6252.4	8.99	6252.3	9.2	6252.2	9.41	6252.1
6252	9.83	6251.9	10.04	6251.8	10.25	6251.7	10.46	6251.6
6251.5	10.87	6251.4	11.08	6251.3	11.29	6251.2	11.5	6251.1
6251	11.92	6250.9	12.13	6250.8	12.41	6250.7	12.7	6250.6
6250.5	13.29	6250.4	13.59	6250.3	13.88	6250.2	14.18	6250.1
6250	14.74	6249.9	14.93	6249.8	15.12	6249.7	15.32	6249.6
6249.5	15.7	6249.4	15.9	6249.3	16.09	6249.2	16.11	6249.2
6249.3	16.64	6249.4	16.9	6249.5	17.17	6249.6	17.43	6249.7
6249.75	17.7	6249.8	17.97	6249.9	18.27	6250	18.6	6250.1
6250.2	19.26	6250.3	19.6	6250.4	19.87	6250.5	20.03	6250.6
6250.7	20.36	6250.8	20.53	6250.9	20.69	6251	20.86	6251.1
6251.2	21.19	6251.3	21.35	6251.4	21.52	6251.5	21.68	6251.6
6251.7	22.02	6251.8	22.18	6251.9	22.35	6252	22.51	6252.1
6252.2	22.84	6252.3	23.01	6252.4	23.17	6252.5	23.34	6252.6
6252.7	23.67	6252.8	23.83	6252.9	24	6253	24.17	6253.1
6253.2	24.5	6253.3	24.66	6253.4	24.83	6253.5	24.99	6253.6
6253.7	25.32	6253.8	25.49	6253.9	25.65	6254	25.82	6254.1
6254.2	26.15	6254.3	26.32	6254.4	26.48	6254.5	26.65	6254.6
6254.7	26.98	6254.8	27.14	6254.9	27.31	6255	27.47	6255.1
6255.2								

27.8	6255.3	27.97	6255.4	28.13	6255.5	28.3	6255.6	28.47
6255.7	28.63	6255.8	28.8	6255.9	28.96	6256	29.13	6256.1
6256.2	29.46	6256.3	29.62	6256.4	29.79	6256.5	29.95	6256.6
6256.7	30.28	6256.8	30.45	6256.9	30.62	6257	30.78	6257.1
6257.2	31.11	6257.3	31.28	6257.4	31.44	6257.5	31.61	6257.6
6257.7	31.94	6257.8	32.1	6257.9	32.27	6258	32.43	6258.1
6258.2	32.76	6258.3	32.93	6258.4	33.1	6258.5	33.26	6258.6
6258.7	33.59	6258.8	33.76	6258.9	33.92	6259	34.09	6259.1
6259.2	34.42	6259.3	34.58	6259.4	34.75	6259.5	34.91	6259.6
6259.7	35.25	6259.8	35.41	6259.9	35.58	6260	35.74	6260.1
6260.2	36.07	6260.3	36.24	6260.4	36.4	6260.5	36.57	6260.6
6260.7	36.95	6260.8	37.16	6260.9	37.37	6261	38.47	6261.1
6261.2	46.94	6261.2						

Manning's	n	Values		num=	3	
Sta	n	Val	Sta	n	Val	
0	.03	.34	.03	37.37	.03	

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.	.34	37.37		0	0	0		.1
	.3							

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6254.45	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.02	Wt. n-Val.	
0.030			
W. S. Elev (ft)	6254.44	Reach Len. (ft)	0.00
0.00	0.00		
Crit W. S. (ft)		Flow Area (sq ft)	
61.12			
E. G. Slope (ft/ft)	0.000127	Area (sq ft)	
61.12			
Q Total (cfs)	63.00	Flow (cfs)	
63.00			
Top Width (ft)	21.85	Top Width (ft)	
21.85			
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	
1.03			



Max Chl Dpth (ft)	5.24	Hydr. Depth (ft)	
2.80			
Conv. Total (cfs)	5597.5	Conv. (cfs)	
5597.5			
Length Wtd. (ft)	0.00	Wetted Per. (ft)	
24.31			
Min Ch El (ft)	6249.20	Shear (lb/sq ft)	
0.02			
Alpha	1.00	Stream Power (lb/ft s)	46.94
0.00	0.00		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	
C & E Loss (ft)	0.13	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

#### CROSS SECTION

RIVER: EXOF  
REACH: EX OVERFLOW RS: 1001

#### INPUT

Description:

Station	Elevation	Data	num=	62	Elev	Sta	Elev	Sta
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								
-27.78	6270.7	-26.94	6270.7	-22.94	6270.6	-19.83	6270.5	-17.18
6270.4								
-14.53	6270.3	-11.88	6270.2	-9.23	6270.1	-6.58	6270	-3.93
6269.9								
-1.28	6269.8	.37	6269.72	.87	6269.7	2.83	6269.6	4.83
6269.5								
6.82	6269.4	8.81	6269.3	10.8	6269.2	11.28	6269.1	11.65
6269								
12.03	6268.9	12.41	6268.8	12.79	6268.7	13.17	6268.6	13.55
6268.5								
13.93	6268.4	14.31	6268.3	14.69	6268.2	14.98	6268.12	15.07
6268.1								
15.45	6268	15.74	6267.9	15.93	6267.8	16.4	6267.7	16.69
6267.7								
16.85	6267.8	17.02	6267.9	17.18	6268	17.35	6268.1	17.51
6268.2								
17.68	6268.3	17.84	6268.4	18.01	6268.5	18.17	6268.6	18.34
6268.7								
18.5	6268.8	18.67	6268.9	18.82	6269	18.98	6269.1	20.23
6269.1								
21.99	6269.2	22.73	6269.3	23.48	6269.4	24.22	6269.5	24.97
6269.6								
25.71	6269.7	26.46	6269.8	27.2	6269.9	27.98	6270	30.04

6270.1					
33.26	6270.2	34.47	6270.2		
Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-27.78	.03	11.28	.013	18.98	.03
Bank Sta:	Left	Right	Lengths:	Left Channel	Right
Expan.					
	11.28	18.98		138.8	138.8
				138.8	138.8
					.1
.3					
Ineffective Flow	num=	1			
Sta L	Sta R	Elev	Permanent		
-27.78	-17.16	6270.42	F		
Left Levee	Station=	-27.1	Elevation=	6270.72	
Right Levee	Station=	30.02	Elevation=	6270.11	

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013	0.030		
W. S. Elev (ft)	6270.16	Reach Len. (ft)	138.80
138.80	138.80		
Crit W. S. (ft)	6267.77	Flow Area (sq ft)	10.11
13.67	6.71		
E. G. Slope (ft/ft)	0.000000	Area (sq ft)	10.11
13.67	6.71		
Q Total (cfs)	0.04	Flow (cfs)	0.00
0.03	0.00		
Top Width (ft)	42.71	Top Width (ft)	22.06
7.70	12.94		
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00	0.00		
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)	0.46
1.78	0.52		
Conv. Total (cfs)	2693.3	Conv. (cfs)	297.5
2182.1	213.7		
Length Wtd. (ft)	138.80	Wetted Per. (ft)	22.09
8.29	13.03		
Min Ch El (ft)	6267.70	Shear (lb/sq ft)	0.00
0.00	0.00		
Alpha	2.67	Stream Power (lb/ft s)	34.47
-27.10	30.02		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.10
0.13	0.05		
C & E Loss (ft)	0.00	Cum SA (acres)	0.10
0.03	0.05		

Warning: The conveyance ratio (upstream conveyance divided by downstream



conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: EXOF

REACH: EX OVERFLOW RS: 1000

#### INPUT

Description:

Station	Elevation	Data	num=	84					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
0	6270.6	.76	6270.6	1.98	6270.5	3.2	6270.4	4.43	
6270.3									
5.65	6270.2	6.87	6270.1	8.1	6270	9.32	6269.9	10.55	
6269.8									
11.86	6269.7	13.18	6269.6	14.51	6269.5	15.84	6269.4	17.16	
6269.3									
19.12	6269.2	21.27	6269.1	22.31	6269.09	35.85	6269	41.17	
6268.9									
41.99	6268.89	43.96	6268.8	47.37	6268.7	48.05	6268.6	48.4	
6268.5									
48.55	6268.4	48.69	6268.3	48.84	6268.2	48.99	6268.1	49.14	
6268									
49.29	6267.9	49.43	6267.8	49.56	6267.7	49.69	6267.6	49.82	
6267.5									
49.96	6267.4	50.09	6267.3	50.22	6267.2	50.35	6267.1	50.48	
6267									
50.61	6266.9	54.45	6266.9	54.6	6267	54.75	6267.1	54.9	
6267.2									
55.06	6267.3	55.21	6267.4	55.36	6267.5	55.51	6267.6	55.67	
6267.7									
55.82	6267.8	55.98	6267.9	56.15	6268	56.31	6268.1	56.48	
6268.2									
56.65	6268.3	56.81	6268.4	57.77	6268.43	60.49	6268.5	62.85	
6268.6									
65.12	6268.7	65.57	6268.8	66.03	6268.9	66.49	6269	66.95	
6269.1									
67.41	6269.2	67.87	6269.3	68.32	6269.4	68.78	6269.5	69.24	
6269.6									
69.7	6269.7	70.36	6269.8	71.11	6269.9	71.85	6270	72.6	
6270.1									
73.77	6270.2	75.1	6270.3	76.43	6270.4	77.87	6270.4	78.31	
6270.3									
78.76	6270.2	79.21	6270.1	79.65	6270	79.81	6270		

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.03		47.37	.013		57.77	.03	
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	47.37	57.77		0	0	0		.1
.3								
Right Levee		Station=	76.07		Elevation=	6270.41		

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6270.16	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.00	Wt. n-Val.	0.030
0.013 0.030			
W. S. Elev (ft)	6270.16	Reach Len. (ft)	47.45
47.45 47.45			
Crit W. S. (ft)	6266.92	Flow Area (sq ft)	39.81
27.04 16.97			
E. G. Slope (ft/ft)	0.000000	Area (sq ft)	39.81
27.04 16.97			
Q Total (cfs)	0.04	Flow (cfs)	0.01
0.03 0.00			
Top Width (ft)	67.13	Top Width (ft)	41.21
10.40 15.51			
Vel Total (ft/s)	0.00	Avg. Vel. (ft/s)	0.00
0.00 0.00			
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)	0.97
2.60 1.09			
Conv. Total (cfs)	8316.8	Conv. (cfs)	1925.4
5504.3 887.1			
Length Wtd. (ft)	47.45	Wetted Per. (ft)	41.26
11.38 15.66			
Min Ch El (ft)	6266.90	Shear (lb/sq ft)	0.00
0.00 0.00			
Alpha	2.87	Stream Power (lb/ft s)	79.81
0.00 76.07			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02
0.06 0.01			
C & E Loss (ft)	0.14	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: OVFL



REACH: Overflow Channel RS: 1000

#### INPUT

Description:

Station	Elevation	Data	num=	78					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6272.5	6.84	6272.5	19.1	6272.4	22.75	6272.3	25.46	
6272.2									
27.63	6272.1	29.8	6272	31.97	6271.9	34.14	6271.8	37.09	
6271.7									
39.72	6271.6	42.88	6271.5	46.38	6271.4	49.92	6271.3	53.46	
6271.2									
56.99	6271.1	60.28	6271	63.46	6270.9	66.65	6270.8	69.84	
6270.7									
71.87	6270.6	73.1	6270.5	75.2	6270.4	77.48	6270.3	78.97	
6270.2									
80.03	6270.1	80.74	6270	80.84	6269.9	80.94	6269.8	81.04	
6269.7									
81.14	6269.6	81.23	6269.5	82.37	6269.5	85.34	6269.6	88.52	
6269.7									
91.88	6269.8	95.58	6269.9	99.28	6270	103.82	6270	111.4	
6269.9									
116.73	6269.8	121.02	6269.8	121.23	6269.9	121.7	6270	122.76	
6270.1									
123.82	6270.2	124.88	6270.3	125.93	6270.4	126.99	6270.5	128.05	
6270.6									
129.1	6270.7	130.16	6270.8	131.15	6270.9	131.5	6271	134.06	
6271.1									
138.53	6271.2	142.99	6271.3	147.45	6271.4	151.27	6271.5	154.7	
6271.6									
156.98	6271.7	159.26	6271.8	161.54	6271.9	163.82	6272	166.1	
6272.1									
168.39	6272.2	170.67	6272.3	172.95	6272.4	175.35	6272.5	177.75	
6272.6									
180.28	6272.7	183.71	6272.8	187.06	6272.9	189.71	6273	192.36	
6273.1									
195.02	6273.2	197.9	6273.3	198.12	6273.3				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	81.14	.016	121.7	.03

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.	81.14	121.7	24.16	24.16	24.16		.1
	.3						

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6271.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.42	Wt. n-Val.	0.030

0.016	0.030		
W. S. Elev (ft)	6270.78	Reach Len. (ft)	24.16
24.16	24.16		
Crit W. S. (ft)	6270.78	Flow Area (sq ft)	4.67
38.30	3.20		
E. G. Slope (ft/ft)	0.003604	Area (sq ft)	4.67
38.30	3.20		
Q Total (cfs)	217.00	Flow (cfs)	6.67
205.26	5.07		
Top Width (ft)	62.59	Top Width (ft)	13.80
40.56	8.23		
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)	1.43
5.36	1.58		
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)	0.34
0.94	0.39		
Conv. Total (cfs)	3614.5	Conv. (cfs)	111.1
3419.0	84.4		
Length Wtd. (ft)	24.16	Wetted Per. (ft)	13.99
40.65	8.27		
Min Ch El (ft)	6269.50	Shear (lb/sq ft)	0.08
0.21	0.09		
Alpha	1.24	Stream Power (lb/ft s)	198.12
0.00	0.00		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.02
0.25	0.01		
C & E Loss (ft)	0.00	Cum SA (acres)	0.01
0.02	0.00		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

#### CROSS SECTION

RIVER: OVFL

REACH: Overflow Channel RS: 999

#### INPUT

Description:

Station	Elevation	Data	num=	67					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6271.5	32.18	6271.5	39.29	6271.4	43.62	6271.3	47.59	
6271.2									
51.08	6271.1	54.32	6271	57.34	6270.9	60.28	6270.8	63.22	
6270.7									



66.16	6270.6	69.11	6270.5	72.05	6270.4	74.52	6270.3	75.88
6270.2								
77.24	6270.1	78.61	6270	80.54	6269.9	82.25	6269.8	83.31
6269.7								
83.7	6269.6	83.8	6269.5	83.9	6269.4	84	6269.3	84.1
6269.2								
84.2	6269.1	85.11	6269.1	86.96	6269.2	90.43	6269.3	94.01
6269.4								
97.72	6269.5	101.43	6269.6	107.82	6269.6	115.44	6269.5	122.9
6269.4								
123.81	6269.4	123.91	6269.5	124	6269.6	124.1	6269.7	124.18
6269.8								
124.25	6269.9	124.47	6270	125.74	6270.1	127.01	6270.2	128.28
6270.3								
129.54	6270.4	130.9	6270.5	132.39	6270.6	133.95	6270.7	136.77
6270.8								
139.6	6270.9	142.43	6271	145.25	6271.1	148.08	6271.2	150.93
6271.3								
154.76	6271.4	158.6	6271.5	162.19	6271.6	164.85	6271.7	167.51
6271.8								
170.17	6271.9	172.83	6272	175.49	6272.1	179.83	6272.2	182.81
6272.3								
185.79	6272.4	186.08	6272.4					

Manning's n	Sta	n Val	Sta	n Val	Sta	n Val
	0	.03	83.31	.016	124.47	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	83.31	124.47		0	0	0	.1
	.3						

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6270.85	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.44	Wt. n-Val.	0.030
0.016 0.030			
W. S. Elev (ft)	6270.41	Reach Len. (ft)	
Crit W. S. (ft)	6270.41	Flow Area (sq ft)	3.71
38.98 1.04			
E. G. Slope (ft/ft)	0.003698	Area (sq ft)	3.71
38.98 1.04			
Q Total (cfs)	217.00	Flow (cfs)	5.26
210.66 1.08			
Top Width (ft)	57.72	Top Width (ft)	11.42
41.16 5.14			
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	1.42
5.40 1.04			
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)	0.32
0.95 0.20			

Conv. Total (cfs)	3568.5	Conv. (cfs)	86.5
3464.2 17.8			
Length Wtd. (ft)		Wetted Per. (ft)	11.44
41.64 5.16			
Min Ch El (ft)	6269.10	Shear (lb/sq ft)	0.07
0.22 0.05			
Alpha	1.15	Stream Power (lb/ft s)	186.08
0.00 0.00			
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.02
0.23 0.01			
C & E Loss (ft)	0.09	Cum SA (acres)	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: A flow split was encountered. The program first calculated the momentum of both channels below the junction. An

energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

#### CROSS SECTION

RIVER: OVFL  
 REACH: Overflow Ch-DS-0 RS: 998

INPUT		Description:		Station Elevation Data		num= 73		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev													
0	6269.5	.23	6269.5	.88	6269.6	1.53	6269.7	2.18					
6269.8													
2.83	6269.9	3.48	6270	4.13	6270.1	4.78	6270.2	5.42					
6270.3													
6.07	6270.4	6.71	6270.5	7.35	6270.6	7.85	6270.68	8.01					
6270.7													
8.5	6270.7	8.6	6270.6	8.7	6270.5	8.8	6270.4	8.9					
6270.3													
9	6270.2	9.1	6270.1	9.2	6270	9.3	6269.9	9.4					
6269.8													
9.5	6269.7	9.6	6269.6	9.7	6269.5	9.8	6269.4	9.9					



6269.3  
 10 6269.2 10.1 6269.1 10.2 6269 10.3 6268.9 10.4  
 6268.8  
 10.5 6268.7 10.6 6268.6 10.7 6268.5 10.79 6268.4 10.89  
 6268.3  
 10.99 6268.2 11.09 6268.1 11.19 6268 14.2 6267.9 22.78  
 6267.8  
 30.95 6267.7 34.7 6267.65 39.11 6267.6 48.43 6267.5 53.38  
 6267.5  
 53.48 6267.6 53.58 6267.7 53.68 6267.8 53.78 6267.9 53.88  
 6268  
 53.98 6268.1 54.08 6268.2 54.17 6268.3 54.27 6268.4 54.37  
 6268.5  
 54.47 6268.6 54.57 6268.7 54.67 6268.8 54.78 6268.9 54.9  
 6269  
 55.02 6269.1 55.14 6269.2 55.25 6269.3 55.28 6269.32 55.37  
 6269.4  
 60.11 6269.4 65.13 6269.3 65.96 6269.3

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .03 7.85 .013 55.28 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 7.85 55.28 132.75 132.75 132.75 .1  
 .3

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 7.62 6270.67 F  
 58.63 65.96 6270.22 F  
 Left Levee Station= 8.46 Elevation= 6270.7  
 Right Levee Station= 55.55 Elevation= 6270.2

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.51	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.13	Wt. n-Val.	
0.013 0.000			
W. S. Elev (ft)	6269.38	Reach Len. (ft)	132.75
132.75 132.75			
Crit W. S. (ft)	6268.61	Flow Area (sq ft)	
73.99 0.00			
E. G. Slope (ft/ft)	0.000357	Area (sq ft)	
73.99 0.00			
Q Total (cfs)	216.98	Flow (cfs)	
216.98 0.00			
Top Width (ft)	45.53	Top Width (ft)	
45.46 0.07			
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	
2.93 0.07			
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)	

1.63 0.03			
Conv. Total (cfs)	11480.7	Conv. (cfs)	
11480.7 0.0			
Length Wtd. (ft)	132.75	Wetted Per. (ft)	
46.77 0.09			
Min Ch El (ft)	6267.50	Shear (lb/sq ft)	
0.04			
Alpha	1.00	Stream Power (lb/ft s)	65.96
8.46 55.55			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.02
0.41 0.01			
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.14 0.00			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: OVFL  
 REACH: Overflow Ch-DS-0 RS: 997

#### INPUT

Description:

Station	Elevation	Data	num=	87					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
-7.48	6270.1	-6.96	6270.1	-4.51	6270	-2.05	6269.9	1.62	
6269.8									
4.68	6269.7	7.62	6269.6	11.47	6269.5	12.12	6269.4	12.77	
6269.3									
13.37	6269.2	13.91	6269.1	14.45	6269	14.88	6268.92	14.99	
6268.9									
15.33	6268.8	15.61	6268.7	15.88	6268.6	16.16	6268.5	16.44	
6268.4									
16.71	6268.3	16.99	6268.2	17.27	6268.1	17.55	6268	17.82	
6267.9									
18.1	6267.8	18.38	6267.7	18.65	6267.6	18.93	6267.5	19.21	
6267.4									
19.48	6267.3	19.76	6267.2	20.04	6267.1	20.31	6267	20.59	
6266.9									
20.87	6266.8	21.15	6266.7	21.42	6266.6	21.7	6266.5	21.98	
6266.4									
22.25	6266.3	42.77	6266.3	42.95	6266.4	43.14	6266.5	43.32	
6266.6									



43.5	6266.7	43.69	6266.8	43.87	6266.9	44.06	6267	44.24
6267.1								
44.43	6267.2	44.61	6267.3	44.8	6267.4	44.98	6267.5	45.17
6267.6								
45.35	6267.7	45.54	6267.8	45.72	6267.9	45.91	6268	46.09
6268.1								
46.28	6268.2	46.46	6268.3	46.65	6268.4	46.83	6268.5	47
6268.6								
47.17	6268.7	47.35	6268.8	47.52	6268.9	47.69	6269	47.98
6269.1								
48.27	6269.2	48.56	6269.3	48.85	6269.4	49.14	6269.5	49.43
6269.6								
60.99	6269.7	76.9	6269.7	80.09	6269.6	83.27	6269.5	86.45
6269.4								
89.64	6269.3	92.82	6269.2	96	6269.1	99.18	6269	102.37
6268.9								
105.55	6268.8	106.52	6268.8					

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
-7.48	.03	14.88	.033
		47.69	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	14.88	47.69		24.72	24.72		.1

Left Levee	Station=	11.26	Elevation=	6269.52
Right Levee	Station=	49.45	Elevation=	6269.62

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.43	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.11	Wt. n-Val.	0.030
0.033 0.030			
W. S. Elev (ft)	6269.32	Reach Len. (ft)	24.72
24.72 24.72			
Crit W. S. (ft)	6267.74	Flow Area (sq ft)	0.45
82.84 0.15			
E. G. Slope (ft/ft)	0.001027	Area (sq ft)	0.45
82.84 0.15			
Q Total (cfs)	216.98	Flow (cfs)	0.24
216.67 0.07			
Top Width (ft)	36.02	Top Width (ft)	2.27
32.81 0.94			
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.53
2.62 0.45			
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)	0.20
2.52 0.16			
Conv. Total (cfs)	6769.7	Conv. (cfs)	7.4
6760.2 2.2			
Length Wtd. (ft)	24.72	Wetted Per. (ft)	2.30
33.96 1.00			

Min Ch El (ft)	6266.30	Shear (lb/sq ft)	0.01
0.16 0.01			
Alpha	1.01	Stream Power (lb/ft s)	106.52
11.26 49.45			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.02
0.18 0.01			
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.02 0.00			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: OVFL  
 REACH: Overflow Ch-DS-0 RS: 996

INPUT									
Description:									
Station	Elevation	Data	num=	92					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6270.1	.51	6270.1	2.27	6270	3.98	6269.9	5.59	
6269.8									
7.14	6269.7	8.3	6269.62	8.61	6269.6	9.99	6269.5	11.27	
6269.4									
12.41	6269.3	13.29	6269.2	13.95	6269.1	14.62	6269	15.29	
6268.9									
15.96	6268.8	16.63	6268.7	17.29	6268.6	17.96	6268.5	18.63	
6268.4									
19.3	6268.3	19.96	6268.2	20.63	6268.1	21.3	6268	21.97	
6267.9									
22.64	6267.8	23.3	6267.7	23.97	6267.6	24.64	6267.5	25.31	
6267.4									
25.97	6267.3	26.64	6267.2	27.31	6267.1	27.98	6267	28.64	
6266.9									
29.31	6266.8	29.98	6266.7	30.65	6266.6	31.32	6266.5	32.03	
6266.4									
32.68	6266.3	33.18	6266.2	33.48	6266.1	33.5	6266.09	33.76	
6266									
44.74	6266	46.04	6266.01	54.05	6266.1	54.24	6266.2	54.43	
6266.3									
54.61	6266.4	54.8	6266.5	55.01	6266.6	55.24	6266.7	55.47	
6266.8									
55.7	6266.9	55.94	6267	56.17	6267.1	56.42	6267.2	56.66	
6267.3									
56.91	6267.4	57.15	6267.5	57.39	6267.6	57.64	6267.7	57.88	
6267.8									
58.13	6267.9	58.37	6268	58.61	6268.1	58.86	6268.2	59.1	
6268.3									
59.35	6268.4	59.55	6268.48	59.65	6268.5	59.77	6268.54	59.93	



6268.6  
60.25 6268.7 60.57 6268.8 60.89 6268.9 61.21 6269 61.54  
6269.1  
61.86 6269.2 62.18 6269.3 62.5 6269.4 62.82 6269.5 63.17  
6269.6  
63.52 6269.7 63.86 6269.8 63.87 6269.8 89.81 6269.9 92.55  
6269.9  
96.31 6269.8 99.26 6269.8

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 8.3 .033 63.87 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan.  
8.3 63.87 0 0 0 .1  
.3  
Left Levee Station= 8 Elevation= 6269.44  
Right Levee Station= 63.57 Elevation= 6269.81

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.40	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.06	Wt. n-Val.	
0.033			
W. S. Elev (ft)	6269.34	Reach Len. (ft)	41.97
41.97 41.97			
Crit W. S. (ft)	6267.42	Flow Area (sq ft)	
113.85			
E. G. Slope (ft/ft)	0.000618	Area (sq ft)	
113.85			
Q Total (cfs)	216.98	Flow (cfs)	
216.98			
Top Width (ft)	50.35	Top Width (ft)	
50.35			
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	
1.91			
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)	
2.26			
Conv. Total (cfs)	8728.4	Conv. (cfs)	
8728.4			
Length Wtd. (ft)	41.97	Wetted Per. (ft)	
51.24			
Min Ch El (ft)	6266.00	Shear (lb/sq ft)	
0.09			
Alpha	1.00	Stream Power (lb/ft s)	99.26
8.00 63.57			
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.02
0.12 0.01			
C & E Loss (ft)	0.07	Cum SA (acres)	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
REACH: Sand Creek RS: 998

INPUT  
Description:  
Station Elevation Data num= 188  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev 0 6276 2.83 6276 8.14 6275.9 12.24 6275.8 15.07  
6275.7  
17.89 6275.6 20.47 6275.5 23.14 6275.4 25.83 6275.3 26.69  
6275.3  
29.72 6275.4 31.86 6275.5 33.06 6275.5 34.7 6275.4 36.78  
6275.3  
38.93 6275.2 41.52 6275.1 45.56 6275 49.56 6274.9 53.5  
6274.8  
57.44 6274.7 61.39 6274.6 65.33 6274.5 69.1 6274.4 72.71  
6274.3  
76.33 6274.2 80.3 6274.1 84.26 6274 88.23 6273.9 92.19  
6273.8  
96.16 6273.7 100.12 6273.6 102.29 6273.5 104.02 6273.4 105.74  
6273.3  
107.47 6273.2 109.19 6273.1 110.91 6273 112.64 6272.9 114.36  
6272.8  
116.09 6272.7 117.81 6272.6 119.77 6272.5 121.72 6272.4 124.95  
6272.3  
128.22 6272.2 129.6 6272.1 130.73 6272 131.86 6271.9 133  
6271.8  
134.13 6271.7 134.45 6271.6 134.69 6271.5 134.93 6271.4 135.19  
6271.3  
135.45 6271.2 135.7 6271.1 135.96 6271 136.22 6270.9 136.48  
6270.8  
136.74 6270.7 137 6270.6 137.26 6270.5 137.52 6270.4 137.78  
6270.3  
138.04 6270.2 138.3 6270.1 138.56 6270 138.81 6269.9 139.07  
6269.8  
139.33 6269.7 139.59 6269.6 139.81 6269.5 140.01 6269.4 140.22  
6269.3  
140.42 6269.2 140.62 6269.1 140.83 6269 141.03 6268.9 141.24  
6268.8  
141.44 6268.7 141.65 6268.6 141.83 6268.5 142.01 6268.4 142.19  
6268.3  
142.38 6268.2 142.56 6268.1 142.74 6268 142.92 6267.9 143.1  
6267.8



143.29	6267.7	143.47	6267.6	143.62	6267.5	143.77	6267.4	143.92
6267.3								
144.06	6267.2	144.21	6267.1	144.36	6267	144.51	6266.9	144.65
6266.8								
144.8	6266.7	144.95	6266.6	145.09	6266.5	145.24	6266.4	145.39
6266.3								
145.52	6266.2	145.65	6266.1	145.79	6266	145.92	6265.9	146.05
6265.8								
146.19	6265.7	146.32	6265.6	150.01	6265.52	151.21	6265.5	152.65
6265.5								
153.56	6265.6	153.71	6265.7	153.87	6265.8	154.03	6265.9	154.18
6266								
154.34	6266.1	154.5	6266.2	154.65	6266.3	154.81	6266.4	154.97
6266.5								
155.12	6266.6	155.27	6266.7	155.42	6266.8	155.57	6266.9	155.73
6267								
155.88	6267.1	156.03	6267.2	156.18	6267.3	156.33	6267.4	156.48
6267.5								
156.63	6267.6	156.81	6267.7	156.98	6267.8	157.16	6267.9	157.34
6268								
157.51	6268.1	157.69	6268.2	157.86	6268.3	158.04	6268.4	158.21
6268.5								
158.39	6268.6	158.56	6268.7	158.74	6268.8	158.92	6268.9	159.09
6269								
159.27	6269.1	159.44	6269.2	159.62	6269.3	159.79	6269.4	159.97
6269.5								
160.54	6269.6	162.69	6269.7	165.02	6269.8	167.45	6269.9	169.96
6270								
172.48	6270.1	175.02	6270.2	177.57	6270.3	180.12	6270.4	182.67
6270.5								
185.22	6270.6	187.77	6270.7	190.31	6270.8	192.86	6270.9	195.41
6271								
197.96	6271.1	200.49	6271.2	203.01	6271.3	205.54	6271.4	208.06
6271.5								
211.16	6271.6	215.04	6271.7	219.38	6271.8	224.24	6271.9	232.83
6272								
253.5	6272.1	276.06	6272.1	286.06	6272	290.37	6271.9	293.51
6271.8								
296.08	6271.7	298.25	6271.6	300	6271.6			

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	139.07	.013
		160.54	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	139.07	160.54		33.99	33.99	.1

Left Levee	Station=	45.54	Elevation=	6275.08
Right Levee	Station=	232.75	Elevation=	6272.02

CROSS SECTION OUTPUT Profile #Flow 1

E.G. Elev (ft)	6272.28	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.39	Wt. n-Val.	0.030
0.013	0.030		
W.S. Elev (ft)	6270.89	Reach Len. (ft)	33.99
33.99	33.99		
Crit W.S. (ft)	6270.89	Flow Area (sq ft)	1.53
82.03	20.23		
E.G. Slope (ft/ft)	0.001362	Area (sq ft)	1.53
82.03	20.23		
Q Total (cfs)	820.00	Flow (cfs)	1.78
791.01	27.21		
Top Width (ft)	56.32	Top Width (ft)	2.82
21.47	32.03		
Vel Total (ft/s)	7.90	Avg. Vel. (ft/s)	1.16
9.64	1.34		
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)	0.54
3.82	0.63		
Conv. Total (cfs)	22217.5	Conv. (cfs)	48.2
21432.0	737.2		
Length Wtd. (ft)	33.99	Wetted Per. (ft)	3.02
23.74	32.06		
Min Ch El (ft)	6265.50	Shear (lb/sq ft)	0.04
0.29	0.05		
Alpha	1.44	Stream Power (lb/ft s)	300.00
45.54	232.75		
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00
0.11	0.04		
C & E Loss (ft)	0.04	Cum SA (acres)	0.00
0.02	0.03		

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek RS: 993

## INPUT

Description:

Station	Elevation	Data	num=	235	Elev	Sta	Elev	Sta	Elev	Sta
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta



El ev									
0	6275. 9	1. 05	6275. 9	2. 47	6275. 8	3. 9	6275. 7	5. 33	
6275. 6									
23. 88	6275. 6	31. 7	6275. 5	33	6275. 4	34. 29	6275. 3	35. 59	
6275. 2									
36. 89	6275. 1	38. 18	6275	39. 48	6274. 9	40. 78	6274. 8	42. 08	
6274. 7									
43. 77	6274. 6	45. 56	6274. 5	47. 35	6274. 4	49. 19	6274. 3	51. 35	
6274. 2									
53. 57	6274. 1	54. 72	6274. 2	56. 01	6274	57. 87	6273. 9	60. 22	
6273. 8									
63. 01	6273. 8	66. 37	6273. 9	66. 49	6273. 9	72. 12	6274	72. 36	
6274. 1									
75. 96	6274. 1	78. 03	6274. 2	80. 09	6274. 3	82. 15	6274. 4	84. 22	
6274. 5									
86. 28	6274. 6	88. 34	6274. 7	90. 4	6274. 8	91. 31	6274. 9	91. 53	
6275									
91. 76	6275. 1	91. 98	6275. 2	92. 44	6275. 2	94. 3	6275. 1	96. 17	
6275									
98. 04	6274. 9	99. 9	6274. 8	101. 77	6274. 7	103. 63	6274. 6	105. 48	
6274. 5									
107. 29	6274. 4	109. 11	6274. 3	110. 92	6274. 2	112. 74	6274. 1	114. 55	
6274									
116. 37	6273. 9	118. 18	6273. 8	120	6273. 7	121. 85	6273. 6	123. 79	
6273. 5									
124. 77	6273. 5	124. 89	6273. 6	125	6273. 7	125. 11	6273. 8	125. 42	
6273. 8									
125. 81	6273. 7	126. 19	6273. 6	126. 74	6273. 5	127. 44	6273. 4	128. 15	
6273. 3									
128. 85	6273. 2	129. 56	6273. 1	130. 27	6273	130. 97	6272. 9	131. 73	
6272. 8									
132. 53	6272. 7	133. 34	6272. 6	134. 05	6272. 5	134. 3	6272. 4	134. 55	
6272. 3									
134. 8	6272. 2	135. 05	6272. 1	135. 31	6272	135. 56	6271. 9	135. 81	
6271. 8									
136. 06	6271. 7	136. 31	6271. 6	136. 56	6271. 5	136. 81	6271. 4	137. 06	
6271. 3									
137. 32	6271. 2	137. 57	6271. 1	137. 82	6271	138. 07	6270. 9	138. 32	
6270. 8									
138. 57	6270. 7	138. 82	6270. 6	139. 07	6270. 5	139. 33	6270. 4	139. 58	
6270. 3									
139. 83	6270. 2	140. 08	6270. 1	140. 33	6270	140. 58	6269. 9	140. 84	
6269. 8									
141. 09	6269. 7	141. 34	6269. 6	141. 59	6269. 5	141. 76	6269. 4	141. 92	
6269. 3									
142. 09	6269. 2	142. 25	6269. 1	142. 42	6269	142. 59	6268. 9	142. 75	
6268. 8									
142. 92	6268. 7	143. 09	6268. 6	143. 25	6268. 5	143. 42	6268. 4	143. 58	
6268. 3									
143. 75	6268. 2	143. 92	6268. 1	144. 08	6268	144. 28	6267. 9	144. 48	
6267. 8									
144. 69	6267. 7	144. 89	6267. 6	145. 09	6267. 5	145. 26	6267. 4	145. 42	
6267. 3									
145. 59	6267. 2	145. 76	6267. 1	145. 92	6267	146. 09	6266. 9	146. 26	

6266. 8									
146. 42	6266. 7	146. 59	6266. 6	146. 76	6266. 5	146. 92	6266. 4	147. 09	
6266. 3									
147. 25	6266. 2	147. 38	6266. 1	147. 51	6266	147. 64	6265. 9	147. 81	
6265. 8									
147. 97	6265. 7	148. 14	6265. 6	148. 31	6265. 5	148. 47	6265. 4	150. 16	
6265. 3									
151. 95	6265. 2	152. 65	6265. 2	153. 99	6265. 3	155. 38	6265. 4	155. 71	
6265. 5									
155. 88	6265. 6	156. 05	6265. 7	156. 22	6265. 8	156. 39	6265. 9	156. 57	
6266									
156. 74	6266. 1	156. 9	6266. 2	157. 06	6266. 3	157. 21	6266. 4	157. 37	
6266. 5									
157. 54	6266. 6	157. 71	6266. 7	157. 88	6266. 8	158. 05	6266. 9	158. 22	
6267									
158. 39	6267. 1	158. 56	6267. 2	158. 74	6267. 3	158. 91	6267. 4	159. 08	
6267. 5									
159. 25	6267. 6	159. 42	6267. 7	159. 59	6267. 8	159. 76	6267. 9	159. 93	
6268									
160. 1	6268. 1	160. 27	6268. 2	160. 44	6268. 3	160. 61	6268. 4	160. 79	
6268. 5									
160. 96	6268. 6	161. 13	6268. 7	161. 55	6268. 7	163. 9	6268. 8	166. 25	
6268. 9									
168. 6	6269	170. 95	6269. 1	172. 4	6269. 2	172. 82	6269. 3	173. 25	
6269. 4									
173. 67	6269. 5	174. 83	6269. 6	177. 34	6269. 7	179. 87	6269. 8	183. 68	
6269. 9									
187. 5	6270	191. 32	6270. 1	195. 14	6270. 2	198. 98	6270. 3	202. 82	
6270. 4									
205. 93	6270. 5	207. 75	6270. 6	209. 56	6270. 7	211. 38	6270. 8	213. 19	
6270. 9									
215. 01	6271	216. 82	6271. 1	218. 63	6271. 2	220. 45	6271. 3	223. 18	
6271. 3									
226. 6	6271. 2	230. 01	6271. 1	233. 43	6271	236. 64	6270. 9	239. 76	
6270. 8									
242. 89	6270. 7	246. 02	6270. 6	249. 15	6270. 5	252. 27	6270. 4	260. 61	
6270. 4									
284. 15	6270. 5	286. 02	6270. 6	287. 88	6270. 7	289. 75	6270. 8	291. 61	
6270. 9									
293. 48	6271	295. 35	6271. 1	297. 21	6271. 2	299. 81	6271. 3	300. 27	
6271. 3									
Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	. 03	142. 92	. 013	160. 96	. 03				
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.									
Expan.	142. 92	160. 96		40. 51	40. 51	40. 51			. 1
. 3									
Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent						
0	90. 77	6274. 92	F						
225. 62	300. 27	6271. 28	F						



Left Levee Station= 92.44 Elevation= 6275.22  
 Right Levee Station= 221.44 Elevation= 6271.34

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6272.00	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.26	Wt. n-Val.	0.030
0.013 0.030			
W. S. Elev (ft)	6270.74	Reach Len. (ft)	26.69
26.69 26.69			
Crit W. S. (ft)	6270.74	Flow Area (sq ft)	4.11
78.94 45.19			
E. G. Slope (ft/ft)	0.001080	Area (sq ft)	4.11
78.94 45.19			
Q Total (cfs)	820.00	Flow (cfs)	5.94
744.73 69.33			
Top Width (ft)	71.77	Top Width (ft)	4.44
18.04 49.29			
Vel Total (ft/s)	6.39	Avg. Vel. (ft/s)	1.45
9.43 1.53			
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)	0.92
4.38 0.92			
Conv. Total (cfs)	24955.3	Conv. (cfs)	180.7
22664.8 2109.9			
Length Wtd. (ft)	26.69	Wetted Per. (ft)	4.90
19.83 49.39			
Min Ch El (ft)	6265.20	Shear (lb/sq ft)	0.06
0.27 0.06			
Alpha	1.98	Stream Power (lb/ft s)	300.27
92.44 221.44			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00
0.05 0.01			
C & E Loss (ft)	0.01	Cum SA (acres)	

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0 RS: 992

INPUT

Description:

Station	Elevation	Data	num=	234					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6275.2	24.42	6275.2	28.89	6275.1	33.36	6275	37.83	
6274.9									
42.3	6274.8	46.77	6274.7	51.24	6274.6	52.72	6274.5	52.82	
6274.4									
52.93	6274.3	53.04	6274.2	53.15	6274.1	56.09	6274.1	57.83	
6274.2									
59.57	6274.3	65.43	6274.3	83.8	6274.2	90.51	6274.1	92.85	
6274									
95.19	6273.9	97.53	6273.8	99.87	6273.7	102.22	6273.6	104.56	
6273.5									
106.9	6273.4	109.24	6273.3	111.58	6273.2	113.93	6273.1	116.17	
6273									
118.35	6272.9	120.53	6272.8	121.62	6272.8	122.28	6272.9	122.94	
6273									
123.75	6273.1	124.66	6273.2	125.3	6273.2	125.51	6273.1	125.72	
6273									
125.93	6272.9	126.14	6272.8	126.36	6272.7	126.57	6272.6	126.78	
6272.5									
126.99	6272.4	127.2	6272.3	127.42	6272.2	127.63	6272.1	127.84	
6272									
128.05	6271.9	128.26	6271.8	128.48	6271.7	128.69	6271.6	128.9	
6271.5									
129.11	6271.4	129.43	6271.3	129.77	6271.2	130.07	6271.1	130.38	
6271									
130.68	6270.9	130.99	6270.8	131.29	6270.7	131.6	6270.6	131.9	
6270.5									
132.21	6270.4	132.52	6270.3	132.82	6270.2	133.13	6270.1	133.43	
6270									
133.74	6269.9	134.04	6269.8	134.31	6269.7	134.59	6269.6	134.8	
6269.5									
135.01	6269.4	135.21	6269.3	135.42	6269.2	135.63	6269.1	135.83	
6269									
136.04	6268.9	136.25	6268.8	136.45	6268.7	136.66	6268.6	136.87	
6268.5									
137.07	6268.4	137.28	6268.3	137.49	6268.2	137.69	6268.1	137.9	
6268									
138.11	6267.9	138.31	6267.8	138.52	6267.7	138.73	6267.6	138.93	
6267.5									
139.14	6267.4	139.35	6267.3	139.56	6267.2	139.77	6267.1	139.98	
6267									
140.19	6266.9	140.39	6266.8	140.6	6266.7	140.81	6266.6	141.02	
6266.5									
141.23	6266.4	141.44	6266.3	141.65	6266.2	141.85	6266.1	142.06	
6266									



142.27	6265.9	142.48	6265.8	142.69	6265.7	142.9	6265.6	143.11
6265.5								
143.31	6265.4	143.52	6265.3	143.73	6265.2	143.94	6265.1	144.15
6265								
144.36	6264.9	144.57	6264.8	144.77	6264.7	144.98	6264.6	145.19
6264.5								
145.4	6264.4	145.61	6264.3	156	6264.3	156.25	6264.4	156.5
6264.5								
156.75	6264.6	157	6264.7	157.25	6264.8	157.5	6264.9	157.75
6265								
158	6265.1	158.25	6265.2	158.5	6265.3	158.75	6265.4	159
6265.5								
159.25	6265.6	159.5	6265.7	159.75	6265.8	160	6265.9	160.25
6266								
160.5	6266.1	160.75	6266.2	161	6266.3	161.25	6266.4	161.5
6266.5								
161.75	6266.6	162	6266.7	162.25	6266.8	162.5	6266.9	162.75
6267								
163	6267.1	163.25	6267.2	163.5	6267.3	163.75	6267.4	164
6267.5								
164.25	6267.6	164.5	6267.7	164.75	6267.8	165	6267.9	165.25
6268								
165.5	6268.1	165.75	6268.2	166	6268.3	166.25	6268.4	166.5
6268.5								
166.82	6268.6	167.14	6268.7	167.46	6268.8	167.78	6268.9	168.04
6268.97								
168.18	6269	168.9	6269.1	169.62	6269.2	170.35	6269.3	171.07
6269.4								
171.79	6269.5	172.38	6269.59	172.48	6269.6	172.88	6269.7	173.28
6269.8								
173.68	6269.9	174.08	6270	174.48	6270.1	174.88	6270.2	175.28
6270.3								
175.68	6270.4	176.08	6270.5	176.29	6270.5	177.45	6270.4	178.6
6270.3								
179.76	6270.2	180.91	6270.1	182.06	6270	183.61	6269.9	185.04
6269.8								
186.47	6269.7	187.9	6269.6	189.33	6269.5	190.76	6269.4	192.19
6269.3								
193.63	6269.2	195.06	6269.1	196.49	6269	197.92	6268.9	199.35
6268.8								
200.78	6268.7	202.21	6268.6	218.17	6268.6	249.61	6268.7	252.54
6268.7								
256.2	6268.6	259.87	6268.5	263.53	6268.4	266.25	6268.4	267.2
6268.3								
267.59	6268.3	272.49	6268.4	280.68	6268.5	283.34	6268.6	284.27
6268.7								
285.21	6268.8	286.14	6268.9	290.42	6269	290.56	6269.01	292.54
6269.1								
294.65	6269.2	296.76	6269.3	298.88	6269.4	300.03	6269.4	
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	135.42	.013	168.18	.03			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.						
	135.42	168.18		11.58	11.58	.1
.3						
Ineffective Flow	num=	2				
Sta L	Sta R	Elev	Permanent			
0	59.57	6274.35	F			
169.59	300.03	6269.49	F			
Left Levee	Station=	124.12	Elevation=	6273.2		
Right Levee	Station=	172.46	Elevation=	6269.59		

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.98	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.40	Wt. n-Val.	
0.013			
W.S. Elev (ft)	6268.57	Reach Len. (ft)	11.58
11.58	11.58		
Crit W.S. (ft)	6268.57	Flow Area (sq ft)	
86.27			
E. G. Slope (ft/ft)	0.001829	Area (sq ft)	
86.27			
Q Total (cfs)	820.02	Flow (cfs)	
820.02			
Top Width (ft)	30.02	Top Width (ft)	
30.02			
Vel Total (ft/s)	9.51	Avg. Vel. (ft/s)	
9.51			
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)	
2.87			
Conv. Total (cfs)	19175.6	Conv. (cfs)	
19175.6			
Length Wtd. (ft)	11.58	Wetted Per. (ft)	
31.81			
Min Ch El (ft)	6264.30	Shear (lb/sq ft)	
0.31			
Alpha	1.00	Stream Power (lb/ft s)	300.03
124.12	172.46		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04
0.28	0.01		
C & E Loss (ft)	0.03	Cum SA (acres)	
0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program



defaulted to critical depth.  
Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

# CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0 RS: 991

## INPUT

Description:

Station	Elevation	Data	num=	223					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6275	3.37	6275	12.83	6274.9	17.27	6274.8	21.92	6274.7
28.54	6274.6	35.17	6274.5	41.79	6274.4	48.41	6274.3	55.39	6274.2
62.76	6274.1	81.52	6274	88.28	6273.9	90.62	6273.8	92.95	6273.7
95.29	6273.6	97.63	6273.5	99.97	6273.4	102.3	6273.3	104.64	6273.2
106.98	6273.1	109.32	6273	111.66	6272.9	114.16	6272.8	114.33	6272.8
118.08	6272.7	119.39	6272.7	119.78	6272.8	119.9	6272.7	120.18	6272.9
120.58	6273	121.12	6273	121.28	6272.9	121.44	6272.8	121.6	6272.7
121.75	6272.6	121.91	6272.5	122.07	6272.4	122.23	6272.3	122.38	6272.2
122.54	6272.1	122.7	6272	122.86	6271.9	123.02	6271.8	123.31	6271.7
123.49	6271.6	123.67	6271.5	123.84	6271.4	124.02	6271.3	124.19	6271.2
124.37	6271.1	124.55	6271	124.72	6270.9	124.9	6270.8	125.07	6270.7
125.25	6270.6	125.42	6270.5	125.6	6270.4	125.77	6270.3	125.95	6270.2
126.12	6270.1	126.3	6270	126.47	6269.9	126.65	6269.8	126.83	6269.7
127	6269.6	127.18	6269.5	127.45	6269.4	127.81	6269.3	128.41	6269.2
129.01	6269.1	129.61	6269	130.21	6268.9	130.81	6268.8	131.41	6268.7
132.01	6268.6	132.6	6268.5	133.2	6268.4	133.8	6268.3	134.4	6268.2
135	6268.1	135.6	6268	136.2	6267.9	136.8	6267.8	137.4	6267.7
138	6267.6	138.2	6267.5	138.4	6267.4	138.6	6267.3	138.8	6267.2

139	6267.1	139.2	6267	139.4	6266.9	139.6	6266.8	139.8	6266.7
140	6266.6	140.2	6266.5	140.4	6266.4	140.6	6266.3	140.8	6266.2
141	6266.1	141.2	6266	141.4	6265.9	141.6	6265.8	141.8	6265.7
142	6265.6	142.2	6265.5	142.4	6265.4	142.6	6265.3	142.8	6265.2
143	6265.1	143.2	6265	143.4	6264.9	143.6	6264.8	143.8	6264.7
144	6264.6	144.2	6264.5	144.4	6264.4	144.6	6264.3	144.8	6264.2
145	6264.1	155	6264.1	155.25	6264.2	155.5	6264.3	155.75	6264.4
156	6264.5	156.25	6264.6	156.5	6264.7	156.75	6264.8	157	6264.9
157.25	6265	157.5	6265.1	157.75	6265.2	158	6265.3	158.25	6265.4
158.5	6265.5	158.75	6265.6	159	6265.7	159.25	6265.8	159.5	6265.9
159.75	6266	160	6266.1	160.25	6266.2	160.5	6266.3	160.75	6266.4
161	6266.5	161.25	6266.6	161.5	6266.7	161.75	6266.8	162	6266.9
162.25	6267	162.5	6267.1	162.75	6267.2	163	6267.3	163.25	6267.4
163.5	6267.5	163.75	6267.6	164	6267.7	164.25	6267.8	164.5	6267.9
164.75	6268	165	6268.1	165.25	6268.2	165.5	6268.3	165.75	6268.4
166	6268.5	166.25	6268.6	166.5	6268.7	166.75	6268.8	167	6268.9
167.25	6269	167.5	6269.1	167.75	6269.2	168	6269.3	168.25	6269.4
168.5	6269.5	168.52	6269.5	168.9	6269.6	169.3	6269.7	169.7	6269.8
170.1	6269.9	170.5	6270	170.91	6270.1	171.31	6270.2	171.71	6270.3
172.11	6270.4	172.51	6270.5	173.41	6270.5	174.74	6270.4	176.17	6270.3
177.6	6270.2	179.03	6270.1	180.45	6270	181.88	6269.9	183.31	6269.8
184.74	6269.7	186.17	6269.6	187.6	6269.5	189.02	6269.4	190.45	6269.3
191.88	6269.2	193.31	6269.1	194.74	6269	196.17	6268.9	197.59	6268.8
199.02	6268.7	254.84	6268.7	258.49	6268.6	262.14	6268.5	266.11	6268.5
272.78	6268.6	276.5	6268.7	277.44	6268.8	278.38	6268.9	281.85	6269
284.14	6269.1	286.42	6269.2	288.71	6269.3	290.99	6269.4	293.28	6269.5
295.56	6269.6	297.85	6269.7	300	6269.7				



Manning's n Values num= 3  
Sta n Val Sta n Val  
0 .03 129.01 .013 168.52 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.01 168.52 100 100 100 .1

.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
176.21 300 6269.51 F  
Left Levee Station= 121.34 Elevation= 6273.03  
Right Levee Station= 171.6 Elevation= 6269.54

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.81	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.30	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6268.51	Reach Len. (ft)	100.01
100.01 100.01			
Crit W. S. (ft)	6268.51	Flow Area (sq ft)	
89.57			
E. G. Slope (ft/ft)	0.001850	Area (sq ft)	
89.57			
Q Total (cfs)	820.02	Flow (cfs)	
820.02			
Top Width (ft)	33.50	Top Width (ft)	
33.50			
Vel Total (ft/s)	9.15	Avg. Vel. (ft/s)	
9.15			
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)	
2.67			
Conv. Total (cfs)	19064.6	Conv. (cfs)	
19064.6			
Length Wtd. (ft)	100.01	Wetted Per. (ft)	
35.25			
Min Ch El (ft)	6264.10	Shear (lb/sq ft)	
0.29			
Alpha	1.00	Stream Power (lb/ft s)	300.00
121.34 171.60			
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.04
0.26 0.01			
C & E Loss (ft)	0.16	Cum SA (acres)	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may

indicate the need for additional cross sections.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 990

#### INPUT

Description:  
Station Elevation Data num= 175  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev 0 6271.5 1.25 6271.5 14.06 6271.4 25.09 6271.3 32.78  
6271.2  
39.93 6271.1 46.38 6271 52.82 6270.9 58.95 6270.8 62.24  
6270.7  
74.21 6270.7 86.91 6270.6 87.78 6270.5 88.74 6270.4 89.79  
6270.3  
90.83 6270.2 91.88 6270.1 92.92 6270 93.97 6269.9 95.02  
6269.8  
96.06 6269.7 97.11 6269.6 98.15 6269.5 99.2 6269.4 100.25  
6269.3  
101.29 6269.2 102.34 6269.1 103.39 6269 104.43 6268.9 105.48  
6268.8  
106.52 6268.7 107.57 6268.6 108.62 6268.5 109.85 6268.4 111.35  
6268.3  
112.85 6268.2 114.35 6268.1 115.86 6268 117.29 6267.9 118.15  
6267.8  
119.02 6267.7 119.88 6267.6 120.74 6267.5 121.1 6267.4 121.3  
6267.3  
121.51 6267.2 121.71 6267.1 121.89 6267 123.09 6266.9 128.09  
6266.8  
133.09 6266.7 138 6266.6 138.2 6266.5 138.4 6266.4 138.6  
6266.3  
138.8 6266.2 139 6266.1 139.2 6266 139.4 6265.9 139.6  
6265.8  
139.8 6265.7 140 6265.6 140.2 6265.5 140.4 6265.4 140.6  
6265.3  
140.8 6265.2 141 6265.1 141.2 6265 141.4 6264.9 141.6  
6264.8  
141.8 6264.7 142 6264.6 142.2 6264.5 142.4 6264.4 142.6  
6264.3  
142.8 6264.2 143 6264.1 143.2 6264 143.4 6263.9 143.6  
6263.8  
143.8 6263.7 144 6263.6 144.2 6263.5 144.4 6263.4 144.6  
6263.3



144.8	6263.2	155.3	6263.2	155.6	6263.3	155.9	6263.4	156.21
6263.5								
156.51	6263.6	156.81	6263.7	157.12	6263.8	157.42	6263.9	157.72
6264								
158.03	6264.1	158.33	6264.2	158.63	6264.3	158.94	6264.4	159.24
6264.5								
159.54	6264.6	159.84	6264.7	160.15	6264.8	160.45	6264.9	160.75
6265								
161.05	6265.1	161.35	6265.2	161.65	6265.3	161.95	6265.4	162.25
6265.5								
162.55	6265.6	162.85	6265.7	163.15	6265.8	163.45	6265.9	163.75
6266								
164.05	6266.1	164.35	6266.2	164.65	6266.3	169	6266.4	173.05
6266.5								
173.74	6266.6	174.44	6266.7	175.14	6266.8	175.84	6266.9	176.48
6267								
176.86	6267.1	177.25	6267.2	177.63	6267.3	178.02	6267.4	178.4
6267.5								
178.79	6267.6	179.37	6267.7	179.96	6267.8	180.54	6267.9	181.12
6268								
181.71	6268.1	182.29	6268.2	182.87	6268.3	183.45	6268.4	184.04
6268.5								
184.46	6268.6	184.74	6268.7	185.03	6268.8	185.32	6268.9	185.61
6269								
185.9	6269.1	186.19	6269.2	186.48	6269.3	186.76	6269.4	187.05
6269.5								
187.36	6269.6	187.69	6269.7	188.01	6269.8	195.99	6269.9	215.85
6269.9								
218.42	6269.8	224.13	6269.7	227.95	6269.6	231.78	6269.5	235.6
6269.4								
239.43	6269.3	243.25	6269.2	247.08	6269.1	250.9	6269	254.72
6268.9								
258.55	6268.8	262.37	6268.7	266.2	6268.6	270.02	6268.5	277.32
6268.4								
283.18	6268.3	288.58	6268.2	293.13	6268.1	297.68	6268	300
6268								

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	138	.013
		173.05	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	138	173.05		6.48	6.48	.1

Ineffective Flow		num= 1	
Sta L	Sta R	Elev	Permanent
215.58	300	6269.89	F
Left Levee	Station=	46.79	Elevation= 6271.02
Right Levee	Station=	187.52	Elevation= 6269.82

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6269.30	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.76	Wt. n-Val.	0.030
0.013	0.030		
W. S. Elev (ft)	6268.54	Reach Len. (ft)	6.48
6.48	6.48		
Crit W. S. (ft)	6267.78	Flow Area (sq ft)	35.96
134.30	11.59		
E. G. Slope (ft/ft)	0.000697	Area (sq ft)	35.96
134.30	11.59		
Q Total (cfs)	1037.00	Flow (cfs)	53.09
968.53	15.37		
Top Width (ft)	76.02	Top Width (ft)	29.81
35.05	11.16		
Vel Total (ft/s)	5.70	Avg. Vel. (ft/s)	1.48
7.21	1.33		
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)	1.21
3.83	1.04		
Conv. Total (cfs)	39276.7	Conv. (cfs)	2010.9
36683.5	582.3		
Length Wtd. (ft)	6.48	Wetted Per. (ft)	29.97
36.36	11.35		
Min Ch El (ft)	6263.20	Shear (lb/sq ft)	0.05
0.16	0.04		
Alpha	1.50	Stream Power (lb/ft s)	300.00
46.79	187.52		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02
1.30	0.00		
C & E Loss (ft)	0.06	Cum SA (acres)	0.02
0.41	0.00		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The split flow optimization for the junction failed to converge within the maximum number of iterations. The results from the final iteration were used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 989

#### INPUT

Description:

Station	Elevation	Data	num= 182	Elev	Sta	Elev	Sta	Elev	Sta



6267.7								
170.34	6267.8	171.04	6267.9	171.74	6268	172.43	6268.1	173.13
6268.2								
173.83	6268.3	174.53	6268.4	175.23	6268.5	175.93	6268.6	176.63
6268.7								
177.33	6268.8	178.03	6268.9	178.73	6269	179.42	6269.1	180.12
6269.2								
180.69	6269.3	181.05	6269.4	181.43	6269.5	181.82	6269.6	182.2
6269.7								
182.59	6269.8	182.98	6269.9	191.39	6270	204.28	6270	206.71
6269.9								
208.92	6269.8	211.3	6269.7	213.88	6269.6	216.45	6269.5	219.02
6269.4								
228.83	6269.3	234.72	6269.2	238.8	6269.1	242.62	6269	246.44
6268.9								
250.27	6268.8	254.09	6268.7	257.92	6268.6	261.74	6268.5	265.57
6268.4								
270.75	6268.3	278.05	6268.2	283.72	6268.1	289.19	6268	294.28
6267.9								
299.54	6267.8	300	6267.8					
Manning's n Values			num=	3				
Sta n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.03	138.08	.013	173.13	.03			
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	
Expan.								
	138.08	173.13		43.52	43.52	43.52	.1	
.3								
Ineffective Flow			num=	1				
Sta L	Sta R	Elev	Permanent	F				
205.11	300	6270.01						
Left Levee	Station=	87	Elevation=	6270.5				
Right Levee	Station=	205.11	Elevation=	6270.03				
CROSS SECTION OUTPUT	Profile #Flow 1							
E.G. Elev (ft)		6269.24	Element			Left OB		
Channel Right OB								
Vel Head (ft)		1.32	Wt. n-Val .			0.030		
0.013								
W.S. Elev (ft)		6267.92	Reach Len. (ft)			43.52		
43.52	43.52							
Crit W.S. (ft)		6267.92	Flow Area (sq ft)			22.59		
105.92								
E.G. Slope (ft/ft)		0.001524	Area (sq ft)			22.59		
105.92								
Q Total (cfs)		1037.00	Flow (cfs)			40.93		
996.07								
Top Width (ft)		57.84	Top Width (ft)			24.77		
33.07								
Vel Total (ft/s)		8.07	Avg. Vel. (ft/s)			1.81		
9.40								



Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	0.91
3.20			
Conv. Total (cfs)	26564.5	Conv. (cfs)	1048.4
25516.1			
Length Wtd. (ft)	43.52	Wetted Per. (ft)	24.90
34.62			
Min Ch El (ft)	6263.10	Shear (lb/sq ft)	0.09
0.29			
Alpha	1.31	Stream Power (lb/ft s)	300.00
87.00 205.11			
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.02
1.28 0.00			
C & E Loss (ft)	0.02	Cum SA (acres)	0.01
0.40 0.00			

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 988

#### INPUT

Description:

Station	Elevation	Data	num=	208					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6270.6	15.16	6270.6	28.64	6270.5	31.48	6270.4	34.31	
6270.3									
37.14	6270.2	40.61	6270.1	45.04	6270	49.48	6269.9	53.91	
6269.8									
58.35	6269.7	62.37	6269.6	65.67	6269.5	68.96	6269.4	72.26	
6269.3									
75.56	6269.2	78.85	6269.1	80.91	6269.1	82.11	6269.2	83.3	
6269.3									
84.5	6269.4	85.7	6269.5	86.9	6269.6	88.1	6269.7	90.42	
6269.7									
91.84	6269.6	93.22	6269.5	93.92	6269.4	94.63	6269.3	95.34	
6269.2									

96.05	6269.1	96.76	6269	97.47	6268.9	98.18	6268.8	98.89
6268.7								
99.6	6268.6	100.31	6268.5	101.02	6268.4	101.73	6268.3	102.44
6268.2								
103.13	6268.1	103.79	6268	104.44	6267.9	105.1	6267.8	105.76
6267.7								
106.41	6267.6	107.07	6267.5	107.73	6267.4	108.39	6267.3	109.04
6267.2								
109.7	6267.1	110.36	6267	110.94	6267	111.47	6267.1	112
6267.2								
112.53	6267.3	113.06	6267.4	116.37	6267.4	117.85	6267.3	119.08
6267.2								
120.24	6267.1	120.97	6267	121.56	6266.9	122.14	6266.8	122.72
6266.7								
123.3	6266.6	123.89	6266.5	124.47	6266.4	125.05	6266.3	125.63
6266.2								
126.22	6266.1	126.79	6266	127.32	6265.9	127.91	6265.8	128.41
6265.7								
128.69	6265.6	128.98	6265.5	129.26	6265.4	129.54	6265.3	129.83
6265.2								
130.11	6265.1	130.39	6265	130.68	6264.9	130.96	6264.8	131.24
6264.7								
131.52	6264.6	131.81	6264.5	132.09	6264.4	132.37	6264.3	132.66
6264.2								
132.94	6264.1	133.22	6264	133.51	6263.9	133.79	6263.8	134.07
6263.7								
134.36	6263.6	134.64	6263.5	134.92	6263.4	135.21	6263.3	135.49
6263.2								
135.77	6263.1	136.06	6263	136.34	6262.9	136.62	6262.8	136.91
6262.7								
137.2	6262.6	137.53	6262.5	137.85	6262.4	138.18	6262.3	138.51
6262.2								
138.83	6262.1	139.16	6262	139.49	6261.9	139.81	6261.8	140.14
6261.7								
140.47	6261.6	140.8	6261.5	141.08	6261.4	141.33	6261.3	141.57
6261.2								
141.82	6261.1	142.06	6261	142.31	6260.9	142.56	6260.8	142.8
6260.7								
143.05	6260.6	143.29	6260.5	143.54	6260.4	143.78	6260.3	144.03
6260.2								
144.28	6260.1	144.52	6260	144.77	6259.9	155.29	6259.9	155.59
6260								
155.89	6260.1	156.19	6260.2	156.49	6260.3	156.79	6260.4	157.09
6260.5								
157.39	6260.6	157.69	6260.7	157.99	6260.8	158.29	6260.9	158.59
6261								
158.89	6261.1	159.22	6261.2	159.58	6261.3	159.95	6261.4	160.32
6261.5								
160.69	6261.6	161.06	6261.7	161.43	6261.8	161.8	6261.9	162.17
6262								
162.54	6262.1	162.91	6262.2	163.27	6262.3	163.64	6262.4	164.01
6262.5								
164.38	6262.6	164.75	6262.7	165.12	6262.8	165.49	6262.9	165.86
6263								



166.23	6263.1	166.59	6263.2	166.88	6263.3	167.18	6263.4	167.48
6263.5								
167.78	6263.6	168.08	6263.7	168.38	6263.8	168.68	6263.9	168.98
6264								
169.28	6264.1	169.58	6264.2	169.88	6264.3	170.18	6264.4	170.48
6264.5								
170.78	6264.6	171.07	6264.7	171.37	6264.8	171.67	6264.9	171.97
6265								
172.27	6265.1	172.57	6265.2	172.87	6265.3	173.17	6265.4	173.47
6265.5								
173.77	6265.6	174.07	6265.7	174.37	6265.8	177.25	6265.9	182.25
6266								
187.25	6266.1	214.46	6266.2	218.01	6266.3	221.57	6266.4	225.12
6266.5								
228.67	6266.6	232.22	6266.7	235.77	6266.8	239.33	6266.9	245.92
6266.9								
253.13	6266.8	277.3	6266.7	300	6266.7			

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	133.22	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	133.22	168.08		39.44	39.44	39.44	.1

Ineffective Flow	num=	1
Sta L	Sta R	Elev
0	89.93	6269.72
Left Levee	Station=	91.19
Right Levee	Station=	239.87
		Elevation= 6269.75
		Elevation= 6266.89

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6265.84	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.50	Wt. n-Val.	0.030
0.013	0.030		
W. S. Elev (ft)	6264.34	Reach Len. (ft)	39.44
39.44	39.44		
Crit W. S. (ft)	6264.34	Flow Area (sq ft)	0.16
105.53	0.62		
E. G. Slope (ft/ft)	0.001768	Area (sq ft)	0.16
105.53	0.62		
Q Total (cfs)	1037.00	Flow (cfs)	0.10
1036.32	0.58		
Top Width (ft)	37.75	Top Width (ft)	0.96
34.86	1.92		
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)	0.61
9.82	0.94		
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)	0.17
3.03	0.32		
Conv. Total (cfs)	24661.6	Conv. (cfs)	2.4

24645.4	13.8		
Length Wtd. (ft)	39.44	Wetted Per. (ft)	1.02
36.13	2.03		
Min Ch El (ft)	6259.90	Shear (lb/sq ft)	0.02
0.32	0.03		
Alpha	1.01	Stream Power (lb/ft s)	300.00
91.19	239.87		
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01
1.18	0.00		
C & E Loss (ft)	0.04	Cum SA (acres)	0.00
0.37	0.00		

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 987

INPUT	Description:	Station	Elevation	Data	num=	241								
Elev		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6270.5	5.82	6270.5	9.64	6270.4	13.16	6270.3	16.68						
6270.2														
20.19	6270.1	23.71	6270	27.23	6269.9	30.74	6269.8	34.26						
6269.7														
37.85	6269.6	42.3	6269.5	46.76	6269.4	51.22	6269.3	55.61						
6269.2														
59.93	6269.1	64.25	6269	68.45	6268.9	71.72	6268.8	74.99						
6268.7														
78.26	6268.6	81.53	6268.5	84.8	6268.4	88.08	6268.3	91.35						
6268.2														
94.62	6268.1	98.74	6268	100.58	6267.9	105.05	6267.9	107.62						
6268														
112.49	6268	113.63	6267.9	114.77	6267.8	115.91	6267.7	116.45						
6267.6														
116.65	6267.5	116.85	6267.4	117.05	6267.3	117.25	6267.2	117.43						



6267.1								
117.61	6267	117.78	6266.9	117.95	6266.8	118.13	6266.7	118.31
6266.6								
118.55	6266.5	118.78	6266.4	119.02	6266.3	119.25	6266.2	119.48
6266.1								
119.72	6266	119.95	6265.9	120.17	6265.8	120.39	6265.7	120.6
6265.6								
120.81	6265.5	121.03	6265.4	121.24	6265.3	121.46	6265.2	121.67
6265.1								
121.88	6265	122.1	6264.9	122.31	6264.8	122.53	6264.7	122.74
6264.6								
122.96	6264.5	123.17	6264.4	123.38	6264.3	123.6	6264.2	123.81
6264.1								
124.03	6264	124.24	6263.9	124.45	6263.8	124.67	6263.7	124.88
6263.6								
125.1	6263.5	125.31	6263.4	125.52	6263.3	125.74	6263.2	125.95
6263.1								
126.17	6263	126.38	6262.9	126.6	6262.8	126.81	6262.7	127.02
6262.6								
127.24	6262.5	127.45	6262.4	127.67	6262.3	127.88	6262.2	128.09
6262.1								
128.31	6262	128.52	6261.9	128.74	6261.8	128.95	6261.7	129.17
6261.6								
129.44	6261.5	129.73	6261.4	130.01	6261.3	130.29	6261.2	130.58
6261.1								
130.86	6261	131.14	6260.9	131.43	6260.8	131.71	6260.7	131.99
6260.6								
132.28	6260.5	132.56	6260.4	132.84	6260.3	133.13	6260.2	133.41
6260.1								
133.69	6260	133.98	6259.9	134.26	6259.8	134.54	6259.7	134.83
6259.6								
135.11	6259.5	135.39	6259.4	135.68	6259.3	135.96	6259.2	136.24
6259.1								
136.56	6259	136.88	6258.9	137.21	6258.8	137.54	6258.7	137.86
6258.6								
138.19	6258.5	138.52	6258.4	138.85	6258.3	139.17	6258.2	139.5
6258.1								
139.83	6258	140.2	6257.9	140.66	6257.8	141.13	6257.7	141.6
6257.6								
142.07	6257.5	142.53	6257.4	143	6257.3	143.47	6257.2	143.93
6257.1								
144.4	6257	144.87	6256.9	155.1	6256.9	155.57	6257	156.04
6257.1								
156.5	6257.2	156.97	6257.3	157.44	6257.4	157.9	6257.5	158.37
6257.6								
158.84	6257.7	159.31	6257.8	159.77	6257.9	160.17	6258	160.54
6258.1								
160.91	6258.2	161.28	6258.3	161.65	6258.4	162.02	6258.5	162.39
6258.6								
162.76	6258.7	163.12	6258.8	163.49	6258.9	163.86	6259	164.23
6259.1								
164.6	6259.2	164.93	6259.3	165.23	6259.4	165.53	6259.5	165.83
6259.6								
166.13	6259.7	166.42	6259.8	166.72	6259.9	167.02	6260	167.32

6260.1								
167.62	6260.2	167.92	6260.3	168.22	6260.4	168.52	6260.5	168.82
6260.6								
169.12	6260.7	169.42	6260.8	169.72	6260.9	170.02	6261	170.32
6261.1								
170.61	6261.2	170.91	6261.3	171.21	6261.4	171.51	6261.5	171.81
6261.6								
172.11	6261.7	172.41	6261.8	172.71	6261.9	173.01	6262	173.31
6262.1								
173.61	6262.2	173.91	6262.3	174.21	6262.4	174.82	6262.5	179.82
6262.6								
184.82	6262.7	189.62	6262.8	191.62	6262.9	193.63	6263	195.63
6263.1								
197.63	6263.2	199.64	6263.3	201.64	6263.4	203.65	6263.5	205.65
6263.6								
207.65	6263.7	209.66	6263.8	211.66	6263.9	213.67	6264	216.68
6264.1								
220.23	6264.2	223.78	6264.3	227.33	6264.4	230.89	6264.5	234.44
6264.6								
237.99	6264.7	241.54	6264.8	245.1	6264.9	248.65	6265	258.2
6265								
259.08	6264.9	270.41	6264.8	284.82	6264.7	285.84	6264.6	286.86
6264.5								
287.96	6264.4	289.05	6264.3	289.66	6264.3	291.32	6264.4	292.9
6264.5								
294.42	6264.6	295.85	6264.7	297.2	6264.8	298.5	6264.9	299.7
6265								
300	6265							
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	127.02	.013	173.01	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	127.02	173.01		10.56	10.56	10.56		.1
.3								
Ineffective Flow num= 1								
Sta L	Sta R	Elev	Permanent					
258.72	300	6265.02	F					
Left Levee Station= 112.13 Elevation= 6268.07								
Right Levee Station= 248.25 Elevation= 6265.11								
CROSS SECTION OUTPUT Profile #Flow 1								
E. G. Elev (ft) 6262.45 Element Left OB								
Channel Right OB								
Vel Head (ft) 1.38 Wt. n-Val.								
0.013								
W. S. Elev (ft) 6261.07 Reach Len. (ft) 10.56								
10.56 10.56								
Crit W. S. (ft) 6261.07 Flow Area (sq ft)								
110.06								



E.G. Slope (ft/ft)	0.001807	Area (sq ft)	
110.06			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	39.56	Top Width (ft)	
39.56			
Vel Total (ft/s)	9.42	Avg. Vel. (ft/s)	
9.42			
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)	
2.78			
Conv. Total (cfs)	24393.1	Conv. (cfs)	
24393.1			
Length Wtd. (ft)	10.56	Wetted Per. (ft)	
40.76			
Min Ch El (ft)	6256.90	Shear (lb/sq ft)	
0.30			
Alpha	1.00	Stream Power (lb/ft s)	300.00
112.13	248.25		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
1.08	0.00		
C & E Loss (ft)	0.00	Cum SA (acres)	0.00
0.33	0.00		

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 986

#### INPUT

Description:

Station	Elevation	Data	num=	260					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6269.7	.65	6269.7	1.86	6269.6	23.84	6269.6	41.05	
6269.5									
44.74	6269.4	47.36	6269.3	48.78	6269.2	53.11	6269.1	57.81	
6269									
62.51	6268.9	66.9	6268.8	71.23	6268.7	75.55	6268.6	79.18	
6268.5									
82.45	6268.4	85.72	6268.3	88.99	6268.2	94.38	6268.1	97.79	

6268									
99	6267.9	100.22	6267.8	101.92	6267.7	102.53	6267.7	103.06	
6267.8									
103.58	6267.9	104.51	6267.9	105.21	6267.8	105.91	6267.7	106.61	
6267.6									
107.35	6267.6	109.92	6267.7	112.2	6267.7	113.52	6267.6	115.96	
6267.5									
116.12	6267.4	116.28	6267.3	116.45	6267.2	116.61	6267.1	116.77	
6267									
116.93	6266.9	117.1	6266.8	117.26	6266.7	117.42	6266.6	117.58	
6266.5									
117.77	6266.4	117.98	6266.3	118.19	6266.2	118.4	6266.1	118.61	
6266									
118.81	6265.9	119.02	6265.8	119.23	6265.7	119.44	6265.6	119.65	
6265.5									
119.86	6265.4	120.07	6265.3	120.28	6265.2	120.49	6265.1	120.7	
6265									
120.9	6264.9	121.11	6264.8	121.32	6264.7	121.53	6264.6	121.74	
6264.5									
121.95	6264.4	122.16	6264.3	122.37	6264.2	122.58	6264.1	122.79	
6264									
122.99	6263.9	123.2	6263.8	123.41	6263.7	123.62	6263.6	123.83	
6263.5									
124.04	6263.4	124.25	6263.3	124.46	6263.2	124.67	6263.1	124.87	
6263									
125.08	6262.9	125.29	6262.8	125.5	6262.7	125.71	6262.6	125.92	
6262.5									
126.13	6262.4	126.34	6262.3	126.55	6262.2	126.76	6262.1	126.96	
6262									
127.17	6261.9	127.4	6261.8	127.63	6261.7	127.85	6261.6	128.08	
6261.5									
128.31	6261.4	128.54	6261.3	128.78	6261.2	129.01	6261.1	129.24	
6261									
129.48	6260.9	129.71	6260.8	129.94	6260.7	130.16	6260.6	130.37	
6260.5									
130.59	6260.4	130.8	6260.3	131.01	6260.2	131.23	6260.1	131.44	
6260									
131.66	6259.9	131.87	6259.8	132.08	6259.7	132.3	6259.6	132.51	
6259.5									
132.73	6259.4	132.94	6259.3	133.16	6259.2	133.37	6259.1	133.64	
6259									
133.92	6258.9	134.21	6258.8	134.49	6258.7	134.77	6258.6	135.06	
6258.5									
135.34	6258.4	135.62	6258.3	135.91	6258.2	136.2	6258.1	136.53	
6258									
136.85	6257.9	137.18	6257.8	137.51	6257.7	137.96	6257.6	138.42	
6257.5									
138.89	6257.4	139.36	6257.3	139.82	6257.2	140.29	6257.1	140.76	
6257									
141.22	6256.9	141.69	6256.8	142.16	6256.7	142.62	6256.6	143.09	
6256.5									
143.56	6256.4	144.02	6256.3	144.49	6256.2	144.96	6256.1	155.05	
6256.1									
155.51	6256.2	155.98	6256.3	156.45	6256.4	156.91	6256.5	157.38	



6256.6								
157.85	6256.7	158.31	6256.8	158.78	6256.9	159.25	6257	159.71
6257.1								
160.18	6257.2	160.65	6257.3	161.11	6257.4	161.58	6257.5	162.05
6257.6								
162.5	6257.7	162.87	6257.8	163.24	6257.9	163.61	6258	163.98
6258.1								
164.34	6258.2	164.63	6258.3	164.93	6258.4	165.23	6258.5	165.53
6258.6								
165.83	6258.7	166.13	6258.8	166.43	6258.9	166.73	6259	167.03
6259.1								
167.33	6259.2	167.63	6259.3	167.93	6259.4	168.23	6259.5	168.53
6259.6								
168.82	6259.7	169.12	6259.8	169.42	6259.9	169.72	6260	170.02
6260.1								
170.32	6260.2	170.62	6260.3	170.92	6260.4	171.22	6260.5	171.52
6260.6								
171.82	6260.7	172.12	6260.8	172.42	6260.9	172.71	6261	173.01
6261.1								
173.31	6261.2	173.61	6261.3	173.91	6261.4	174.21	6261.5	174.65
6261.6								
179.62	6261.7	184.62	6261.8	189.66	6261.9	191.12	6261.9	193.08
6261.8								
193.46	6261.8	194.8	6261.9	196.15	6262	197.49	6262.1	198.84
6262.2								
200.18	6262.3	201.53	6262.4	202.87	6262.5	204.22	6262.6	205.6
6262.7								
207.6	6262.8	209.61	6262.9	211.61	6263	213.61	6263.1	215.62
6263.2								
217.62	6263.3	219.63	6263.4	221.63	6263.5	223.63	6263.6	225.64
6263.7								
227.64	6263.8	230.14	6263.9	233.69	6264	237.25	6264.1	240.8
6264.2								
244.35	6264.3	247.9	6264.4	251.46	6264.5	259.74	6264.5	260.62
6264.4								
265.71	6264.3	278.7	6264.2	279.71	6264.1	280.73	6264	281.79
6263.9								
282.89	6263.8	283.98	6263.7	284.71	6263.7	286.37	6263.8	287.98
6263.9								
289.53	6264	291	6264.1	292.43	6264.2	293.78	6264.3	295.1
6264.4								
296.32	6264.5	297.52	6264.6	298.61	6264.7	299.69	6264.8	300
6264.8								

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.03	127.17	.013
			173.01
			.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	127.17	173.01		6.48	6.48	6.48	.1
.3							

Ineffective Flow	num= 1
Sta L	Sta R
	Elev Permanent

260.39	300	6264.57	F
Left Levee	Station=	97.89	Elevation= 6268.05
Right Levee	Station=	251.6	Elevation= 6264.48

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6261.59	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.38	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6260.21	Reach Len. (ft)	6.48
6.48	6.48		
Crit W. S. (ft)	6260.21	Flow Area (sq ft)	
109.84			
E. G. Slope (ft/ft)	0.001807	Area (sq ft)	
109.84			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	39.35	Top Width (ft)	
39.35			
Vel Total (ft/s)	9.44	Avg. Vel. (ft/s)	
9.44			
Max Chl Dpth (ft)	4.11	Hydr. Depth (ft)	
2.79			
Conv. Total (cfs)	24393.3	Conv. (cfs)	
24393.3			
Length Wtd. (ft)	6.48	Wetted Per. (ft)	
40.56			
Min Ch El (ft)	6256.10	Shear (lb/sq ft)	
0.31			
Alpha	1.00	Stream Power (lb/ft s)	300.00
97.89	251.60		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
1.05	0.00		
C & E Loss (ft)	0.00	Cum SA (acres)	0.00
0.32	0.00		

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION



RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 985

INPUT

Description:

Station	Elevation	Data	num=	264					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6269.6	15.95	6269.6	40.63	6269.5	43.87	6269.4	45.29	
6269.3									
46.71	6269.2	48.13	6269.1	52.47	6269	57.17	6268.9	61.88	
6268.8									
66.58	6268.7	71.28	6268.6	75.98	6268.5	80.5	6268.4	84.26	
6268.3									
88.78	6268.2	95.59	6268.1	96.81	6268	98.02	6267.9	99.24	
6267.8									
100.46	6267.7	102.38	6267.6	103.18	6267.6	103.71	6267.7	104.24	
6267.8									
104.76	6267.9	105.82	6267.9	106.52	6267.8	107.22	6267.7	107.92	
6267.6									
108.61	6267.5	111.83	6267.5	115.81	6267.4	115.97	6267.3	116.14	
6267.2									
116.3	6267.1	116.46	6267	116.63	6266.9	116.79	6266.8	116.95	
6266.7									
117.11	6266.6	117.28	6266.5	117.48	6266.4	117.69	6266.3	117.9	
6266.2									
118.11	6266.1	118.32	6266	118.52	6265.9	118.73	6265.8	118.94	
6265.7									
119.15	6265.6	119.36	6265.5	119.57	6265.4	119.78	6265.3	119.99	
6265.2									
120.2	6265.1	120.41	6265	120.61	6264.9	120.82	6264.8	121.03	
6264.7									
121.24	6264.6	121.45	6264.5	121.66	6264.4	121.87	6264.3	122.08	
6264.2									
122.29	6264.1	122.5	6264	122.7	6263.9	122.91	6263.8	123.12	
6263.7									
123.33	6263.6	123.54	6263.5	123.75	6263.4	123.96	6263.3	124.17	
6263.2									
124.38	6263.1	124.58	6263	124.79	6262.9	125	6262.8	125.21	
6262.7									
125.42	6262.6	125.63	6262.5	125.84	6262.4	126.05	6262.3	126.26	
6262.2									
126.47	6262.1	126.67	6262	126.88	6261.9	127.09	6261.8	127.3	
6261.7									
127.51	6261.6	127.72	6261.5	127.93	6261.4	128.14	6261.3	128.35	
6261.2									
128.56	6261.1	128.76	6261	128.97	6260.9	129.18	6260.8	129.39	
6260.7									
129.6	6260.6	129.81	6260.5	130.02	6260.4	130.23	6260.3	130.44	
6260.2									
130.65	6260.1	130.85	6260	131.06	6259.9	131.27	6259.8	131.48	
6259.7									
131.69	6259.6	131.9	6259.5	132.11	6259.4	132.32	6259.3	132.53	
6259.2									

132.73	6259.1	132.94	6259	133.15	6258.9	133.36	6258.8	133.57	
6258.7									
133.78	6258.6	133.99	6258.5	134.2	6258.4	134.41	6258.3	134.62	
6258.2									
134.82	6258.1	135.03	6258	135.24	6257.9	135.45	6257.8	135.66	
6257.7									
135.87	6257.6	136.17	6257.5	136.64	6257.4	137.11	6257.3	137.57	
6257.2									
138.04	6257.1	138.51	6257	138.97	6256.9	139.44	6256.8	139.91	
6256.7									
140.37	6256.6	140.84	6256.5	141.31	6256.4	141.77	6256.3	142.24	
6256.2									
142.71	6256.1	143.17	6256	143.64	6255.9	144.11	6255.8	144.57	
6255.7									
155.43	6255.7	155.89	6255.8	156.36	6255.9	156.83	6256	157.29	
6256.1									
157.76	6256.2	158.23	6256.3	158.69	6256.4	159.16	6256.5	159.63	
6256.6									
160.09	6256.7	160.56	6256.8	161.03	6256.9	161.49	6257	161.96	
6257.1									
162.43	6257.2	162.89	6257.3	163.36	6257.4	163.83	6257.5	164.19	
6257.6									
164.49	6257.7	164.8	6257.8	165.1	6257.9	165.4	6258	165.71	
6258.1									
166.01	6258.2	166.31	6258.3	166.62	6258.4	166.92	6258.5	167.22	
6258.6									
167.53	6258.7	167.83	6258.8	168.13	6258.9	168.43	6259	168.74	
6259.1									
169.04	6259.2	169.34	6259.3	169.65	6259.4	169.95	6259.5	170.25	
6259.6									
170.55	6259.7	170.86	6259.8	171.16	6259.9	171.46	6260	171.77	
6260.1									
172.07	6260.2	172.37	6260.3	172.68	6260.4	172.98	6260.5	173.28	
6260.6									
173.59	6260.7	173.89	6260.8	174.19	6260.9	174.49	6261	178.82	
6261.1									
183.23	6261.2	187.64	6261.3	193.76	6261.3	195.71	6261.2	198.04	
6261.2									
199.38	6261.3	200.73	6261.4	202.07	6261.5	203.42	6261.6	204.77	
6261.7									
206.11	6261.8	207.46	6261.9	208.8	6262	210.15	6262.1	211.49	
6262.2									
212.84	6262.3	214.18	6262.4	215.53	6262.5	216.87	6262.6	218.22	
6262.7									
219.56	6262.8	220.91	6262.9	222.65	6263	224.66	6263.1	226.66	
6263.2									
228.66	6263.3	230.67	6263.4	232.67	6263.5	234.68	6263.6	236.68	
6263.7									
239.22	6263.8	242.77	6263.9	246.33	6264	249.88	6264.1	253.43	
6264.2									
260.61	6264.2	261.49	6264.1	262.38	6264	274.85	6263.9	275.87	
6263.8									
276.88	6263.7	277.91	6263.6	279.01	6263.5	280.1	6263.4	282.8	
6263.4									



284.47 6263.5 286.01 6263.6 287.56 6263.7 289 6263.8 290.43  
6263.9  
291.77 6264 293.08 6264.1 294.32 6264.2 295.52 6264.3 296.66  
6264.4  
297.74 6264.5 298.76 6264.6 299.72 6264.7 300 6264.7

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 127.09 .013 172.98 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 127.09 172.98 24.63 24.63 24.63 .1

.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
262.07 300 6264.03 F  
Left Levee Station= 105.01 Elevation= 6267.95  
Right Levee Station= 260.81 Elevation= 6264.31

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6261.13	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.37	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6259.75	Reach Len. (ft)	24.63
24.63 24.63			
Crit W. S. (ft)	6259.75	Flow Area (sq ft)	
110.26			
E. G. Slope (ft/ft)	0.001786	Area (sq ft)	
110.26			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	39.34	Top Width (ft)	
39.34			
Vel Total (ft/s)	9.41	Avg. Vel. (ft/s)	
9.41			
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)	
2.80			
Conv. Total (cfs)	24536.3	Conv. (cfs)	
24536.3			
Length Wtd. (ft)	24.63	Wetted Per. (ft)	
40.59			
Min Ch El (ft)	6255.70	Shear (lb/sq ft)	
0.30			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.01 260.81			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
1.04 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.00
0.32 0.00			

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 984

INPUT

Description:

Station	Elevation	Data	num=	357	Elev	Sta	Elev	Sta	Elev	Sta
Elev	0	6269.5	38.5	6269.5	40.61	6269.4	42.72	6269.3	43.88	
6269.3	44.42	6269.4	44.96	6269.5	45.51	6269.6	46.05	6269.7	46.59	
6269.8	46.93	6269.8	48.24	6269.7	49.56	6269.6	50.87	6269.5	52.19	
6269.4	53.5	6269.3	54.82	6269.2	56.13	6269.1	57.45	6269	58.76	
6268.9	62.77	6268.8	67.52	6268.7	72.27	6268.6	77.03	6268.5	81.78	
6268.4	88.55	6268.3	90.59	6268.2	91.8	6268.1	93.02	6268	94.23	
6267.9	95.45	6267.8	96.67	6267.7	97.88	6267.6	99.1	6267.5	100.31	
6267.4	101.53	6267.3	104.9	6267.2	105.48	6267.2	106.01	6267.3	106.54	
6267.4	107.07	6267.5	107.59	6267.6	108.12	6267.7	108.65	6267.8	109.18	
6267.9	109.7	6268	110.02	6268	110.72	6267.9	112.49	6267.8	112.98	
6267.7	113.3	6267.6	113.63	6267.5	113.95	6267.4	114.27	6267.3	114.6	
6267.2	114.92	6267.1	115.24	6267	115.57	6266.9	115.86	6266.8	116.05	
6266.7	116.25	6266.6	116.45	6266.5	116.65	6266.4	116.84	6266.3	117.04	
6266.2	117.24	6266.1	117.44	6266	117.63	6265.9	117.83	6265.8	118.03	



6265.7  
 118.23 6265.6 118.42 6265.5 118.62 6265.4 118.82 6265.3 119.02  
 6265.2  
 119.24 6265.1 119.46 6265 119.68 6264.9 119.89 6264.8 120.11  
 6264.7  
 120.33 6264.6 120.55 6264.5 120.77 6264.4 120.99 6264.3 121.21  
 6264.2  
 121.42 6264.1 121.64 6264 121.86 6263.9 122.08 6263.8 122.3  
 6263.7  
 122.52 6263.6 122.74 6263.5 122.95 6263.4 123.17 6263.3 123.39  
 6263.2  
 123.61 6263.1 123.83 6263 124.05 6262.9 124.27 6262.8 124.48  
 6262.7  
 124.7 6262.6 124.92 6262.5 125.14 6262.4 125.36 6262.3 125.58  
 6262.2  
 125.8 6262.1 126.01 6262 126.23 6261.9 126.45 6261.8 126.67  
 6261.7  
 126.89 6261.6 127.03 6261.54 127.11 6261.5 127.32 6261.4 127.54  
 6261.3  
 127.76 6261.2 127.98 6261.1 128.2 6261 128.42 6260.9 128.64  
 6260.8  
 128.85 6260.7 129.07 6260.6 129.29 6260.5 129.51 6260.4 129.73  
 6260.3  
 129.95 6260.2 130.17 6260.1 130.38 6260 130.6 6259.9 130.82  
 6259.8  
 131.04 6259.7 131.26 6259.6 131.48 6259.5 131.7 6259.4 131.91  
 6259.3  
 132.13 6259.2 132.35 6259.1 132.57 6259 132.79 6258.9 133.01  
 6258.8  
 133.23 6258.7 133.44 6258.6 133.66 6258.5 133.88 6258.4 134.1  
 6258.3  
 134.32 6258.2 134.54 6258.1 134.76 6258 134.97 6257.9 135.19  
 6257.8  
 135.41 6257.7 135.63 6257.6 135.85 6257.5 136.05 6257.4 136.23  
 6257.3  
 136.42 6257.2 136.61 6257.1 136.8 6257 136.99 6256.9 137.18  
 6256.8  
 137.36 6256.7 137.55 6256.6 137.74 6256.5 137.93 6256.4 138.12  
 6256.3  
 138.3 6256.2 138.49 6256.1 138.68 6256 138.87 6255.9 139.06  
 6255.8  
 139.25 6255.7 139.43 6255.6 139.62 6255.5 139.81 6255.4 140  
 6255.3  
 140.19 6255.2 140.37 6255.1 140.56 6255 140.75 6254.9 140.94  
 6254.8  
 141.13 6254.7 141.32 6254.6 141.56 6254.5 142.03 6254.4 142.49  
 6254.3  
 142.96 6254.2 143.43 6254.1 143.89 6254 144.36 6253.9 144.83  
 6253.8  
 145.84 6253.9 154.1 6253.9 155.02 6253.8 155.49 6253.9 155.96  
 6254  
 156.42 6254.1 156.89 6254.2 157.36 6254.3 157.82 6254.4 158.29  
 6254.5  
 158.54 6254.6 158.74 6254.7 158.94 6254.8 159.14 6254.9 159.34

6255  
 159.54 6255.1 159.74 6255.2 159.94 6255.3 160.14 6255.4 160.34  
 6255.5  
 160.54 6255.6 160.74 6255.7 160.94 6255.8 161.14 6255.9 161.34  
 6256  
 161.54 6256.1 161.74 6256.2 161.94 6256.3 162.14 6256.4 162.34  
 6256.5  
 162.54 6256.6 162.74 6256.7 162.94 6256.8 163.14 6256.9 163.34  
 6257  
 163.54 6257.1 163.74 6257.2 163.95 6257.3 164.26 6257.4 164.56  
 6257.5  
 164.86 6257.6 165.16 6257.7 165.47 6257.8 165.77 6257.9 166.07  
 6258  
 166.38 6258.1 166.68 6258.2 166.98 6258.3 167.29 6258.4 167.59  
 6258.5  
 167.89 6258.6 168.19 6258.7 168.5 6258.8 168.8 6258.9 169.1  
 6259  
 169.41 6259.1 169.71 6259.2 170.01 6259.3 170.32 6259.4 170.62  
 6259.5  
 170.92 6259.6 171.23 6259.7 171.53 6259.8 171.83 6259.9 172.13  
 6260  
 172.44 6260.1 172.74 6260.2 172.99 6260.28 173.04 6260.3 173.35  
 6260.4  
 173.65 6260.5 173.95 6260.6 174.26 6260.7 176.56 6260.8 181.38  
 6260.9  
 186.21 6261 191.22 6261.1 194.9 6261.1 195.6 6261 196.31  
 6260.9  
 197.02 6260.8 197.73 6260.7 198.44 6260.6 199.15 6260.5 199.86  
 6260.4  
 201.79 6260.3 202.25 6260.2 202.35 6260.1 202.44 6260 202.54  
 6259.9  
 202.63 6259.8 202.72 6259.7 202.82 6259.6 202.91 6259.5 203.01  
 6259.4  
 204.18 6259.3 205.59 6259.2 207 6259.1 208.42 6259 209.83  
 6258.9  
 211.24 6258.8 212.65 6258.7 213.39 6258.7 214.75 6258.8 216.11  
 6258.9  
 217.47 6259 218.82 6259.1 220.18 6259.2 221.54 6259.3 222.9  
 6259.4  
 224.26 6259.5 225.62 6259.6 226.98 6259.7 228.34 6259.8 229.7  
 6259.9  
 231.06 6260 232.42 6260.1 233.77 6260.2 235.13 6260.3 236.49  
 6260.4  
 237.85 6260.5 239.21 6260.6 240.57 6260.7 241.93 6260.8 247.88  
 6260.9  
 255.53 6261 258.57 6261.1 259.15 6261.2 261.92 6261.2 263.08  
 6261.1  
 264.49 6261 270.58 6261 271.49 6261.1 272.4 6261.2 273.27  
 6261.3  
 274.06 6261.4 274.86 6261.5 275.66 6261.6 276.46 6261.7 277.2  
 6261.8  
 277.92 6261.9 278.63 6262 279.35 6262.1 280.07 6262.2 280.78  
 6262.3  
 281.49 6262.4 282.15 6262.5 282.81 6262.6 283.46 6262.7 284.12



6262.8  
 284.78 6262.9 285.88 6263 287.13 6263.1 288.33 6263.2 289.53  
 6263.3  
 290.65 6263.4 291.73 6263.5 292.81 6263.6 293.8 6263.7 294.76  
 6263.8  
 295.72 6263.9 296.55 6264 297.39 6264.1 298.17 6264.2 298.88  
 6264.3  
 299.58 6264.4 300 6264.4

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .03 127.03 .013 172.99 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan.  
 127.03 172.99 7.25 7.25 7.25 .1

.3  
 Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 106.27 6267.94 F  
 264.16 300 6263.55 F  
 Left Levee Station= 106.69 Elevation= 6268.09  
 Right Levee Station= 261.65 Elevation= 6263.74

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6259.93	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.48	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6258.46	Reach Len. (ft)	7.25
7.25			
Crit W. S. (ft)	6258.39	Flow Area (sq ft)	
106.38			
E. G. Slope (ft/ft)	0.001694	Area (sq ft)	
106.38			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	33.71	Top Width (ft)	
33.71			
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)	
9.75			
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	
3.16			
Conv. Total (cfs)	25198.3	Conv. (cfs)	
25198.3			
Length Wtd. (ft)	7.25	Wetted Per. (ft)	
35.66			
Min Ch El (ft)	6253.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
106.69			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01

0.98 0.00  
 C & E Loss (ft) 0.09 Cum SA (acres) 0.00  
 0.30 0.00

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 983

#### INPUT

Description:  
 Station Elevation Data num= 399  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta  
 Elev  
 0 6269.5 38.6 6269.5 40.72 6269.4 42.59 6269.4 43.13  
 6269.5  
 43.68 6269.6 44.22 6269.7 44.76 6269.8 45.31 6269.9 45.85  
 6270  
 47.34 6270 48.66 6269.9 49.97 6269.8 51.29 6269.7 52.6  
 6269.6  
 53.91 6269.5 55.23 6269.4 56.54 6269.3 57.86 6269.2 59.17  
 6269.1  
 60.49 6269 61.8 6268.9 63.93 6268.8 68.68 6268.7 73.43  
 6268.6  
 78.18 6268.5 83.18 6268.4 88.28 6268.3 89.49 6268.2 90.71  
 6268.1  
 91.92 6268 93.14 6267.9 94.36 6267.8 95.57 6267.7 96.79  
 6267.6  
 98 6267.5 99.22 6267.4 100.43 6267.3 101.65 6267.2 104.92  
 6267.1  
 106.28 6267.1 106.8 6267.2 107.33 6267.3 107.86 6267.4 108.38  
 6267.5  
 108.91 6267.6 109.44 6267.7 109.97 6267.8 110.49 6267.9 111.01  
 6267.9  
 111.83 6267.8 112.16 6267.7 112.48 6267.6 112.8 6267.5 113.13  
 6267.4  
 113.45 6267.3 113.77 6267.2 114.1 6267.1 114.42 6267 114.75  
 6266.9  
 115.07 6266.8 115.39 6266.7 115.66 6266.6 115.93 6266.5 116.2  
 6266.4  
 116.47 6266.3 116.74 6266.2 117 6266.1 117.22 6266 117.44  
 6265.9  
 117.66 6265.8 117.88 6265.7 118.1 6265.6 118.32 6265.5 118.53  
 6265.4  
 118.75 6265.3 118.97 6265.2 119.19 6265.1 119.41 6265 119.63  
 6264.9  
 119.85 6264.8 120.06 6264.7 120.28 6264.6 120.5 6264.5 120.72  
 6264.4



120.94	6264.3	121.16	6264.2	121.38	6264.1	121.59	6264	121.81
6263.9								
122.03	6263.8	122.25	6263.7	122.47	6263.6	122.69	6263.5	122.91
6263.4								
123.12	6263.3	123.34	6263.2	123.56	6263.1	123.78	6263	124
6262.9								
124.22	6262.8	124.44	6262.7	124.65	6262.6	124.87	6262.5	125.09
6262.4								
125.31	6262.3	125.53	6262.2	125.75	6262.1	125.97	6262	126.18
6261.9								
126.4	6261.8	126.62	6261.7	126.77	6261.63	126.84	6261.6	127.06
6261.5								
127.28	6261.4	127.49	6261.3	127.71	6261.2	127.93	6261.1	128.15
6261								
128.37	6260.9	128.59	6260.8	128.81	6260.7	129.02	6260.6	129.24
6260.5								
129.46	6260.4	129.68	6260.3	129.9	6260.2	130.12	6260.1	130.34
6260								
130.55	6259.9	130.77	6259.8	130.99	6259.7	131.21	6259.6	131.43
6259.5								
131.65	6259.4	131.87	6259.3	132.08	6259.2	132.3	6259.1	132.52
6259								
132.74	6258.9	132.96	6258.8	133.18	6258.7	133.4	6258.6	133.61
6258.5								
133.83	6258.4	134.05	6258.3	134.27	6258.2	134.49	6258.1	134.71
6258								
134.93	6257.9	135.14	6257.8	135.36	6257.7	135.58	6257.6	135.8
6257.5								
136	6257.4	136.19	6257.3	136.38	6257.2	136.57	6257.1	136.76
6257								
136.95	6256.9	137.13	6256.8	137.32	6256.7	137.51	6256.6	137.7
6256.5								
137.89	6256.4	138.07	6256.3	138.26	6256.2	138.45	6256.1	138.64
6256								
138.83	6255.9	139.02	6255.8	139.2	6255.7	139.39	6255.6	139.58
6255.5								
139.77	6255.4	139.96	6255.3	140.14	6255.2	140.33	6255.1	140.52
6255								
140.71	6254.9	140.9	6254.8	141.09	6254.7	141.27	6254.6	141.46
6254.5								
141.65	6254.4	141.84	6254.3	142.03	6254.2	142.21	6254.1	142.4
6254								
142.59	6253.9	142.78	6253.8	142.97	6253.7	143.24	6253.6	143.71
6253.5								
144.18	6253.4	144.64	6253.3	145.8	6253.4	145.81	6253.6	145.82
6253.8								
145.84	6254.1	147.37	6254.1	147.39	6253.8	147.4	6253.6	147.41
6253.3								
149.09	6253.4	149.1	6253.6	149.11	6253.8	149.13	6254.1	150.71
6254.1								
150.73	6253.8	150.74	6253.6	150.75	6253.3	152.48	6253.4	152.49
6253.6								
152.5	6253.8	152.52	6254.1	154.05	6254.1	154.07	6253.8	154.08
6253.6								

154.09	6253.3	155.2	6253.3	155.67	6253.4	156.13	6253.5	156.6
6253.6								
156.89	6253.7	157.09	6253.8	157.29	6253.9	157.49	6254	157.69
6254.1								
157.89	6254.2	158.09	6254.3	158.29	6254.4	158.49	6254.5	158.69
6254.6								
158.89	6254.7	159.09	6254.8	159.29	6254.9	159.49	6255	159.69
6255.1								
159.89	6255.2	160.09	6255.3	160.29	6255.4	160.49	6255.5	160.69
6255.6								
160.89	6255.7	161.09	6255.8	161.29	6255.9	161.49	6256	161.69
6256.1								
161.89	6256.2	162.09	6256.3	162.29	6256.4	162.49	6256.5	162.69
6256.6								
162.89	6256.7	163.09	6256.8	163.29	6256.9	163.49	6257	163.69
6257.1								
163.89	6257.2	164.17	6257.3	164.47	6257.4	164.78	6257.5	165.08
6257.6								
165.38	6257.7	165.68	6257.8	165.99	6257.9	166.29	6258	166.59
6258.1								
166.9	6258.2	167.2	6258.3	167.5	6258.4	167.81	6258.5	168.11
6258.6								
168.41	6258.7	168.72	6258.8	169.02	6258.9	169.32	6259	169.62
6259.1								
169.93	6259.2	170.23	6259.3	170.53	6259.4	170.84	6259.5	171.14
6259.6								
171.44	6259.7	171.75	6259.8	172.05	6259.9	172.35	6260	172.65
6260.1								
172.96	6260.2	172.99	6260.21	173.26	6260.3	173.56	6260.4	173.87
6260.5								
174.17	6260.6	175.26	6260.7	180.26	6260.8	185.17	6260.9	189.36
6261								
190.96	6261	191.36	6260.9	191.76	6260.8	192.16	6260.7	192.56
6260.6								
192.96	6260.5	193.36	6260.4	193.76	6260.3	194.17	6260.2	194.76
6260.1								
195.41	6260	196.07	6259.9	196.72	6259.8	197.37	6259.7	198.02
6259.6								
198.67	6259.5	199.32	6259.4	200.61	6259.3	202.08	6259.2	203.56
6259.1								
205.04	6259	206.46	6258.9	207.87	6258.8	209.28	6258.7	210.69
6258.6								
212.1	6258.5	213.52	6258.4	214.93	6258.3	216.34	6258.2	217.75
6258.1								
219.16	6258	219.33	6258	220.69	6258.1	222.05	6258.2	223.41
6258.3								
224.77	6258.4	226.13	6258.5	227.49	6258.6	228.85	6258.7	236.41
6258.8								
244.06	6258.9	251.7	6259	257.45	6259.1	258.04	6259.2	258.62
6259.3								
259.21	6259.4	263.3	6259.4	264.51	6259.5	266.99	6259.5	267.9
6259.6								
268.78	6259.7	269.58	6259.8	270.38	6259.9	271.11	6260	271.83
6260.1								



272.55	6260.2	273.24	6260.3	273.9	6260.4	274.56	6260.5	275.21
6260.6								
275.87	6260.7	276.88	6260.8	278.76	6260.9	279.32	6261	279.87
6261.1								
280.42	6261.2	280.97	6261.3	281.52	6261.4	282.07	6261.5	282.62
6261.6								
283.17	6261.7	283.71	6261.8	284.23	6261.9	284.74	6262	285.26
6262.1								
285.78	6262.2	286.3	6262.3	286.82	6262.4	287.34	6262.5	287.86
6262.6								
288.38	6262.7	288.89	6262.8	289.41	6262.9	289.93	6263	290.45
6263.1								
290.96	6263.2	291.46	6263.3	292.02	6263.4	292.98	6263.5	293.94
6263.6								
294.84	6263.7	295.67	6263.8	296.5	6263.9	297.25	6264	297.96
6264.1								
298.67	6264.2	299.24	6264.3	299.82	6264.4	300	6264.4	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	126.77	.013
			172.99
			.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	126.77	172.99		8.69	8.69		.1

Ineffective Flow	num=	2
Sta L	Sta R	Elev
0	106.69	6267.83
194.64	300	6261.19
Left Levee	Station=	108.78
Right Levee	Station=	194.22
		Elevation= 6267.98
		Elevation= 6261.34

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6259.84	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.19	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6258.65	Reach Len. (ft)	8.69
8.69	8.69		
Crit W. S. (ft)	6258.21	Flow Area (sq ft)	
118.69			
E. G. Slope (ft/ft)	0.001444	Area (sq ft)	
118.69			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	34.98	Top Width (ft)	
34.98			
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)	
8.74			
Max Chl Dpth (ft)	5.35	Hydr. Depth (ft)	
3.39			

Conv. Total (cfs)	27287.2	Conv. (cfs)
27287.2		
Length Wtd. (ft)	8.69	Wetted Per. (ft)
41.61		
Min Ch El (ft)	6253.30	Shear (lb/sq ft)
0.26		
Alpha	1.00	Stream Power (lb/ft s)
108.78	194.22	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)
0.96	0.00	
C & E Loss (ft)	0.09	Cum SA (acres)
0.29	0.00	0.00

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 982

INPUT Description:									
Station	Elevation	Data	num=	410					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev	0	6269.7	13.22	6269.7	20.5	6269.6	38.81	6269.5	41.02
6269.5	41.57	6269.6	42.11	6269.7	42.65	6269.8	43.2	6269.9	43.74
6270	44.28	6270.1	44.83	6270.2	45.37	6270.3	47.13	6270.3	48.44
6270.2	49.75	6270.1	51.07	6270	52.38	6269.9	53.7	6269.8	55.01
6269.7	56.33	6269.6	57.64	6269.5	58.96	6269.4	60.27	6269.3	61.59
6269.2	62.9	6269.1	64.22	6269	65.53	6268.9	66.84	6268.8	70.15
6268.7	74.91	6268.6	79.66	6268.5	85.83	6268.4	87.04	6268.3	88.26
6268.2	89.48	6268.1	90.69	6268	91.91	6267.9	93.12	6267.8	94.34
6267.7	95.55	6267.6	96.77	6267.5	97.99	6267.4	99.2	6267.3	100.42
6267.2	101.63	6267.1	104.2	6267	107.41	6267	107.94	6267.1	108.46
6267.2	108.99	6267.3	109.52	6267.4	110.05	6267.5	110.78	6267.5	111.59
6267.4	111.92	6267.3	112.24	6267.2	112.56	6267.1	112.89	6267	113.21
6266.9	113.53	6266.8	113.86	6266.7	114.18	6266.6	114.51	6266.5	114.83



6266. 4  
115. 12 6266. 3 115. 39 6266. 2 115. 66 6266. 1 115. 93 6266 116. 2  
6265. 9  
116. 47 6265. 8 116. 74 6265. 7 117. 01 6265. 6 117. 28 6265. 5 117. 54  
6265. 4  
117. 81 6265. 3 118. 08 6265. 2 118. 35 6265. 1 118. 62 6265 118. 89  
6264. 9  
119. 16 6264. 8 119. 43 6264. 7 119. 7 6264. 6 119. 97 6264. 5 120. 24  
6264. 4  
120. 51 6264. 3 120. 78 6264. 2 121. 05 6264. 1 121. 31 6264 121. 58  
6263. 9  
121. 85 6263. 8 122. 12 6263. 7 122. 39 6263. 6 122. 66 6263. 5 122. 93  
6263. 4  
123. 15 6263. 3 123. 37 6263. 2 123. 58 6263. 1 123. 8 6263 124. 02  
6262. 9  
124. 24 6262. 8 124. 46 6262. 7 124. 68 6262. 6 124. 9 6262. 5 125. 11  
6262. 4  
125. 33 6262. 3 125. 55 6262. 2 125. 77 6262. 1 125. 99 6262 126. 21  
6261. 9  
126. 43 6261. 8 126. 64 6261. 7 126. 86 6261. 6 127. 08 6261. 5 127. 3  
6261. 4  
127. 52 6261. 3 127. 74 6261. 2 127. 95 6261. 1 128. 17 6261 128. 39  
6260. 9  
128. 61 6260. 8 128. 83 6260. 7 129. 05 6260. 6 129. 27 6260. 5 129. 48  
6260. 4  
129. 7 6260. 3 129. 92 6260. 2 130. 14 6260. 1 130. 36 6260 130. 58  
6259. 9  
130. 8 6259. 8 131. 01 6259. 7 131. 23 6259. 6 131. 45 6259. 5 131. 67  
6259. 4  
131. 89 6259. 3 132. 11 6259. 2 132. 33 6259. 1 132. 54 6259 132. 76  
6258. 9  
132. 98 6258. 8 133. 2 6258. 7 133. 42 6258. 6 133. 64 6258. 5 133. 86  
6258. 4  
134. 07 6258. 3 134. 29 6258. 2 134. 51 6258. 1 134. 73 6258 134. 95  
6257. 9  
135. 17 6257. 8 135. 39 6257. 7 135. 6 6257. 6 135. 82 6257. 5 136. 04  
6257. 4  
136. 22 6257. 3 136. 41 6257. 2 136. 6 6257. 1 136. 79 6257 136. 98  
6256. 9  
137. 16 6256. 8 137. 35 6256. 7 137. 54 6256. 6 137. 73 6256. 5 137. 92  
6256. 4  
138. 11 6256. 3 138. 29 6256. 2 138. 48 6256. 1 138. 67 6256 138. 86  
6255. 9  
139. 05 6255. 8 139. 23 6255. 7 139. 42 6255. 6 139. 61 6255. 5 139. 8  
6255. 4  
139. 99 6255. 3 140. 17 6255. 2 140. 36 6255. 1 140. 55 6255 140. 74  
6254. 9  
140. 93 6254. 8 141. 12 6254. 7 141. 3 6254. 6 141. 49 6254. 5 141. 68  
6254. 4  
141. 87 6254. 3 142. 06 6254. 2 142. 24 6254. 1 142. 43 6254 142. 62  
6253. 9  
142. 81 6253. 8 143 6253. 7 143. 19 6253. 6 143. 37 6253. 5 143. 56  
6253. 4  
143. 75 6253. 3 143. 94 6253. 2 144. 13 6253. 1 144. 31 6253 144. 5

6252. 9  
144. 69 6252. 8 144. 88 6252. 7 155. 14 6252. 7 155. 34 6252. 8 155. 54  
6252. 9  
155. 74 6253 155. 94 6253. 1 156. 14 6253. 2 156. 34 6253. 3 156. 54  
6253. 4  
156. 74 6253. 5 156. 94 6253. 6 157. 14 6253. 7 157. 34 6253. 8 157. 54  
6253. 9  
157. 74 6254 157. 94 6254. 1 158. 14 6254. 2 158. 34 6254. 3 158. 54  
6254. 4  
158. 74 6254. 5 158. 94 6254. 6 159. 14 6254. 7 159. 34 6254. 8 159. 54  
6254. 9  
159. 74 6255 159. 94 6255. 1 160. 14 6255. 2 160. 34 6255. 3 160. 54  
6255. 4  
160. 74 6255. 5 160. 94 6255. 6 161. 14 6255. 7 161. 34 6255. 8 161. 54  
6255. 9  
161. 74 6256 161. 94 6256. 1 162. 14 6256. 2 162. 34 6256. 3 162. 54  
6256. 4  
162. 74 6256. 5 162. 94 6256. 6 163. 14 6256. 7 163. 34 6256. 8 163. 54  
6256. 9  
163. 74 6257 163. 94 6257. 1 164. 21 6257. 2 164. 51 6257. 3 164. 81  
6257. 4  
165. 12 6257. 5 165. 42 6257. 6 165. 72 6257. 7 166. 03 6257. 8 166. 33  
6257. 9  
166. 63 6258 166. 94 6258. 1 167. 24 6258. 2 167. 54 6258. 3 167. 84  
6258. 4  
168. 15 6258. 5 168. 45 6258. 6 168. 75 6258. 7 168. 88 6258. 74 169. 06  
6258. 8  
169. 36 6258. 9 169. 66 6259 169. 97 6259. 1 170. 27 6259. 2 170. 57  
6259. 3  
170. 88 6259. 4 171. 18 6259. 5 171. 48 6259. 6 171. 78 6259. 7 172. 09  
6259. 8  
172. 39 6259. 9 172. 69 6260 173 6260. 1 173. 3 6260. 2 173. 6  
6260. 3  
173. 91 6260. 4 174. 21 6260. 5 174. 68 6260. 6 179. 68 6260. 7 184. 68  
6260. 8  
190. 22 6260. 8 190. 96 6260. 7 191. 71 6260. 6 192. 45 6260. 5 193. 19  
6260. 4  
193. 94 6260. 3 194. 68 6260. 2 195. 43 6260. 1 196. 17 6260 196. 91  
6259. 9  
197. 66 6259. 8 198. 4 6259. 7 199. 15 6259. 6 199. 89 6259. 5 200. 63  
6259. 4  
201. 38 6259. 3 202. 12 6259. 2 202. 8 6259. 1 203. 46 6259 204. 11  
6258. 9  
204. 76 6258. 8 205. 41 6258. 7 206. 06 6258. 6 206. 71 6258. 5 207. 8  
6258. 4  
209. 28 6258. 3 210. 76 6258. 2 212. 24 6258. 1 213. 71 6258 215. 19  
6257. 9  
216. 66 6257. 8 218. 13 6257. 7 219. 59 6257. 6 221. 06 6257. 5 222. 52  
6257. 4  
223. 99 6257. 3 225. 45 6257. 2 226. 79 6257. 1 228. 19 6257 229. 86  
6256. 9  
231. 89 6256. 8 256. 58 6256. 8 256. 59 6256. 7 256. 61 6256. 2 256. 63  
6255. 7  
256. 65 6255. 2 256. 67 6254. 7 256. 68 6254. 6 257. 27 6256. 6 257. 28



6256.4  
 263.4 6254.8 263.41 6255.3 263.43 6255.8 263.45 6256.3 263.46  
 6256.8  
 263.48 6257.3 263.49 6257.8 265.58 6257.8 267.81 6257.9 268.6  
 6258  
 269.15 6258.1 269.67 6258.2 270.19 6258.3 270.71 6258.4 271.21  
 6258.5  
 271.71 6258.6 272.2 6258.7 272.7 6258.8 273.2 6258.9 273.69  
 6259  
 274.18 6259.1 274.66 6259.2 275.14 6259.3 275.62 6259.4 276.1  
 6259.5  
 276.59 6259.6 277.07 6259.7 277.55 6259.8 278.03 6259.9 278.52  
 6260  
 279 6260.1 279.48 6260.2 279.96 6260.3 280.44 6260.4 280.93  
 6260.5  
 281.42 6260.6 281.95 6260.7 282.49 6260.8 283.02 6260.9 283.56  
 6261  
 284.09 6261.1 284.62 6261.2 285.16 6261.3 285.69 6261.4 286.23  
 6261.5  
 286.76 6261.6 287.3 6261.7 287.83 6261.8 288.36 6261.9 288.9  
 6262  
 289.43 6262.1 289.97 6262.2 290.5 6262.3 291.04 6262.4 291.52  
 6262.5  
 291.91 6262.6 292.3 6262.7 292.7 6262.8 293.09 6262.9 293.48  
 6263  
 293.88 6263.1 294.27 6263.2 294.66 6263.3 295.05 6263.4 295.45  
 6263.5  
 295.84 6263.6 296.23 6263.7 296.62 6263.8 297.22 6263.9 297.86  
 6264  
 298.44 6264.1 299.01 6264.2 299.49 6264.3 299.92 6264.4 300  
 6264.4

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .03 134.73 .013 168.88 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 134.73 168.88 10.14 10.14 10.14 .1

.3  
 Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 110.04 6267.43 F  
 190.45 300 6260.73 F  
 Left Levee Station= 110.04 Elevation= 6267.48  
 Right Levee Station= 190.03 Elevation= 6260.89

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft) 6259.74 Element Left OB  
 Channel Right OB  
 Vel Head (ft) 0.88 Wt. n-Val. 0.030  
 0.013 0.030

W. S. Elev (ft) 6258.86 Reach Len. (ft) 10.14  
 10.14 10.14  
 Crit W. S. (ft) 6257.74 Flow Area (sq ft) 0.81  
 137.87 0.02  
 E. G. Slope (ft/ft) 0.000742 Area (sq ft) 0.81  
 137.87 0.02  
 Q Total (cfs) 1037.00 Flow (cfs) 0.58  
 1036.41 0.00  
 Top Width (ft) 36.39 Top Width (ft) 1.88  
 34.15 0.36  
 Vel Total (ft/s) 7.48 Avg. Vel. (ft/s) 0.72  
 7.52 0.20  
 Max Chl Dpth (ft) 6.16 Hydr. Depth (ft) 0.43  
 4.04 0.06  
 Conv. Total (cfs) 38063.9 Conv. (cfs) 21.4  
 38042.4 0.2  
 Length Wtd. (ft) 10.14 Wetted Per. (ft) 2.07  
 36.76 0.38  
 Min Ch El (ft) 6252.70 Shear (lb/sq ft) 0.02  
 0.17 0.00  
 Alpha 1.01 Stream Power (lb/ft s) 300.00  
 110.04 190.03  
 Frctn Loss (ft) 0.01 Cum Volume (acre-ft) 0.01  
 0.93 0.00  
 C & E Loss (ft) 0.07 Cum SA (acres) 0.00  
 0.29 0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 981

INPUT  
 Description:  
 Station Elevation Data num= 492  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta  
 Elev 0 6269.9 2.58 6269.9 3.95 6269.89 3.95 6270.2 4.95  
 6270.2  
 11.23 6270.1 17.31 6270 22.58 6269.9 26.27 6269.8 29.77  
 6269.7  
 33.05 6269.6 38.81 6269.6 39.36 6269.7 39.9 6269.8 40.44  
 6269.9



40.99	6270	41.53	6270.1	42.07	6270.2	42.62	6270.3	43.16
6270.4								
43.7	6270.5	44.25	6270.6	44.79	6270.7	45.93	6270.7	47.24
6270.6								
48.56	6270.5	49.87	6270.4	51.19	6270.3	52.5	6270.2	53.82
6270.1								
55.13	6270	56.45	6269.9	57.76	6269.8	59.08	6269.7	60.39
6269.6								
61.7	6269.5	63.02	6269.4	64.33	6269.3	65.65	6269.2	66.96
6269.1								
68.28	6269	69.59	6268.9	70.91	6268.8	72.22	6268.7	76.33
6268.6								
81.17	6268.5	84.1	6268.4	85.32	6268.3	86.54	6268.2	87.75
6268.1								
88.97	6268	90.18	6267.9	91.4	6267.8	92.61	6267.7	93.83
6267.6								
95.04	6267.5	96.26	6267.4	97.48	6267.3	98.69	6267.2	99.91
6267.1								
101.12	6267	102.39	6266.9	106.54	6266.8	108.01	6266.8	108.53
6266.9								
109.59	6267.1	110.07	6267.1	110.55	6267	111.13	6266.9	111.46
6266.8								
111.78	6266.7	112.1	6266.6	112.43	6266.5	112.75	6266.4	113.07
6266.3								
113.36	6266.2	113.5	6266.1	113.65	6266	113.79	6265.9	113.93
6265.8								
114.08	6265.7	114.26	6265.6	114.56	6265.5	114.87	6265.4	115.17
6265.3								
115.48	6265.2	115.79	6265.1	116.09	6265	116.4	6264.9	116.7
6264.8								
117.01	6264.7	117.31	6264.6	117.93	6264.4	118.23	6264.3	118.54
6264.2								
118.84	6264.1	119.46	6263.9	119.76	6263.8	120.07	6263.7	120.37
6263.6								
120.68	6263.5	120.98	6263.4	121.29	6263.3	121.6	6263.2	121.88
6263.1								
122.42	6262.9	122.69	6262.8	122.95	6262.7	123.22	6262.6	123.76
6262.4								
124.03	6262.3	124.3	6262.2	124.57	6262.1	125.11	6261.9	125.38
6261.8								
125.65	6261.7	125.92	6261.6	126.19	6261.5	126.45	6261.4	126.72
6261.3								
126.99	6261.2	127.26	6261.1	127.8	6260.9	128.07	6260.8	128.34
6260.7								
128.61	6260.6	129.15	6260.4	129.42	6260.3	129.66	6260.2	129.88
6260.1								
130.32	6259.9	130.53	6259.8	130.75	6259.7	130.97	6259.6	131.41
6259.4								
131.63	6259.3	131.85	6259.2	132.06	6259.1	132.5	6258.9	132.72
6258.8								
132.94	6258.7	133.16	6258.6	133.38	6258.5	133.59	6258.4	133.81
6258.3								
134.03	6258.2	134.25	6258.1	134.69	6257.9	134.71	6257.89	134.91
6257.8								

135.12	6257.7	135.34	6257.6	135.78	6257.4	135.97	6257.3	136.16
6257.2								
136.35	6257.1	136.54	6257	136.72	6256.9	136.91	6256.8	137.1
6256.7								
137.29	6256.6	137.48	6256.5	137.66	6256.4	137.85	6256.3	138.04
6256.2								
138.23	6256.1	138.61	6255.9	138.79	6255.8	138.98	6255.7	139.17
6255.6								
139.55	6255.4	139.73	6255.3	139.92	6255.2	140.11	6255.1	140.47
6254.9								
140.66	6254.8	140.84	6254.7	141.02	6254.6	141.2	6254.5	141.39
6254.4								
141.57	6254.3	141.75	6254.2	141.93	6254.1	142.12	6254	142.3
6253.9								
142.48	6253.8	142.67	6253.7	142.85	6253.6	143.21	6253.4	143.4
6253.3								
143.58	6253.2	143.76	6253.1	143.95	6253	144.13	6252.9	144.31
6252.8								
144.49	6252.7	144.68	6252.6	145.63	6252.8	145.64	6253.2	145.68
6254.2								
145.7	6254.7	145.72	6254.9	147.2	6254.9	147.22	6254.7	147.28
6253.2								
147.29	6252.7	148.97	6252.8	148.98	6253.2	149.02	6254.2	149.04
6254.7								
149.06	6254.9	150.54	6254.9	150.56	6254.7	150.58	6254.2	150.6
6253.7								
150.62	6253.2	150.63	6252.7	152.32	6252.8	152.33	6253.2	152.35
6253.7								
152.39	6254.7	152.41	6254.9	153.89	6254.9	153.91	6254.7	153.97
6253.2								
153.98	6252.7	154.94	6252.6	155.14	6252.7	155.34	6252.8	155.54
6252.9								
155.94	6253.1	156.14	6253.2	156.34	6253.3	156.54	6253.4	156.94
6253.6								
157.14	6253.7	157.34	6253.8	157.54	6253.9	157.94	6254.1	158.14
6254.2								
158.34	6254.3	158.54	6254.4	158.94	6254.6	159.14	6254.7	159.34
6254.8								
159.54	6254.9	159.94	6255.1	160.14	6255.2	160.34	6255.3	160.54
6255.4								
160.94	6255.6	161.14	6255.7	161.34	6255.8	161.54	6255.9	161.94
6256.1								
162.14	6256.2	162.34	6256.3	162.54	6256.4	162.94	6256.6	163.14
6256.7								
163.34	6256.8	163.54	6256.9	163.74	6257	164.02	6257.1	164.32
6257.2								
164.62	6257.3	164.93	6257.4	165.53	6257.6	165.83	6257.7	166.14
6257.8								
166.44	6257.9	166.74	6258	167.05	6258.1	167.35	6258.2	167.65
6258.3								
167.96	6258.4	168.56	6258.6	168.86	6258.7	169.05	6258.76	169.17
6258.8								
169.47	6258.9	169.77	6259	170.08	6259.1	170.38	6259.2	170.68
6259.3								



170.99	6259.4	171.59	6259.6	171.89	6259.7	172.2	6259.8	172.5
6259.9								
172.8	6260	173.11	6260.1	173.41	6260.2	173.71	6260.3	174.02
6260.4								
174.55	6260.5	179.55	6260.6	184.55	6260.7	190.01	6260.7	190.76
6260.6								
192.24	6260.4	192.99	6260.3	193.73	6260.2	194.48	6260.1	195.96
6259.9								
196.71	6259.8	197.45	6259.7	198.2	6259.6	199.68	6259.4	200.43
6259.3								
201.17	6259.2	201.92	6259.1	202.66	6259	203.37	6258.9	204.07
6258.8								
204.8	6258.7	205.59	6258.6	207.17	6258.4	207.96	6258.3	208.75
6258.2								
209.54	6258.1	211.12	6257.9	211.91	6257.8	212.7	6257.7	213.48
6257.6								
214.27	6257.5	215.07	6257.4	216.11	6257.3	217.65	6257.2	219.2
6257.1								
220.74	6257	222.29	6256.9	223.83	6256.8	225.33	6256.7	226.79
6256.6								
228.26	6256.5	229.72	6256.4	231.19	6256.3	232.65	6256.2	234.04
6256.1								
235.22	6256	236.55	6255.9	237.89	6255.8	239.4	6255.7	240.95
6255.6								
242.71	6255.5	244.69	6255.4	246.66	6255.3	248.64	6255.2	250.62
6255.1								
251.19	6255	252.62	6255	253.98	6254.9	254.82	6254.9	254.83
6255								
254.85	6255.1	254.87	6255.2	254.88	6255.3	254.9	6255.4	254.92
6255.5								
254.93	6255.6	254.95	6255.7	254.97	6255.8	256.32	6255.8	256.39
6255.1								
256.41	6254.8	256.43	6254.6	256.47	6254.6	256.48	6254.8	256.51
6255.1								
256.57	6255.7	256.6	6255.6	256.61	6255.5	256.63	6255.4	256.65
6255.3								
256.66	6255.2	256.68	6255.1	256.7	6255	256.71	6254.9	256.73
6254.8								
256.75	6254.7	256.76	6254.6	256.8	6254.4	260.04	6254.4	260.06
6254.5								
260.07	6254.6	260.13	6254.9	260.15	6255	260.16	6255.1	260.18
6255.2								
260.2	6255.3	260.22	6255.4	260.26	6255.6	260.27	6255.7	260.29
6255.8								
261.62	6255.8	261.63	6255.7	261.65	6255.6	261.67	6255.4	261.69
6255.3								
261.7	6255.2	261.72	6255.1	261.76	6255.1	262.41	6255.2	263.19
6255.9								
263.29	6255.3	264.16	6255.4	265.03	6255.5	265.46	6255.8	265.89
6255.6								
266.16	6255.7	266.37	6255.8	266.64	6255.9	267.17	6256	267.71
6256.1								
268.24	6256.2	268.78	6256.3	269.31	6256.4	269.85	6256.5	270.38
6256.6								

270.8	6256.7	271.19	6256.8	271.58	6256.9	271.98	6257	272.36
6257.1								
272.74	6257.2	273.12	6257.3	273.5	6257.4	274.26	6257.6	274.64
6257.7								
275.02	6257.8	275.4	6257.9	275.79	6258	276.18	6258.1	276.57
6258.2								
276.96	6258.3	277.36	6258.4	278.14	6258.6	278.53	6258.7	278.92
6258.8								
279.31	6258.9	280.09	6259.1	280.48	6259.2	280.84	6259.3	281.21
6259.4								
281.95	6259.6	282.31	6259.7	282.68	6259.8	283.05	6259.9	283.79
6260.1								
284.15	6260.2	284.52	6260.3	284.89	6260.4	285.63	6260.6	285.99
6260.7								
286.36	6260.8	286.73	6260.9	287.47	6261.1	287.83	6261.2	288.2
6261.3								
288.57	6261.4	288.94	6261.5	289.3	6261.6	289.67	6261.7	290.04
6261.8								
290.41	6261.9	290.78	6262	291.14	6262.1	291.51	6262.2	291.88
6262.3								
292.25	6262.4	292.62	6262.5	292.98	6262.6	293.34	6262.7	293.71
6262.8								
294.07	6262.9	294.79	6263.1	295.16	6263.2	295.52	6263.3	295.88
6263.4								
296.25	6263.5	296.61	6263.6	296.97	6263.7	297.33	6263.8	297.7
6263.9								
298.42	6264.1	298.79	6264.2	299.15	6264.3	299.45	6264.4	299.74
6264.5								
299.91	6264.6	300	6264.6					

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	134.71	.013
169.05			
Bank Sta:	Left	Right	Lengths:
Expan.			Left Channel
	134.71	169.05	Right
			Coeff
			Contr.
			.1
.3			
Ineffective Flow	num=	2	
Sta L	Sta R	Elev	Permanent
0	108.36	6267.27	F
190.03	300	6260.77	F
Left Levee	Station=	112.13	Elevation= 6267.08
Right Levee	Station=	188.77	Elevation= 6260.98

CROSS SECTION OUTPUT	Profile #Flow 1		
E. G. Elev (ft)	6259.66	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.56	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6258.09	Reach Len. (ft)	12.04
12.04	12.04		



Crit W.S. (ft)	6258.09	Flow Area (sq ft)	0.04
103.32 E.G. Slope (ft/ft)	0.002717	Area (sq ft)	0.04
103.32 Q Total (cfs)	1037.00	Flow (cfs)	0.02
1036.98 Top Width (ft)	32.76	Top Width (ft)	0.44
32.32 Vel Total (ft/s)	10.03	Avg. Vel. (ft/s)	0.52
10.04 Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)	0.10
3.20 Conv. Total (cfs)	19893.7	Conv. (cfs)	0.4
19893.3 Length Wtd. (ft)		Wetted Per. (ft)	0.49
47.26 Min Ch El (ft)	6252.60	Shear (lb/sq ft)	0.02
0.37 Alpha	1.00	Stream Power (lb/ft s)	300.00
112.13 188.77 Frctn Loss (ft)		Cum Volume (acre-ft)	0.01
0.90 0.00 C & E Loss (ft)		Cum SA (acres)	0.00
0.28 0.00			

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

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 980

#### INPUT

Description:

Station	Elevation	Data	num=	473					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
0	6270.7	.15	6270.7	6.35	6270.6	10.35	6270.5	13.74	
6270.4									
17.03	6270.3	20.31	6270.2	23.59	6270.1	26.79	6270	29.94	
6269.9									
33.08	6269.8	39.05	6269.8	40.29	6269.9	40.63	6270	40.91	

6270.1									
41.08	6270.2	41.26	6270.3	41.43	6270.4	41.6	6270.5	41.78	
6270.6									
41.95	6270.7	42.5	6270.8	43.04	6270.9	43.58	6271	44.13	
6271.1									
45.92	6271.1	47.24	6271	48.55	6270.9	49.87	6270.8	51.18	
6270.7									
52.5	6270.6	53.81	6270.5	55.13	6270.4	56.44	6270.3	57.76	
6270.2									
59.07	6270.1	60.38	6270	61.7	6269.9	63.01	6269.8	64.33	
6269.7									
65.64	6269.6	66.96	6269.5	68.27	6269.4	69.59	6269.3	70.9	
6269.2									
72.22	6269.1	73.53	6269	74.85	6268.9	76.16	6268.8	77.48	
6268.7									
78.79	6268.6	81.27	6268.5	82.48	6268.4	83.7	6268.3	84.92	
6268.2									
86.13	6268.1	87.35	6268	88.56	6267.9	89.78	6267.8	90.99	
6267.7									
92.21	6267.6	93.43	6267.5	94.64	6267.4	95.86	6267.3	97.07	
6267.2									
98.29	6267.1	99.5	6267	100.72	6266.9	101.94	6266.8	104.03	
6266.7									
108.19	6266.6	109.78	6266.6	110.25	6266.5	110.7	6266.4	110.89	
6266.3									
111.09	6266.2	111.28	6266.1	111.47	6266	111.67	6265.9	111.86	
6265.8									
112.05	6265.7	112.25	6265.6	112.44	6265.5	112.63	6265.4	112.83	
6265.3									
113.02	6265.2	113.22	6265.1	113.41	6265	113.6	6264.9	113.85	
6264.8									
114.15	6264.7	114.45	6264.6	114.75	6264.5	115.05	6264.4	115.35	
6264.3									
115.64	6264.2	115.94	6264.1	116.24	6264	116.54	6263.9	116.84	
6263.8									
117.14	6263.7	117.44	6263.6	117.73	6263.5	118.03	6263.4	118.33	
6263.3									
118.63	6263.2	118.93	6263.1	119.23	6263	119.53	6262.9	119.82	
6262.8									
120.12	6262.7	120.42	6262.6	120.72	6262.5	121.02	6262.4	121.32	
6262.3									
121.62	6262.2	121.91	6262.1	122.21	6262	122.51	6261.9	122.81	
6261.8									
123.11	6261.7	123.41	6261.6	123.71	6261.5	124	6261.4	124.3	
6261.3									
124.6	6261.2	124.9	6261.1	125.2	6261	125.5	6260.9	125.8	
6260.8									
126.09	6260.7	126.39	6260.6	126.69	6260.5	126.99	6260.4	127.29	
6260.3									
127.59	6260.2	127.89	6260.1	128.18	6260	128.48	6259.9	128.78	
6259.8									
129.08	6259.7	129.38	6259.6	129.68	6259.5	129.98	6259.4	130.27	
6259.3									
130.57	6259.2	130.87	6259.1	131.16	6259	131.46	6258.9	131.75	



6258.8  
 132.04 6258.7 132.34 6258.6 132.63 6258.5 132.93 6258.4 133.22  
 6258.3  
 133.51 6258.2 133.81 6258.1 134.1 6258 134.39 6257.9 134.69  
 6257.8  
 134.98 6257.7 135.28 6257.6 135.57 6257.5 135.86 6257.4 136.1  
 6257.3  
 136.27 6257.2 136.45 6257.1 136.63 6257 136.81 6256.9 136.98  
 6256.8  
 137.16 6256.7 137.34 6256.6 137.52 6256.5 137.71 6256.4 137.89  
 6256.3  
 138.07 6256.2 138.26 6256.1 138.44 6256 138.62 6255.9 138.8  
 6255.8  
 138.99 6255.7 139.17 6255.6 139.35 6255.5 139.54 6255.4 139.72  
 6255.3  
 139.9 6255.2 140.08 6255.1 140.27 6255 140.45 6254.9 140.63  
 6254.8  
 140.81 6254.7 141 6254.6 141.18 6254.5 141.36 6254.4 141.55  
 6254.3  
 141.73 6254.2 141.91 6254.1 142.09 6254 142.28 6253.9 142.46  
 6253.8  
 142.64 6253.7 142.82 6253.6 143.01 6253.5 143.19 6253.4 143.37  
 6253.3  
 143.56 6253.2 143.74 6253.1 143.92 6253 144.1 6252.9 144.29  
 6252.8  
 144.47 6252.7 144.65 6252.6 144.84 6252.5 155.18 6252.5 155.38  
 6252.6  
 155.58 6252.7 155.78 6252.8 155.98 6252.9 156.18 6253 156.38  
 6253.1  
 156.58 6253.2 156.78 6253.3 156.98 6253.4 157.18 6253.5 157.38  
 6253.6  
 157.58 6253.7 157.78 6253.8 157.98 6253.9 158.18 6254 158.38  
 6254.1  
 158.58 6254.2 158.78 6254.3 158.98 6254.4 159.18 6254.5 159.38  
 6254.6  
 159.58 6254.7 159.78 6254.8 159.98 6254.9 160.18 6255 160.38  
 6255.1  
 160.58 6255.2 160.78 6255.3 160.98 6255.4 161.18 6255.5 161.38  
 6255.6  
 161.58 6255.7 161.78 6255.8 161.98 6255.9 162.18 6256 162.38  
 6256.1  
 162.58 6256.2 162.78 6256.3 163.01 6256.4 163.25 6256.5 163.48  
 6256.6  
 163.71 6256.7 163.94 6256.8 164.22 6256.9 164.52 6257 164.82  
 6257.1  
 165.11 6257.2 165.41 6257.3 165.71 6257.4 166.01 6257.5 166.31  
 6257.6  
 166.61 6257.7 166.91 6257.8 167.21 6257.9 167.51 6258 167.81  
 6258.1  
 168.1 6258.2 168.4 6258.3 168.7 6258.4 169 6258.5 169.3  
 6258.6  
 169.6 6258.7 169.89 6258.8 170.19 6258.9 170.49 6259 170.79  
 6259.1  
 171.08 6259.2 171.38 6259.3 171.68 6259.4 171.91 6259.48 171.97

6259.5  
 172.27 6259.6 172.57 6259.7 172.87 6259.8 173.16 6259.9 173.46  
 6260  
 173.76 6260.1 174.05 6260.2 174.35 6260.3 177.03 6260.4 182.12  
 6260.5  
 187.24 6260.6 189.81 6260.6 190.51 6260.5 191.22 6260.4 192.01  
 6260.3  
 192.8 6260.2 193.58 6260.1 194.37 6260 195.16 6259.9 195.95  
 6259.8  
 196.74 6259.7 197.53 6259.6 198.32 6259.5 199.11 6259.4 199.9  
 6259.3  
 200.69 6259.2 201.48 6259.1 202.27 6259 203.06 6258.9 203.85  
 6258.8  
 204.64 6258.7 205.43 6258.6 206.22 6258.5 207 6258.4 207.79  
 6258.3  
 208.58 6258.2 209.37 6258.1 210.16 6258 210.95 6257.9 211.74  
 6257.8  
 212.53 6257.7 213.32 6257.6 214.11 6257.5 214.9 6257.4 215.69  
 6257.3  
 216.48 6257.2 217.27 6257.1 218.06 6257 218.85 6256.9 219.64  
 6256.8  
 220.43 6256.7 221.21 6256.6 222 6256.5 222.79 6256.4 223.58  
 6256.3  
 224.42 6256.2 225.15 6256.1 225.88 6256 227.21 6255.9 227.25  
 6256.1  
 228.75 6255.8 230.3 6255.7 230.44 6255.8 231.84 6255.6 233.39  
 6255.5  
 234.93 6255.4 235.11 6255.7 237.54 6255.3 240.24 6255.2 241.99  
 6255.1  
 243.73 6255 245.48 6254.9 247.23 6254.8 248.98 6254.7 249.84  
 6254.6  
 249.95 6254.5 250.06 6254.4 250.17 6254.3 250.28 6254.2 251.42  
 6254.2  
 251.58 6254.5 252.54 6254.2 252.65 6254.3 252.76 6254.4 252.87  
 6254.5  
 252.98 6254.6 253.27 6254.7 253.52 6254.3 254.92 6254.8 257.2  
 6254.9  
 259.47 6255 261.75 6255.1 263.39 6255.2 264.64 6255.3 265.88  
 6255.4  
 267.12 6255.5 267.66 6255.6 268.02 6255.7 268.37 6255.8 268.73  
 6255.9  
 269.08 6256 269.44 6256.1 269.79 6256.2 270.15 6256.3 270.5  
 6256.4  
 270.86 6256.5 271.21 6256.6 271.57 6256.7 271.92 6256.8 272.28  
 6256.9  
 272.63 6257 272.99 6257.1 273.34 6257.2 273.69 6257.3 274.05  
 6257.4  
 274.4 6257.5 274.76 6257.6 275.11 6257.7 275.47 6257.8 275.82  
 6257.9  
 276.18 6258 276.53 6258.1 276.89 6258.2 277.24 6258.3 277.6  
 6258.4  
 277.95 6258.5 278.31 6258.6 278.66 6258.7 279.02 6258.8 279.37  
 6258.9  
 279.72 6259 280.08 6259.1 280.43 6259.2 280.79 6259.3 281.14



6259.4								
281.5	6259.5	281.85	6259.6	282.21	6259.7	282.56	6259.8	282.92
6259.9								
283.27	6260	283.63	6260.1	283.98	6260.2	284.34	6260.3	284.69
6260.4								
285.05	6260.5	285.4	6260.6	285.76	6260.7	286.11	6260.8	286.46
6260.9								
286.82	6261	287.17	6261.1	287.53	6261.2	287.88	6261.3	288.24
6261.4								
288.59	6261.5	288.95	6261.6	289.3	6261.7	289.66	6261.8	290.01
6261.9								
290.36	6262	290.71	6262.1	291.06	6262.2	291.41	6262.3	291.77
6262.4								
292.12	6262.5	292.47	6262.6	292.82	6262.7	293.17	6262.8	293.52
6262.9								
293.88	6263	294.23	6263.1	294.58	6263.2	294.93	6263.3	295.28
6263.4								
295.63	6263.5	295.99	6263.6	296.34	6263.7	296.69	6263.8	297.04
6263.9								
297.39	6264	297.74	6264.1	298.1	6264.2	298.45	6264.3	298.8
6264.4								
299.15	6264.5	299.79	6264.6	300	6264.6			

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	134.1	.013
			171.91
			.03

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	134.1	171.91		10	10	10		.1

Ineffective Flow	num=	1
Sta L	Sta R	Elev
190.45	300	6260.62
Left Levee	Station=	43.86
Right Levee	Station=	190.03
		Elevation= 6271.1
		Elevation= 6260.62

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6259.45	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.94	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6258.51	Reach Len. (ft)	10.00
10.00			
Crit W.S. (ft)	6257.55	Flow Area (sq ft)	0.38
133.19			
E. G. Slope (ft/ft)	0.000857	Area (sq ft)	0.38
133.19			
Q Total (cfs)	1037.00	Flow (cfs)	0.21
1036.79			
Top Width (ft)	36.40	Top Width (ft)	1.49
34.92			

Vel Total (ft/s)	7.76	Avg. Vel. (ft/s)	0.56
7.78			
Max Chl Dpth (ft)	6.01	Hydr. Depth (ft)	0.25
3.81			
Conv. Total (cfs)	35416.3	Conv. (cfs)	7.2
35409.1			
Length Wtd. (ft)	10.00	Wetted Per. (ft)	1.57
37.55			
Min Ch El (ft)	6252.50	Shear (lb/sq ft)	0.01
0.19			
Alpha	1.01	Stream Power (lb/ft s)	300.00
43.86	190.03		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.87	0.00		
C & E Loss (ft)	0.04	Cum SA (acres)	0.00
0.27	0.00		

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 979

INPUT									
Description:									
Station	Elevation	Data	num=	455					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6270.9	2.94	6270.9	6.1	6270.8	10.63	6270.8	14.03	
6270.9									
17.42	6271	20.82	6271.1	24.22	6271.2	27.61	6271.3	31.01	
6271.4									
34.4	6271.5	36.29	6271.5	44.55	6271.4	45.67	6271.3	46.79	
6271.2									
47.9	6271.1	49.02	6271	50.14	6270.9	51.26	6270.8	52.38	
6270.7									
53.49	6270.6	54.61	6270.5	55.73	6270.4	56.85	6270.3	57.96	
6270.2									
59.08	6270.1	60.2	6270	61.32	6269.9	62.44	6269.8	63.55	
6269.7									
64.67	6269.6	65.79	6269.5	66.91	6269.4	68.03	6269.3	69.14	
6269.2									
70.26	6269.1	71.38	6269	72.64	6268.9	74.22	6268.8	75.8	
6268.7									
77.38	6268.6	78.96	6268.5	80.55	6268.4	81.99	6268.3	83.34	
6268.2									
84.62	6268.1	85.84	6268	87.06	6267.9	88.27	6267.8	89.49	
6267.7									
90.7	6267.6	91.92	6267.5	93.13	6267.4	94.35	6267.3	95.57	



6267.2								
96.78	6267.1	98	6267	99.21	6266.9	100.43	6266.8	101.64
6266.7								
102.86	6266.6	106.65	6266.5	108.91	6266.4	109.6	6266.3	110.55
6266.2								
110.79	6266.1	110.98	6266	111.17	6265.9	111.36	6265.8	111.55
6265.7								
111.75	6265.6	111.94	6265.5	112.13	6265.4	112.32	6265.3	112.51
6265.2								
112.7	6265.1	112.89	6265	113.08	6264.9	113.33	6264.8	113.59
6264.7								
113.85	6264.6	114.12	6264.5	114.38	6264.4	114.66	6264.3	114.96
6264.2								
115.25	6264.1	115.55	6264	115.84	6263.9	116.13	6263.8	116.43
6263.7								
116.72	6263.6	117.01	6263.5	117.31	6263.4	117.6	6263.3	117.9
6263.2								
118.19	6263.1	118.48	6263	118.78	6262.9	119.07	6262.8	119.36
6262.7								
119.66	6262.6	119.95	6262.5	120.24	6262.4	120.54	6262.3	120.83
6262.2								
121.13	6262.1	121.42	6262	121.71	6261.9	122.01	6261.8	122.3
6261.7								
122.59	6261.6	122.89	6261.5	123.18	6261.4	123.48	6261.3	123.77
6261.2								
124.06	6261.1	124.36	6261	124.65	6260.9	124.94	6260.8	125.24
6260.7								
125.53	6260.6	125.83	6260.5	126.12	6260.4	126.41	6260.3	126.71
6260.2								
127	6260.1	127.29	6260	127.59	6259.9	127.88	6259.8	128.18
6259.7								
128.47	6259.6	128.76	6259.5	129.06	6259.4	129.35	6259.3	129.64
6259.2								
129.94	6259.1	130.23	6259	130.53	6258.9	130.82	6258.8	131.11
6258.7								
131.41	6258.6	131.7	6258.5	131.99	6258.4	132.29	6258.3	132.58
6258.2								
132.88	6258.1	133.17	6258	133.46	6257.9	133.76	6257.8	134.05
6257.7								
134.34	6257.6	134.64	6257.5	134.93	6257.4	135.2	6257.3	135.39
6257.2								
135.59	6257.1	135.78	6257	135.97	6256.9	136.17	6256.8	136.36
6256.7								
136.55	6256.6	136.75	6256.5	136.94	6256.4	137.14	6256.3	137.33
6256.2								
137.52	6256.1	137.72	6256	137.91	6255.9	138.1	6255.8	138.3
6255.7								
138.47	6255.6	138.64	6255.5	138.88	6255.4	139.12	6255.3	139.35
6255.2								
139.59	6255.1	139.82	6255	140.06	6254.9	140.29	6254.8	140.53
6254.7								
140.76	6254.6	141	6254.5	141.2	6254.4	141.37	6254.3	141.55
6254.2								
141.73	6254.1	141.91	6254	142.09	6253.9	142.28	6253.8	142.46

6253.7								
142.64	6253.6	142.82	6253.5	143.01	6253.4	143.19	6253.3	143.37
6253.2								
143.56	6253.1	143.74	6253	143.92	6252.9	144.1	6252.8	144.29
6252.7								
144.47	6252.6	144.65	6252.5	144.84	6252.4	155.18	6252.4	155.38
6252.5								
155.58	6252.6	155.78	6252.7	155.98	6252.8	156.18	6252.9	156.38
6253								
156.58	6253.1	156.78	6253.2	156.98	6253.3	157.18	6253.4	157.38
6253.5								
157.58	6253.6	157.78	6253.7	157.98	6253.8	158.18	6253.9	158.4
6254								
158.63	6254.1	158.86	6254.2	159.1	6254.3	159.33	6254.4	159.57
6254.5								
159.81	6254.6	160.05	6254.7	160.28	6254.8	160.52	6254.9	160.76
6255								
161	6255.1	161.24	6255.2	161.47	6255.3	161.65	6255.4	161.9
6255.5								
162.14	6255.6	162.38	6255.7	162.63	6255.8	162.87	6255.9	163.12
6256								
163.36	6256.1	163.6	6256.2	163.85	6256.3	164.09	6256.4	164.34
6256.5								
164.58	6256.6	164.82	6256.7	165.02	6256.8	165.22	6256.9	165.41
6257								
165.6	6257.1	165.8	6257.2	166	6257.3	166.3	6257.4	166.59
6257.5								
166.89	6257.6	167.19	6257.7	167.49	6257.8	167.78	6257.9	168.08
6258								
168.38	6258.1	168.67	6258.2	168.97	6258.3	169.27	6258.4	169.56
6258.5								
169.86	6258.6	170.16	6258.7	170.46	6258.8	170.75	6258.9	171.05
6259								
171.35	6259.1	171.64	6259.2	171.94	6259.3	172.24	6259.4	172.37
6259.44								
172.53	6259.5	172.83	6259.6	173.13	6259.7	173.42	6259.8	173.72
6259.9								
174.02	6260	174.32	6260.1	176.39	6260.2	181.55	6260.3	186.72
6260.4								
189.88	6260.4	190.58	6260.3	191.29	6260.2	191.99	6260.1	192.7
6260								
193.4	6259.9	194.11	6259.8	194.81	6259.7	195.51	6259.6	196.22
6259.5								
196.92	6259.4	197.63	6259.3	198.33	6259.2	199.04	6259.1	199.74
6259								
200.45	6258.9	201.21	6258.8	202.03	6258.7	202.84	6258.6	203.66
6258.5								
204.47	6258.4	205.3	6258.3	206.14	6258.2	206.98	6258.1	207.82
6258								
208.66	6257.9	209.5	6257.8	210.35	6257.7	211.19	6257.6	212.03
6257.5								
212.87	6257.4	213.71	6257.3	214.57	6257.2	215.43	6257.1	216.29
6257								
217.15	6256.9	218.01	6256.8	218.87	6256.7	219.73	6256.6	220.59



6256.5								
221.45	6256.4	222.31	6256.3	223.17	6256.2	224.03	6256.1	224.88
6256								
225.74	6255.9	226.6	6255.8	227.46	6255.7	228.32	6255.6	229.18
6255.5								
230.04	6255.4	231.02	6255.3	232.84	6255.2	234.66	6255.1	236.07
6255								
237.48	6254.9	238.88	6254.8	241.44	6254.7	243.96	6254.6	245.46
6254.5								
245.57	6254.4	245.68	6254.3	245.79	6254.2	245.9	6254.1	248.24
6254.1								
248.35	6254.2	248.46	6254.3	248.57	6254.4	248.68	6254.5	249.98
6254.6								
252.26	6254.7	254.53	6254.8	256.8	6254.9	259.08	6255	261.35
6255.1								
263.63	6255.2	265.9	6255.3	267.08	6255.4	267.44	6255.5	267.79
6255.6								
268.14	6255.7	268.5	6255.8	268.85	6255.9	269.2	6256	269.56
6256.1								
269.91	6256.2	270.26	6256.3	270.61	6256.4	270.96	6256.5	271.31
6256.6								
271.67	6256.7	272.02	6256.8	272.37	6256.9	272.72	6257	273.07
6257.1								
273.43	6257.2	273.78	6257.3	274.13	6257.4	274.48	6257.5	274.83
6257.6								
275.18	6257.7	275.54	6257.8	275.89	6257.9	276.24	6258	276.59
6258.1								
276.94	6258.2	277.29	6258.3	277.65	6258.4	278	6258.5	278.35
6258.6								
278.7	6258.7	279.05	6258.8	279.4	6258.9	279.76	6259	280.11
6259.1								
280.46	6259.2	280.81	6259.3	281.16	6259.4	281.51	6259.5	281.87
6259.6								
282.22	6259.7	282.57	6259.8	282.92	6259.9	283.27	6260	283.63
6260.1								
283.98	6260.2	284.33	6260.3	284.68	6260.4	285.03	6260.5	285.38
6260.6								
285.74	6260.7	286.09	6260.8	286.44	6260.9	286.79	6261	287.14
6261.1								
287.49	6261.2	287.85	6261.3	288.2	6261.4	288.55	6261.5	288.9
6261.6								
289.25	6261.7	289.6	6261.8	289.96	6261.9	290.31	6262	290.66
6262.1								
291.01	6262.2	291.36	6262.3	291.71	6262.4	292.07	6262.5	292.42
6262.6								
292.77	6262.7	293.12	6262.8	293.47	6262.9	293.83	6263	294.18
6263.1								
294.53	6263.2	294.88	6263.3	295.23	6263.4	295.58	6263.5	295.94
6263.6								
296.29	6263.7	296.64	6263.8	296.99	6263.9	297.34	6264	297.69
6264.1								
298.05	6264.2	298.4	6264.3	298.75	6264.4	299.71	6264.5	300
6264.5								

Manning's n Values		num=	3	n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	133.17	.013	172.37	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	133.17	172.37		8.17	8.17	.1

Ineffective Flow		num=	1
Sta L	Sta R	Elev	Permanent
190.45	300	6260.46	F

Left Levee	Station=	44.28	Elevation=	6271.44
Right Levee	Station=	189.19	Elevation=	6260.41

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6259.40	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.80	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6258.60	Reach Len. (ft)	8.17
8.17			
Crit W. S. (ft)	6257.37	Flow Area (sq ft)	0.52
144.21			
E. G. Slope (ft/ft)	0.000698	Area (sq ft)	0.52
144.21			
Q Total (cfs)	1037.00	Flow (cfs)	0.29
1036.71			
Top Width (ft)	38.42	Top Width (ft)	1.74
36.67			
Vel Total (ft/s)	7.17	Avg. Vel. (ft/s)	0.56
7.19			
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)	0.30
3.93			
Conv. Total (cfs)	39256.2	Conv. (cfs)	11.1
39245.2			
Length Wtd. (ft)	8.17	Wetted Per. (ft)	1.84
39.25			
Min Ch El (ft)	6252.40	Shear (lb/sq ft)	0.01
0.16			
Alpha	1.01	Stream Power (lb/ft s)	300.00
44.28			
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.84			
C & E Loss (ft)	0.08	Cum SA (acres)	0.00
0.26			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.



This may indicate the need for additional cross sections.  
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

# CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 978

## INPUT

Description:

Station	Elevation	Data	num=	429	Elev	Sta	Elev	Sta
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
-30.34	6271.3	-27.74	6271.3	-27.74	6271.4	-26.74	6271.4	-16.96
6271.3								
-7.17	6271.2	2.61	6271.1	12.39	6271	15.69	6270.9	16.81
6270.8								
17.93	6270.7	19.04	6270.6	20.16	6270.5	21.28	6270.4	22.4
6270.3								
23.51	6270.2	24.63	6270.1	25.75	6270	26.87	6269.9	27.99
6269.8								
29.1	6269.7	30.22	6269.6	31.34	6269.5	32.46	6269.4	33.59
6269.3								
35.17	6269.2	36.75	6269.1	38.33	6269	39.91	6268.9	41.49
6268.8								
43.07	6268.7	44.66	6268.6	46.24	6268.5	47.82	6268.4	49.4
6268.3								
50.98	6268.2	52.47	6268.1	53.83	6268	55.18	6267.9	56.53
6267.8								
57.87	6267.7	59.09	6267.6	60.3	6267.5	61.52	6267.4	62.73
6267.3								
63.95	6267.2	65.17	6267.1	66.38	6267	67.6	6266.9	68.81
6266.8								
70.03	6266.7	71.24	6266.6	72.46	6266.5	75.77	6266.4	77.62
6266.3								
78.44	6266.2	79.39	6266.1	80.21	6266	80.4	6265.9	80.59
6265.8								
80.78	6265.7	80.97	6265.6	81.16	6265.5	81.35	6265.4	81.54
6265.3								
81.73	6265.2	81.92	6265.1	82.12	6265	82.32	6264.9	82.58
6264.8								
82.85	6264.7	83.11	6264.6	83.37	6264.5	83.64	6264.4	83.9
6264.3								
84.16	6264.2	84.42	6264.1	84.69	6264	84.95	6263.9	85.21
6263.8								
85.48	6263.7	85.74	6263.6	86	6263.5	86.26	6263.4	86.53
6263.3								
86.79	6263.2	87.05	6263.1	87.32	6263	87.59	6262.9	87.88
6262.8								
88.17	6262.7	88.47	6262.6	88.76	6262.5	89.06	6262.4	89.35
6262.3								
89.64	6262.2	89.94	6262.1	90.23	6262	90.52	6261.9	90.82

6261.8								
91.11	6261.7	91.41	6261.6	91.7	6261.5	91.99	6261.4	92.29
6261.3								
92.58	6261.2	92.87	6261.1	93.17	6261	93.46	6260.9	93.76
6260.8								
94.05	6260.7	94.34	6260.6	94.64	6260.5	94.93	6260.4	95.22
6260.3								
95.52	6260.2	95.81	6260.1	96.11	6260	96.4	6259.9	96.69
6259.8								
96.99	6259.7	97.28	6259.6	97.57	6259.5	97.87	6259.4	98.16
6259.3								
98.46	6259.2	98.75	6259.1	99.04	6259	99.34	6258.9	99.63
6258.8								
99.92	6258.7	100.22	6258.6	100.51	6258.5	100.81	6258.4	101.1
6258.3								
101.39	6258.2	101.69	6258.1	101.98	6258	102.27	6257.9	102.57
6257.8								
102.86	6257.7	103.16	6257.6	103.45	6257.5	103.74	6257.4	104.04
6257.3								
104.13	6257.25	104.23	6257.2	104.42	6257.1	104.62	6257	104.81
6256.9								
105	6256.8	105.2	6256.7	105.39	6256.6	105.58	6256.5	105.78
6256.4								
105.97	6256.3	106.16	6256.2	106.36	6256.1	106.55	6256	106.74
6255.9								
106.94	6255.8	107.13	6255.7	107.32	6255.6	107.52	6255.5	107.71
6255.4								
107.9	6255.3	108.1	6255.2	108.29	6255.1	108.48	6255	108.68
6254.9								
108.87	6254.8	109.06	6254.7	109.26	6254.6	109.45	6254.5	109.64
6254.4								
109.84	6254.3	110.03	6254.2	110.31	6254.1	110.54	6254	110.76
6253.9								
119.06	6253.8	119.07	6253.7	119.1	6253.2	119.12	6252.7	119.14
6252.2								
119.61	6252.25	120.14	6252.3	120.16	6252.7	120.18	6253.2	120.21
6253.7								
120.22	6253.8	128.51	6253.9	128.73	6254	128.96	6254.1	129.28
6254.2								
129.52	6254.3	129.76	6254.4	130.01	6254.5	130.25	6254.6	130.5
6254.7								
130.74	6254.8	130.98	6254.9	131.23	6255	131.47	6255.1	131.71
6255.2								
131.96	6255.3	132.2	6255.4	132.45	6255.5	132.69	6255.6	132.93
6255.7								
133.18	6255.8	133.42	6255.9	133.67	6256	133.91	6256.1	134.15
6256.2								
134.4	6256.3	134.64	6256.4	134.88	6256.5	135.13	6256.6	135.34
6256.7								
135.53	6256.8	135.72	6256.9	135.92	6257	136.11	6257.1	136.31
6257.2								
136.5	6257.3	136.6	6257.35	136.69	6257.4	136.89	6257.5	137.08
6257.6								
137.28	6257.7	137.56	6257.8	137.86	6257.9	138.15	6258	138.45



6258.1								
138.75	6258.2	139.04	6258.3	139.34	6258.4	139.64	6258.5	139.93
6258.6								
140.23	6258.7	140.53	6258.8	140.83	6258.9	141.12	6259	141.42
6259.1								
141.72	6259.2	142.01	6259.3	142.31	6259.4	142.61	6259.5	142.9
6259.6								
143.2	6259.7	143.5	6259.8	143.79	6259.9	144.09	6260	148.69
6260.1								
153.85	6260.2	159.03	6260.3	159.13	6260.3	159.83	6260.2	160.54
6260.1								
161.24	6260	161.95	6259.9	162.65	6259.8	163.36	6259.7	164.06
6259.6								
164.76	6259.5	165.47	6259.4	166.17	6259.3	166.88	6259.2	167.58
6259.1								
168.29	6259	168.99	6258.9	169.7	6258.8	170.4	6258.7	171.11
6258.6								
171.81	6258.5	172.52	6258.4	173.22	6258.3	173.92	6258.2	174.63
6258.1								
175.33	6258	176.04	6257.9	176.74	6257.8	177.45	6257.7	178.15
6257.6								
178.86	6257.5	179.56	6257.4	180.27	6257.3	180.97	6257.2	181.74
6257.1								
182.56	6257	183.37	6256.9	184.19	6256.8	185.01	6256.7	185.82
6256.6								
186.64	6256.5	187.46	6256.4	188.27	6256.3	189.09	6256.2	189.91
6256.1								
190.75	6256	191.59	6255.9	192.43	6255.8	193.27	6255.7	194.12
6255.6								
194.58	6255.6	194.96	6255.5	195.8	6255.4	196.64	6255.3	197.48
6255.2								
199.23	6255.1	201.03	6255	202.82	6254.9	204.62	6254.8	206.42
6254.7								
208.22	6254.6	210.02	6254.5	211.74	6254.4	211.85	6254.3	211.96
6254.2								
212.06	6254.1	212.17	6254	214.48	6254	214.59	6254.1	214.69
6254.2								
214.8	6254.3	214.9	6254.4	215.41	6254	216.81	6254.5	219.12
6254.6								
221.43	6254.7	223.75	6254.8	226.17	6254.9	228.93	6255	231.85
6255.1								
234.78	6255.2	236.37	6255.3	236.72	6255.4	237.07	6255.5	237.42
6255.6								
237.77	6255.7	238.13	6255.8	238.48	6255.9	238.83	6256	239.18
6256.1								
239.53	6256.2	239.88	6256.3	240.23	6256.4	240.59	6256.5	240.94
6256.6								
241.29	6256.7	241.64	6256.8	241.99	6256.9	242.34	6257	242.69
6257.1								
243.05	6257.2	243.4	6257.3	243.75	6257.4	244.1	6257.5	244.45
6257.6								
244.8	6257.7	245.15	6257.8	245.5	6257.9	245.86	6258	246.21
6258.1								
246.56	6258.2	246.91	6258.3	247.26	6258.4	247.61	6258.5	247.96

6258.6								
248.32	6258.7	248.67	6258.8	249.02	6258.9	249.37	6259	249.72
6259.1								
250.07	6259.2	250.42	6259.3	250.78	6259.4	251.13	6259.5	251.48
6259.6								
251.83	6259.7	252.18	6259.8	252.53	6259.9	252.88	6260	253.24
6260.1								
253.59	6260.2	253.94	6260.3	254.29	6260.4	254.64	6260.5	254.99
6260.6								
255.34	6260.7	255.69	6260.8	256.05	6260.9	256.4	6261	256.75
6261.1								
257.1	6261.2	257.45	6261.3	257.8	6261.4	258.15	6261.5	258.51
6261.6								
258.86	6261.7	259.21	6261.8	259.56	6261.9	259.91	6262	260.26
6262.1								
260.61	6262.2	260.97	6262.3	261.32	6262.4	261.67	6262.5	262.02
6262.6								
262.37	6262.7	262.72	6262.8	263.07	6262.9	263.43	6263	263.78
6263.1								
264.13	6263.2	264.48	6263.3	264.83	6263.4	265.18	6263.5	265.53
6263.6								
265.88	6263.7	266.23	6263.8	266.58	6263.9	266.93	6264	267.28
6264.1								
267.62	6264.2	268.08	6264.3	269.08	6264.4	269.66	6264.4	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
-30.34	.03	104.13	.013
			136.6
			.03
Bank Sta:	Left	Right	Lengths:
Expan.			Left Channel
	104.13	136.6	Right
			Coeff Contr.
			.1
.3			
Ineffective Flow	num=	1	
Sta L	Sta R	Elev	Permanent
160.11	269.66	6260.15	F
Left Levee	Station=	77.18	Elevation= 6266.33
Right Levee	Station=	159.69	Elevation= 6260.26

CROSS SECTION OUTPUT	Profile #Flow 1		
E. G. Elev (ft)	6259.31	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	0.030
0.013	0.030		
W. S. Elev (ft)	6257.76	Reach Len. (ft)	12.60
12.60	12.60		
Crit W. S. (ft)	6257.76	Flow Area (sq ft)	0.35
103.57	0.16		
E. G. Slope (ft/ft)	0.001939	Area (sq ft)	0.35
103.57	0.16		
Q Total (cfs)	1037.00	Flow (cfs)	0.29
1036.60	0.11		



Top Width (ft)	34.75	Top Width (ft)	1.44
32.47 0.84			
Vel Total (ft/s)	9.96	Avg. Vel. (ft/s)	0.82
10.01 0.68			
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)	0.25
3.19 0.19			
Conv. Total (cfs)	23551.0	Conv. (cfs)	6.6
23542.0 2.5			
Length Wtd. (ft)	12.60	Wetted Per. (ft)	1.53
36.93 0.94			
Min Ch El (ft)	6252.20	Shear (lb/sq ft)	0.03
0.34 0.02			
Alpha	1.01	Stream Power (lb/ft s)	269.66
77.18 159.69			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.82 0.00			
C & E Loss (ft)	0.00	Cum SA (acres)	0.00
0.25 0.00			

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

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 977

#### INPUT

Description:

Station	Elevation	Data	num=	442					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6270.9	1.28	6270.9	7.94	6270.8	14.61	6270.7	21.27	
6270.6									
27.94	6270.5	36.02	6270.4	45.8	6270.3	47.63	6270.2	48.74	
6270.1									
49.86	6270	50.98	6269.9	52.45	6269.8	54.03	6269.7	55.61	
6269.6									
57.19	6269.5	58.78	6269.4	60.36	6269.3	61.94	6269.2	63.52	
6269.1									

65.1	6269	66.68	6268.9	68.26	6268.8	69.84	6268.7	71.42
6268.6								
73.01	6268.5	74.59	6268.4	76.17	6268.3	77.75	6268.2	79.33
6268.1								
80.91	6268	82.49	6267.9	84.07	6267.8	85.44	6267.7	86.79
6267.6								
88.14	6267.5	89.5	6267.4	90.85	6267.3	92.2	6267.2	93.56
6267.1								
94.87	6267	96.08	6266.9	97.3	6266.8	98.51	6266.7	99.73
6266.6								
100.94	6266.5	102.16	6266.4	103.38	6266.3	106.28	6266.2	107.12
6266.1								
108.06	6266	109	6265.9	109.94	6265.8	110.56	6265.7	110.75
6265.6								
110.94	6265.5	111.13	6265.4	111.33	6265.3	111.52	6265.2	111.71
6265.1								
111.9	6265	112.15	6264.9	112.41	6264.8	112.68	6264.7	112.94
6264.6								
113.2	6264.5	113.46	6264.4	113.73	6264.3	113.99	6264.2	114.25
6264.1								
114.52	6264	114.78	6263.9	115.04	6263.8	115.3	6263.7	115.57
6263.6								
115.83	6263.5	116.09	6263.4	116.36	6263.3	116.62	6263.2	116.88
6263.1								
117.14	6263	117.41	6262.9	117.67	6262.8	117.93	6262.7	118.2
6262.6								
118.46	6262.5	118.72	6262.4	118.98	6262.3	119.25	6262.2	119.51
6262.1								
119.77	6262	120.04	6261.9	120.3	6261.8	120.56	6261.7	120.82
6261.6								
121.09	6261.5	121.35	6261.4	121.61	6261.3	121.87	6261.2	122.14
6261.1								
122.4	6261	122.66	6260.9	122.93	6260.8	123.19	6260.7	123.48
6260.6								
123.78	6260.5	124.07	6260.4	124.37	6260.3	124.66	6260.2	124.95
6260.1								
125.25	6260	125.54	6259.9	125.83	6259.8	126.13	6259.7	126.42
6259.6								
126.72	6259.5	127.01	6259.4	127.3	6259.3	127.6	6259.2	127.89
6259.1								
128.18	6259	128.48	6258.9	128.77	6258.8	129.07	6258.7	129.36
6258.6								
129.65	6258.5	129.95	6258.4	130.24	6258.3	130.53	6258.2	130.83
6258.1								
131.12	6258	131.42	6257.9	131.71	6257.8	132	6257.7	132.3
6257.6								
132.59	6257.5	132.88	6257.4	133.18	6257.3	133.41	6257.2	133.6
6257.1								
133.75	6257.02	133.79	6257	133.99	6256.9	134.18	6256.8	134.37
6256.7								
134.57	6256.6	134.76	6256.5	134.95	6256.4	135.15	6256.3	135.34
6256.2								
135.54	6256.1	135.73	6256	135.92	6255.9	136.12	6255.8	136.31
6255.7								



136.5	6255.6	136.7	6255.5	136.89	6255.4	137.09	6255.3	137.32
6255.2								
137.55	6255.1	137.78	6255	138.01	6254.9	138.24	6254.8	138.47
6254.7								
138.7	6254.6	138.93	6254.5	139.16	6254.4	139.39	6254.3	139.62
6254.2								
139.85	6254.1	140.08	6254	140.31	6253.9	140.56	6253.8	140.81
6253.7								
141.06	6253.6	141.31	6253.5	141.56	6253.4	141.82	6253.3	142.07
6253.2								
142.32	6253.1	142.57	6253	142.82	6252.9	143.07	6252.8	143.32
6252.7								
143.57	6252.6	143.82	6252.5	144.08	6252.4	144.33	6252.3	144.58
6252.2								
144.83	6252.1	155.2	6252.1	155.5	6252.2	155.8	6252.3	156.1
6252.4								
156.4	6252.5	156.71	6252.6	157.01	6252.7	157.31	6252.8	157.61
6252.9								
157.92	6253	158.22	6253.1	158.52	6253.2	158.82	6253.3	159.12
6253.4								
159.43	6253.5	159.72	6253.6	159.96	6253.7	160.19	6253.8	160.43
6253.9								
160.67	6254	160.91	6254.1	161.15	6254.2	161.38	6254.3	161.62
6254.4								
161.86	6254.5	162.1	6254.6	162.34	6254.7	162.57	6254.8	162.81
6254.9								
163.05	6255	163.29	6255.1	163.54	6255.2	163.78	6255.3	164.03
6255.4								
164.27	6255.5	164.51	6255.6	164.76	6255.7	165	6255.8	165.25
6255.9								
165.49	6256	165.73	6256.1	165.98	6256.2	166.22	6256.3	166.46
6256.4								
166.71	6256.5	166.9	6256.6	167.1	6256.7	167.29	6256.8	167.49
6256.9								
167.68	6257	167.87	6257.1	168.07	6257.2	168.26	6257.3	168.46
6257.4								
168.65	6257.5	168.84	6257.6	169.04	6257.7	169.23	6257.8	169.43
6257.9								
169.62	6258	169.81	6258.1	170.01	6258.2	170.2	6258.3	170.43
6258.4								
170.72	6258.5	171.02	6258.6	171.32	6258.7	171.62	6258.8	171.91
6258.9								
172.21	6259	172.51	6259.1	172.8	6259.2	173.1	6259.3	173.4
6259.4								
173.69	6259.5	173.99	6259.6	174.29	6259.7	175.93	6259.8	180.93
6259.9								
186.02	6260	189.97	6260	190.68	6259.9	191.38	6259.8	192.09
6259.7								
192.79	6259.6	193.5	6259.5	194.2	6259.4	194.91	6259.3	195.61
6259.2								
196.32	6259.1	197.02	6259	197.72	6258.9	198.43	6258.8	199.13
6258.7								
199.84	6258.6	200.54	6258.5	201.25	6258.4	201.95	6258.3	202.66
6258.2								

203.36	6258.1	204.07	6258	204.77	6257.9	205.47	6257.8	206.18
6257.7								
206.88	6257.6	207.59	6257.5	208.29	6257.4	209	6257.3	209.7
6257.2								
210.41	6257.1	211.11	6257	211.82	6256.9	212.52	6256.8	213.22
6256.7								
213.93	6256.6	214.63	6256.5	215.34	6256.4	216.04	6256.3	216.75
6256.2								
217.45	6256.1	218.16	6256	218.86	6255.9	219.57	6255.8	220.27
6255.7								
220.97	6255.6	221.64	6255.5	222.28	6255.4	222.91	6255.3	223.55
6255.2								
224.18	6255.1	225.03	6255	226.8	6254.9	227.6	6255.1	228.57
6254.8								
230.34	6254.7	232.1	6254.6	233.87	6254.5	235.63	6254.4	237.4
6254.3								
238.51	6254.2	238.61	6254.1	238.71	6254	238.81	6253.9	238.92
6253.8								
241.08	6253.8	241.18	6253.9	241.28	6254	241.39	6254.1	241.49
6254.2								
243.15	6254.3	246.08	6254.4	249.01	6254.5	251.94	6254.6	254.87
6254.7								
257.8	6254.8	260.73	6254.9	263.66	6255	266.07	6255.1	266.43
6255.2								
266.78	6255.3	267.13	6255.4	267.48	6255.5	267.83	6255.6	268.18
6255.7								
268.53	6255.8	268.89	6255.9	269.24	6256	269.59	6256.1	269.94
6256.2								
270.29	6256.3	270.64	6256.4	270.99	6256.5	271.35	6256.6	271.7
6256.7								
272.05	6256.8	272.4	6256.9	272.75	6257	273.1	6257.1	273.45
6257.2								
273.81	6257.3	274.16	6257.4	274.51	6257.5	274.86	6257.6	275.21
6257.7								
275.56	6257.8	275.91	6257.9	276.26	6258	276.62	6258.1	276.97
6258.2								
277.32	6258.3	277.67	6258.4	278.02	6258.5	278.37	6258.6	278.72
6258.7								
279.08	6258.8	279.43	6258.9	279.78	6259	280.13	6259.1	280.48
6259.2								
280.83	6259.3	281.18	6259.4	281.54	6259.5	281.89	6259.6	282.24
6259.7								
282.59	6259.8	282.94	6259.9	283.29	6260	283.64	6260.1	284
6260.2								
284.35	6260.3	284.7	6260.4	285.05	6260.5	285.4	6260.6	285.75
6260.7								
286.1	6260.8	286.45	6260.9	286.8	6261	287.15	6261.1	287.5
6261.2								
287.85	6261.3	288.19	6261.4	288.54	6261.5	288.89	6261.6	289.24
6261.7								
289.59	6261.8	289.93	6261.9	290.28	6262	290.63	6262.1	290.98
6262.2								
291.33	6262.3	291.67	6262.4	292.02	6262.5	292.37	6262.6	292.72
6262.7								



293.06 6262.8 293.41 6262.9 293.76 6263 294.11 6263.1 294.46  
6263.2  
294.8 6263.3 295.15 6263.4 295.5 6263.5 295.85 6263.6 296.2  
6263.7  
296.54 6263.8 296.89 6263.9 297.24 6264 297.63 6264.1 298.62  
6264.2  
299.62 6264.3 300 6264.3

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 133.75 .013 170.01 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 133.75 170.01 50 50 50 .1

.3  
Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
190.03 300 6259.93 F  
Left Levee Station= 49.73 Elevation= 6270.1  
Right Levee Station= 188.77 Elevation= 6260.04

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6258.30	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.56	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6256.75	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6256.75	Flow Area (sq ft)	
103.48			
E. G. Slope (ft/ft)	0.001795	Area (sq ft)	
103.48			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	32.90	Top Width (ft)	
32.90			
Vel Total (ft/s)	10.02	Avg. Vel. (ft/s)	
10.02			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
3.15			
Conv. Total (cfs)	24475.0	Conv. (cfs)	
24475.0			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
34.77			
Min Ch El (ft)	6252.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00
49.73 188.77			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
0.79			
C & E Loss (ft)	0.02	Cum SA (acres)	

0.24

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 976

#### INPUT

Description:  
Station Elevation Data num= 429  
Sta Elev Sta Elev Sta Elev Sta Elev Sta  
Elev  
0 6268.7 4.23 6268.7 4.99 6268.6 5.75 6268.5 6.5  
6268.4  
22 6268.4 26.98 6268.5 31.96 6268.6 36.94 6268.7 38.49  
6268.8  
39.86 6268.8 41.59 6268.7 43.32 6268.6 45.05 6268.5 46.78  
6268.4  
48.51 6268.3 50.24 6268.2 51.97 6268.1 53.6 6268 55.16  
6267.9  
56.71 6267.8 58.27 6267.7 60.15 6267.6 62.16 6267.5 64.22  
6267.4  
66.31 6267.3 68.4 6267.2 70.49 6267.1 72.58 6267 74.66  
6266.9  
76.75 6266.8 78.84 6266.7 80.93 6266.6 83.02 6266.5 85.1  
6266.4  
87.19 6266.3 89.28 6266.2 91.37 6266.1 93.46 6266 97.27  
6265.9  
101.1 6265.8 104.94 6265.7 106.06 6265.6 106.71 6265.5 107.35  
6265.4  
108 6265.3 108.64 6265.2 109.27 6265.1 109.86 6265 109.99  
6264.9  
110.11 6264.8 110.24 6264.7 110.37 6264.6 110.98 6264.5 111.97  
6264.4  
112.2 6264.3 112.44 6264.2 112.68 6264.1 112.92 6264 113.16  
6263.9  
113.4 6263.8 113.64 6263.7 113.88 6263.6 114.12 6263.5 114.36  
6263.4  
114.59 6263.3 114.83 6263.2 115.07 6263.1 115.34 6263 115.6  
6262.9



115.87	6262.8	116.13	6262.7	116.4	6262.6	116.66	6262.5	116.93
6262.4								
117.19	6262.3	117.46	6262.2	117.72	6262.1	117.99	6262	118.26
6261.9								
118.52	6261.8	118.79	6261.7	119.05	6261.6	119.32	6261.5	119.58
6261.4								
119.85	6261.3	120.11	6261.2	120.38	6261.1	120.64	6261	120.91
6260.9								
121.17	6260.8	121.44	6260.7	121.7	6260.6	121.97	6260.5	122.23
6260.4								
122.5	6260.3	122.76	6260.2	123.03	6260.1	123.29	6260	123.56
6259.9								
123.82	6259.8	124.09	6259.7	124.35	6259.6	124.62	6259.5	124.88
6259.4								
125.15	6259.3	125.41	6259.2	125.68	6259.1	125.94	6259	126.21
6258.9								
126.47	6258.8	126.74	6258.7	127	6258.6	127.27	6258.5	127.53
6258.4								
127.8	6258.3	128.06	6258.2	128.33	6258.1	128.6	6258	128.86
6257.9								
129.13	6257.8	129.39	6257.7	129.66	6257.6	129.92	6257.5	130.19
6257.4								
130.45	6257.3	130.72	6257.2	130.98	6257.1	131.25	6257	131.51
6256.9								
131.76	6256.8	132.01	6256.7	132.26	6256.6	132.51	6256.5	132.76
6256.4								
133.01	6256.3	133.26	6256.2	133.51	6256.1	133.76	6256	134.01
6255.9								
134.26	6255.8	134.51	6255.7	134.76	6255.6	135.01	6255.5	135.26
6255.4								
135.51	6255.3	135.76	6255.2	136.01	6255.1	136.26	6255	136.51
6254.9								
136.76	6254.8	137.01	6254.7	137.26	6254.6	137.51	6254.5	137.76
6254.4								
138.01	6254.3	138.26	6254.2	138.51	6254.1	138.76	6254	139.01
6253.9								
139.26	6253.8	139.51	6253.7	139.76	6253.6	140.01	6253.5	140.26
6253.4								
140.51	6253.3	140.76	6253.2	141.01	6253.1	141.26	6253	141.51
6252.9								
141.76	6252.8	142.01	6252.7	142.26	6252.6	142.51	6252.5	142.76
6252.4								
143.01	6252.3	143.26	6252.2	143.51	6252.1	143.76	6252	144.01
6251.9								
144.26	6251.8	144.51	6251.7	144.76	6251.6	155.29	6251.6	155.59
6251.7								
155.89	6251.8	156.19	6251.9	156.49	6252	156.79	6252.1	157.09
6252.2								
157.39	6252.3	157.69	6252.4	157.99	6252.5	158.29	6252.6	158.59
6252.7								
158.89	6252.8	159.19	6252.9	159.49	6253	159.79	6253.1	160.09
6253.2								
160.39	6253.3	160.69	6253.4	160.99	6253.5	161.29	6253.6	161.59
6253.7								

161.89	6253.8	162.19	6253.9	162.49	6254	162.79	6254.1	163.09
6254.2								
163.39	6254.3	163.69	6254.4	163.99	6254.5	164.29	6254.6	164.59
6254.7								
164.89	6254.8	165.19	6254.9	165.49	6255	165.79	6255.1	166.09
6255.2								
166.39	6255.3	166.69	6255.4	166.99	6255.5	167.29	6255.6	167.59
6255.7								
167.89	6255.8	168.19	6255.9	168.49	6256	168.69	6256.1	168.88
6256.2								
169.07	6256.3	169.27	6256.4	169.46	6256.5	169.66	6256.6	169.85
6256.7								
170.04	6256.8	170.24	6256.9	170.43	6257	170.63	6257.1	170.82
6257.2								
171.01	6257.3	171.18	6257.38	171.21	6257.4	171.4	6257.5	171.6
6257.6								
171.79	6257.7	172	6257.8	172.24	6257.9	172.49	6258	172.73
6258.1								
172.97	6258.2	173.21	6258.3	173.46	6258.4	173.7	6258.5	173.94
6258.6								
174.18	6258.7	174.43	6258.8	177.98	6258.9	182.98	6259	189.51
6259								
190.22	6258.9	190.94	6258.8	191.65	6258.7	192.36	6258.6	193.08
6258.5								
193.79	6258.4	194.5	6258.3	195.22	6258.2	195.93	6258.1	196.64
6258								
197.36	6257.9	198.07	6257.8	198.78	6257.7	199.5	6257.6	200.21
6257.5								
200.92	6257.4	201.64	6257.3	202.35	6257.2	203.06	6257.1	203.78
6257								
204.49	6256.9	205.2	6256.8	205.92	6256.7	206.63	6256.6	207.34
6256.5								
208.06	6256.4	208.77	6256.3	209.48	6256.2	210.2	6256.1	210.91
6256								
211.62	6255.9	212.34	6255.8	213.05	6255.7	213.76	6255.6	214.48
6255.5								
215.19	6255.4	215.9	6255.3	216.62	6255.2	217.33	6255.1	218.05
6255								
218.8	6254.9	219.55	6254.8	220.29	6254.7	221.04	6254.6	221.77
6254.5								
222.44	6254.4	224.05	6254.3	226.08	6254.2	228.12	6254.1	230.14
6254								
232.15	6253.9	233.41	6254	234.16	6253.8	236.06	6253.8	236.17
6253.7								
238.08	6253.6	238.18	6253.5	238.28	6253.4	238.38	6253.3	238.48
6253.2								
240.5	6253.4	240.67	6253.2	240.77	6253.3	240.87	6253.4	240.97
6253.5								
241.07	6253.6	243.85	6253.7	246.69	6253.8	249.53	6253.9	252.33
6254								
255.13	6254.1	257.89	6254.2	260.62	6254.3	263.37	6254.4	264.06
6254.5								
264.41	6254.6	264.76	6254.7	265.11	6254.8	265.46	6254.9	265.8
6255								



266.15	6255.1	266.5	6255.2	266.85	6255.3	267.2	6255.4	267.54
6255.5								
267.89	6255.6	268.24	6255.7	268.59	6255.8	268.94	6255.9	269.28
6256								
269.63	6256.1	269.98	6256.2	270.33	6256.3	270.68	6256.4	271.02
6256.5								
271.37	6256.6	271.72	6256.7	272.07	6256.8	272.42	6256.9	272.76
6257								
273.11	6257.1	273.46	6257.2	273.81	6257.3	274.16	6257.4	274.51
6257.5								
274.85	6257.6	275.2	6257.7	275.55	6257.8	275.9	6257.9	276.25
6258								
276.59	6258.1	276.94	6258.2	277.29	6258.3	277.64	6258.4	277.98
6258.5								
278.33	6258.6	278.68	6258.7	279.03	6258.8	279.38	6258.9	279.72
6259								
280.07	6259.1	280.42	6259.2	280.77	6259.3	281.12	6259.4	281.46
6259.5								
281.81	6259.6	282.16	6259.7	282.51	6259.8	282.86	6259.9	283.2
6260								
283.55	6260.1	283.9	6260.2	284.25	6260.3	284.59	6260.4	284.94
6260.5								
285.29	6260.6	285.64	6260.7	285.99	6260.8	286.33	6260.9	286.68
6261								
287.03	6261.1	287.38	6261.2	287.73	6261.3	288.07	6261.4	288.42
6261.5								
288.77	6261.6	289.12	6261.7	289.46	6261.8	289.81	6261.9	290.16
6262								
290.51	6262.1	290.86	6262.2	291.2	6262.3	291.55	6262.4	291.9
6262.5								
292.25	6262.6	292.6	6262.7	292.94	6262.8	293.29	6262.9	293.64
6263								
293.99	6263.1	294.34	6263.2	294.71	6263.3	295.7	6263.4	296.69
6263.5								
297.69	6263.6	298.68	6263.7	299.67	6263.8	300	6263.8	

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	131.25	.013	171.18	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	131.25	171.18		50	50		.1

Ineffective Flow			num= 1		
Sta L	Sta R	Elev	Permanent	F	
188.77	300	6259.01			
Left Levee	Station=	40.09	Elevation=	6268.9	
Right Levee	Station=	189.61	Elevation=	6258.91	

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6257.67	Element	Left OB
-----------------	---------	---------	---------

Channel	Right OB			
Vel Head (ft)	1.48	Wt. n-Val.		
0.013				
W. S. Elev (ft)	6256.19	Reach Len. (ft)	50.00	
50.00	50.00			
Crit W. S. (ft)	6256.19	Flow Area (sq ft)		
106.20				
E. G. Slope (ft/ft)	0.001803	Area (sq ft)		
106.20				
Q Total (cfs)	1037.00	Flow (cfs)		
1037.00				
Top Width (ft)	35.57	Top Width (ft)		
35.57				
Vel Total (ft/s)	9.76	Avg. Vel. (ft/s)		
9.76				
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		
2.99				
Conv. Total (cfs)	24422.0	Conv. (cfs)		
24422.0				
Length Wtd. (ft)	50.00	Wetted Per. (ft)		
37.21				
Min Ch El (ft)	6251.60	Shear (lb/sq ft)		
0.32				
Alpha	1.00	Stream Power (lb/ft s)	300.00	
40.09	189.61			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01	
0.67				
C & E Loss (ft)	0.00	Cum SA (acres)		
0.21				

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 975

INPUT  
 Description:  
 Station Elevation Data num= 394  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev								



0	6266.6	.89	6266.6	2.59	6266.5	6.55	6266.4	11.67	
6266.4	19.4	6266.3	30.05	6266.2	36.51	6266.1	46.74	6266	63.04
6265.9	80.29	6265.8	90.31	6265.7	98	6265.6	100.65	6265.5	103.3
6265.4	105.96	6265.3	106.45	6265.2	106.74	6265.1	107.04	6265	107.33
6264.9	107.63	6264.8	107.92	6264.7	108.22	6264.6	108.51	6264.5	108.81
6264.4	109.11	6264.3	109.4	6264.2	109.7	6264.1	109.99	6264	110.29
6263.9	110.58	6263.8	110.88	6263.7	111.17	6263.6	111.47	6263.5	111.76
6263.4	112.06	6263.3	112.35	6263.2	112.65	6263.1	112.95	6263	113.24
6262.9	113.54	6262.8	113.83	6262.7	114.13	6262.6	114.42	6262.5	114.72
6262.4	115.01	6262.3	115.31	6262.2	115.6	6262.1	115.9	6262	116.2
6261.9	116.49	6261.8	116.79	6261.7	117.08	6261.6	117.38	6261.5	117.67
6261.4	117.97	6261.3	118.26	6261.2	118.56	6261.1	118.85	6261	119.15
6260.9	119.44	6260.8	119.74	6260.7	120.04	6260.6	120.34	6260.5	120.64
6260.4	120.94	6260.3	121.24	6260.2	121.55	6260.1	121.85	6260	122.15
6259.9	122.46	6259.8	122.76	6259.7	123.03	6259.6	123.3	6259.5	123.56
6259.4	123.83	6259.3	124.09	6259.2	124.36	6259.1	124.62	6259	124.89
6258.9	125.15	6258.8	125.42	6258.7	125.68	6258.6	125.95	6258.5	126.21
6258.4	126.48	6258.3	126.74	6258.2	127.01	6258.1	127.27	6258	127.54
6257.9	127.8	6257.8	128.07	6257.7	128.33	6257.6	128.6	6257.5	128.86
6257.4	129.13	6257.3	129.39	6257.2	129.66	6257.1	129.92	6257	130.19
6256.9	130.46	6256.8	130.72	6256.7	130.99	6256.6	131.25	6256.5	131.51
6256.4	131.76	6256.3	132.01	6256.2	132.26	6256.1	132.51	6256	132.76
6255.9	133.01	6255.8	133.26	6255.7	133.51	6255.6	133.76	6255.5	134.01
6255.4	134.26	6255.3	134.51	6255.2	134.76	6255.1	135.01	6255	135.26
6254.9	135.51	6254.8	135.76	6254.7	136.01	6254.6	136.26	6254.5	136.51
6254.4	136.76	6254.3	137.01	6254.2	137.26	6254.1	137.51	6254	137.76
6253.9	138.01	6253.8	138.26	6253.7	138.51	6253.6	138.76	6253.5	139.01
6253.4									

139.26	6253.3	139.51	6253.2	139.76	6253.1	140.01	6253	140.26	
6252.9	140.51	6252.8	140.76	6252.7	141.01	6252.6	141.26	6252.5	141.51
6252.4	141.76	6252.3	142.01	6252.2	142.26	6252.1	142.51	6252	142.76
6251.9	143.01	6251.8	143.26	6251.7	143.51	6251.6	143.76	6251.5	144.01
6251.4	144.26	6251.3	144.51	6251.2	144.76	6251.1	155.28	6251.1	155.58
6251.2	155.88	6251.3	156.18	6251.4	156.48	6251.5	156.78	6251.6	157.08
6251.7	157.38	6251.8	157.68	6251.9	157.98	6252	158.28	6252.1	158.58
6252.2	158.88	6252.3	159.18	6252.4	159.48	6252.5	159.78	6252.6	160.08
6252.7	160.38	6252.8	160.68	6252.9	160.98	6253	161.28	6253.1	161.58
6253.2	161.88	6253.3	162.18	6253.4	162.48	6253.5	162.78	6253.6	163.08
6253.7	163.38	6253.8	163.68	6253.9	163.98	6254	164.28	6254.1	164.58
6254.2	164.88	6254.3	165.18	6254.4	165.48	6254.5	165.78	6254.6	166.08
6254.7	166.38	6254.8	166.68	6254.9	166.98	6255	167.28	6255.1	167.58
6255.2	167.88	6255.3	168.18	6255.4	168.48	6255.5	168.73	6255.6	168.97
6255.7	169.21	6255.8	169.46	6255.9	169.7	6256	169.94	6256.1	170.18
6256.2	170.42	6256.3	170.65	6256.4	170.88	6256.5	171.11	6256.6	171.34
6256.7	171.57	6256.8	171.8	6256.9	172.03	6257	172.26	6257.1	172.42
6257.17	172.49	6257.2	172.71	6257.3	172.94	6257.4	173.17	6257.5	173.4
6257.6	173.63	6257.7	173.86	6257.8	174.09	6257.9	174.32	6258	189.98
6258	190.57	6257.9	191.17	6257.8	191.76	6257.7	192.36	6257.6	192.96
6257.5	193.55	6257.4	194.15	6257.3	194.75	6257.2	195.34	6257.1	195.94
6257	196.53	6256.9	197.13	6256.8	197.73	6256.7	198.32	6256.6	198.92
6256.5	199.51	6256.4	200.11	6256.3	200.71	6256.2	201.3	6256.1	201.9
6256	202.49	6255.9	203.09	6255.8	203.69	6255.7	204.28	6255.6	204.88
6255.5	205.47	6255.4	206.07	6255.3	206.67	6255.2	207.26	6255.1	207.86
6255	208.45	6254.9	209.05	6254.8	209.65	6254.7	210.21	6254.6	210.74
6254.5	211.27	6254.4	211.81	6254.3	212.34	6254.2	212.87	6254.1	213.4
6254									



213.94	6253.9	214.45	6253.9	214.47	6253.8	215	6253.7	215.53
6253.6								
216.07	6253.5	218.27	6253.4	220.85	6253.3	223.17	6253.2	226
6253.1								
228.82	6253	230.37	6252.9	230.48	6252.8	230.58	6252.7	230.68
6252.6								
230.79	6252.5	231.66	6253	232.96	6252.5	233.06	6252.6	233.17
6252.7								
233.2	6252.7	233.27	6252.8	233.37	6252.9	235.03	6253	238.76
6253.1								
242.49	6253.2	245.31	6253.3	246.22	6253.3	249.96	6253.4	253.69
6253.5								
256.95	6253.6	260.02	6253.7	261.71	6253.8	262.06	6253.9	262.41
6254								
262.76	6254.1	263.11	6254.2	263.46	6254.3	263.81	6254.4	264.16
6254.5								
264.51	6254.6	264.86	6254.7	265.21	6254.8	265.56	6254.9	265.91
6255								
266.26	6255.1	266.61	6255.2	266.96	6255.3	267.31	6255.4	267.66
6255.5								
268.01	6255.6	268.36	6255.7	268.71	6255.8	269.06	6255.9	269.41
6256								
269.76	6256.1	270.11	6256.2	270.46	6256.3	270.81	6256.4	271.16
6256.5								
271.51	6256.6	271.86	6256.7	272.21	6256.8	272.56	6256.9	272.91
6257								
273.26	6257.1	273.61	6257.2	273.96	6257.3	274.31	6257.4	274.66
6257.5								
275.01	6257.6	275.36	6257.7	275.71	6257.8	276.06	6257.9	276.41
6258								
276.77	6258.1	277.12	6258.2	277.47	6258.3	277.82	6258.4	278.17
6258.5								
278.52	6258.6	278.87	6258.7	279.22	6258.8	279.57	6258.9	279.92
6259								
280.27	6259.1	280.62	6259.2	280.97	6259.3	281.32	6259.4	281.67
6259.5								
282.02	6259.6	282.38	6259.7	282.73	6259.8	283.08	6259.9	283.43
6260								
283.78	6260.1	284.13	6260.2	284.48	6260.3	284.84	6260.4	285.19
6260.5								
285.54	6260.6	285.89	6260.7	286.24	6260.8	286.59	6260.9	286.94
6261								
287.3	6261.1	287.65	6261.2	288	6261.3	288.35	6261.4	288.7
6261.5								
289.05	6261.6	289.4	6261.7	289.76	6261.8	290.11	6261.9	290.46
6262								
290.81	6262.1	291.16	6262.2	291.51	6262.3	292.03	6262.4	293.02
6262.5								
294.01	6262.6	295	6262.7	295.99	6262.8	300	6262.8	
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	129.92	.013	172.42	.03			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	129.92	172.42		22.55	22.55		.1
.3							
Ineffective Flow	num=	1					
Sta L	Sta R	Elev	Permanent				
189.61	300	6258	F				
Left Levee	Station=	105.43	Elevation=	6265.35			
Right Levee	Station=	189.61	Elevation=	6258.09			

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6257.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6255.68	Reach Len. (ft)	22.55
22.55	22.55		
Crit W. S. (ft)	6255.68	Flow Area (sq ft)	
105.88			
E. G. Slope (ft/ft)	0.001823	Area (sq ft)	
105.88			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.61	Top Width (ft)	
35.61			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24286.3	Conv. (cfs)	
24286.3			
Length Wtd. (ft)	22.55	Wetted Per. (ft)	
37.25			
Min Ch El (ft)	6251.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.43	189.61		
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.54			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.16			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.



Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

# CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 974

## INPUT

Description:

Station	Elevation	Data	num=	373					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
-36.1	6266.4	-34.2	6266.4	-32.49	6266.3	-30.79	6266.2	-29.08	
6266.1									
-27.38	6266	-25.67	6265.9	-16.94	6265.8	-6.87	6265.7	.13	
6265.6									
5.11	6265.5	8.1	6265.4	11.09	6265.3	25.97	6265.2	47.98	
6265.1									
59.67	6265	68.84	6264.9	69.15	6264.8	69.45	6264.7	69.76	
6264.6									
70.06	6264.5	70.37	6264.4	70.67	6264.3	70.98	6264.2	71.28	
6264.1									
71.59	6264	71.89	6263.9	72.19	6263.8	72.5	6263.7	72.8	
6263.6									
73.11	6263.5	73.41	6263.4	73.72	6263.3	74.02	6263.2	74.33	
6263.1									
74.63	6263	74.94	6262.9	75.24	6262.8	75.55	6262.7	75.85	
6262.6									
76.15	6262.5	76.46	6262.4	76.76	6262.3	77.07	6262.2	77.37	
6262.1									
77.68	6262	77.98	6261.9	78.29	6261.8	78.59	6261.7	78.9	
6261.6									
79.2	6261.5	79.5	6261.4	79.81	6261.3	80.11	6261.2	80.42	
6261.1									
80.72	6261	81.03	6260.9	81.33	6260.8	81.64	6260.7	81.94	
6260.6									
82.25	6260.5	82.55	6260.4	82.86	6260.3	83.16	6260.2	83.46	
6260.1									
83.77	6260	84.07	6259.9	84.38	6259.8	84.68	6259.7	84.99	
6259.6									
85.29	6259.5	85.6	6259.4	85.9	6259.3	86.21	6259.2	86.51	
6259.1									
86.81	6259	87.12	6258.9	87.42	6258.8	87.73	6258.7	88.03	
6258.6									
88.34	6258.5	88.64	6258.4	88.95	6258.3	89.25	6258.2	89.56	
6258.1									
89.86	6258	90.17	6257.9	90.47	6257.8	90.77	6257.7	91.08	
6257.6									
91.38	6257.5	91.69	6257.4	91.99	6257.3	92.3	6257.2	92.6	
6257.1									
92.91	6257	93.21	6256.9	93.52	6256.8	93.82	6256.7	94.12	
6256.6									

94.43	6256.5	94.73	6256.4	95.04	6256.3	95.34	6256.2	95.6	
6256.1									
95.85	6256	96.1	6255.9	96.35	6255.8	96.6	6255.7	96.85	
6255.6									
97.1	6255.5	97.35	6255.4	97.6	6255.3	97.85	6255.2	98.1	
6255.1									
98.35	6255	98.6	6254.9	98.85	6254.8	99.1	6254.7	99.35	
6254.6									
99.6	6254.5	99.85	6254.4	100.1	6254.3	100.35	6254.2	100.6	
6254.1									
100.85	6254	101.1	6253.9	101.35	6253.8	101.6	6253.7	101.85	
6253.6									
102.1	6253.5	102.35	6253.4	102.6	6253.3	102.85	6253.2	103.1	
6253.1									
103.35	6253	103.6	6252.9	103.85	6252.8	104.1	6252.7	104.35	
6252.6									
104.6	6252.5	104.85	6252.4	105.1	6252.3	105.35	6252.2	105.6	
6252.1									
105.85	6252	106.1	6251.9	106.35	6251.8	106.6	6251.7	106.85	
6251.6									
107.1	6251.5	107.35	6251.4	107.6	6251.3	107.85	6251.2	108.1	
6251.1									
108.35	6251	108.6	6250.9	108.85	6250.8	118.96	6250.8	119.26	
6250.9									
119.56	6251	119.86	6251.1	120.16	6251.2	120.46	6251.3	120.76	
6251.4									
121.06	6251.5	121.36	6251.6	121.66	6251.7	121.96	6251.8	122.26	
6251.9									
122.56	6252	122.86	6252.1	123.16	6252.2	123.46	6252.3	123.76	
6252.4									
124.06	6252.5	124.36	6252.6	124.66	6252.7	124.96	6252.8	125.26	
6252.9									
125.56	6253	125.86	6253.1	126.16	6253.2	126.46	6253.3	126.76	
6253.4									
127.06	6253.5	127.36	6253.6	127.66	6253.7	127.96	6253.8	128.26	
6253.9									
128.56	6254	128.86	6254.1	129.16	6254.2	129.46	6254.3	129.76	
6254.4									
130.06	6254.5	130.36	6254.6	130.66	6254.7	130.96	6254.8	131.26	
6254.9									
131.56	6255	131.86	6255.1	132.16	6255.2	132.47	6255.3	132.87	
6255.4									
133.26	6255.5	133.65	6255.6	134.05	6255.7	134.44	6255.8	134.83	
6255.9									
135.22	6256	135.62	6256.1	136.01	6256.2	136.4	6256.3	136.8	
6256.4									
137.19	6256.5	137.58	6256.6	137.97	6256.7	138.37	6256.8	153.49	
6256.8									
154.19	6256.7	154.88	6256.6	155.58	6256.5	156.24	6256.4	156.77	
6256.3									
157.3	6256.2	157.83	6256.1	158.36	6256	158.89	6255.9	159.45	
6255.8									
160.13	6255.7	160.48	6256	160.81	6255.6	161.49	6255.5	162.17	
6255.4									



162.85	6255.3	162.91	6255.8	163.53	6255.2	164.21	6255.1	164.89
6255								
165.57	6254.9	166.24	6254.8	166.92	6254.7	167.6	6254.6	168.28
6254.5								
168.96	6254.4	169.64	6254.3	170.32	6254.2	171	6254.1	171.68
6254								
172.36	6253.9	173.04	6253.8	173.72	6253.7	174.39	6253.6	175.07
6253.5								
175.75	6253.4	176.43	6253.3	177.11	6253.2	177.79	6253.1	178.47
6253								
181.55	6252.9	184.72	6252.8	187.88	6252.7	189.4	6252.6	189.5
6252.5								
189.6	6252.4	189.7	6252.3	189.8	6252.2	191.91	6252.2	192.01
6252.3								
192.11	6252.4	192.21	6252.5	192.22	6252.6	192.31	6252.6	193.56
6252.7								
196.41	6252.8	199.27	6252.9	202.13	6253	204.99	6253.1	207.84
6253.2								
210.7	6253.3	213.58	6253.4	216.46	6253.5	219.49	6253.6	222.87
6253.7								
224.61	6253.8	224.98	6253.9	225.34	6254	225.71	6254.1	226.07
6254.2								
226.44	6254.3	226.8	6254.4	227.16	6254.5	227.53	6254.6	227.89
6254.7								
228.26	6254.8	228.62	6254.9	228.99	6255	229.35	6255.1	229.71
6255.2								
230.08	6255.3	230.44	6255.4	230.81	6255.5	231.17	6255.6	231.54
6255.7								
231.9	6255.8	232.27	6255.9	232.63	6256	232.99	6256.1	233.36
6256.2								
233.72	6256.3	234.09	6256.4	234.45	6256.5	234.82	6256.6	235.18
6256.7								
235.54	6256.8	235.91	6256.9	236.27	6257	236.64	6257.1	237
6257.2								
237.37	6257.3	237.73	6257.4	238.09	6257.5	238.46	6257.6	238.82
6257.7								
239.19	6257.8	239.55	6257.9	239.92	6258	240.28	6258.1	240.65
6258.2								
241.02	6258.3	241.39	6258.4	241.75	6258.5	242.12	6258.6	242.49
6258.7								
242.86	6258.8	243.23	6258.9	243.6	6259	243.97	6259.1	244.33
6259.2								
244.7	6259.3	245.07	6259.4	245.44	6259.5	245.81	6259.6	246.18
6259.7								
246.54	6259.8	246.91	6259.9	247.28	6260	247.65	6260.1	248.02
6260.2								
248.39	6260.3	248.75	6260.4	249.12	6260.5	249.49	6260.6	249.86
6260.7								
250.23	6260.8	250.6	6260.9	250.96	6261	251.33	6261.1	251.7
6261.2								
252.07	6261.3	252.44	6261.4	252.81	6261.5	253.17	6261.6	253.54
6261.7								
253.91	6261.8	254.28	6261.9	255.13	6262	256.12	6262.1	257.11
6262.2								

258.1	6262.3	259.09	6262.4	263.9	6262.4	
Manning's n Values						
Sta	n Val	Sta	n Val	Sta	n Val	
-36.1	.03	92.91	.013	138.37	.03	
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.						
Expan.	92.91	138.37		19.92	19.92	19.92
.3						.1
Ineffective Flow num= 1						
Sta L	Sta R	Elev	Permanent			
153.51	263.9	6256.67	F			
Left Levee Station= 68.91 Elevation= 6264.88						
Right Levee Station= 153.51 Elevation= 6256.85						

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6256.92	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6255.45	Reach Len. (ft)	19.92
19.92 19.92			
Crit W. S. (ft)	6255.45	Flow Area (sq ft)	
106.50			
E. G. Slope (ft/ft)	0.001804	Area (sq ft)	
106.50			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24417.2	Conv. (cfs)	
24417.2			
Length Wtd. (ft)	19.92	Wetted Per. (ft)	
37.49			
Min Ch El (ft)	6250.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	263.90
68.91 153.51			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.49			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.15			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth



for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

# CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-0- RS: 973

## INPUT

Description:

Station	Elevation	Data	num=	390					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
-32.18	6266.2	-29.67	6266.2	-26.39	6266.1	-24.69	6266	-22.99	
6265.9									
-21.29	6265.8	-13.57	6265.7	-2.85	6265.6	1.97	6265.5	5.36	
6265.4									
8.45	6265.3	11.39	6265.2	14.33	6265.1	17.27	6265	20.21	
6264.9									
23.16	6264.8	34.13	6264.7	51.24	6264.6	67.2	6264.5	72.15	
6264.4									
72.48	6264.3	72.81	6264.2	73.14	6264.1	73.47	6264	73.8	
6263.9									
74.13	6263.8	74.46	6263.7	74.79	6263.6	75.12	6263.5	75.45	
6263.4									
75.78	6263.3	76.11	6263.2	76.44	6263.1	76.77	6263	77.1	
6262.9									
77.43	6262.8	77.76	6262.7	78.09	6262.6	78.42	6262.5	78.75	
6262.4									
79.08	6262.3	79.41	6262.2	79.74	6262.1	80.07	6262	80.4	
6261.9									
80.73	6261.8	81.05	6261.7	81.37	6261.6	81.69	6261.5	82.01	
6261.4									
82.32	6261.3	82.64	6261.2	82.96	6261.1	83.28	6261	83.6	
6260.9									
83.92	6260.8	84.24	6260.7	84.56	6260.6	84.87	6260.5	85.19	
6260.4									
85.51	6260.3	85.83	6260.2	86.15	6260.1	86.47	6260	86.79	
6259.9									
87.11	6259.8	87.42	6259.7	87.74	6259.6	88.06	6259.5	88.38	
6259.4									
88.7	6259.3	89.02	6259.2	89.34	6259.1	89.66	6259	89.97	
6258.9									
90.29	6258.8	90.61	6258.7	90.93	6258.6	91.25	6258.5	91.57	
6258.4									
91.89	6258.3	92.21	6258.2	92.52	6258.1	92.84	6258	93.16	
6257.9									

93.48	6257.8	93.8	6257.7	94.12	6257.6	94.44	6257.5	94.76	
6257.4									
95.07	6257.3	95.39	6257.2	95.71	6257.1	96.03	6257	96.35	
6256.9									
96.67	6256.8	96.99	6256.7	97.31	6256.6	97.62	6256.5	97.94	
6256.4									
98.26	6256.3	98.58	6256.2	98.9	6256.1	99.22	6256	99.48	
6255.9									
99.73	6255.8	99.98	6255.7	100.23	6255.6	100.48	6255.5	100.73	
6255.4									
100.98	6255.3	101.23	6255.2	101.48	6255.1	101.73	6255	101.98	
6254.9									
102.23	6254.8	102.48	6254.7	102.73	6254.6	102.98	6254.5	103.23	
6254.4									
103.48	6254.3	103.73	6254.2	103.98	6254.1	104.23	6254	104.48	
6253.9									
104.73	6253.8	104.98	6253.7	105.23	6253.6	105.48	6253.5	105.73	
6253.4									
105.98	6253.3	106.23	6253.2	106.48	6253.1	106.73	6253	106.98	
6252.9									
107.23	6252.8	107.48	6252.7	107.73	6252.6	107.98	6252.5	108.23	
6252.4									
108.48	6252.3	108.73	6252.2	108.98	6252.1	109.23	6252	109.48	
6251.9									
109.73	6251.8	109.98	6251.7	110.23	6251.6	110.48	6251.5	110.73	
6251.4									
110.98	6251.3	111.23	6251.2	111.48	6251.1	111.73	6251	111.98	
6250.9									
112.23	6250.8	112.48	6250.7	112.73	6250.6	122.82	6250.6	123.12	
6250.7									
123.42	6250.8	123.73	6250.9	124.03	6251	124.33	6251.1	124.63	
6251.2									
124.93	6251.3	125.23	6251.4	125.53	6251.5	125.83	6251.6	126.13	
6251.7									
126.43	6251.8	126.73	6251.9	127.03	6252	127.33	6252.1	127.63	
6252.2									
127.94	6252.3	128.24	6252.4	128.54	6252.5	128.84	6252.6	129.14	
6252.7									
129.44	6252.8	129.74	6252.9	130.04	6253	130.34	6253.1	130.64	
6253.2									
130.93	6253.3	131.23	6253.4	131.53	6253.5	131.83	6253.6	132.13	
6253.7									
132.43	6253.8	132.73	6253.9	133.03	6254	133.33	6254.1	133.63	
6254.2									
133.93	6254.3	134.23	6254.4	134.53	6254.5	134.83	6254.6	135.13	
6254.7									
135.42	6254.8	135.72	6254.9	136.02	6255	136.34	6255.1	136.74	
6255.2									
137.14	6255.3	137.53	6255.4	137.93	6255.5	138.33	6255.6	138.73	
6255.7									
139.13	6255.8	139.52	6255.9	139.92	6256	140.3	6256.1	140.67	
6256.2									
141.03	6256.3	141.4	6256.4	141.76	6256.5	142.13	6256.6	157.52	
6256.6									



158.14	6256.5	158.74	6256.4	159.35	6256.3	159.95	6256.2	160.56
6256.1								
161.16	6256	161.77	6255.9	162.37	6255.8	162.97	6255.7	163.58
6255.6								
164.18	6255.5	164.79	6255.4	165.39	6255.3	165.99	6255.2	166.6
6255.1								
167.2	6255	167.81	6254.9	168.41	6254.8	169.01	6254.7	169.62
6254.6								
170.22	6254.5	170.83	6254.4	171.43	6254.3	172.04	6254.2	172.64
6254.1								
173.24	6254	173.85	6253.9	174.45	6253.8	175.06	6253.7	175.66
6253.6								
176.28	6253.5	176.97	6253.4	177.66	6253.3	178.35	6253.2	179.04
6253.1								
179.73	6253	180.42	6252.9	181.11	6252.8	181.8	6252.7	183.25
6252.6								
184.35	6252.6	186.62	6252.5	188.78	6252.5	191.04	6252.4	192.75
6252.3								
192.85	6252.2	192.95	6252.1	193.05	6252	193.15	6251.9	195.22
6251.9								
195.32	6252	195.42	6252.1	195.52	6252.2	195.62	6252.3	196.1
6252.4								
197.26	6252.5	198.54	6252.6	199.91	6252.7	201.33	6252.8	202.79
6252.9								
205.51	6253	206.35	6253	206.64	6252.9	206.93	6252.8	207.22
6252.7								
207.51	6252.6	209.91	6252.7	210.76	6252.6	213.29	6252.7	213.55
6252.8								
213.81	6252.9	214.07	6253	214.33	6253.1	214.42	6253.1	214.82
6253.2								
216.45	6253.3	219.57	6253.4	222.69	6253.5	223.03	6254.3	223.53
6254.2								
224.03	6254.1	224.51	6254	225.19	6253.6	225.38	6253.7	225.44
6253.8								
225.51	6253.9	225.58	6254	225.65	6254.1	225.72	6254.2	225.79
6254.3								
227.13	6254.3	227.25	6254.4	228.62	6254.3	228.97	6254.4	229.32
6254.5								
229.67	6254.6	230.02	6254.7	230.37	6254.8	230.78	6254.9	231.19
6255								
231.61	6255.1	232.03	6255.2	232.44	6255.3	232.86	6255.4	233.28
6255.5								
233.69	6255.6	234.11	6255.7	234.53	6255.8	234.94	6255.9	235.36
6256								
235.78	6256.1	236.19	6256.2	236.61	6256.3	237.03	6256.4	237.44
6256.5								
237.86	6256.6	238.28	6256.7	238.69	6256.8	239.11	6256.9	239.53
6257								
239.94	6257.1	240.36	6257.2	240.78	6257.3	241.19	6257.4	241.61
6257.5								
242.03	6257.6	242.44	6257.7	242.86	6257.8	243.27	6257.9	243.67
6258								
244.07	6258.1	244.47	6258.2	244.87	6258.3	245.27	6258.4	245.67
6258.5								

246.07	6258.6	246.47	6258.7	246.87	6258.8	247.27	6258.9	247.67
6259								
248.07	6259.1	248.47	6259.2	248.87	6259.3	249.27	6259.4	249.67
6259.5								
250.07	6259.6	250.47	6259.7	250.87	6259.8	251.27	6259.9	251.67
6260								
252.07	6260.1	252.46	6260.2	252.86	6260.3	253.26	6260.4	253.66
6260.5								
254.06	6260.6	254.46	6260.7	254.86	6260.8	255.26	6260.9	255.66
6261								
256.06	6261.1	256.46	6261.2	256.86	6261.3	257.26	6261.4	258.17
6261.5								
259.17	6261.6	260.17	6261.7	261.16	6261.8	262.16	6261.9	267.82
6261.9								

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
-32.18	.03	97.62	.013
		140.3	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.						
	97.62	140.3		7.53	7.53	.1

Ineffective Flow	num=	1
Sta L	Sta R	Elev Permanent
157.85	267.82	6256.56
		F
Left Levee	Station=	72.83
Right Levee	Station=	156.59
		Elevation= 6264.32
		Elevation= 6256.65

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6256.72	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.47	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6255.25	Reach Len. (ft)	7.53
7.53	7.53		
Crit W. S. (ft)	6255.25	Flow Area (sq ft)	
106.46			
E. G. Slope (ft/ft)	0.001805	Area (sq ft)	
106.46			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.84	Top Width (ft)	
35.84			
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	
9.74			
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	24405.7	Conv. (cfs)	
24405.7			
Length Wtd. (ft)	7.53	Wetted Per. (ft)	
37.48			



Min Ch El (ft)	6250.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	267.82
72.83	156.59		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01
0.44			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.13			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 972

#### INPUT

Description:

Station	Elevation	Data	num=	372	Elev	Sta	Elev	Sta	Elev	Sta
Elev										
-66.04	6266.1	-63.22	6266.1	-58.86	6266	-57.17	6265.9	-55.47		
6265.8										
-51.5	6265.7	-40.89	6265.6	-33.49	6265.5	-30.79	6265.4	-28.26		
6265.3										
-25.41	6265.2	-22.05	6265.1	-18.91	6265	-15.98	6264.9	-13.06		
6264.8										
-10.13	6264.7	-7.21	6264.6	3.48	6264.5	18.96	6264.4	30.72		
6264.3										
35.96	6264.2	38.29	6264.1	38.62	6264	38.95	6263.9	39.28		
6263.8										
39.6	6263.7	39.93	6263.6	40.26	6263.5	40.59	6263.4	40.92		
6263.3										
41.25	6263.2	41.58	6263.1	41.91	6263	42.24	6262.9	42.57		
6262.8										
42.9	6262.7	43.23	6262.6	43.55	6262.5	43.88	6262.4	44.21		
6262.3										
44.54	6262.2	44.87	6262.1	45.2	6262	45.53	6261.9	45.86		
6261.8										
46.19	6261.7	46.52	6261.6	46.85	6261.5	47.17	6261.4	47.5		
6261.3										
47.83	6261.2	48.16	6261.1	48.49	6261	48.82	6260.9	49.15		

6260.8									
49.48	6260.7	49.81	6260.6	50.14	6260.5	50.47	6260.4	50.8	
6260.3									
51.12	6260.2	51.45	6260.1	51.78	6260	52.11	6259.9	52.44	
6259.8									
52.77	6259.7	53.1	6259.6	53.43	6259.5	53.76	6259.4	54.09	
6259.3									
54.42	6259.2	54.75	6259.1	55.07	6259	55.4	6258.9	55.73	
6258.8									
56.06	6258.7	56.39	6258.6	56.72	6258.5	57.05	6258.4	57.38	
6258.3									
57.71	6258.2	58.04	6258.1	58.37	6258	58.7	6257.9	59.02	
6257.8									
59.35	6257.7	59.68	6257.6	60.01	6257.5	60.34	6257.4	60.67	
6257.3									
61	6257.2	61.35	6257.1	61.69	6257	62.03	6256.9	62.38	
6256.8									
62.72	6256.7	63.06	6256.6	63.4	6256.5	63.75	6256.4	64.09	
6256.3									
64.43	6256.2	64.78	6256.1	65.12	6256	65.45	6255.9	65.7	
6255.8									
65.95	6255.7	66.2	6255.6	66.45	6255.5	66.7	6255.4	66.95	
6255.3									
67.2	6255.2	67.45	6255.1	67.7	6255	67.95	6254.9	68.2	
6254.8									
68.45	6254.7	68.7	6254.6	68.95	6254.5	69.2	6254.4	69.45	
6254.3									
69.7	6254.2	69.96	6254.1	70.21	6254	70.46	6253.9	70.71	
6253.8									
70.96	6253.7	71.21	6253.6	71.46	6253.5	71.71	6253.4	71.96	
6253.3									
72.21	6253.2	72.46	6253.1	72.71	6253	72.96	6252.9	73.21	
6252.8									
73.46	6252.7	73.71	6252.6	73.96	6252.5	74.21	6252.4	74.46	
6252.3									
74.71	6252.2	74.96	6252.1	75.21	6252	75.46	6251.9	75.71	
6251.8									
75.96	6251.7	76.21	6251.6	76.46	6251.5	76.71	6251.4	76.96	
6251.3									
77.21	6251.2	77.46	6251.1	77.71	6251	77.96	6250.9	78.21	
6250.8									
78.46	6250.7	78.71	6250.6	89.22	6250.6	89.52	6250.7	89.82	
6250.8									
90.12	6250.9	90.42	6251	90.72	6251.1	91.02	6251.2	91.32	
6251.3									
91.62	6251.4	91.92	6251.5	92.22	6251.6	92.52	6251.7	92.82	
6251.8									
93.12	6251.9	93.42	6252	93.72	6252.1	94.03	6252.2	94.33	
6252.3									
94.63	6252.4	94.93	6252.5	95.23	6252.6	95.53	6252.7	95.83	
6252.8									
96.13	6252.9	96.43	6253	96.73	6253.1	97.03	6253.2	97.33	
6253.3									
97.63	6253.4	97.93	6253.5	98.23	6253.6	98.53	6253.7	98.83	



6253.8									
99.13	6253.9	99.44	6254	99.74	6254.1	100.04	6254.2	100.34	
6254.3									
100.64	6254.4	100.94	6254.5	101.23	6254.6	101.53	6254.7	101.83	
6254.8									
102.13	6254.9	102.43	6255	102.81	6255.1	103.17	6255.2	103.54	
6255.3									
103.9	6255.4	104.27	6255.5	104.63	6255.6	105	6255.7	105.37	
6255.8									
105.73	6255.9	106.1	6256	106.46	6256.1	106.83	6256.2	107.19	
6256.3									
107.56	6256.4	107.93	6256.5	108.29	6256.6	123.7	6256.6	124.34	
6256.5									
124.94	6256.4	125.55	6256.3	126.15	6256.2	126.76	6256.1	127.36	
6256									
127.96	6255.9	128.57	6255.8	129.17	6255.7	129.78	6255.6	130.38	
6255.5									
130.98	6255.4	131.59	6255.3	132.19	6255.2	132.8	6255.1	133.4	
6255									
134.01	6254.9	134.61	6254.8	135.21	6254.7	135.82	6254.6	136.42	
6254.5									
137.03	6254.4	137.63	6254.3	138.23	6254.2	138.84	6254.1	139.44	
6254									
140.05	6253.9	140.65	6253.8	141.26	6253.7	141.86	6253.6	142.46	
6253.5									
143.07	6253.4	143.67	6253.3	144.28	6253.2	144.88	6253.1	145.48	
6253									
146.09	6252.9	146.69	6252.8	147.26	6252.7	147.82	6252.6	148.38	
6252.5									
152.55	6252.4	156.94	6252.3	159.06	6252.2	159.16	6252.1	159.26	
6252									
159.36	6251.9	159.46	6251.8	161.88	6251.8	162.3	6251.9	162.73	
6252									
164.17	6252.1	164.29	6252.2	164.4	6252.3	164.52	6252.4	164.64	
6252.5									
165.26	6252.6	165.75	6252.7	168.53	6252.7	170.45	6252.8	171.9	
6252.8									
175.53	6252.9	178.46	6253	181.19	6253.1	183.92	6253.2	185.85	
6253.4									
186.65	6253.3	189.38	6253.4	191.46	6253.5	191.86	6253.6	192.26	
6253.7									
192.66	6253.8	193.06	6253.9	193.46	6254	193.86	6254.1	194.26	
6254.2									
194.66	6254.3	195.06	6254.4	195.46	6254.5	195.86	6254.6	196.26	
6254.7									
196.66	6254.8	197.06	6254.9	197.46	6255	197.87	6255.1	198.27	
6255.2									
198.67	6255.3	199.07	6255.4	199.38	6255.5	199.47	6255.5	199.87	
6255.6									
200.27	6255.7	200.67	6255.8	201.09	6255.9	201.5	6256	201.92	
6256.1									
202.34	6256.2	202.75	6256.3	203.17	6256.4	203.59	6256.5	204.01	
6256.6									
204.42	6256.7	204.84	6256.8	205.26	6256.9	205.67	6257	206.09	

6257.1									
206.51	6257.2	206.92	6257.3	207.34	6257.4	207.76	6257.5	208.17	
6257.6									
208.59	6257.7	209.01	6257.8	209.42	6257.9	209.84	6258	210.26	
6258.1									
210.67	6258.2	211.09	6258.3	211.51	6258.4	211.92	6258.5	212.34	
6258.6									
212.76	6258.7	213.18	6258.8	213.59	6258.9	214.01	6259	214.43	
6259.1									
214.84	6259.2	215.26	6259.3	215.68	6259.4	216.09	6259.5	216.51	
6259.6									
216.93	6259.7	217.34	6259.8	217.76	6259.9	218.18	6260	218.59	
6260.1									
219.01	6260.2	219.43	6260.3	219.84	6260.4	220.26	6260.5	220.68	
6260.6									
221.09	6260.7	221.51	6260.8	221.93	6260.9	222.35	6261	222.76	
6261.1									
223.18	6261.2	223.93	6261.3	224.94	6261.4	225.95	6261.5	226.97	
6261.6									
228.1	6261.7	233.96	6261.7						

Manning's n	Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
-66.04	.03	62.38	.013	106.46	.03	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	62.38	106.46		12.38	12.38		.1

.3						
Ineffective Flow	num=	1				
Sta L	Sta R	Elev	Permanent			
122.73	233.96	6256.61	F			
Left Levee	Station=	35.62	Elevation=	6264.23		
Right Levee	Station=	122.73	Elevation=	6256.7		

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6256.67	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.48	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6255.19	Reach Len. (ft)	12.38
12.38	12.38		
Crit W. S. (ft)	6255.19	Flow Area (sq ft)	
106.04			
E. G. Slope (ft/ft)	0.001830	Area (sq ft)	
106.04			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.87	Top Width (ft)	
35.87			
Vel Total (ft/s)	9.78	Avg. Vel. (ft/s)	
9.78			



Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	
2.96			
Conv. Total (cfs)	24240.3	Conv. (cfs)	
24240.3			
Length Wtd. (ft)	12.38	Wetted Per. (ft)	
37.50			
Min Ch El (ft)	6250.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	233.96
35.62			
122.73			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01
0.42			
C & E Loss (ft)	0.01	Cum SA (acres)	
0.12			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 971

#### INPUT

Description:

Station	Elevation	Data	num=	378					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6265.9	5.82	6265.9	10.23	6265.8	11.92	6265.7	18.65	
6265.6									
25.92	6265.5	32.41	6265.4	37.03	6265.3	39.54	6265.2	42.06	
6265.1									
44.58	6265	47.1	6264.9	49.62	6264.8	52.13	6264.7	54.77	
6264.6									
58.06	6264.5	60.96	6264.4	63.86	6264.3	69.56	6264.2	83.55	
6264.1									
89.24	6264	94.22	6263.9	99.19	6263.8	104.17	6263.7	104.58	
6263.6									
104.93	6263.5	105.27	6263.4	105.62	6263.3	105.96	6263.2	106.31	
6263.1									
106.65	6263	106.99	6262.9	107.34	6262.8	107.68	6262.7	108.03	
6262.6									
108.37	6262.5	108.72	6262.4	109.06	6262.3	109.41	6262.2	109.75	

6262.1									
110.1	6262	110.44	6261.9	110.79	6261.8	111.13	6261.7	111.48	
6261.6									
111.82	6261.5	112.17	6261.4	112.51	6261.3	112.86	6261.2	113.2	
6261.1									
113.54	6261	113.89	6260.9	114.23	6260.8	114.58	6260.7	114.92	
6260.6									
115.27	6260.5	115.61	6260.4	115.96	6260.3	116.3	6260.2	116.65	
6260.1									
116.99	6260	117.34	6259.9	117.68	6259.8	118.03	6259.7	118.37	
6259.6									
118.72	6259.5	119.06	6259.4	119.41	6259.3	119.75	6259.2	120.09	
6259.1									
120.44	6259	120.78	6258.9	121.13	6258.8	121.47	6258.7	121.82	
6258.6									
122.16	6258.5	122.51	6258.4	122.85	6258.3	123.2	6258.2	123.54	
6258.1									
123.89	6258	124.23	6257.9	124.58	6257.8	124.92	6257.7	125.27	
6257.6									
125.61	6257.5	125.96	6257.4	126.3	6257.3	126.65	6257.2	126.99	
6257.1									
127.33	6257	127.67	6256.9	128.02	6256.8	128.36	6256.7	128.7	
6256.6									
129.05	6256.5	129.39	6256.4	129.73	6256.3	130.07	6256.2	130.42	
6256.1									
130.76	6256	131.1	6255.9	131.45	6255.8	131.71	6255.7	131.96	
6255.6									
132.21	6255.5	132.46	6255.4	132.71	6255.3	132.96	6255.2	133.21	
6255.1									
133.46	6255	133.71	6254.9	133.96	6254.8	134.21	6254.7	134.46	
6254.6									
134.71	6254.5	134.96	6254.4	135.21	6254.3	135.46	6254.2	135.71	
6254.1									
135.96	6254	136.21	6253.9	136.46	6253.8	136.71	6253.7	136.96	
6253.6									
137.21	6253.5	137.46	6253.4	137.71	6253.3	137.96	6253.2	138.21	
6253.1									
138.46	6253	138.71	6252.9	138.96	6252.8	139.21	6252.7	139.46	
6252.6									
139.71	6252.5	139.96	6252.4	140.21	6252.3	140.46	6252.2	140.71	
6252.1									
140.96	6252	141.21	6251.9	141.46	6251.8	141.71	6251.7	141.96	
6251.6									
142.21	6251.5	142.46	6251.4	142.71	6251.3	142.96	6251.2	143.21	
6251.1									
143.46	6251	143.71	6250.9	143.96	6250.8	144.21	6250.7	144.46	
6250.6									
144.71	6250.5	144.96	6250.4	155.05	6250.4	155.35	6250.5	155.65	
6250.6									
155.95	6250.7	156.25	6250.8	156.55	6250.9	156.85	6251	157.15	
6251.1									
157.45	6251.2	157.75	6251.3	158.05	6251.4	158.35	6251.5	158.65	
6251.6									
158.95	6251.7	159.25	6251.8	159.55	6251.9	159.85	6252	160.15	



6252.1								
160.45	6252.2	160.75	6252.3	161.05	6252.4	161.35	6252.5	161.65
6252.6								
161.95	6252.7	162.25	6252.8	162.55	6252.9	162.85	6253	163.15
6253.1								
163.45	6253.2	163.75	6253.3	164.05	6253.4	164.35	6253.5	164.65
6253.6								
164.95	6253.7	165.25	6253.8	165.55	6253.9	165.85	6254	166.15
6254.1								
166.45	6254.2	166.75	6254.3	167.05	6254.4	167.35	6254.5	167.65
6254.6								
167.95	6254.7	168.25	6254.8	168.55	6254.9	168.88	6255	169.21
6255.1								
169.54	6255.2	169.87	6255.3	170.2	6255.4	170.53	6255.5	170.86
6255.6								
171.19	6255.7	171.39	6255.76	171.52	6255.8	171.85	6255.9	172.18
6256								
172.51	6256.1	172.84	6256.2	173.17	6256.3	173.5	6256.4	173.83
6256.5								
174.16	6256.6	174.49	6256.7	189.94	6256.7	190.64	6256.6	191.34
6256.5								
192.03	6256.4	192.64	6256.3	193.18	6256.2	193.72	6256.1	194.26
6256								
194.8	6255.9	195.34	6255.8	195.88	6255.7	196.42	6255.6	196.96
6255.5								
197.5	6255.4	198.04	6255.3	198.58	6255.2	199.12	6255.1	199.66
6255								
200.19	6254.9	200.73	6254.8	201.27	6254.7	201.81	6254.6	202.35
6254.5								
202.89	6254.4	203.43	6254.3	203.97	6254.2	204.51	6254.1	205.05
6254								
205.59	6253.9	206.13	6253.8	206.67	6253.7	207.21	6253.6	207.75
6253.5								
208.29	6253.4	208.82	6253.3	209.36	6253.2	209.9	6253.1	210.44
6253								
210.98	6252.9	211.52	6252.8	212.06	6252.7	212.6	6252.6	213.14
6252.5								
213.69	6252.4	213.81	6252.5	214.05	6253	214.25	6252.3	219.14
6252.2								
227.09	6252.1	227.2	6252	227.3	6251.9	227.41	6251.8	227.52
6251.7								
228.81	6252	229.91	6251.7	230.02	6251.8	230.14	6251.9	230.25
6252								
230.36	6252.1	233.98	6252.2	237.64	6252.3	241.29	6252.4	243.1
6252.5								
244.95	6252.5	247.6	6252.6	248.61	6252.6	251.9	6252.7	252.26
6252.7								
255.81	6252.8	257.71	6252.9	258.11	6253	258.5	6253.1	258.89
6253.2								
259.28	6253.3	259.68	6253.4	260.07	6253.5	260.46	6253.6	260.85
6253.7								
261.25	6253.8	261.64	6253.9	262.03	6254	262.42	6254.1	262.82
6254.2								
263.21	6254.3	263.6	6254.4	264	6254.5	264.39	6254.6	264.78

6254.7								
265.17	6254.8	265.57	6254.9	265.96	6255	266.35	6255.1	266.74
6255.2								
267.14	6255.3	267.53	6255.4	267.92	6255.5	268.31	6255.6	268.71
6255.7								
269.1	6255.8	269.49	6255.9	269.88	6256	270.28	6256.1	270.67
6256.2								
271.06	6256.3	271.45	6256.4	271.85	6256.5	272.24	6256.6	272.63
6256.7								
273.03	6256.8	273.42	6256.9	273.81	6257	274.2	6257.1	274.6
6257.2								
274.99	6257.3	275.38	6257.4	275.77	6257.5	276.17	6257.6	276.56
6257.7								
276.95	6257.8	277.34	6257.9	277.74	6258	278.13	6258.1	278.52
6258.2								
278.91	6258.3	279.31	6258.4	279.7	6258.5	280.09	6258.6	280.48
6258.7								
280.88	6258.8	281.27	6258.9	281.66	6259	282.05	6259.1	282.45
6259.2								
282.84	6259.3	283.23	6259.4	283.62	6259.5	284.02	6259.6	284.41
6259.7								
284.8	6259.8	285.19	6259.9	285.59	6260	285.98	6260.1	286.37
6260.2								
286.76	6260.3	287.16	6260.4	287.55	6260.5	287.94	6260.6	288.33
6260.7								
288.73	6260.8	289.12	6260.9	289.51	6261	290.7	6261.1	291.97
6261.2								
293.24	6261.3	294.5	6261.4	300	6261.4			
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	130.76	.013	171.39	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	130.76	171.39		37.63	37.63	37.63		.1
.3								
Ineffective Flow num= 1								
Sta L	Sta R	Elev	Permanent					
190.03	300	6256.59	F					
Left Levee	Station=	103.33	Elevation=	6263.68				
Right Levee	Station=	189.61	Elevation=	6256.72				
CROSS SECTION OUTPUT Profile #Flow 1								
E. G. Elev (ft) 6256.53 Element Left OB								
Channel Right OB								
Vel Head (ft)	1.47	Wt. n-Val.						
0.013								
W. S. Elev (ft)	6255.06	Reach Len. (ft)	37.63					
37.63	37.63							
Crit W. S. (ft)	6255.06	Flow Area (sq ft)						
106.74								



E. G. Slope (ft/ft)	0.001786	Area (sq ft)	
106.74			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.77	Top Width (ft)	
35.77			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24541.1	Conv. (cfs)	
24541.1			
Length Wtd. (ft)	37.63	Wetted Per. (ft)	
37.42			
Min Ch El (ft)	6250.40	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
103.33	189.61		
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.01
0.39			
C & E Loss (ft)	0.02	Cum SA (acres)	
0.11			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 970

#### INPUT

Description:

Station	Elevation	Data	num=	391					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6265.3	3.4	6265.2	6.49	6265.1	9.29	6265	11.91	
6264.9									
14.96	6264.8	20.21	6264.7	49.65	6264.7	52.22	6264.6	54.81	
6264.5									
57.39	6264.4	59.98	6264.3	62.56	6264.2	65.15	6264.1	67.74	
6264									
70.32	6263.9	72.91	6263.8	75.5	6263.7	78.08	6263.6	80.67	

6263.5									
83.25	6263.4	85.84	6263.3	88.43	6263.2	91.01	6263.1	93.6	
6263									
96.18	6262.9	98.77	6262.8	101.36	6262.7	104.08	6262.6	105.3	
6262.5									
106.44	6262.5	106.78	6262.4	107.12	6262.3	107.45	6262.2	107.79	
6262.1									
108.13	6262	108.47	6261.9	108.81	6261.8	109.14	6261.7	109.48	
6261.6									
109.82	6261.5	110.16	6261.4	110.5	6261.3	110.84	6261.2	111.17	
6261.1									
111.51	6261	111.85	6260.9	112.19	6260.8	112.53	6260.7	112.86	
6260.6									
113.2	6260.5	113.54	6260.4	113.88	6260.3	114.22	6260.2	114.56	
6260.1									
114.89	6260	115.23	6259.9	115.57	6259.8	115.91	6259.7	116.25	
6259.6									
116.58	6259.5	116.92	6259.4	117.26	6259.3	117.6	6259.2	117.94	
6259.1									
118.28	6259	118.61	6258.9	118.95	6258.8	119.29	6258.7	119.63	
6258.6									
119.97	6258.5	120.3	6258.4	120.64	6258.3	120.89	6258.3	121.25	
6258.2									
121.62	6258.1	121.98	6258	122.35	6257.9	122.72	6257.8	123.08	
6257.7									
123.45	6257.6	123.82	6257.5	124.18	6257.4	124.55	6257.3	124.92	
6257.2									
125.28	6257.1	125.65	6257	126.01	6256.9	126.38	6256.8	126.75	
6256.7									
127.11	6256.6	127.48	6256.5	127.85	6256.4	128.21	6256.3	128.58	
6256.2									
128.95	6256.1	129.31	6256	129.68	6255.9	130.04	6255.8	130.41	
6255.7									
130.78	6255.6	131.14	6255.5	131.5	6255.4	131.75	6255.3	132	
6255.2									
132.25	6255.1	132.5	6255	132.75	6254.9	133	6254.8	133.25	
6254.7									
133.5	6254.6	133.75	6254.5	134	6254.4	134.25	6254.3	134.5	
6254.2									
134.75	6254.1	135	6254	135.25	6253.9	135.5	6253.8	135.75	
6253.7									
136	6253.6	136.25	6253.5	136.5	6253.4	136.75	6253.3	137	
6253.2									
137.25	6253.1	137.5	6253	137.75	6252.9	138	6252.8	138.25	
6252.7									
138.5	6252.6	138.75	6252.5	139	6252.4	139.25	6252.3	139.5	
6252.2									
139.75	6252.1	140	6252	140.25	6251.9	140.5	6251.8	140.75	
6251.7									
141	6251.6	141.25	6251.5	141.5	6251.4	141.75	6251.3	142	
6251.2									
142.25	6251.1	142.5	6251	142.75	6250.9	143	6250.8	143.26	
6250.7									
143.51	6250.6	143.76	6250.5	144.01	6250.4	144.26	6250.3	144.51	



6250.2								
144.76	6250.1	155.25	6250.1	155.55	6250.2	155.85	6250.3	156.15
6250.4								
156.45	6250.5	156.75	6250.6	157.05	6250.7	157.35	6250.8	157.65
6250.9								
157.95	6251	158.25	6251.1	158.55	6251.2	158.85	6251.3	159.15
6251.4								
159.45	6251.5	159.75	6251.6	160.05	6251.7	160.35	6251.8	160.65
6251.9								
160.95	6252	161.25	6252.1	161.55	6252.2	161.85	6252.3	162.15
6252.4								
162.45	6252.5	162.75	6252.6	163.05	6252.7	163.35	6252.8	163.65
6252.9								
163.95	6253	164.25	6253.1	164.55	6253.2	164.85	6253.3	165.15
6253.4								
165.45	6253.5	165.75	6253.6	166.05	6253.7	166.35	6253.8	166.65
6253.9								
166.95	6254	167.25	6254.1	167.55	6254.2	167.85	6254.3	168.15
6254.4								
168.45	6254.5	168.74	6254.6	168.94	6254.7	169.15	6254.8	169.35
6254.9								
169.55	6255	169.75	6255.1	169.95	6255.2	169.98	6255.22	170.15
6255.3								
170.35	6255.4	170.55	6255.5	170.75	6255.6	170.96	6255.7	171.16
6255.8								
171.36	6255.9	171.56	6256	171.76	6256.1	171.96	6256.2	172.16
6256.3								
172.36	6256.4	172.57	6256.5	172.77	6256.6	172.97	6256.7	173.17
6256.8								
173.37	6256.9	173.57	6257	173.77	6257.1	173.97	6257.2	174.17
6257.3								
174.38	6257.4	189.25	6257.5	190.78	6257.5	191.22	6257.4	191.66
6257.3								
192.1	6257.2	192.54	6257.1	192.98	6257	193.41	6256.9	193.85
6256.8								
194.29	6256.7	194.73	6256.6	195.17	6256.5	195.62	6256.4	196.07
6256.3								
196.52	6256.2	196.97	6256.1	197.41	6256	197.86	6255.9	198.31
6255.8								
198.76	6255.7	199.2	6255.6	199.65	6255.5	200.1	6255.4	200.55
6255.3								
200.99	6255.2	201.44	6255.1	201.89	6255	202.33	6254.9	202.78
6254.8								
203.23	6254.7	203.68	6254.6	204.12	6254.5	204.57	6254.4	204.7
6254.7								
205.02	6254.3	205.46	6254.2	205.91	6254.1	206.36	6254	206.81
6253.9								
207.28	6253.8	207.75	6253.7	208.22	6253.6	208.69	6253.5	209.16
6253.4								
209.63	6253.3	210.1	6253.2	210.57	6253.1	210.65	6253.5	211.04
6253								
211.51	6252.9	211.98	6252.8	212.45	6252.7	212.92	6252.6	213.39
6252.5								
213.86	6252.4	214.33	6252.3	214.79	6252.2	215.26	6252.1	215.76

6252								
216.26	6251.9	228.9	6251.8	229.04	6251.7	229.18	6251.6	229.32
6251.5								
229.46	6251.4	232.25	6251.4	232.39	6251.5	232.49	6251.7	232.52
6251.6								
232.66	6251.7	232.8	6251.8	232.94	6251.9	240.6	6252	247.97
6252.1								
253.08	6252.2	256.52	6252.3	258.54	6252.4	258.94	6252.5	259.33
6252.6								
259.73	6252.7	260.12	6252.8	260.52	6252.9	260.91	6253	261.31
6253.1								
261.7	6253.2	262.1	6253.3	262.49	6253.4	262.89	6253.5	263.29
6253.6								
263.68	6253.7	264.08	6253.8	264.47	6253.9	264.87	6254	265.26
6254.1								
265.66	6254.2	266.05	6254.3	266.45	6254.4	266.84	6254.5	267.24
6254.6								
267.63	6254.7	268.03	6254.8	268.43	6254.9	268.82	6255	269.22
6255.1								
269.61	6255.2	270.01	6255.3	270.4	6255.4	270.8	6255.5	271.19
6255.6								
271.59	6255.7	271.98	6255.8	272.38	6255.9	272.77	6256	273.17
6256.1								
273.57	6256.2	273.96	6256.3	274.36	6256.4	274.75	6256.5	275.15
6256.6								
275.54	6256.7	275.94	6256.8	276.33	6256.9	276.73	6257	277.12
6257.1								
277.52	6257.2	277.91	6257.3	278.31	6257.4	278.7	6257.5	279.1
6257.6								
279.5	6257.7	279.89	6257.8	280.29	6257.9	280.68	6258	281.08
6258.1								
281.47	6258.2	281.87	6258.3	282.26	6258.4	282.66	6258.5	283.05
6258.6								
283.45	6258.7	283.84	6258.8	284.24	6258.9	284.64	6259	285.03
6259.1								
285.43	6259.2	285.82	6259.3	286.22	6259.4	286.61	6259.5	287.01
6259.6								
287.4	6259.7	287.79	6259.8	288.19	6259.9	288.58	6260	288.97
6260.1								
289.37	6260.2	289.76	6260.3	290.16	6260.4	291.22	6260.5	293.93
6260.6								
300	6260.6							
Manning's n Values								
Sta	n Val	Sta	num=	3	Sta	n Val		
0	.03	132.5	.013	169.98		.03		
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.								
	132.5	169.98		50	50	50		.1
.3								
Ineffective Flow	num=	1						
Sta L Sta R Elev	Permanent	F						
192.96	300	6257.47						



Left Levee Station= 49.73 Elevation= 6264.69  
 Right Levee Station= 189.19 Elevation= 6257.47

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6256.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6254.71	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6254.71	Flow Area (sq ft)	
106.85			
E. G. Slope (ft/ft)	0.001777	Area (sq ft)	
106.85			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.74	Top Width (ft)	
35.74			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)	
2.99			
Conv. Total (cfs)	24598.0	Conv. (cfs)	
24598.0			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
37.38			
Min Ch El (ft)	6250.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
49.73 189.19			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01
0.30			
C & E Loss (ft)	0.00	Cum SA (acres)	
0.08			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01

REACH: Sand Creek-DS-0- RS: 969

INPUT

Description:

Station	Elevation	Data	num=	251					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6264	2.64	6264	6.84	6263.9	11.04	6263.8	15.24	
6263.7									
19.44	6263.6	24.89	6263.5	29.66	6263.4	34.61	6263.3	39.56	
6263.2									
44.5	6263.1	49.45	6263	54.4	6262.9	59.35	6262.8	64.47	
6262.7									
69.43	6262.6	74.02	6262.5	78.62	6262.4	83.21	6262.3	87.14	
6262.2									
90.53	6262.1	93.93	6262	97.32	6261.9	100.71	6261.8	105.22	
6261.7									
106.35	6261.6	106.94	6261.6	107.3	6261.5	107.67	6261.4	108.04	
6261.3									
108.4	6261.2	108.77	6261.1	109.14	6261	109.5	6260.9	109.87	
6260.8									
110.24	6260.7	110.6	6260.6	110.97	6260.5	111.33	6260.4	111.7	
6260.3									
112.07	6260.2	112.43	6260.1	112.8	6260	113.17	6259.9	113.53	
6259.8									
113.9	6259.7	114.27	6259.6	114.63	6259.5	115	6259.4	115.36	
6259.3									
115.73	6259.2	116.1	6259.1	116.46	6259	116.83	6258.9	117.2	
6258.8									
117.56	6258.7	117.93	6258.6	118.3	6258.5	118.66	6258.4	119.03	
6258.3									
119.39	6258.2	119.76	6258.1	120.13	6258	120.49	6257.9	120.86	
6257.8									
121.23	6257.7	121.59	6257.6	121.96	6257.5	122.33	6257.4	122.69	
6257.3									
123.06	6257.2	123.42	6257.1	123.79	6257	124.16	6256.9	124.52	
6256.8									
124.89	6256.7	125.26	6256.6	125.62	6256.5	125.99	6256.4	126.36	
6256.3									
126.72	6256.2	127.09	6256.1	127.45	6256	127.82	6255.9	128.19	
6255.8									
128.55	6255.7	128.92	6255.6	129.29	6255.5	129.65	6255.4	130.02	
6255.3									
130.39	6255.2	130.75	6255.1	131.11	6255	131.47	6255	131.84	
6254.9									
131.72	6254.8	131.97	6254.7	132.22	6254.6	132.47	6254.5	132.72	
6254.4									
132.97	6254.3	133.22	6254.2	133.47	6254.1	133.72	6254	133.97	
6253.9									
134.22	6253.8	134.47	6253.7	134.72	6253.6	134.97	6253.5	135.22	
6253.4									
135.47	6253.3	135.72	6253.2	135.97	6253.1	136.22	6253	136.47	
6252.9									
136.72	6252.8	136.97	6252.7	137.22	6252.6	137.48	6252.5	137.73	



6252. 4  
137. 98 6252. 3 138. 23 6252. 2 138. 48 6252. 1 138. 73 6252 138. 98  
6251. 9  
139. 23 6251. 8 139. 48 6251. 7 139. 73 6251. 6 139. 98 6251. 5 140. 23  
6251. 4  
140. 48 6251. 3 140. 73 6251. 2 140. 99 6251. 1 141. 24 6251 141. 49  
6250. 9  
141. 74 6250. 8 141. 99 6250. 7 142. 24 6250. 6 142. 49 6250. 5 142. 74  
6250. 4  
142. 99 6250. 3 143. 24 6250. 2 143. 49 6250. 1 143. 74 6250 143. 99  
6249. 9  
144. 25 6249. 8 144. 5 6249. 7 144. 75 6249. 6 155. 21 6249. 6 155. 51  
6249. 7  
155. 81 6249. 8 156. 11 6249. 9 156. 41 6250 156. 71 6250. 1 157. 01  
6250. 2  
157. 31 6250. 3 157. 61 6250. 4 157. 91 6250. 5 158. 21 6250. 6 158. 51  
6250. 7  
158. 81 6250. 8 159. 11 6250. 9 159. 41 6251 159. 71 6251. 1 160. 01  
6251. 2  
160. 31 6251. 3 160. 61 6251. 4 160. 91 6251. 5 161. 21 6251. 6 161. 51  
6251. 7  
161. 81 6251. 8 162. 11 6251. 9 162. 41 6252 162. 71 6252. 1 163. 01  
6252. 2  
163. 31 6252. 3 163. 61 6252. 4 163. 91 6252. 5 164. 21 6252. 6 164. 51  
6252. 7  
164. 81 6252. 8 165. 11 6252. 9 165. 41 6253 165. 71 6253. 1 166. 01  
6253. 2  
166. 31 6253. 3 166. 61 6253. 4 166. 91 6253. 5 167. 21 6253. 6 167. 51  
6253. 7  
167. 81 6253. 8 168. 11 6253. 9 168. 41 6254 168. 71 6254. 1 169. 02  
6254. 2  
169. 32 6254. 3 169. 62 6254. 4 169. 93 6254. 5 170. 23 6254. 6 170. 53  
6254. 7  
170. 84 6254. 8 171. 14 6254. 9 171. 44 6255 171. 48 6255. 02 171. 68  
6255. 1  
171. 88 6255. 2 172. 08 6255. 3 172. 28 6255. 4 172. 48 6255. 5 172. 68  
6255. 6  
172. 89 6255. 7 173. 09 6255. 8 173. 29 6255. 9 173. 49 6256 173. 69  
6256. 1  
173. 89 6256. 2 174. 09 6256. 3 174. 29 6256. 4 181. 87 6256. 5 186. 87  
6256. 6  
190 6256. 7 191. 15 6256. 8 193. 28 6256. 9 196. 33 6257 200. 35  
6257. 1  
205. 4 6257. 2 211. 85 6257. 3 220. 64 6257. 4 238. 15 6257. 5 245. 04  
6257. 6  
259. 5 6257. 7 273. 95 6257. 8 281. 58 6257. 9 282. 39 6258 283. 21  
6258. 1  
284. 02 6258. 2 284. 84 6258. 3 285. 66 6258. 4 286. 5 6258. 5 287. 35  
6258. 6  
288. 2 6258. 7 289. 06 6258. 8 289. 94 6258. 9 290. 75 6259 291. 63  
6259. 1  
292. 5 6259. 2 293. 38 6259. 3 294. 26 6259. 4 295. 13 6259. 5 295. 99  
6259. 6  
300 6259. 6

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131. 11 .013 171. 48 .03  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131. 11 171. 48 50 50 50 .1  
.3  
Left Levee Station= 105. 85 Elevation= 6261. 73  
Right Levee Station= 173. 7 Elevation= 6256. 46

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft) 6255. 68 Element Left OB  
Channel Right OB  
Vel Head (ft) 1. 46 Wt. n-Val .  
0. 013  
W. S. Elev (ft) 6254. 22 Reach Len. (ft) 50. 00  
50. 00 50. 00  
Crit W. S. (ft) 6254. 22 Flow Area (sq ft)  
106. 96  
E. G. Slope (ft/ft) 0. 001780 Area (sq ft)  
106. 96  
Q Total (cfs) 1037. 00 Flow (cfs)  
1037. 00  
Top Width (ft) 35. 89 Top Width (ft)  
35. 89  
Vel Total (ft/s) 9. 69 Avg. Vel. (ft/s)  
9. 69  
Max Chl Dpth (ft) 4. 62 Hydr. Depth (ft)  
2. 98  
Conv. Total (cfs) 24580. 2 Conv. (cfs)  
24580. 2  
Length Wtd. (ft) 50. 00 Wetted Per. (ft)  
37. 52  
Min Ch El (ft) 6249. 60 Shear (lb/sq ft)  
0. 32  
Alpha 1. 00 Stream Power (lb/ft s) 300. 00  
105. 85 173. 70  
Frctn Loss (ft) 0. 09 Cum Volume (acre-ft) 0. 01  
0. 18  
C & E Loss (ft) 0. 00 Cum SA (acres)  
0. 04

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that



there is not a valid subcritical answer. The program defaulted to critical depth.

# CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-0- RS: 968

## INPUT

Description:

Station	Elevation	Data	num=	248					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6263.5	2.29	6263.5	4.34	6263.4	6.47	6263.3	8.6	
6263.2									
10.72	6263.1	12.85	6263	14.98	6262.9	17.11	6262.8	19.26	
6262.7									
21.53	6262.6	23.81	6262.5	26.08	6262.4	29.13	6262.3	33.63	
6262.2									
38.13	6262.1	42.73	6262	70.63	6261.9	75.25	6261.8	79.86	
6261.7									
82.85	6261.7	83.83	6261.8	83.98	6261.8	86.85	6261.7	89.72	
6261.6									
91.59	6261.5	93.21	6261.4	94.82	6261.3	96.75	6261.2	98.92	
6261.1									
101.1	6261	103.69	6260.9	105.68	6260.8	107.35	6260.7	107.74	
6260.6									
108.12	6260.5	108.5	6260.4	108.88	6260.3	109.27	6260.2	109.65	
6260.1									
110.03	6260	110.42	6259.9	110.8	6259.8	111.18	6259.7	111.56	
6259.6									
111.95	6259.5	112.33	6259.4	112.71	6259.3	113.09	6259.2	113.48	
6259.1									
113.86	6259	114.24	6258.9	114.62	6258.8	115.01	6258.7	115.39	
6258.6									
115.77	6258.5	116.15	6258.4	116.54	6258.3	116.92	6258.2	117.3	
6258.1									
117.69	6258	118.07	6257.9	118.45	6257.8	118.83	6257.7	119.22	
6257.6									
119.6	6257.5	119.98	6257.4	120.36	6257.3	120.75	6257.2	121.13	
6257.1									
121.51	6257	121.89	6256.9	122.28	6256.8	122.66	6256.7	123.04	
6256.6									
123.42	6256.5	123.81	6256.4	124.19	6256.3	124.57	6256.2	124.96	
6256.1									
125.34	6256	125.72	6255.9	126.1	6255.8	126.49	6255.7	126.87	
6255.6									
127.25	6255.5	127.63	6255.4	128.02	6255.3	128.4	6255.2	128.78	
6255.1									
129.16	6255	129.55	6254.9	129.93	6254.8	130.31	6254.7	130.69	
6254.6									
131.08	6254.5	131.44	6254.4	131.69	6254.3	131.95	6254.2	132.2	
6254.1									

132.45	6254	132.7	6253.9	132.95	6253.8	133.2	6253.7	133.45	
6253.6									
133.7	6253.5	133.95	6253.4	134.2	6253.3	134.45	6253.2	134.7	
6253.1									
134.95	6253	135.21	6252.9	135.46	6252.8	135.71	6252.7	135.96	
6252.6									
136.21	6252.5	136.46	6252.4	136.71	6252.3	136.96	6252.2	137.21	
6252.1									
137.46	6252	137.71	6251.9	137.96	6251.8	138.21	6251.7	138.47	
6251.6									
138.72	6251.5	138.97	6251.4	139.22	6251.3	139.47	6251.2	139.72	
6251.1									
139.97	6251	140.22	6250.9	140.47	6250.8	140.72	6250.7	140.97	
6250.6									
141.22	6250.5	141.47	6250.4	141.73	6250.3	141.98	6250.2	142.23	
6250.1									
142.48	6250	142.73	6249.9	142.98	6249.8	143.23	6249.7	143.48	
6249.6									
143.73	6249.5	143.98	6249.4	144.23	6249.3	144.48	6249.2	144.73	
6249.1									
155.18	6249.1	155.48	6249.2	155.78	6249.3	156.08	6249.4	156.38	
6249.5									
156.68	6249.6	156.98	6249.7	157.28	6249.8	157.58	6249.9	157.88	
6250									
158.18	6250.1	158.48	6250.2	158.78	6250.3	159.08	6250.4	159.38	
6250.5									
159.68	6250.6	159.98	6250.7	160.28	6250.8	160.58	6250.9	160.88	
6251									
161.18	6251.1	161.48	6251.2	161.78	6251.3	162.08	6251.4	162.38	
6251.5									
162.68	6251.6	162.98	6251.7	163.28	6251.8	163.58	6251.9	163.88	
6252									
164.18	6252.1	164.48	6252.2	164.78	6252.3	165.08	6252.4	165.38	
6252.5									
165.68	6252.6	165.98	6252.7	166.28	6252.8	166.58	6252.9	166.88	
6253									
167.18	6253.1	167.48	6253.2	167.78	6253.3	168.08	6253.4	168.38	
6253.5									
168.68	6253.6	168.98	6253.7	169.28	6253.8	169.59	6253.9	169.89	
6254									
169.91	6254.01	170.19	6254.1	170.5	6254.2	170.8	6254.3	171.1	
6254.4									
171.41	6254.5	171.71	6254.6	172.01	6254.7	172.31	6254.8	172.62	
6254.9									
172.92	6255	173.22	6255.1	173.53	6255.2	173.83	6255.3	174.13	
6255.4									
174.41	6255.5	179.49	6255.6	184.48	6255.7	189.48	6255.8	194.21	
6255.9									
198.77	6256	203.33	6256.1	207.89	6256.2	212.44	6256.3	217	
6256.4									
221.56	6256.5	226.12	6256.6	230.68	6256.7	235.24	6256.8	239.8	
6256.9									
244.36	6257	248.92	6257.1	253.48	6257.2	258.04	6257.3	262.6	
6257.4									



267.85 6257.5 282.3 6257.6 289.42 6257.7 290.24 6257.8 291.05  
6257.9  
291.88 6258 292.73 6258.1 293.58 6258.2 294.44 6258.3 295.31  
6258.4  
296.19 6258.5 297.06 6258.6 300 6258.6

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 132.45 .013 169.91 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan.  
132.45 169.91 50 50 50 .1  
.3  
Left Levee Station= 83.65 Elevation= 6261.85  
Right Levee Station= 274.63 Elevation= 6258.85

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6255.18	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6253.72	Reach Len. (ft)	21.51
21.51 21.51			
Crit W. S. (ft)	6253.72	Flow Area (sq ft)	
106.85			
E. G. Slope (ft/ft)	0.001784	Area (sq ft)	
106.85			
Q Total (cfs)	1037.00	Flow (cfs)	
1037.00			
Top Width (ft)	35.86	Top Width (ft)	
35.86			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)	
2.98			
Conv. Total (cfs)	24548.8	Conv. (cfs)	
24548.8			
Length Wtd. (ft)	21.51	Wetted Per. (ft)	
37.50			
Min Ch El (ft)	6249.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
83.65 274.63			
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01
0.05			
C & E Loss (ft)	0.04	Cum SA (acres)	

Warning: The energy equation could not be balanced within the specified number

of iterations. The program used critical depth  
for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface  
was set equal to critical depth, the calculated  
water surface came back below critical depth. This indicates that  
there is not a valid subcritical answer. The program  
defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical  
depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 966

#### INPUT

Description:

Station	Elevation	Data	num=	228					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev	0	6259.5	43.63	6259.5	45.8	6259.6	48.01	6259.6	48.82
6259.5									
49.64	6259.4	50.45	6259.3	51.27	6259.2	52.08	6259.1	54.22	
6259.1									
55.72	6259.2	57.22	6259.3	58.72	6259.4	60.22	6259.5	61.72	
6259.6									
63.22	6259.7	64.72	6259.8	68.05	6259.9	71.87	6260	75.43	
6260									
78.06	6259.9	79.41	6259.8	80.77	6259.7	82.13	6259.6	83.49	
6259.5									
84.32	6259.4	84.67	6259.3	85.01	6259.2	85.36	6259.1	85.71	
6259									
86.05	6258.9	86.4	6258.8	86.75	6258.7	87.1	6258.6	87.44	
6258.5									
87.79	6258.4	88.14	6258.3	88.49	6258.2	88.83	6258.1	89.18	
6258									
89.53	6257.9	89.87	6257.8	90.22	6257.7	90.71	6257.6	91.63	
6257.5									
92.56	6257.4	93.48	6257.3	94.22	6257.2	94.58	6257.1	94.93	
6257									
95.29	6256.9	95.65	6256.8	96	6256.7	96.36	6256.6	96.71	
6256.5									
97.07	6256.4	97.42	6256.3	97.78	6256.2	98.13	6256.1	98.49	
6256									
98.84	6255.9	99.2	6255.8	99.55	6255.7	99.91	6255.6	100.26	
6255.5									
100.62	6255.4	100.97	6255.3	101.33	6255.2	101.69	6255.1	102.04	
6255									
102.4	6254.9	102.75	6254.8	103.11	6254.7	103.46	6254.6	103.82	
6254.5									
104.17	6254.4	104.53	6254.3	104.88	6254.2	105.24	6254.1	105.59	
6254									
105.95	6253.9	106.3	6253.8	106.66	6253.7	107.02	6253.6	107.37	



6253.5								
107.73	6253.4	108.08	6253.3	109.61	6253.3	110.44	6253.2	111.26
6253.1								
112.08	6253	112.9	6252.9	113.72	6252.8	114.55	6252.7	115.37
6252.6								
116.19	6252.5	117.01	6252.4	117.84	6252.3	118.66	6252.2	119.48
6252.1								
120.3	6252	121.13	6251.9	121.95	6251.8	122.77	6251.7	123.59
6251.6								
124.41	6251.5	125.24	6251.4	126.32	6251.3	127.99	6251.2	129.65
6251.1								
131.31	6251	132.98	6250.9	134.64	6250.8	136.3	6250.7	137.97
6250.6								
138.96	6250.5	139.26	6250.4	139.56	6250.3	139.86	6250.2	140.16
6250.1								
140.46	6250	140.77	6249.9	141.07	6249.8	141.37	6249.7	141.67
6249.6								
141.97	6249.5	142.27	6249.4	142.57	6249.3	142.87	6249.2	143.17
6249.1								
143.47	6249	143.78	6248.9	144.08	6248.8	144.38	6248.7	144.68
6248.6								
155.14	6248.6	155.44	6248.7	155.74	6248.8	156.04	6248.9	156.34
6249								
156.64	6249.1	156.94	6249.2	157.24	6249.3	157.54	6249.4	157.84
6249.5								
158.14	6249.6	158.44	6249.7	158.74	6249.8	159.04	6249.9	159.34
6250								
159.64	6250.1	159.94	6250.2	160.24	6250.3	160.54	6250.4	160.84
6250.5								
161.14	6250.6	161.44	6250.7	161.74	6250.8	162.04	6250.9	162.34
6251								
162.64	6251.1	162.94	6251.2	163.24	6251.3	163.54	6251.4	163.84
6251.5								
164.14	6251.6	164.44	6251.7	164.74	6251.8	165.04	6251.9	165.34
6252								
165.64	6252.1	165.94	6252.2	166.24	6252.3	166.54	6252.4	166.84
6252.5								
167.14	6252.6	167.44	6252.7	167.74	6252.8	168.04	6252.9	168.34
6253								
168.64	6253.1	168.94	6253.2	169.25	6253.3	169.55	6253.4	169.85
6253.5								
170.16	6253.6	170.46	6253.7	170.76	6253.8	171.07	6253.9	171.37
6254								
171.41	6254.01	171.67	6254.1	171.97	6254.2	172.28	6254.3	172.58
6254.4								
172.88	6254.5	173.19	6254.6	173.49	6254.7	173.79	6254.8	174.1
6254.9								
174.67	6255	179.67	6255.1	184.67	6255.2	189.66	6255.3	194.58
6255.4								
199.5	6255.5	204.41	6255.6	209.33	6255.7	214.24	6255.8	219.16
6255.9								
224.07	6256	228.99	6256.1	233.91	6256.2	238.82	6256.3	243.74
6256.4								
248.65	6256.5	253.57	6256.6	258.48	6256.7	263.4	6256.8	268.32

6256.9								
273.23	6257	277.93	6257.1	282.49	6257.2	287.05	6257.3	291.61
6257.4								
297.27	6257.5	298.12	6257.6	300	6257.6			

Manning's n Values	num=	3		
Sta n Val	Sta n Val	Sta n Val		
0 .03	131.31	.013	171.41	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.						
	131.31	171.41		50	50	.1
.3						
Left Levee	Station=	75.27	Elevation=	6260.12		
Right Levee	Station=	176.21	Elevation=	6255.12		

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6254.32	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.31	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6253.01	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6253.01	Flow Area (sq ft)	21.71
112.20			
E. G. Slope (ft/ft)	0.001599	Area (sq ft)	21.71
112.20			
Q Total (cfs)	1100.00	Flow (cfs)	46.33
1053.67			
Top Width (ft)	56.36	Top Width (ft)	19.30
37.06			
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)	2.13
9.39			
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)	1.12
3.03			
Conv. Total (cfs)	27510.0	Conv. (cfs)	1158.8
26351.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	19.41
38.10			
Min Ch El (ft)	6248.60	Shear (lb/sq ft)	0.11
0.29			
Alpha	1.25	Stream Power (lb/ft s)	300.00
75.27 176.21			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.06
4.13 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.25
1.16 0.01			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth



for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

# CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 965

## INPUT

Description:

Station	Elevation	Data	num=	264					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6259.6	46.46	6259.6	48.64	6259.7	50.38	6259.8	50.88	
6259.9									
51.38	6260	51.89	6260.1	52.39	6260.2	52.89	6260.3	53.39	
6260.4									
53.89	6260.5	54.4	6260.6	54.9	6260.7	55.4	6260.8	55.9	
6260.9									
56.4	6261	56.5	6261	56.88	6260.9	57.26	6260.8	58.11	
6260.7									
59.23	6260.6	60.35	6260.5	61.46	6260.4	62.58	6260.3	63.7	
6260.2									
64.82	6260.1	65.93	6260	67.05	6259.9	69.63	6259.8	72.09	
6259.7									
73.5	6259.6	74.92	6259.5	76.33	6259.4	77.75	6259.3	79.16	
6259.2									
80.58	6259.1	81.99	6259	83.41	6258.9	84.81	6258.8	85.63	
6258.7									
86.46	6258.6	87.28	6258.5	88.1	6258.4	88.93	6258.3	89.08	
6258.3									
89.77	6258.4	90.53	6258.5	91.38	6258.6	92.23	6258.7	93.08	
6258.8									
93.93	6258.9	94.77	6259	95.62	6259.1	96.47	6259.2	97.32	
6259.3									
98.16	6259.4	99.01	6259.5	99.86	6259.6	102.05	6259.7	104.64	
6259.7									
106.06	6259.6	107.49	6259.5	108.22	6259.4	108.45	6259.3	108.68	
6259.2									
108.91	6259.1	109.14	6259	109.36	6258.9	109.67	6258.8	110.19	
6258.7									
110.71	6258.6	111.23	6258.5	111.75	6258.4	112.27	6258.3	112.8	
6258.2									
113.32	6258.1	113.84	6258	114.36	6257.9	114.88	6257.8	115.37	
6257.7									
115.68	6257.6	115.99	6257.5	116.3	6257.4	116.61	6257.3	116.91	
6257.2									

117.22	6257.1	117.53	6257	117.84	6256.9	118.15	6256.8	118.46	
6256.7									
118.76	6256.6	119.07	6256.5	119.38	6256.4	119.69	6256.3	120	
6256.2									
120.3	6256.1	120.61	6256	120.92	6255.9	121.23	6255.8	121.54	
6255.7									
121.84	6255.6	122.15	6255.5	122.46	6255.4	122.77	6255.3	123.08	
6255.2									
123.39	6255.1	123.69	6255	124	6254.9	124.31	6254.8	124.62	
6254.7									
124.93	6254.6	125.23	6254.5	125.54	6254.4	125.85	6254.3	126.16	
6254.2									
126.47	6254.1	126.78	6254	127.08	6253.9	127.39	6253.8	127.7	
6253.7									
128.01	6253.6	128.32	6253.5	128.62	6253.4	128.93	6253.3	129.24	
6253.2									
129.55	6253.1	129.86	6253	130.17	6252.9	130.47	6252.8	130.78	
6252.7									
131.09	6252.6	131.4	6252.5	131.7	6252.4	132	6252.3	132.3	
6252.2									
132.6	6252.1	132.9	6252	133.2	6251.9	133.5	6251.8	133.81	
6251.7									
134.11	6251.6	134.41	6251.5	134.71	6251.4	135.01	6251.3	135.31	
6251.2									
135.61	6251.1	135.91	6251	136.21	6250.9	136.51	6250.8	136.81	
6250.7									
137.11	6250.6	137.41	6250.5	137.71	6250.4	138.01	6250.3	138.31	
6250.2									
138.61	6250.1	138.91	6250	139.21	6249.9	139.51	6249.8	139.81	
6249.7									
140.11	6249.6	140.41	6249.5	140.71	6249.4	141.01	6249.3	141.31	
6249.2									
141.61	6249.1	141.91	6249	142.21	6248.9	142.51	6248.8	142.81	
6248.7									
143.11	6248.6	143.41	6248.5	143.71	6248.4	144.01	6248.3	144.31	
6248.2									
144.61	6248.1	155.1	6248.1	155.4	6248.2	155.7	6248.3	156	
6248.4									
156.3	6248.5	156.6	6248.6	156.9	6248.7	157.2	6248.8	157.5	
6248.9									
157.8	6249	158.1	6249.1	158.4	6249.2	158.7	6249.3	159	
6249.4									
159.3	6249.5	159.6	6249.6	159.9	6249.7	160.2	6249.8	160.5	
6249.9									
160.8	6250	161.1	6250.1	161.4	6250.2	161.7	6250.3	162	
6250.4									
162.3	6250.5	162.6	6250.6	162.9	6250.7	163.2	6250.8	163.5	
6250.9									
163.8	6251	164.1	6251.1	164.4	6251.2	164.7	6251.3	165	
6251.4									
165.3	6251.5	165.6	6251.6	165.9	6251.7	166.2	6251.8	166.5	
6251.9									
166.8	6252	167.1	6252.1	167.4	6252.2	167.7	6252.3	168	
6252.4									



168.3	6252.5	168.6	6252.6	168.91	6252.7	169.21	6252.8	169.51
6252.9								
169.82	6253	169.84	6253.01	170.12	6253.1	170.42	6253.2	170.73
6253.3								
171.03	6253.4	171.33	6253.5	171.63	6253.6	171.94	6253.7	172.24
6253.8								
172.54	6253.9	172.85	6254	173.15	6254.1	173.45	6254.2	173.76
6254.3								
174.06	6254.4	174.55	6254.5	179.55	6254.6	184.55	6254.7	189.55
6254.8								
194.99	6254.9	200.43	6255	205.87	6255.1	211.31	6255.2	216.75
6255.3								
222.2	6255.4	227.64	6255.5	233.08	6255.6	238.52	6255.7	243.96
6255.8								
249.4	6255.9	254.84	6256	261.61	6256.1	268.4	6256.2	275.19
6256.3								
281.98	6256.4	288.77	6256.5	295.56	6256.6	300	6256.6	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	129.86	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	129.86	169.84		50	50		.1

Ineffective Flow	num=	1
Sta L	Sta R	Elev
0	98.73	6259.63
Left Levee	Station=	104.59
Right Levee	Station=	256.2
		Elevation= 6259.7
		Elevation= 6256.16

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6254.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.46	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6252.74	Reach Len. (ft)	50.00
50.00	50.00		
Crit W. S. (ft)	6252.74	Flow Area (sq ft)	
113.30			
E. G. Slope (ft/ft)	0.001793	Area (sq ft)	
113.30			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	38.38	Top Width (ft)	
38.38			
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)	
9.71			
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)	
2.95			
Conv. Total (cfs)	25977.7	Conv. (cfs)	

25977.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.88			
Min Ch El (ft)	6248.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
104.59	256.20		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
4.00	0.00		
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
1.12	0.01		

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 964

## INPUT

Description:	Station	Elevation	Data	num=	240	Elev	Sta	Elev	Sta	Elev	Sta
Elev	0	6259.5	50.51	6259.5	58.79	6259.4	66.02	6259.3	71.28		
6259.3											
71.51	6259.4	73.06	6259.4	74.55	6259.3	76.04	6259.2	77.53			
6259.1											
79.02	6259	80.51	6258.9	81.85	6258.8	82.67	6258.7	83.49			
6258.6											
84.32	6258.5	85.14	6258.4	85.96	6258.3	86.79	6258.2	87.61			
6258.1											
88.43	6258	89.26	6257.9	90.08	6257.8	90.91	6257.7	91.57			
6257.7											
92.27	6257.8	92.96	6257.9	93.66	6258	94.36	6258.1	95.05			
6258.2											
95.75	6258.3	96.45	6258.4	97.15	6258.5	97.84	6258.6	98.54			
6258.7											
99.26	6258.8	100.11	6258.9	100.95	6259	101.8	6259.1	104.15			
6259.2											
106.12	6259.2	108.12	6259.1	110.11	6259	110.86	6258.9	111.16			
6258.8											



111.46	6258.7	111.75	6258.6	112.05	6258.5	112.35	6258.4	112.64
6258.3								
112.94	6258.2	113.24	6258.1	113.53	6258	113.83	6257.9	114.13
6257.8								
114.42	6257.7	114.72	6257.6	115.02	6257.5	115.31	6257.4	115.61
6257.3								
115.91	6257.2	116.2	6257.1	116.5	6257	116.8	6256.9	117.09
6256.8								
117.39	6256.7	117.69	6256.6	117.98	6256.5	118.28	6256.4	118.58
6256.3								
118.87	6256.2	119.17	6256.1	119.47	6256	119.77	6255.9	120.07
6255.8								
120.38	6255.7	120.68	6255.6	120.98	6255.5	121.29	6255.4	121.59
6255.3								
121.89	6255.2	122.2	6255.1	122.5	6255	122.8	6254.9	123.11
6254.8								
123.41	6254.7	123.72	6254.6	124.03	6254.5	124.33	6254.4	124.64
6254.3								
124.95	6254.2	125.26	6254.1	125.57	6254	125.87	6253.9	126.22
6253.8								
126.57	6253.7	126.82	6253.6	127.19	6253.5	127.46	6253.4	127.73
6253.3								
128	6253.2	128.26	6253.1	128.53	6253	128.8	6252.9	129.1
6252.8								
129.39	6252.7	129.67	6252.6	129.96	6252.5	130.25	6252.4	130.53
6252.3								
130.82	6252.2	131.11	6252.1	131.39	6252	131.69	6251.9	131.99
6251.8								
132.29	6251.7	132.59	6251.6	132.89	6251.5	133.19	6251.4	133.49
6251.3								
133.79	6251.2	134.09	6251.1	134.39	6251	134.69	6250.9	134.99
6250.8								
135.29	6250.7	135.59	6250.6	135.89	6250.5	136.19	6250.4	136.49
6250.3								
136.79	6250.2	137.09	6250.1	137.39	6250	137.69	6249.9	137.99
6249.8								
138.29	6249.7	138.59	6249.6	138.89	6249.5	139.19	6249.4	139.49
6249.3								
139.79	6249.2	140.09	6249.1	140.39	6249	140.69	6248.9	140.99
6248.8								
141.29	6248.7	141.59	6248.6	141.89	6248.5	142.19	6248.4	142.49
6248.3								
142.79	6248.2	143.09	6248.1	143.39	6248	143.69	6247.9	143.99
6247.8								
144.29	6247.7	144.59	6247.6	155.01	6247.6	155.21	6247.7	155.41
6247.8								
155.61	6247.9	155.85	6248	156.15	6248.1	156.45	6248.2	156.75
6248.3								
157.05	6248.4	157.35	6248.5	157.65	6248.6	157.95	6248.7	158.25
6248.8								
158.55	6248.9	158.85	6249	159.15	6249.1	159.45	6249.2	159.75
6249.3								
160.05	6249.4	160.35	6249.5	160.65	6249.6	160.95	6249.7	161.25
6249.8								

161.55	6249.9	161.85	6250	162.15	6250.1	162.45	6250.2	162.75
6250.3								
163.05	6250.4	163.35	6250.5	163.65	6250.6	163.95	6250.7	164.25
6250.8								
164.55	6250.9	164.85	6251	165.15	6251.1	165.45	6251.2	165.75
6251.3								
166.05	6251.4	166.35	6251.5	166.65	6251.6	166.95	6251.7	167.25
6251.8								
167.55	6251.9	167.85	6252	168.15	6252.1	168.9	6252.2	169.2
6252.3								
169.5	6252.4	169.81	6252.5	170.11	6252.6	170.41	6252.7	170.71
6252.8								
171.02	6252.9	171.32	6253	171.36	6253.01	171.62	6253.1	171.93
6253.2								
172.23	6253.3	172.53	6253.4	172.84	6253.5	173.14	6253.6	173.44
6253.7								
173.74	6253.8	174.05	6253.9	174.47	6254	179.47	6254.1	184.47
6254.2								
189.47	6254.3	198.65	6254.4	207.85	6254.5	217.05	6254.6	226.25
6254.7								
235.45	6254.8	244.65	6254.9	253.85	6255	262.34	6255.1	269.17
6255.2								
275.99	6255.3	282.82	6255.4	289.65	6255.5	296.48	6255.6	300
6255.6								

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	128.53	.013
			171.36
			.03

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.
Expan.								
	128.53	171.36		50	50	50		.1

.3	Ineffective Flow	num=	1
Sta L	Sta R	Elev	Permanent
0	101.24	6259.12	F
Left Levee	Station=	104.59	Elevation= 6259.22
Right Levee	Station=	254.95	Elevation= 6255.19

CROSS SECTION OUTPUT	Profile #Flow 1		
E. G. Elev (ft)	6253.75	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.44	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6252.31	Reach Len. (ft)	50.00
50.00	50.00		
Crit W. S. (ft)	6252.31	Flow Area (sq ft)	
114.09			
E. G. Slope (ft/ft)	0.001776	Area (sq ft)	
114.09			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			



Top Width (ft)	38.73	Top Width (ft)	
Vel Total (ft/s)	9.64	Avg. Vel. (ft/s)	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	
Conv. Total (cfs)	26104.4	Conv. (cfs)	
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
Min Ch El (ft)	6247.60	Shear (lb/sq ft)	
Alpha	1.00	Stream Power (lb/ft s)	300.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
C & E Loss (ft)	0.01	Cum SA (acres)	0.24

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 963

#### INPUT

Description:

Station	Elevation	Data	num=	240	Elev	Sta	Elev	Sta
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6258	25.2	6258	31.54	6257.9	47.12	6257.9	52.9
53.98	6258.1	55.07	6258.2	56.15	6258.3	57.24	6258.4	58.32
59.41	6258.6	60.49	6258.7	61.58	6258.8	62.66	6258.9	63.86
67	6258.8	68.99	6258.7	70.97	6258.6	72.96	6258.5	74.95
76.3	6258.3	77.62	6258.2	78.95	6258.1	80.27	6258	81.6
83.13	6257.8	84.66	6257.7	86.19	6257.6	87.72	6257.5	89.25

6257.4								
90.78	6257.3	92.31	6257.2	94.3	6257.2	95.3	6257.3	96.29
97.29	6257.5	98.28	6257.6	99.26	6257.7	99.96	6257.8	100.66
101.36	6258	102.06	6258.1	102.76	6258.2	103.46	6258.3	104.16
104.86	6258.5	105.78	6258.5	107.75	6258.4	109.71	6258.3	111.68
112.05	6258.1	112.36	6258	112.67	6257.9	112.98	6257.8	113.29
113.59	6257.6	113.9	6257.5	114.21	6257.4	114.52	6257.3	114.83
115.13	6257.1	115.46	6257	115.81	6256.9	116.15	6256.8	116.5
116.85	6256.6	117.2	6256.5	117.51	6256.4	117.76	6256.3	118.01
118.35	6256.1	118.78	6256	119.1	6255.9	119.36	6255.8	119.63
119.9	6255.6	120.17	6255.5	120.44	6255.4	120.7	6255.3	120.97
121.24	6255.1	121.51	6255	121.78	6254.9	122.05	6254.8	122.31
122.58	6254.6	122.85	6254.5	123.12	6254.4	123.39	6254.3	123.65
123.92	6254.1	124.19	6254	124.47	6253.9	124.81	6253.8	125.1
125.39	6253.6	125.68	6253.5	125.96	6253.4	126.25	6253.3	126.54
126.82	6253.1	127.11	6253	127.4	6252.9	127.68	6252.8	127.97
128.26	6252.6	128.54	6252.5	128.83	6252.4	129.12	6252.3	129.41
129.69	6252.1	129.98	6252	130.27	6251.9	130.55	6251.8	130.84
131.13	6251.6	131.41	6251.5	131.71	6251.4	132.01	6251.3	132.31
132.61	6251.1	132.91	6251	133.21	6250.9	133.51	6250.8	133.81
134.11	6250.6	134.41	6250.5	134.71	6250.4	135.01	6250.3	135.31
135.61	6250.1	135.91	6250	136.21	6249.9	136.51	6249.8	136.81
137.11	6249.6	137.41	6249.5	137.71	6249.4	138.01	6249.3	138.31
138.61	6249.1	138.91	6249	139.21	6248.9	139.51	6248.8	139.81
140.11	6248.6	140.41	6248.5	140.71	6248.4	141.01	6248.3	141.31
141.61	6248.1	141.91	6248	142.21	6247.9	142.51	6247.8	142.81
143.11	6247.6	143.41	6247.5	143.71	6247.4	144.01	6247.3	144.31
144.61	6247.1	155.02	6247.1	155.22	6247.2	155.42	6247.3	155.62



6247.4								
155.82	6247.5	156.02	6247.6	156.22	6247.7	156.42	6247.8	156.62
6247.9								
156.82	6248	157.02	6248.1	157.22	6248.2	157.42	6248.3	157.72
6248.4								
158.02	6248.5	158.32	6248.6	158.62	6248.7	158.92	6248.8	159.22
6248.9								
159.52	6249	159.82	6249.1	160.12	6249.2	160.42	6249.3	160.72
6249.4								
161.02	6249.5	161.32	6249.6	161.62	6249.7	161.92	6249.8	162.22
6249.9								
162.52	6250	162.82	6250.1	163.12	6250.2	163.42	6250.3	163.72
6250.4								
164.02	6250.5	164.32	6250.6	164.62	6250.7	164.92	6250.8	165.22
6250.9								
165.52	6251	165.82	6251.1	166.12	6251.2	166.42	6251.3	166.72
6251.4								
167.02	6251.5	167.32	6251.6	167.62	6251.7	167.92	6251.8	168.22
6251.9								
169.43	6252	169.84	6252.06	170.12	6252.1	170.42	6252.2	170.72
6252.3								
171.03	6252.4	171.33	6252.5	171.63	6252.6	171.94	6252.7	172.24
6252.8								
172.54	6252.9	172.85	6253	173.15	6253.1	173.45	6253.2	173.75
6253.3								
174.06	6253.4	174.41	6253.5	179.41	6253.6	184.41	6253.7	189.41
6253.8								
198.53	6253.9	207.73	6254	216.93	6254.1	226.13	6254.2	235.33
6254.3								
248.64	6254.4	263.69	6254.5	278.74	6254.6	293.79	6254.7	300
6254.7								

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 129.98 .013 169.84 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 129.98 169.84 50 50 50 .1

.3 Ineffective Flow num= 1  
Sta L Sta R Elev Permanent  
0 102.5 6258.36 F  
Left Levee Station= 105.43 Elevation= 6258.46  
Right Levee Station= 209.72 Elevation= 6254.02

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6253.34	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.50	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6251.84	Reach Len. (ft)	50.00

50.00	50.00		
Crit W. S. (ft)	6251.84	Flow Area (sq ft)	
111.93			
E. G. Slope (ft/ft)	0.001829	Area (sq ft)	
111.93			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	37.63	Top Width (ft)	
37.63			
Vel Total (ft/s)	9.83	Avg. Vel. (ft/s)	
9.83			
Max Chl Dpth (ft)	4.74	Hydr. Depth (ft)	
2.97			
Conv. Total (cfs)	25723.4	Conv. (cfs)	
25723.4			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
39.26			
Min Ch El (ft)	6247.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00
105.43	209.72		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.74	0.00		
C & E Loss (ft)	0.00	Cum SA (acres)	0.24
1.03	0.01		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.  
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 962

#### INPUT

Description:

Station	Elevation	Data	num=	244					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6257.6	58.01	6257.6	58.97	6257.7	59.61	6257.8	59.71	
6257.9									
59.8	6258	59.9	6258.1	59.99	6258.2	60.09	6258.3	60.19	
6258.4									



60.28	6258.5	60.38	6258.6	60.47	6258.7	60.57	6258.8	60.67
6258.9								
61.02	6258.9	62.36	6258.8	63.7	6258.7	65.05	6258.6	66.62
6258.5								
68.61	6258.4	70.59	6258.3	72.58	6258.2	74.56	6258.1	76.55
6258								
78.53	6257.9	80.52	6257.8	82.17	6257.7	83.43	6257.6	84.69
6257.5								
85.95	6257.4	87.21	6257.3	88.47	6257.2	89.73	6257.1	90.87
6257								
91.82	6256.9	92.78	6256.8	93.73	6256.7	94.69	6256.6	96.65
6256.6								
97.99	6256.7	99.04	6256.8	100.05	6256.9	101.05	6257	102.05
6257.1								
103.05	6257.2	104.06	6257.3	105.06	6257.4	106.06	6257.5	107.06
6257.6								
112.88	6257.6	113.15	6257.5	113.41	6257.4	113.68	6257.3	113.95
6257.2								
114.22	6257.1	114.49	6257	114.75	6256.9	115.02	6256.8	115.29
6256.7								
115.56	6256.6	115.83	6256.5	116.09	6256.4	116.36	6256.3	116.63
6256.2								
116.9	6256.1	117.17	6256	117.44	6255.9	117.7	6255.8	117.97
6255.7								
118.24	6255.6	118.51	6255.5	118.78	6255.4	119.04	6255.3	119.31
6255.2								
119.58	6255.1	119.85	6255	120.2	6254.9	120.53	6254.8	120.82
6254.7								
121.11	6254.6	121.4	6254.5	121.68	6254.4	121.97	6254.3	122.26
6254.2								
122.54	6254.1	122.83	6254	123.12	6253.9	123.4	6253.8	123.69
6253.7								
123.98	6253.6	124.26	6253.5	124.55	6253.4	124.84	6253.3	125.12
6253.2								
125.41	6253.1	125.7	6253	125.98	6252.9	126.27	6252.8	126.56
6252.7								
126.84	6252.6	127.13	6252.5	127.42	6252.4	127.7	6252.3	127.99
6252.2								
128.28	6252.1	128.56	6252	128.85	6251.9	129.14	6251.8	129.42
6251.7								
129.71	6251.6	130	6251.5	130.28	6251.4	130.57	6251.3	130.86
6251.2								
131.14	6251.1	131.43	6251	131.73	6250.9	132.03	6250.8	132.33
6250.7								
132.63	6250.6	132.93	6250.5	133.23	6250.4	133.53	6250.3	133.83
6250.2								
134.13	6250.1	134.43	6250	134.73	6249.9	135.03	6249.8	135.33
6249.7								
135.63	6249.6	135.93	6249.5	136.23	6249.4	136.53	6249.3	136.83
6249.2								
137.13	6249.1	137.43	6249	137.73	6248.9	138.03	6248.8	138.33
6248.7								
138.63	6248.6	138.93	6248.5	139.23	6248.4	139.53	6248.3	139.83
6248.2								

140.13	6248.1	140.43	6248	140.73	6247.9	141.03	6247.8	141.33			
6247.7											
141.63	6247.6	141.93	6247.5	142.23	6247.4	142.53	6247.3	142.83			
6247.2											
143.13	6247.1	143.43	6247	143.73	6246.9	144.03	6246.8	144.33			
6246.7											
144.63	6246.6	155.03	6246.6	155.23	6246.7	155.43	6246.8	155.63			
6246.9											
155.83	6247	156.03	6247.1	156.23	6247.2	156.43	6247.3	156.63			
6247.4											
156.83	6247.5	157.03	6247.6	157.23	6247.7	157.43	6247.8	157.63			
6247.9											
157.83	6248	158.03	6248.1	158.23	6248.2	158.43	6248.3	158.63			
6248.4											
158.83	6248.5	159.03	6248.6	159.29	6248.7	159.59	6248.8	159.89			
6248.9											
160.19	6249	160.49	6249.1	160.79	6249.2	161.09	6249.3	161.39			
6249.4											
161.69	6249.5	161.99	6249.6	162.29	6249.7	162.59	6249.8	162.89			
6249.9											
163.19	6250	163.49	6250.1	163.79	6250.2	164.09	6250.3	164.39			
6250.4											
164.69	6250.5	164.99	6250.6	165.29	6250.7	165.59	6250.8	165.89			
6250.9											
166.19	6251	166.49	6251.1	166.79	6251.2	167.09	6251.3	167.39			
6251.4											
167.69	6251.5	167.99	6251.6	168.29	6251.7	169.79	6251.8	171.04			
6251.9											
171.34	6252	171.44	6252.03	171.64	6252.1	171.95	6252.2	172.25			
6252.3											
172.55	6252.4	172.85	6252.5	173.16	6252.6	173.46	6252.7	173.76			
6252.8											
174.07	6252.9	174.37	6253	180.35	6253.1	185.65	6253.2	190.65			
6253.3											
193.73	6253.3	196.42	6253.2	199.11	6253.1	203.57	6253.1	206.61			
6253.2											
209.66	6253.3	212.7	6253.4	219.21	6253.5	233.34	6253.6	247.47			
6253.7											
261.61	6253.8	275.76	6253.9	297.15	6254	300	6254				
Manning's n Values				num=	3						
Sta	n Val	Sta	n Val	Sta	n Val						
0	.03	128.56	.013	171.44	.03						
Bank Sta: Left Right				Lengths: Left Channel Right	Coeff Contr.						
Expan.				128.56 171.44	50 50 50	.1					
.3											
Ineffective Flow				num=	1						
Sta L	Sta R	Elev	Permanent								
0	105.85	6257.63	F								
Left Levee		Station=	112.97	Elevation=		6257.63					
Right Levee		Station=	192.54	Elevation=		6253.38					



## CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6252.92	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6251.43	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6251.43	Flow Area (sq ft)	
112.24			
E. G. Slope (ft/ft)	0.001794	Area (sq ft)	
112.24			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	37.25	Top Width (ft)	
37.25			
Vel Total (ft/s)	9.80	Avg. Vel. (ft/s)	
9.80			
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	
3.01			
Conv. Total (cfs)	25969.3	Conv. (cfs)	
25969.3			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
38.97			
Min Ch El (ft)	6246.60	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
112.97 192.54			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.61 0.00			
C & E Loss (ft)	0.00	Cum SA (acres)	0.24
0.99 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 961

## INPUT

## Description:

Station	Elevation	Data	num=	334						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev	0	6257.6	33.9	6257.6	47.55	6257.7	49.43	6257.8	51.3	
6257.9										
53.17	6258	56.2	6258	62.04	6257.9	63.31	6257.8	64.57		
6257.7										
65.83	6257.6	67.09	6257.5	68.36	6257.4	69.62	6257.3	70.88		
6257.2										
72.14	6257.1	73.41	6257	77.85	6256.9	82.81	6256.8	85.67		
6256.7										
87.46	6256.6	89.08	6256.5	90.04	6256.4	90.99	6256.3	91.95		
6256.2										
92.91	6256.1	93.86	6256	94.82	6255.9	95.77	6255.8	96.73		
6255.7										
97.63	6255.7	98.98	6255.8	100.32	6255.9	101.66	6256	103		
6256.1										
104.34	6256.2	105.68	6256.3	106.87	6256.4	107.88	6256.5	108.88		
6256.6										
110.85	6256.6	114.17	6256.5	114.43	6256.4	114.7	6256.3	114.97		
6256.2										
115.24	6256.1	115.57	6256	115.94	6255.9	116.25	6255.8	116.54		
6255.7										
116.83	6255.6	117.11	6255.5	117.4	6255.4	117.69	6255.3	117.97		
6255.2										
118.26	6255.1	118.55	6255	118.83	6254.9	119.12	6254.8	119.41		
6254.7										
119.7	6254.6	119.98	6254.5	120.27	6254.4	120.56	6254.3	120.84		
6254.2										
121.13	6254.1	121.42	6254	121.7	6253.9	121.99	6253.8	122.28		
6253.7										
122.56	6253.6	122.85	6253.5	123.14	6253.4	123.42	6253.3	123.71		
6253.2										
124	6253.1	124.28	6253	124.57	6252.9	124.86	6252.8	125.14		
6252.7										
125.43	6252.6	125.72	6252.5	126	6252.4	126.29	6252.3	126.58		
6252.2										
126.86	6252.1	127.15	6252	127.44	6251.9	127.72	6251.8	128.01		
6251.7										
128.3	6251.6	128.58	6251.5	128.87	6251.4	129.16	6251.3	129.44		
6251.2										
129.73	6251.1	130.02	6251	130.3	6250.9	130.59	6250.8	130.88		
6250.7										
131.16	6250.6	131.45	6250.5	131.75	6250.4	132.05	6250.3	132.35		
6250.2										
132.65	6250.1	132.95	6250	133.25	6249.9	133.55	6249.8	133.85		
6249.7										
134.15	6249.6	134.45	6249.5	134.75	6249.4	135.05	6249.3	135.35		
6249.2										
135.65	6249.1	135.95	6249	136.25	6248.9	136.55	6248.8	136.85		
6248.7										
137.15	6248.6	137.45	6248.5	137.75	6248.4	138.05	6248.3	138.35		
6248.2										



138.65	6248.1	138.95	6248	139.25	6247.9	139.55	6247.8	139.85
6247.7								
140.15	6247.6	140.45	6247.5	140.75	6247.4	141.05	6247.3	141.35
6247.2								
141.65	6247.1	141.95	6247	142.25	6246.9	142.55	6246.8	142.85
6246.7								
143.15	6246.6	143.45	6246.5	143.75	6246.4	144.05	6246.3	144.35
6246.2								
144.65	6246.1	155.04	6246.1	155.24	6246.2	155.44	6246.3	155.64
6246.4								
155.84	6246.5	156.04	6246.6	156.24	6246.7	156.44	6246.8	156.64
6246.9								
156.84	6247	157.04	6247.1	157.24	6247.2	157.44	6247.3	157.64
6247.4								
157.84	6247.5	158.04	6247.6	158.24	6247.7	158.44	6247.8	158.64
6247.9								
158.84	6248	159.04	6248.1	159.24	6248.2	159.44	6248.3	159.64
6248.4								
159.84	6248.5	160.04	6248.6	160.24	6248.7	160.44	6248.8	160.64
6248.9								
160.86	6249	161.16	6249.1	161.46	6249.2	161.76	6249.3	162.06
6249.4								
162.36	6249.5	162.66	6249.6	162.96	6249.7	163.26	6249.8	163.56
6249.9								
163.86	6250	164.16	6250.1	164.46	6250.2	164.76	6250.3	165.06
6250.4								
165.36	6250.5	165.66	6250.6	165.96	6250.7	166.26	6250.8	166.56
6250.9								
166.86	6251	167.16	6251.1	167.46	6251.2	167.76	6251.3	168.06
6251.4								
168.36	6251.5	169.86	6251.58	170.16	6251.6	171.96	6251.7	172.26
6251.8								
172.56	6251.9	172.86	6252	173.17	6252.1	173.47	6252.2	173.77
6252.3								
174.08	6252.4	174.38	6252.5	180.91	6252.6	187.33	6252.7	189.69
6252.7								
190.24	6252.6	190.8	6252.5	191.35	6252.4	191.9	6252.3	192.46
6252.2								
193.01	6252.1	193.57	6252	194.12	6251.9	194.67	6251.8	195.23
6251.7								
195.78	6251.6	196.34	6251.5	196.89	6251.4	197.44	6251.3	198
6251.2								
198.55	6251.1	199.11	6251	199.66	6250.9	200.21	6250.8	200.77
6250.7								
201.32	6250.6	201.87	6250.5	202.43	6250.4	202.98	6250.3	203.54
6250.2								
204.09	6250.1	204.64	6250	205.2	6249.9	205.8	6249.8	206.84
6249.7								
207.89	6249.6	209.9	6249.5	212.1	6249.4	212.57	6249.4	212.86
6249.5								
213.15	6249.6	213.25	6249.3	214.35	6249.2	215.53	6249.1	216.81
6249								
218.15	6248.9	219.67	6248.8	221.17	6248.7	222.43	6248.6	223.69
6248.5								

225.17	6248.4	227.25	6248.3	229.88	6248.2	232.7	6248.2	234.16
6248.3								
234.48	6249	235.16	6248.9	235.62	6248.4	235.84	6248.8	236.51
6248.7								
237.08	6248.5	237.19	6248.6	238.94	6248.5	245.36	6248.4	251.78
6248.3								
258.45	6248.3	259.03	6249.2	259.35	6249.1	259.91	6249	260.25
6248.9								
260.66	6248.4	260.86	6248.8	261.47	6248.7	262.05	6248.5	262.08
6248.6								
263.39	6248.6	264.39	6248.7	265.23	6248.8	266.13	6248.9	267.04
6249								
267.89	6249.1	268.6	6249.2	269.31	6249.3	270.02	6249.4	270.72
6249.5								
271.41	6249.6	272.03	6249.7	272.66	6249.8	273.28	6249.9	273.87
6250								
274.43	6250.1	275	6250.2	275.56	6250.3	276.12	6250.4	276.68
6250.5								
277.25	6250.6	277.82	6250.7	278.4	6250.8	278.92	6250.9	279.44
6251								
279.95	6251.1	280.46	6251.2	280.97	6251.3	281.48	6251.4	281.99
6251.5								
282.5	6251.6	283.01	6251.7	283.52	6251.8	284.02	6251.9	284.5
6252								
284.98	6252.1	285.46	6252.2	285.93	6252.3	286.41	6252.4	286.88
6252.5								
287.36	6252.6	287.83	6252.7	288.31	6252.8	288.78	6252.9	289.26
6253								
292.78	6253.1	296.67	6253.2	299.51	6253.3	300	6253.3	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	130.02	.013
169.86			.03
Bank Sta:	Left	Right	Lengths:
Expan.			Left Channel
	130.02	169.86	Right
			50
			50
			50
			.1
.3			
Ineffective Flow	num=	2	
Sta L	Sta R	Elev	Permanent
0	107.1	6256.46	F
190.03	300	6252.49	F
Left Levee	Station=	113.81	Elevation= 6256.53
Right Levee	Station=	189.61	Elevation= 6252.76

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6252.47	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.50	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6250.98	Reach Len. (ft)	50.00
50.00	50.00		



Crit W.S. (ft)	6250.98	Flow Area (sq ft)	
112.08			
E.G. Slope (ft/ft)	0.001774	Area (sq ft)	
112.08			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	36.70	Top Width (ft)	
36.70			
Vel Total (ft/s)	9.81	Avg. Vel. (ft/s)	
9.81			
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)	
3.05			
Conv. Total (cfs)	26119.3	Conv. (cfs)	
26119.3			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
38.50			
Min Ch El (ft)	6246.10	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
113.81 189.61			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05
3.48 0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.24
0.95 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 960

#### INPUT

Description:

Station	Elevation	Data	num=	399					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6254.2	.12	6254.2	5.46	6254.1	10.8	6254	26.21	
6253.9									
32.83	6253.8	39.45	6253.7	46.07	6253.6	56.98	6253.5	59.77	
6253.5									
60.01	6253.6	60.24	6253.7	60.47	6253.8	60.71	6253.9	60.94	

6254									
61.17	6254.1	62.37	6254.1	65.04	6254	67.16	6253.9	69.02	
6253.8									
70.72	6253.7	72.26	6253.6	73.8	6253.5	75.39	6253.4	76.95	
6253.3									
78.4	6253.2	79.77	6253.1	81.08	6253	82.34	6252.9	83.56	
6252.8									
84.75	6252.7	88.6	6252.7	91.19	6252.6	97.11	6252.5	97.66	
6252.5									
98.33	6252.6	99	6252.7	99.67	6252.8	100.29	6252.9	100.79	
6253									
101.29	6253.1	101.79	6253.2	102.29	6253.3	102.79	6253.4	103.29	
6253.5									
103.79	6253.6	104.29	6253.7	104.79	6253.8	105.29	6253.9	105.79	
6254									
106.29	6254.1	106.79	6254.2	107.29	6254.3	107.79	6254.4	108.3	
6254.5									
108.8	6254.6	109.3	6254.7	109.8	6254.8	110.3	6254.9	110.8	
6255									
111.3	6255.1	111.8	6255.2	113.03	6255.3	115.32	6255.3	115.8	
6255.2									
116.29	6255.1	116.78	6255	117.26	6254.9	117.71	6254.8	117.99	
6254.7									
118.28	6254.6	118.57	6254.5	118.85	6254.4	119.14	6254.3	119.43	
6254.2									
119.71	6254.1	120	6254	120.29	6253.9	120.57	6253.8	120.86	
6253.7									
121.15	6253.6	121.43	6253.5	121.72	6253.4	122.01	6253.3	122.3	
6253.2									
122.58	6253.1	122.87	6253	123.16	6252.9	123.44	6252.8	123.73	
6252.7									
124.02	6252.6	124.3	6252.5	124.59	6252.4	124.88	6252.3	125.16	
6252.2									
125.45	6252.1	125.74	6252	126.02	6251.9	126.31	6251.8	126.6	
6251.7									
126.88	6251.6	127.17	6251.5	127.46	6251.4	127.74	6251.3	128.03	
6251.2									
128.32	6251.1	128.6	6251	128.89	6250.9	129.18	6250.8	129.46	
6250.7									
129.75	6250.6	130.04	6250.5	130.32	6250.4	130.61	6250.3	130.9	
6250.2									
131.18	6250.1	131.47	6250	131.77	6249.9	132.07	6249.8	132.37	
6249.7									
132.67	6249.6	132.97	6249.5	133.27	6249.4	133.57	6249.3	133.87	
6249.2									
134.17	6249.1	134.47	6249	134.77	6248.9	135.07	6248.8	135.37	
6248.7									
135.67	6248.6	135.97	6248.5	136.27	6248.4	136.57	6248.3	136.87	
6248.2									
137.17	6248.1	137.47	6248	137.77	6247.9	138.07	6247.8	138.37	
6247.7									
138.67	6247.6	138.97	6247.5	139.27	6247.4	139.57	6247.3	139.87	
6247.2									
140.17	6247.1	140.47	6247	140.77	6246.9	141.07	6246.8	141.37	



6246.7  
141.67 6246.6 141.97 6246.5 142.27 6246.4 142.57 6246.3 142.87  
6246.2  
143.17 6246.1 143.47 6246 143.77 6245.9 144.07 6245.8 144.37  
6245.7  
144.67 6245.6 155.05 6245.6 155.25 6245.7 155.45 6245.8 155.65  
6245.9  
155.85 6246 156.05 6246.1 156.25 6246.2 156.45 6246.3 156.65  
6246.4  
156.85 6246.5 157.05 6246.6 157.25 6246.7 157.45 6246.8 157.65  
6246.9  
157.85 6247 158.05 6247.1 158.25 6247.2 158.45 6247.3 158.65  
6247.4  
158.85 6247.5 159.05 6247.6 159.25 6247.7 159.45 6247.8 159.65  
6247.9  
159.85 6248 160.05 6248.1 160.25 6248.2 160.45 6248.3 160.65  
6248.4  
160.85 6248.5 161.05 6248.6 161.25 6248.7 161.45 6248.8 161.65  
6248.9  
161.85 6249 162.05 6249.1 162.25 6249.2 162.45 6249.3 162.73  
6249.4  
163.03 6249.5 163.33 6249.6 163.63 6249.7 163.93 6249.8 164.23  
6249.9  
164.53 6250 164.83 6250.1 165.13 6250.2 165.43 6250.3 165.73  
6250.4  
166.03 6250.5 166.33 6250.6 166.63 6250.7 166.93 6250.8 167.23  
6250.9  
167.53 6251 167.83 6251.1 168.13 6251.2 168.33 6251.24 168.61  
6251.3  
170.52 6251.4 172.44 6251.5 173.18 6251.6 173.48 6251.7 173.78  
6251.8  
174.09 6251.9 174.39 6252 180.65 6252.1 187.4 6252.2 189.63  
6252.2  
190.05 6252.1 190.47 6252 190.89 6251.9 191.31 6251.8 191.72  
6251.7  
192.14 6251.6 192.56 6251.5 192.98 6251.4 193.4 6251.3 193.82  
6251.2  
194.22 6251.1 194.62 6251 195.03 6250.9 195.45 6250.8 195.87  
6250.7  
196.28 6250.6 196.7 6250.5 197.13 6250.4 197.56 6250.3 197.99  
6250.2  
198.42 6250.1 198.85 6250 199.28 6249.9 199.71 6249.8 200.14  
6249.7  
200.57 6249.6 201 6249.5 201.43 6249.4 201.86 6249.3 202.29  
6249.2  
202.72 6249.1 203.15 6249 203.58 6248.9 204.01 6248.8 204.44  
6248.7  
204.87 6248.6 205.3 6248.5 205.73 6248.4 206.16 6248.3 206.59  
6248.2  
207.02 6248.1 207.45 6248 207.88 6247.9 208.31 6247.8 208.74  
6247.7  
209.17 6247.6 209.59 6247.5 210.02 6247.4 210.45 6247.3 210.88  
6247.2  
211.31 6247.1 211.74 6247 212.17 6246.9 212.6 6246.8 213.03

6246.7  
213.46 6246.6 215.88 6246.5 218.49 6246.4 221.39 6246.3 224.75  
6246.2  
228.4 6246.1 232.21 6246 235.39 6246 236.12 6245.9 239.88  
6245.8  
241.55 6245.9 241.59 6245.4 241.64 6245.7 241.82 6245.6 242.01  
6245.5  
242.09 6245.5 242.2 6245.4 242.39 6245.3 242.59 6245.6 243.09  
6245.7  
243.19 6245.8 244.19 6245.3 246.36 6245.3 246.56 6245.4 246.61  
6245.8  
246.67 6245.6 246.77 6245.5 246.98 6245.6 247.19 6245.7 247.24  
6245.5  
247.72 6245.8 248.14 6245.9 248.3 6245.7 252.79 6245.9 253.57  
6246  
258.34 6246 258.67 6246.1 263.89 6246.1 265.17 6246.2 268.08  
6246.2  
268.82 6246.3 269.79 6246.3 270.74 6246.4 271.17 6246.4 271.38  
6246.5  
271.6 6246.6 271.82 6246.7 272.04 6246.8 272.25 6246.9 272.58  
6247  
272.93 6247.1 273.29 6247.2 273.65 6247.3 274 6247.4 274.36  
6247.5  
274.72 6247.6 275.07 6247.7 275.43 6247.8 275.78 6247.9 276.14  
6248  
276.5 6248.1 276.85 6248.2 277.21 6248.3 277.57 6248.4 277.92  
6248.5  
278.28 6248.6 278.66 6248.7 279.05 6248.8 279.45 6248.9 279.85  
6249  
280.25 6249.1 280.65 6249.2 281.05 6249.3 281.45 6249.4 281.85  
6249.5  
282.25 6249.6 282.65 6249.7 283.05 6249.8 283.45 6249.9 283.85  
6250  
284.25 6250.1 284.5 6250.2 284.73 6250.3 284.95 6250.4 285.17  
6250.5  
285.39 6250.6 285.61 6250.7 285.84 6250.8 286.06 6250.9 286.28  
6251  
286.5 6251.1 286.72 6251.2 286.95 6251.3 287.17 6251.4 287.47  
6251.5  
287.95 6251.6 288.44 6251.7 288.93 6251.8 289.42 6251.9 289.9  
6252  
290.39 6252.1 290.88 6252.2 291.37 6252.3 291.85 6252.4 292.34  
6252.5  
292.83 6252.6 293.32 6252.7 293.81 6252.8 294.29 6252.9 294.78  
6253  
295.36 6253.1 296.3 6253.2 297.25 6253.3 300 6253.3  
  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .03 131.47 .013 168.33 .03  
  
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 131.47 168.33 50 50 50 .1



.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 112.13 6255.33 F  
190.03 300 6252.12 F  
Left Levee Station= 115.48 Elevation= 6255.3  
Right Levee Station= 187.94 Elevation= 6252.18

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6252.02	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	0.030
0.013			
W.S. Elev (ft)	6250.47	Reach Len. (ft)	50.00
50.00 50.00			
Crit W.S. (ft)	6250.47	Flow Area (sq ft)	0.31
110.06			
E. G. Slope (ft/ft)	0.001738	Area (sq ft)	0.31
110.06			
Q Total (cfs)	1100.00	Flow (cfs)	0.24
1099.76			
Top Width (ft)	35.80	Top Width (ft)	1.34
34.46			
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)	0.75
9.99			
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	0.23
3.19			
Conv. Total (cfs)	26389.4	Conv. (cfs)	5.7
26383.8			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.42
36.24			
Min Ch El (ft)	6245.60	Shear (lb/sq ft)	0.02
0.33			
Alpha	1.01	Stream Power (lb/ft s)	300.00
115.48 187.94			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.35 0.00			
C & E Loss (ft)	0.02	Cum SA (acres)	0.24
0.91 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 959

INPUT

Description:

Station	Elevation	Data	num=	373	Elev	Sta	Elev	Sta	Elev	Sta
0	6254.6	13.02	6254.6	25.77	6254.5	33.92	6254.5	34.3		
6254.6										
34.68	6254.7	35.06	6254.8	35.44	6254.9	35.82	6255	36.2		
6255.1										
36.58	6255.2	36.96	6255.3	38.2	6255.4	39.93	6255.5	46.4		
6255.5										
63.21	6255.4	65.32	6255.3	66.61	6255.2	67.58	6255.1	68.55		
6255										
69.52	6254.9	70.49	6254.8	71.46	6254.7	72.44	6254.6	73.5		
6254.5										
74.56	6254.4	75.62	6254.3	76.69	6254.2	77.75	6254.1	78.81		
6254										
79.87	6253.9	80.93	6253.8	82	6253.7	83.06	6253.6	84.12		
6253.5										
85.18	6253.4	86.24	6253.3	87.31	6253.2	88.37	6253.1	89.43		
6253										
90.49	6252.9	91.56	6252.8	92.62	6252.7	93.68	6252.6	94.74		
6252.5										
95.8	6252.4	96.87	6252.3	97.93	6252.2	98.99	6252.1	100.05		
6252										
101.55	6252	102.21	6252.1	102.87	6252.2	103.53	6252.3	104.19		
6252.4										
104.85	6252.5	105.51	6252.6	106.17	6252.7	106.83	6252.8	107.48		
6252.9										
108.17	6253	109.25	6253.1	110.32	6253.2	111.4	6253.3	112.47		
6253.4										
113.55	6253.5	114.62	6253.6	116.58	6253.6	117.09	6253.5	117.59		
6253.4										
118.1	6253.3	118.61	6253.2	119.12	6253.1	119.63	6253	120.14		
6252.9										
120.64	6252.8	121.34	6252.7	121.83	6252.6	122.31	6252.5	122.8		
6252.4										
123.29	6252.3	123.75	6252.2	124.03	6252.1	124.32	6252	124.61		
6251.9										
124.9	6251.8	125.18	6251.7	125.47	6251.6	125.76	6251.5	126.04		
6251.4										
126.33	6251.3	126.62	6251.2	126.9	6251.1	127.19	6251	127.48		
6250.9										
127.76	6250.8	128.05	6250.7	128.34	6250.6	128.62	6250.5	128.91		
6250.4										
129.2	6250.3	129.48	6250.2	129.77	6250.1	130.06	6250	130.34		
6249.9										



130.63	6249.8	130.92	6249.7	131.2	6249.6	131.49	6249.5	131.79
6249.4								
132.09	6249.3	132.39	6249.2	132.69	6249.1	132.99	6249	133.29
6248.9								
133.59	6248.8	133.89	6248.7	134.19	6248.6	134.49	6248.5	134.79
6248.4								
135.09	6248.3	135.39	6248.2	135.69	6248.1	135.99	6248	136.29
6247.9								
136.59	6247.8	136.89	6247.7	137.19	6247.6	137.49	6247.5	137.79
6247.4								
138.09	6247.3	138.39	6247.2	138.69	6247.1	138.99	6247	139.29
6246.9								
139.59	6246.8	139.89	6246.7	140.19	6246.6	140.49	6246.5	140.79
6246.4								
141.09	6246.3	141.39	6246.2	141.69	6246.1	141.99	6246	142.29
6245.9								
142.59	6245.8	142.89	6245.7	143.19	6245.6	143.49	6245.5	143.79
6245.4								
144.09	6245.3	144.39	6245.2	144.69	6245.1	155.06	6245.1	155.26
6245.2								
155.47	6245.3	155.67	6245.4	155.87	6245.5	156.07	6245.6	156.27
6245.7								
156.47	6245.8	156.67	6245.9	156.87	6246	157.07	6246.1	157.27
6246.2								
157.47	6246.3	157.67	6246.4	157.87	6246.5	158.07	6246.6	158.27
6246.7								
158.47	6246.8	158.67	6246.9	158.87	6247	159.07	6247.1	159.27
6247.2								
159.47	6247.3	159.67	6247.4	159.87	6247.5	160.07	6247.6	160.27
6247.7								
160.47	6247.8	160.67	6247.9	160.87	6248	161.07	6248.1	161.27
6248.2								
161.47	6248.3	161.67	6248.4	161.87	6248.5	162.07	6248.6	162.27
6248.7								
162.47	6248.8	162.67	6248.9	162.87	6249	163.07	6249.1	163.27
6249.2								
163.47	6249.3	163.67	6249.4	163.87	6249.5	164.07	6249.6	164.3
6249.7								
164.6	6249.8	164.9	6249.9	165.2	6250	165.5	6250.1	165.8
6250.2								
166.1	6250.3	166.4	6250.4	166.7	6250.5	167	6250.6	167.3
6250.7								
167.6	6250.8	167.9	6250.9	168.2	6251	168.97	6251.1	169.88
6251.15								
170.89	6251.2	172.81	6251.3	174.1	6251.4	174.4	6251.5	179.79
6251.6								
185.5	6251.7	189.75	6251.7	190.17	6251.6	190.59	6251.5	191
6251.4								
191.42	6251.3	191.84	6251.2	192.26	6251.1	192.68	6251	193.1
6250.9								
193.52	6250.8	193.94	6250.7	194.36	6250.6	194.77	6250.5	195.19
6250.4								
195.61	6250.3	196.03	6250.2	196.45	6250.1	196.87	6250	197.29
6249.9								

197.71	6249.8	198.13	6249.7	198.54	6249.6	198.96	6249.5	199.38
6249.4								
199.8	6249.3	200.22	6249.2	200.64	6249.1	201.06	6249	201.48
6248.9								
201.9	6248.8	202.35	6248.7	202.81	6248.6	203.27	6248.5	203.73
6248.4								
204.2	6248.3	204.66	6248.2	205.12	6248.1	205.58	6248	206.04
6247.9								
206.5	6247.8	206.96	6247.7	207.42	6247.6	207.88	6247.5	208.34
6247.4								
208.81	6247.3	209.27	6247.2	209.73	6247.1	210.19	6247	210.65
6246.9								
211.11	6246.8	211.57	6246.7	212.03	6246.6	212.49	6246.5	212.95
6246.4								
213.42	6246.3	215.5	6246.2	217.96	6246.1	220.41	6246	222.86
6245.9								
225.33	6245.8	227.82	6245.7	230.31	6245.6	232.76	6245.5	232.86
6245.4								
232.97	6245.3	233.07	6245.2	233.17	6245.1	234.82	6245	235.32
6245								
235.42	6245.1	235.52	6245.2	235.62	6245.3	235.72	6245.4	235.87
6245.5								
238.49	6245.6	241.11	6245.7	243.73	6245.8	246.35	6245.9	248.93
6246								
251.51	6246.1	254.08	6246.2	256.66	6246.3	259.24	6246.4	261.81
6246.5								
264.39	6246.6	266.97	6246.7	269.54	6246.8	272.12	6246.9	272.62
6247								
273.01	6247.1	273.4	6247.2	273.79	6247.3	274.18	6247.4	274.57
6247.5								
274.96	6247.6	275.35	6247.7	275.74	6247.8	276.13	6247.9	276.52
6248								
276.91	6248.1	277.3	6248.2	277.68	6248.3	278.07	6248.4	278.46
6248.5								
278.85	6248.6	279.24	6248.7	279.63	6248.8	280.02	6248.9	280.41
6249								
280.8	6249.1	281.19	6249.2	281.58	6249.3	281.97	6249.4	282.36
6249.5								
282.75	6249.6	283.14	6249.7	283.53	6249.8	283.92	6249.9	284.31
6250								
284.7	6250.1	285.09	6250.2	285.48	6250.3	285.87	6250.4	286.26
6250.5								
286.65	6250.6	287.03	6250.7	287.43	6250.8	287.83	6250.9	288.23
6251								
288.63	6251.1	289.03	6251.2	289.43	6251.3	289.83	6251.4	290.23
6251.5								
290.63	6251.6	291.03	6251.7	291.43	6251.8	291.83	6251.9	292.23
6252								
292.63	6252.1	293.03	6252.2	293.44	6252.3	293.84	6252.4	294.24
6252.5								
294.64	6252.6	295.04	6252.7	295.44	6252.8	295.84	6252.9	296.24
6253								
296.34	6253	298.21	6252.9	300	6252.9			



Manning's n Values num= 3  
Sta n Val Sta n Val  
0 .03 130.06 .013 169.88 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 130.06 169.88 50 50 50 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 113.39 6253.58 F  
190.45 300 6251.6 F  
Left Levee Station= 114.64 Elevation= 6253.67  
Right Levee Station= 189.19 Elevation= 6251.72

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6251.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.55	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6249.98	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6249.98	Flow Area (sq ft)	
110.20			
E. G. Slope (ft/ft)	0.001776	Area (sq ft)	
110.20			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.02	Top Width (ft)	
35.02			
Vel Total (ft/s)	9.98	Avg. Vel. (ft/s)	
9.98			
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)	
3.15			
Conv. Total (cfs)	26102.7	Conv. (cfs)	
26102.7			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
36.94			
Min Ch El (ft)	6245.10	Shear (lb/sq ft)	
0.33			
Alpha	1.00	Stream Power (lb/ft s)	300.00
114.64 189.19			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
3.22 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.24
0.87 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 958

#### INPUT

Description:

Station	Elevation	Data	num=	299	Elev	Sta	Elev	Sta	Elev	Sta
Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6252.5	7.05	6252.5	10.29	6252.4	13.53	6252.3	16.77		
6252.2										
20.02	6252.1	23.26	6252	26.5	6251.9	29.74	6251.8	63.58		
6251.8										
67.44	6251.7	74.95	6251.6	82.46	6251.5	89.97	6251.4	97.48		
6251.3										
98.92	6251.2	100.36	6251.1	101.83	6251	103.29	6250.9	104.76		
6250.8										
106.23	6250.7	107.69	6250.6	109.16	6250.5	109.98	6250.7	110.08		
6250.5										
111.17	6250.6	113.06	6250.7	114.9	6250.8	116.75	6250.9	117.76		
6250.9										
119.13	6250.8	120.5	6250.7	121.88	6250.6	123.25	6250.5	124.62		
6250.4										
126	6250.3	126.73	6250.2	127.24	6250.1	127.75	6250	128.26		
6249.9										
128.76	6249.8	129.31	6249.7	129.79	6249.6	130.08	6249.5	130.36		
6249.4										
130.65	6249.3	130.94	6249.2	131.22	6249.1	131.51	6249	131.81		
6248.9										
132.11	6248.8	132.41	6248.7	132.71	6248.6	133.01	6248.5	133.31		
6248.4										
133.61	6248.3	133.91	6248.2	134.21	6248.1	134.51	6248	134.81		
6247.9										
135.11	6247.8	135.41	6247.7	135.71	6247.6	136.01	6247.5	136.31		
6247.4										
136.61	6247.3	136.91	6247.2	137.21	6247.1	137.51	6247	137.81		
6246.9										
138.11	6246.8	138.41	6246.7	138.71	6246.6	139.01	6246.5	139.31		
6246.4										
139.61	6246.3	139.91	6246.2	140.21	6246.1	140.51	6246	140.81		
6245.9										
141.11	6245.8	141.41	6245.7	141.71	6245.6	142.01	6245.5	142.31		
6245.4										
142.61	6245.3	142.91	6245.2	143.21	6245.1	143.51	6245	143.81		



6244.9								
144.11	6244.8	144.41	6244.7	144.71	6244.6	155.08	6244.6	155.28
6244.7								
155.48	6244.8	155.68	6244.9	155.88	6245	156.08	6245.1	156.28
6245.2								
156.48	6245.3	156.68	6245.4	156.88	6245.5	157.08	6245.6	157.28
6245.7								
157.48	6245.8	157.68	6245.9	157.88	6246	158.08	6246.1	158.28
6246.2								
158.48	6246.3	158.68	6246.4	158.88	6246.5	159.08	6246.6	159.28
6246.7								
159.48	6246.8	159.68	6246.9	159.88	6247	160.08	6247.1	160.28
6247.2								
160.48	6247.3	160.68	6247.4	160.88	6247.5	161.08	6247.6	161.28
6247.7								
161.48	6247.8	161.68	6247.9	161.88	6248	162.08	6248.1	162.28
6248.2								
162.48	6248.3	162.68	6248.4	162.88	6248.5	163.08	6248.6	163.28
6248.7								
163.48	6248.8	163.68	6248.9	163.88	6249	164.08	6249.1	164.28
6249.2								
164.48	6249.3	164.68	6249.4	164.88	6249.5	165.08	6249.6	165.28
6249.7								
165.48	6249.8	165.68	6249.9	165.88	6250	166.17	6250.1	166.47
6250.2								
166.77	6250.3	167.07	6250.4	167.37	6250.5	167.67	6250.6	167.97
6250.7								
168.27	6250.8	168.35	6250.81	169.34	6250.9	171.25	6251	173
6251.1								
174.02	6251.2	181.94	6251.3	187.63	6251.4	189.65	6251.4	190.12
6251.3								
190.59	6251.2	191.06	6251.1	191.53	6251	192	6250.9	192.47
6250.8								
192.94	6250.7	193.41	6250.6	193.88	6250.5	194.35	6250.4	194.82
6250.3								
195.29	6250.2	195.76	6250.1	196.23	6250	196.7	6249.9	197.17
6249.8								
197.64	6249.7	198.11	6249.6	198.58	6249.5	199.05	6249.4	199.52
6249.3								
199.99	6249.2	200.46	6249.1	200.93	6249	201.4	6248.9	201.87
6248.8								
202.34	6248.7	202.81	6248.6	203.29	6248.5	203.76	6248.4	204.23
6248.3								
204.71	6248.2	205.18	6248.1	205.66	6248	206.13	6247.9	206.61
6247.8								
207.08	6247.7	207.56	6247.6	208.03	6247.5	208.51	6247.4	208.98
6247.3								
209.46	6247.2	209.93	6247.1	210.41	6247	210.88	6246.9	211.36
6246.8								
211.83	6246.7	212.31	6246.6	212.78	6246.5	213.26	6246.4	214.79
6246.3								
217.45	6246.2	220.11	6246.1	222.77	6246	225.42	6245.9	228.08
6245.8								
230.74	6245.7	233.36	6245.6	235.97	6245.5	238.59	6245.4	241.13

6245.3								
242.55	6245.2	242.65	6245.1	242.75	6245	242.85	6244.9	242.95
6244.8								
245.07	6244.8	245.17	6244.9	245.27	6245	245.37	6245.1	245.46
6245.2								
246.89	6245.3	249.4	6245.4	251.91	6245.5	254.42	6245.6	256.93
6245.7								
259.45	6245.8	261.96	6245.9	264.47	6246	266.98	6246.1	269.49
6246.2								
272	6246.3	273.53	6246.4	273.93	6246.5	274.33	6246.6	274.74
6246.7								
275.14	6246.8	275.54	6246.9	275.95	6247	276.35	6247.1	276.75
6247.2								
277.15	6247.3	277.56	6247.4	277.96	6247.5	278.36	6247.6	278.76
6247.7								
279.17	6247.8	279.57	6247.9	279.97	6248	280.38	6248.1	280.78
6248.2								
281.18	6248.3	281.58	6248.4	281.99	6248.5	282.39	6248.6	282.79
6248.7								
283.19	6248.8	283.6	6248.9	283.91	6249.6	284	6249	284.4
6249.1								
284.81	6249.2	285.21	6249.3	285.61	6249.4	286.01	6249.5	286.42
6249.6								
286.82	6249.7	287.22	6249.8	287.63	6249.9	288.03	6250	288.43
6250.1								
288.83	6250.2	289.24	6250.3	289.64	6250.4	290.04	6250.5	290.5
6250.6								
291.1	6250.7	291.69	6250.8	292.29	6250.9	293.45	6251	295.03
6251.1								
296.22	6251.2	297.69	6251.3	299.16	6251.4	300	6251.4	
Manning's n Values								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.03	131.51	.013	168.35	.03			
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.								
	131.51	168.35		50	50	50		.1
.3								
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
0	116.32	6250.89	F					
190.03	300	6251.19	F					
Left Levee	Station=	117.57	Elevation=	6250.94				
Right Levee	Station=	189.19	Elevation=	6251.25				
CROSS SECTION OUTPUT Profile #Flow 1								
E. G. Elev (ft) 6251.04 Element Left OB								
Channel Right OB								
Vel Head (ft)	1.59	Wt. n-Val.						0.030
0.013								
W. S. Elev (ft)	6249.44	Reach Len. (ft)						50.00



50.00	50.00			
Crit W.S. (ft)	6249.44	Flow Area (sq ft)	0.28	
108.61				
E.G. Slope (ft/ft)	0.001742	Area (sq ft)	0.28	
108.61				
Q Total (cfs)	1100.00	Flow (cfs)	0.21	
1099.79				
Top Width (ft)	34.53	Top Width (ft)	1.27	
33.26				
Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)	0.73	
10.13				
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	0.22	
3.27				
Conv. Total (cfs)	26356.9	Conv. (cfs)	5.0	
26352.0				
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.35	
35.12				
Min Ch El (ft)	6244.60	Shear (lb/sq ft)	0.02	
0.34				
Alpha	1.00	Stream Power (lb/ft s)	300.00	
117.57	189.19			
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.05	
3.10	0.00			
C & E Loss (ft)	0.01	Cum SA (acres)	0.24	
0.83	0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 957

#### INPUT

Description:

Station	Elevation	Data	num=	322					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6250.9	3.24	6250.9	15.11	6250.8	23.82	6250.7	32.94	
6250.6									
42.06	6250.5	56.55	6250.5	60.36	6250.6	64.17	6250.7	75.25	
6250.8									

78.56	6250.9	81.09	6251	83.61	6251.1	85.53	6251.2	87.32
6251.3								
89.11	6251.4	90.9	6251.5	92.69	6251.6	94.48	6251.7	96.27
6251.8								
98.06	6251.9	99.85	6252	101.64	6252.1	103.43	6252.2	105.21
6252.3								
107	6252.4	108.79	6252.5	110.58	6252.6	112.12	6252.7	112.95
6252.8								
113.78	6252.9	114.61	6253	115.44	6253.1	116.27	6253.2	116.51
6253.2								
116.71	6253.1	116.91	6253	117.11	6252.9	117.31	6252.8	117.51
6252.7								
117.71	6252.6	117.91	6252.5	118.11	6252.4	118.31	6252.3	118.55
6252.2								
118.85	6252.1	119.15	6252	119.45	6251.9	119.74	6251.8	120.04
6251.7								
120.34	6251.6	120.64	6251.5	120.93	6251.4	121.23	6251.3	121.53
6251.2								
121.83	6251.1	122.13	6251	122.42	6250.9	122.72	6250.8	123.02
6250.7								
123.32	6250.6	123.68	6250.5	124.07	6250.4	124.47	6250.3	124.86
6250.2								
125.25	6250.1	125.65	6250	126.04	6249.9	126.44	6249.8	126.83
6249.7								
127.23	6249.6	127.62	6249.5	128.01	6249.4	128.41	6249.3	128.8
6249.2								
129.2	6249.1	129.59	6249	129.98	6248.9	130.38	6248.8	130.77
6248.7								
131.17	6248.6	131.53	6248.5	131.83	6248.4	132.13	6248.3	132.43
6248.2								
132.73	6248.1	133.03	6248	133.33	6247.9	133.63	6247.8	133.93
6247.7								
134.23	6247.6	134.53	6247.5	134.83	6247.4	135.13	6247.3	135.43
6247.2								
135.73	6247.1	136.03	6247	136.33	6246.9	136.63	6246.8	136.93
6246.7								
137.23	6246.6	137.53	6246.5	137.83	6246.4	138.13	6246.3	138.43
6246.2								
138.73	6246.1	139.03	6246	139.33	6245.9	139.63	6245.8	139.93
6245.7								
140.23	6245.6	140.53	6245.5	140.83	6245.4	141.13	6245.3	141.43
6245.2								
141.73	6245.1	142.03	6245	142.33	6244.9	142.63	6244.8	142.93
6244.7								
143.23	6244.6	143.53	6244.5	143.83	6244.4	144.13	6244.3	144.43
6244.2								
144.73	6244.1	155.09	6244.1	155.29	6244.2	155.49	6244.3	155.69
6244.4								
155.89	6244.5	156.09	6244.6	156.29	6244.7	156.49	6244.8	156.69
6244.9								
156.89	6245	157.09	6245.1	157.29	6245.2	157.49	6245.3	157.69
6245.4								
157.89	6245.5	158.09	6245.6	158.29	6245.7	158.49	6245.8	158.69
6245.9								



158.89	6246	159.09	6246.1	159.29	6246.2	159.49	6246.3	159.69
6246.4								
159.89	6246.5	160.09	6246.6	160.29	6246.7	160.49	6246.8	160.69
6246.9								
160.89	6247	161.09	6247.1	161.29	6247.2	161.49	6247.3	161.69
6247.4								
161.89	6247.5	162.09	6247.6	162.29	6247.7	162.49	6247.8	162.69
6247.9								
162.89	6248	163.09	6248.1	163.29	6248.2	163.49	6248.3	163.69
6248.4								
163.89	6248.5	164.09	6248.6	164.29	6248.7	164.49	6248.8	164.69
6248.9								
164.89	6249	165.09	6249.1	165.29	6249.2	165.49	6249.3	165.69
6249.4								
165.89	6249.5	166.09	6249.6	166.29	6249.7	166.49	6249.8	166.69
6249.9								
166.89	6250	167.09	6250.1	167.29	6250.2	167.49	6250.3	167.74
6250.4								
168.04	6250.5	168.34	6250.6	169.7	6250.7	169.9	6250.72	170.83
6250.8								
171.85	6250.9	172.87	6251	173.89	6251.1	188.46	6251.2	189.59
6251.2								
190.06	6251.1	190.53	6251	191	6250.9	191.47	6250.8	191.93
6250.7								
192.4	6250.6	192.87	6250.5	193.34	6250.4	193.81	6250.3	194.28
6250.2								
194.75	6250.1	195.22	6250	195.69	6249.9	196.16	6249.8	196.63
6249.7								
197.1	6249.6	197.57	6249.5	198.04	6249.4	198.51	6249.3	198.98
6249.2								
199.45	6249.1	199.92	6249	200.39	6248.9	200.86	6248.8	201.31
6248.7								
201.65	6248.6	202.09	6248.5	202.55	6248.4	203.01	6248.3	203.47
6248.2								
203.93	6248.1	204.39	6248	204.85	6247.9	205.31	6247.8	205.77
6247.7								
206.23	6247.6	206.69	6247.5	207.15	6247.4	207.61	6247.3	208.07
6247.2								
208.53	6247.1	208.99	6247	209.45	6246.9	209.91	6246.8	210.37
6246.7								
210.83	6246.6	211.29	6246.5	211.75	6246.4	212.21	6246.3	212.67
6246.2								
213.13	6246.1	213.95	6246	216.35	6245.9	218.75	6245.8	221.16
6245.7								
223.56	6245.6	225.96	6245.5	228.35	6245.4	230.74	6245.3	233.13
6245.2								
235.57	6245.1	238.02	6245	238.26	6244.9	238.35	6244.8	238.45
6244.7								
238.55	6244.6	238.65	6244.5	240.68	6244.5	240.78	6244.6	240.88
6244.7								
240.98	6244.8	241.08	6244.9	241.33	6245	243.92	6245.1	246.51
6245.2								
249.1	6245.3	251.71	6245.4	254.36	6245.5	257.01	6245.6	259.65
6245.7								

262.28	6245.8	264.91	6245.9	267.54	6246	270.17	6246.1	272.8
6246.2								
274.54	6246.3	274.83	6246.4	275.12	6246.5	275.4	6246.6	275.69
6246.7								
275.98	6246.8	276.27	6246.9	276.58	6247	276.89	6247.1	277.2
6247.2								
277.51	6247.3	279.53	6247.4	282.8	6247.5	286.07	6247.6	289.34
6247.7								
292.61	6247.8	292.72	6247.9	293.18	6247.9	293.55	6248	293.92
6248.1								
294.3	6248.2	294.67	6248.3	295.04	6248.4	295.41	6248.5	295.79
6248.6								
296.16	6248.7	296.53	6248.8	296.9	6248.9	297.28	6249	297.65
6249.1								
298.02	6249.2	298.39	6249.3	298.76	6249.4	299.14	6249.5	299.51
6249.6								
299.88	6249.7	300	6249.7					

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	129.59	.013
			169.9
			.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	129.59	169.9		50	50	50	.1

.3							
Ineffective Flow	num=	2					
Sta L	Sta R	Elev	Permanent				
0	115.48	6253.12	F				
190.03	300	6250.8	F				
Left Levee	Station=	115.9	Elevation=	6253.2			
Right Levee	Station=	189.61	Elevation=	6250.72			

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6250.53	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.57	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6248.96	Reach Len. (ft)	50.00
50.00	50.00		
Crit W. S. (ft)	6248.96	Flow Area (sq ft)	
109.52			
E. G. Slope (ft/ft)	0.001816	Area (sq ft)	
109.52			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	35.07	Top Width (ft)	
35.07			
Vel Total (ft/s)	10.04	Avg. Vel. (ft/s)	
10.04			
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)	
3.12			



Conv. Total (cfs)	25811.0	Conv. (cfs)	
25811.0			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	
36.99			
Min Ch El (ft)	6244.10	Shear (lb/sq ft)	
0.34			
Alpha	1.00	Stream Power (lb/ft s)	300.00
115.90 189.61			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.05
2.97 0.00			
C & E Loss (ft)	0.02	Cum SA (acres)	0.24
0.79 0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 956

#### INPUT

Description:

Station	Elevation	Data	num=	287					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-36.9	6250.1	-23.07	6250.1	-16.35	6250	-12.08	6249.9	-8.19	
6249.8									
-4.3	6249.7	.09	6249.6	3.84	6249.5	11.19	6249.4	38.67	
6249.4									
38.75	6249.5	65.32	6249.6	66.81	6249.7	68.3	6249.8	69.79	
6249.9									
70.55	6250	71.1	6250.1	71.64	6250.2	72.19	6250.3	72.73	
6250.4									
73.27	6250.5	73.82	6250.6	74.36	6250.7	74.91	6250.8	75.45	
6250.9									
75.99	6251	76.54	6251.1	77.08	6251.2	77.63	6251.3	78.17	
6251.4									
78.72	6251.5	79.26	6251.6	79.8	6251.7	80.35	6251.8	80.89	
6251.9									
82.86	6251.9	83.15	6251.8	83.43	6251.7	83.7	6251.6	83.98	
6251.5									
84.26	6251.4	84.54	6251.3	84.82	6251.2	85.1	6251.1	85.38	

6251									
85.66	6250.9	85.93	6250.8	86.21	6250.7	86.49	6250.6	86.77	
6250.5									
87.05	6250.4	87.33	6250.3	87.64	6250.2	87.96	6250.1	88.28	
6250									
88.6	6249.9	88.92	6249.8	89.24	6249.7	89.56	6249.6	89.87	
6249.5									
90.19	6249.4	90.51	6249.3	90.83	6249.2	91.15	6249.1	91.47	
6249									
91.79	6248.9	92.11	6248.8	92.43	6248.7	92.74	6248.6	93.06	
6248.5									
93.38	6248.4	93.7	6248.3	94.02	6248.2	94.34	6248.1	94.65	
6248									
94.95	6247.9	95.25	6247.8	95.55	6247.7	95.85	6247.6	96.15	
6247.5									
96.45	6247.4	96.75	6247.3	97.05	6247.2	97.35	6247.1	97.65	
6247									
97.95	6246.9	98.25	6246.8	98.55	6246.7	98.85	6246.6	99.15	
6246.5									
99.45	6246.4	99.75	6246.3	100.05	6246.2	100.35	6246.1	100.65	
6246									
100.95	6245.9	101.25	6245.8	101.55	6245.7	101.85	6245.6	102.15	
6245.5									
102.45	6245.4	102.75	6245.3	103.05	6245.2	103.35	6245.1	103.65	
6245									
103.95	6244.9	104.25	6244.8	104.55	6244.7	104.85	6244.6	105.15	
6244.5									
105.45	6244.4	105.75	6244.3	106.05	6244.2	106.35	6244.1	106.65	
6244									
106.95	6243.9	107.25	6243.8	107.55	6243.7	107.85	6243.6	118.21	
6243.6									
118.43	6243.7	118.65	6243.8	118.86	6243.9	119.08	6244	119.3	
6244.1									
119.52	6244.2	119.73	6244.3	119.95	6244.4	120.17	6244.5	120.38	
6244.6									
120.6	6244.7	120.82	6244.8	121.04	6244.9	121.25	6245	121.47	
6245.1									
121.69	6245.2	121.91	6245.3	122.12	6245.4	122.34	6245.5	122.56	
6245.6									
122.78	6245.7	122.99	6245.8	123.21	6245.9	123.43	6246	123.64	
6246.1									
123.86	6246.2	124.08	6246.3	124.3	6246.4	124.51	6246.5	124.74	
6246.6									
124.97	6246.7	125.21	6246.8	125.45	6246.9	125.68	6247	125.92	
6247.1									
126.15	6247.2	126.39	6247.3	126.63	6247.4	126.86	6247.5	127.1	
6247.6									
127.33	6247.7	127.57	6247.8	127.81	6247.9	128.04	6248	128.28	
6248.1									
128.51	6248.2	128.75	6248.3	128.99	6248.4	129.22	6248.5	129.46	
6248.6									
129.7	6248.7	129.93	6248.8	130.17	6248.9	130.4	6249	130.64	
6249.1									
130.88	6249.2	131.11	6249.3	131.35	6249.4	132.06	6249.5	134.41	



6249.55								
137.06	6249.6	152.67	6249.6	153.33	6249.5	153.99	6249.4	154.66
6249.3								
155.32	6249.2	155.98	6249.1	156.65	6249	157.31	6248.9	157.97
6248.8								
158.64	6248.7	159.3	6248.6	159.96	6248.5	160.62	6248.4	161.28
6248.3								
161.94	6248.2	162.6	6248.1	163.27	6248	163.93	6247.9	164.59
6247.8								
165.25	6247.7	165.91	6247.6	166.57	6247.5	167.23	6247.4	167.89
6247.3								
168.56	6247.2	169.22	6247.1	169.88	6247	170.54	6246.9	171.2
6246.8								
171.86	6246.7	172.52	6246.6	173.18	6246.5	173.84	6246.4	174.51
6246.3								
175.17	6246.2	175.83	6246.1	176.49	6246	178.67	6245.9	181.16
6245.8								
183.64	6245.7	186.13	6245.6	188.61	6245.5	191.09	6245.4	193.57
6245.3								
196.05	6245.2	198.53	6245.1	201.01	6245	203.49	6244.9	205.97
6244.8								
207.42	6244.7	207.52	6244.6	207.62	6244.5	207.72	6244.4	207.82
6244.3								
209.96	6244.3	210.06	6244.4	210.16	6244.5	210.26	6244.6	210.36
6244.7								
211.9	6244.8	214.46	6244.9	217.02	6245	219.59	6245.1	222.15
6245.2								
223.99	6245.3	224.71	6245.3	227.27	6245.4	229.82	6245.5	232.37
6245.6								
234.93	6245.7	237.48	6245.8	241.16	6245.9	245.73	6246	247.84
6246.1								
248.35	6246.2	248.86	6246.3	249.37	6246.4	249.88	6246.5	250.39
6246.6								
250.9	6246.7	251.41	6246.8	251.93	6246.9	252.44	6247	252.95
6247.1								
253.01	6247.7	253.46	6247.2	253.97	6247.3	254.48	6247.4	254.99
6247.5								
255.5	6247.6	256.01	6247.7	256.38	6247.8	256.53	6247.8	257.04
6247.9								
257.55	6248	258.06	6248.1	258.57	6248.2	259.08	6248.3	259.59
6248.4								
260.1	6248.5	260.61	6248.6	261.13	6248.7	261.64	6248.8	262.15
6248.9								
262.66	6249	263.1	6249					

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
-36.9	.03	92.43	.013	134.41	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.
Expan.	92.43	134.41		50	50	.1
.3						
Ineffective Flow			num=	2		

Sta L	Sta R	Elev	Permanent
-36.9	81.09	6251.92	F
156.48	263.1	6249.05	F
Left Levee	Station=	82.77	Elevation= 6251.9
Right Levee	Station=	152.71	Elevation= 6249.62

# CROSS SECTION OUTPUT Profile #Flow 1

E. G.	Elev (ft)	6249.96	Element	Left OB
Channel	Right OB			
Vel Head (ft)		1.52	Wt. n-Val.	
0.013				
W. S. Elev (ft)		6248.44	Reach Len. (ft)	50.00
50.00	50.00			
Crit W. S. (ft)		6248.44	Flow Area (sq ft)	
111.21				
E. G. Slope (ft/ft)		0.001768	Area (sq ft)	
111.21				
Q Total (cfs)		1100.00	Flow (cfs)	
1100.00				
Top Width (ft)		35.85	Top Width (ft)	
35.85				
Vel Total (ft/s)		9.89	Avg. Vel. (ft/s)	
9.89				
Max Chl Dpth (ft)		4.84	Hydr. Depth (ft)	
3.10				
Conv. Total (cfs)		26161.8	Conv. (cfs)	
26161.8				
Length Wtd. (ft)		50.00	Wetted Per. (ft)	
37.66				
Min Ch El (ft)		6243.60	Shear (lb/sq ft)	
0.33				
Alpha		1.00	Stream Power (lb/ft s)	263.10
82.77	152.71			
Frctn Loss (ft)		0.07	Cum Volume (acre-ft)	0.05
2.85	0.00			
C & E Loss (ft)		0.09	Cum SA (acres)	0.24
0.75	0.01			

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

## CROSS SECTION



RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 955

INPUT									
Description:									
Station	Elevation	Data	num=	344					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6249.1	0	6249.4	.42	6249.4	2.42	6249.3	4.43	6249.2	6.43
6248.6	8.31	6249	10.46	6248.9	31.24	6248.8	32.32	6248.7	32.47
6248.8	33.43	6248.5	50.66	6248.5	50.74	6248.6	50.81	6248.7	50.89
6249.3	50.96	6248.9	51.04	6249	51.11	6249.1	51.19	6249.2	51.99
6249.2	60.14	6249.3	82.6	6249.2	105.05	6249.1	108.53	6249.1	108.63
6249.7	108.72	6249.3	108.82	6249.4	108.91	6249.5	109.08	6249.6	110.52
6250.2	111.95	6249.8	112.97	6249.9	113.51	6250	114.05	6250.1	114.59
6250.7	115.13	6250.3	115.67	6250.4	116.21	6250.5	116.75	6250.6	117.29
6251.2	117.83	6250.8	118.37	6250.9	118.91	6251	119.46	6251.1	120
6251	120.54	6251.3	120.73	6251.3	121.01	6251.2	121.3	6251.1	121.58
6250.5	121.87	6250.9	122.16	6250.8	122.44	6250.7	122.73	6250.6	123.01
6250	123.3	6250.4	123.58	6250.3	123.87	6250.2	124.15	6250.1	124.44
6249.5	124.72	6249.9	125.01	6249.8	125.29	6249.7	125.58	6249.6	125.86
6249	126.15	6249.4	126.43	6249.3	126.72	6249.2	127	6249.1	127.29
6248.5	127.57	6248.9	127.86	6248.8	128.14	6248.7	128.43	6248.6	128.72
6248	129	6248.4	129.29	6248.3	129.57	6248.2	129.86	6248.1	130.14
6247.5	130.43	6247.9	130.71	6247.8	131	6247.7	131.28	6247.6	131.57
6247	131.87	6247.4	132.17	6247.3	132.47	6247.2	132.77	6247.1	133.07
6246.5	133.37	6246.9	133.67	6246.8	133.97	6246.7	134.27	6246.6	134.57
6246	134.87	6246.4	135.17	6246.3	135.47	6246.2	135.77	6246.1	136.07
6245.5	136.37	6245.9	136.67	6245.8	136.97	6245.7	137.27	6245.6	137.57
6245	137.87	6245.4	138.17	6245.3	138.47	6245.2	138.77	6245.1	139.07

139.37	6244.9	139.67	6244.8	139.97	6244.7	140.27	6244.6	140.57
6244.5	140.87	6244.4	141.17	6244.3	141.47	6244.2	141.77	6244.1
6244	142.37	6243.9	142.67	6243.8	142.97	6243.7	143.27	6243.6
6243.5	143.87	6243.4	144.17	6243.3	144.47	6243.2	144.77	6243.1
6243.1	155.34	6243.2	155.56	6243.3	155.77	6243.4	155.99	6243.5
6243.6	156.43	6243.7	156.64	6243.8	156.86	6243.9	157.08	6244
6244.1	157.51	6244.2	157.71	6244.3	157.92	6244.4	158.13	6244.5
6244.6	158.54	6244.7	158.75	6244.8	158.96	6244.9	159.16	6245
6245.1	159.58	6245.2	159.78	6245.3	159.98	6245.4	160.18	6245.5
6245.6	160.58	6245.7	160.78	6245.8	160.98	6245.9	161.18	6246
6246.1	161.58	6246.2	161.78	6246.3	161.98	6246.4	162.18	6246.5
6246.6	162.58	6246.7	162.78	6246.8	162.98	6246.9	163.18	6247
6247.1	163.58	6247.2	163.78	6247.3	163.98	6247.4	164.18	6247.5
6247.6	164.58	6247.7	164.78	6247.8	164.98	6247.9	165.18	6248
6248.1	165.58	6248.2	165.78	6248.3	165.98	6248.4	166.18	6248.5
6248.6	166.58	6248.7	166.78	6248.8	166.98	6248.9	167.18	6249
6249.1	167.58	6249.2	167.78	6249.3	167.98	6249.4	168.18	6249.5
6249.6	168.71	6249.7	169.15	6249.8	169.58	6249.9	170.02	6250
6250.1	170.89	6250.2	171.32	6250.3	171.76	6250.4	172.19	6250.5
6250.5	190.31	6250.4	190.76	6250.3	191.2	6250.2	191.64	6250.1
6250	192.52	6249.9	192.96	6249.8	193.4	6249.7	193.84	6249.6
6249.5	194.73	6249.4	195.17	6249.3	195.61	6249.2	196.05	6249.1
6249	196.93	6248.9	197.38	6248.8	197.57	6249.6	197.82	6248.7
6248.6	198.7	6248.5	199.14	6248.4	199.58	6248.3	200.02	6248.2
6248.1	200.91	6248	201.35	6247.9	201.79	6247.8	201.9	6248.1
6247.7	202.67	6247.6	203.11	6247.5	203.55	6247.4	204.03	6247.3
6247.2	205.33	6247.1	205.98	6247	206.63	6246.9	207.28	6246.8
6246.7								



208.58	6246.6	209.22	6246.5	209.87	6246.4	210.52	6246.3	211.17
6246.2								
211.82	6246.1	212.47	6246	213.12	6245.9	214.57	6245.8	217.16
6245.7								
219.75	6245.6	222.35	6245.5	224.94	6245.4	227.53	6245.3	230.14
6245.2								
232.76	6245.1	235.38	6245	238.01	6244.9	240.63	6244.8	243.21
6244.7								
245.79	6244.6	248.37	6244.5	248.7	6244.4	248.8	6244.3	248.9
6244.2								
249	6244.1	249.1	6244	251.15	6244	251.25	6244.1	251.35
6244.2								
251.45	6244.3	251.55	6244.4	251.57	6244.6	251.84	6244.5	254.27
6244.6								
256.71	6244.7	259.14	6244.8	261.58	6244.9	264.01	6245	266.45
6245.1								
268.88	6245.2	271.32	6245.3	273.75	6245.4	276.19	6245.5	276.96
6245.6								
277.4	6245.7	277.83	6245.8	278.26	6245.9	278.69	6246	279.12
6246.1								
279.55	6246.2	279.98	6246.3	280.41	6246.4	280.85	6246.5	281.28
6246.6								
281.71	6246.7	282.14	6246.8	282.57	6246.9	283	6247	283.43
6247.1								
283.86	6247.2	284.29	6247.3	284.73	6247.4	285.16	6247.5	285.59
6247.6								
286.02	6247.7	286.45	6247.8	286.88	6247.9	287.31	6248	287.74
6248.1								
288.17	6248.2	288.61	6248.3	289.04	6248.4	289.47	6248.5	289.9
6248.6								
290.33	6248.7	290.76	6248.8	291.19	6248.9	291.62	6249	292.06
6249.1								
292.49	6249.2	292.92	6249.3	293.35	6249.4	293.78	6249.5	294.21
6249.6								
294.64	6249.7	295.07	6249.8	295.5	6249.9	295.94	6250	296.37
6250.1								
296.8	6250.2	297.23	6250.3	297.66	6250.4	298.09	6250.5	298.52
6250.6								
298.95	6250.7	299.38	6250.8	299.82	6250.9	300	6250.9	

Manning's n Values num= 3  
Sta n Val Sta n Val  
0 .03 130.14 .013 169.58 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
Expan. 130.14 169.58 50 50 50 .1

.3  
Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 118.83 6251.23 F  
190.87 300 6249.99 F  
Left Levee Station= 120.51 Elevation= 6251.3  
Right Levee Station= 189.61 Elevation= 6250.08

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6249.57	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.22	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6248.35	Reach Len. (ft)	50.00
50.00 50.00			
Crit W. S. (ft)	6247.93	Flow Area (sq ft)	0.17
124.19			
E. G. Slope (ft/ft)	0.001227	Area (sq ft)	0.17
124.19			
Q Total (cfs)	1100.00	Flow (cfs)	0.09
1099.91			
Top Width (ft)	36.74	Top Width (ft)	1.00
35.74			
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)	0.52
8.86			
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)	0.17
3.47			
Conv. Total (cfs)	31397.8	Conv. (cfs)	2.6
31395.2			
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.06
37.75			
Min Ch El (ft)	6243.10	Shear (lb/sq ft)	0.01
0.25			
Alpha	1.00	Stream Power (lb/ft s)	300.00
120.51 189.61			
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.05
2.71 0.00			
C & E Loss (ft)	0.12	Cum SA (acres)	0.24
0.71 0.01			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 954

INPUT

Description:

Station Elevation Data		num= 344							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Elev									
0	6248.9	1.18	6248.9	3.07	6248.8	4.93	6248.7	6.78	
6248.6									
8.63	6248.5	10.48	6248.4	12.33	6248.3	14.18	6248.2	16.03	



6248.1								
17.88	6248	19.73	6247.9	21.57	6247.8	23.42	6247.7	25.27
6247.6								
33.66	6247.6	35.65	6247.7	37.64	6247.8	39.62	6247.9	41.61
6248								
43.6	6248.1	45.59	6248.2	47.58	6248.3	49.56	6248.4	50.95
6248.5								
51.36	6248.6	51.78	6248.7	52.19	6248.8	57.28	6248.8	67.38
6248.7								
105.39	6248.6	105.58	6248.6	105.78	6248.7	105.89	6248.8	105.99
6248.9								
106.1	6249	115.98	6249.1	117.05	6249.2	118.12	6249.3	119.19
6249.4								
120.26	6249.5	121.33	6249.6	121.95	6249.6	122.35	6249.5	122.75
6249.4								
123.16	6249.3	123.56	6249.2	123.97	6249.1	124.37	6249	124.77
6248.9								
125.18	6248.8	125.58	6248.7	125.99	6248.6	126.39	6248.5	126.79
6248.4								
127.2	6248.3	127.6	6248.2	128	6248.1	128.41	6248	128.81
6247.9								
129.22	6247.8	129.62	6247.7	129.91	6247.6	130.19	6247.5	130.47
6247.4								
130.75	6247.3	131.03	6247.2	131.31	6247.1	131.59	6247	131.89
6246.9								
132.19	6246.8	132.49	6246.7	132.79	6246.6	133.09	6246.5	133.39
6246.4								
133.69	6246.3	133.99	6246.2	134.29	6246.1	134.59	6246	134.89
6245.9								
135.19	6245.8	135.49	6245.7	135.79	6245.6	136.09	6245.5	136.39
6245.4								
136.69	6245.3	136.99	6245.2	137.29	6245.1	137.59	6245	137.89
6244.9								
138.19	6244.8	138.49	6244.7	138.79	6244.6	139.09	6244.5	139.39
6244.4								
139.69	6244.3	139.99	6244.2	140.29	6244.1	140.59	6244	140.89
6243.9								
141.19	6243.8	141.49	6243.7	141.79	6243.6	142.09	6243.5	142.39
6243.4								
142.69	6243.3	142.99	6243.2	143.29	6243.1	143.59	6243	143.89
6242.9								
144.19	6242.8	144.49	6242.7	144.79	6242.6	155.12	6242.6	155.33
6242.7								
155.53	6242.8	155.73	6242.9	155.93	6243	156.14	6243.1	156.34
6243.2								
156.54	6243.3	156.74	6243.4	156.95	6243.5	157.15	6243.6	157.35
6243.7								
157.55	6243.8	157.75	6243.9	157.96	6244	158.16	6244.1	158.36
6244.2								
158.56	6244.3	158.77	6244.4	158.97	6244.5	159.17	6244.6	159.37
6244.7								
159.58	6244.8	159.78	6244.9	159.98	6245	160.18	6245.1	160.39
6245.2								
160.59	6245.3	160.79	6245.4	160.99	6245.5	161.2	6245.6	161.4

6245.7								
161.6	6245.8	161.8	6245.9	162	6246	162.21	6246.1	162.41
6246.2								
162.61	6246.3	162.81	6246.4	163.02	6246.5	163.22	6246.6	163.42
6246.7								
163.62	6246.8	163.83	6246.9	164.03	6247	164.23	6247.1	164.43
6247.2								
164.64	6247.3	164.84	6247.4	165.04	6247.5	165.24	6247.6	165.45
6247.7								
165.65	6247.8	165.85	6247.9	166.05	6248	166.25	6248.1	166.46
6248.2								
166.66	6248.3	166.86	6248.4	167.07	6248.5	167.27	6248.6	167.48
6248.7								
167.68	6248.8	167.89	6248.9	168.09	6249	168.3	6249.1	168.51
6249.2								
168.84	6249.3	169.16	6249.4	169.49	6249.5	169.82	6249.6	170.16
6249.7								
170.51	6249.8	170.87	6249.9	171.23	6250	171.26	6250.01	171.58
6250.1								
171.94	6250.2	172.3	6250.3	172.65	6250.4	173.01	6250.5	173.36
6250.6								
173.72	6250.7	174.08	6250.8	174.43	6250.9	180.76	6251	189.88
6251								
190.3	6250.9	190.72	6250.8	191.14	6250.7	191.56	6250.6	191.98
6250.5								
192.39	6250.4	192.81	6250.3	193.23	6250.2	193.65	6250.1	194.07
6250								
194.49	6249.9	194.91	6249.8	195.33	6249.7	195.75	6249.6	196.17
6249.5								
196.58	6249.4	197	6249.3	197.42	6249.2	197.84	6249.1	198.26
6249								
198.68	6248.9	199.1	6248.8	199.52	6248.7	199.94	6248.6	200.36
6248.5								
200.78	6248.4	201.19	6248.3	201.61	6248.2	202.03	6248.1	202.45
6248								
202.57	6248.1	202.87	6247.9	203.29	6247.8	203.71	6247.7	204.13
6247.6								
204.55	6247.5	204.97	6247.4	205.38	6247.3	205.8	6247.2	206.22
6247.1								
206.64	6247	207.06	6246.9	207.48	6246.8	207.9	6246.7	208.32
6246.6								
208.74	6246.5	209.16	6246.4	209.57	6246.3	209.99	6246.2	210.41
6246.1								
210.83	6246	211.22	6245.9	211.61	6245.8	212	6245.7	212.39
6245.6								
212.79	6245.5	213.18	6245.4	213.96	6245.3	216.58	6245.2	219.2
6245.1								
221.83	6245	224.41	6244.9	226.98	6244.8	229.56	6244.7	232.14
6244.6								
234.72	6244.5	237.3	6244.4	239.88	6244.3	241.51	6244.2	241.61
6244.1								
241.71	6244	241.81	6243.9	241.91	6243.8	246.55	6243.8	246.68
6243.9								
246.8	6244	246.92	6244.1	247.05	6244.2	251.26	6244.3	254.05



6244.4  
 256.85 6244.5 260.06 6244.6 264.8 6244.7 269.54 6244.8 274.28  
 6244.9  
 277.8 6245 278.18 6245.1 278.55 6245.2 278.92 6245.3 279.3  
 6245.4  
 279.67 6245.5 280.05 6245.6 280.42 6245.7 280.8 6245.8 281.17  
 6245.9  
 281.54 6246 281.92 6246.1 282.29 6246.2 282.67 6246.3 283.04  
 6246.4  
 283.42 6246.5 283.79 6246.6 284.17 6246.7 284.54 6246.8 284.91  
 6246.9  
 285.29 6247 285.66 6247.1 286.04 6247.2 286.41 6247.3 286.79  
 6247.4  
 287.16 6247.5 287.53 6247.6 287.91 6247.7 288.28 6247.8 288.66  
 6247.9  
 289.03 6248 289.41 6248.1 289.78 6248.2 290.15 6248.3 290.53  
 6248.4  
 290.9 6248.5 291.28 6248.6 291.65 6248.7 292.03 6248.8 292.4  
 6248.9  
 292.78 6249 293.15 6249.1 293.52 6249.2 293.9 6249.3 294.27  
 6249.4  
 294.65 6249.5 295.02 6249.6 295.4 6249.7 295.77 6249.8 296.17  
 6249.9  
 296.6 6250 297.04 6250.1 297.47 6250.2 297.91 6250.3 298.34  
 6250.4  
 298.78 6250.5 299.21 6250.6 299.65 6250.7 300 6250.7

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .03 128.41 .013 171.26 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan.  
 128.41 171.26 34.26 34.26 34.26 .1

.3  
 Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 5.33 6248.71 F  
 189.19 300 6249.59 F  
 Left Levee Station= 121.34 Elevation= 6249.64  
 Right Levee Station= 189.19 Elevation= 6249.64

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6249.40	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.82	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6248.58	Reach Len. (ft)	34.26
34.26 34.26			
Crit W. S. (ft)	6247.46	Flow Area (sq ft)	0.68
151.24			
E. G. Slope (ft/ft)	0.000712	Area (sq ft)	0.68

151.24			
Q Total (cfs)	1100.00	Flow (cfs)	0.39
1099.61			
Top Width (ft)	41.17	Top Width (ft)	2.35
38.82			
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)	0.57
7.27			
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)	0.29
3.90			
Conv. Total (cfs)	41224.9	Conv. (cfs)	14.6
41210.3			
Length Wtd. (ft)	34.26	Wetted Per. (ft)	2.42
41.09			
Min Ch El (ft)	6242.60	Shear (lb/sq ft)	0.01
0.16			
Alpha	1.01	Stream Power (lb/ft s)	300.00
121.34 189.19			
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.05
2.55 0.00			
C & E Loss (ft)	0.05	Cum SA (acres)	0.23
0.66 0.01			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 953

#### INPUT

Description:  
 Station Elevation Data num= 354  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta  
 Elev 0 6248.8 .66 6248.8 2.56 6248.7 4.46 6248.6 6.36  
 6248.5  
 8.26 6248.4 10.16 6248.3 12.06 6248.2 13.96 6248.1 15.85  
 6248  
 17.75 6247.9 19.65 6247.8 21.55 6247.7 23.45 6247.6 40.6  
 6247.6  
 42.15 6247.7 43.7 6247.8 45.25 6247.9 46.8 6248 48.35  
 6248.1  
 49.91 6248.2 51.26 6248.3 52.56 6248.4 101.13 6248.4 101.34  
 6248.5  
 101.58 6248.6 102.1 6248.7 104.64 6248.8 106.39 6248.8 107.91  
 6248.7  
 109.42 6248.6 110.94 6248.5 112.45 6248.4 114.32 6248.3 117.89  
 6248.2  
 121.46 6248.1 122.97 6248 123.58 6247.9 124.18 6247.8 124.79  
 6247.7



125. 4	6247. 6	126. 01	6247. 5	126. 65	6247. 4	127. 36	6247. 3	128. 06
6247. 2								
128. 76	6247. 1	129. 46	6247	130. 17	6246. 9	130. 87	6246. 8	131. 53
6246. 7								
131. 83	6246. 6	132. 13	6246. 5	132. 43	6246. 4	132. 73	6246. 3	133. 03
6246. 2								
133. 33	6246. 1	133. 63	6246	133. 93	6245. 9	134. 23	6245. 8	134. 53
6245. 7								
134. 83	6245. 6	135. 13	6245. 5	135. 43	6245. 4	135. 73	6245. 3	136. 03
6245. 2								
136. 33	6245. 1	136. 63	6245	136. 93	6244. 9	137. 23	6244. 8	137. 53
6244. 7								
137. 83	6244. 6	138. 13	6244. 5	138. 43	6244. 4	138. 73	6244. 3	139. 03
6244. 2								
139. 33	6244. 1	139. 63	6244	139. 93	6243. 9	140. 23	6243. 8	140. 53
6243. 7								
140. 83	6243. 6	141. 13	6243. 5	141. 43	6243. 4	141. 73	6243. 3	142. 03
6243. 2								
142. 33	6243. 1	142. 63	6243	142. 93	6242. 9	143. 18	6243. 4	143. 23
6242. 8								
143. 53	6242. 7	143. 83	6242. 6	144. 13	6242. 5	144. 43	6242. 4	144. 73
6242. 3								
155. 18	6242. 3	155. 39	6242. 4	155. 6	6242. 5	155. 8	6242. 6	156. 01
6242. 7								
156. 21	6242. 8	156. 42	6242. 9	156. 62	6243	156. 83	6243. 1	157. 03
6243. 2								
157. 24	6243. 3	157. 44	6243. 4	157. 65	6243. 5	157. 85	6243. 6	158. 06
6243. 7								
158. 26	6243. 8	158. 47	6243. 9	158. 68	6244	158. 88	6244. 1	159. 09
6244. 2								
159. 29	6244. 3	159. 5	6244. 4	159. 7	6244. 5	159. 91	6244. 6	160. 11
6244. 7								
160. 32	6244. 8	160. 52	6244. 9	160. 73	6245	160. 93	6245. 1	161. 14
6245. 2								
161. 34	6245. 3	161. 55	6245. 4	161. 75	6245. 5	161. 96	6245. 6	162. 17
6245. 7								
162. 37	6245. 8	162. 58	6245. 9	162. 78	6246	162. 99	6246. 1	163. 19
6246. 2								
163. 4	6246. 3	163. 6	6246. 4	163. 81	6246. 5	164. 01	6246. 6	164. 22
6246. 7								
164. 42	6246. 8	164. 63	6246. 9	164. 83	6247	165. 04	6247. 1	165. 24
6247. 2								
165. 45	6247. 3	165. 66	6247. 4	165. 86	6247. 5	166. 07	6247. 6	166. 27
6247. 7								
166. 48	6247. 8	166. 68	6247. 9	166. 89	6248	167. 09	6248. 1	167. 3
6248. 2								
167. 5	6248. 3	167. 71	6248. 4	167. 91	6248. 5	168. 12	6248. 6	168. 32
6248. 7								
168. 54	6248. 8	168. 85	6248. 9	169. 15	6249	169. 36	6249. 07	169. 45
6249. 1								
169. 75	6249. 2	170. 06	6249. 3	170. 36	6249. 4	170. 66	6249. 5	170. 96
6249. 6								
171. 27	6249. 7	171. 57	6249. 8	171. 87	6249. 9	172. 18	6250	172. 48
6250. 1								

172. 78	6250. 2	173. 08	6250. 3	173. 39	6250. 4	173. 69	6250. 5	173. 99
6250. 6								
174. 29	6250. 7	176. 08	6250. 8	181. 05	6250. 9	186. 01	6251	189. 94
6251								
190. 26	6250. 9	190. 58	6250. 8	190. 89	6250. 7	191. 21	6250. 6	191. 53
6250. 5								
191. 85	6250. 4	192. 17	6250. 3	192. 49	6250. 2	192. 81	6250. 1	193. 13
6250								
193. 45	6249. 9	193. 77	6249. 8	194. 09	6249. 7	194. 41	6249. 6	194. 73
6249. 5								
195. 05	6249. 4	195. 37	6249. 3	195. 69	6249. 2	196. 02	6249. 1	196. 37
6249								
196. 71	6248. 9	197. 06	6248. 8	197. 41	6248. 7	197. 76	6248. 6	198. 1
6248. 5								
198. 45	6248. 4	198. 8	6248. 3	199. 14	6248. 2	199. 49	6248. 1	199. 84
6248								
200. 18	6247. 9	200. 53	6247. 8	200. 88	6247. 7	201. 23	6247. 6	201. 57
6247. 5								
201. 92	6247. 4	202. 27	6247. 3	202. 61	6247. 2	202. 96	6247. 1	203. 31
6247								
203. 65	6246. 9	204	6246. 8	204. 35	6246. 7	204. 7	6246. 6	205. 04
6246. 5								
205. 39	6246. 4	205. 74	6246. 3	206. 08	6246. 2	206. 43	6246. 1	206. 78
6246								
207. 12	6245. 9	207. 47	6245. 8	207. 82	6245. 7	208. 24	6245. 6	208. 73
6245. 5								
209. 24	6245. 4	209. 25	6245. 5	210. 25	6245. 2	210. 76	6245. 1	211. 26
6245								
211. 33	6245	211. 34	6245. 1	211. 36	6245. 2	212. 41	6244. 9	212. 49
6244. 8								
212. 56	6244. 7	212. 64	6244. 6	212. 71	6244. 5	212. 77	6244. 4	212. 78
6244. 2								
212. 8	6243. 7	212. 82	6243. 2	212. 84	6242. 7	212. 86	6242. 2	212. 9
6241. 8								
213. 06	6241. 8	213. 31	6241. 9	213. 55	6242	213. 8	6242. 1	214. 05
6242. 2								
214. 29	6242. 3	214. 54	6242. 4	214. 78	6242. 5	215. 03	6242. 6	215. 27
6242. 7								
215. 52	6242. 8	215. 77	6242. 9	216. 01	6243	216. 26	6243. 1	216. 52
6243. 2								
216. 83	6243. 3	217. 44	6243. 5	218. 25	6243. 6	218. 42	6243. 7	218. 59
6243. 8								
218. 76	6243. 9	218. 94	6244	222. 21	6244. 1	225. 65	6244. 2	232. 55
6244. 4								
235. 89	6244. 5	239. 43	6244. 6	242. 96	6244. 7	246. 5	6244. 8	250. 03
6244. 9								
253. 56	6245	257. 1	6245. 1	260. 1	6245. 2	262. 68	6245. 3	266. 78
6245. 4								
271. 15	6245. 5	271. 91	6245. 8	271. 99	6245. 6	272. 71	6245. 7	273. 18
6245. 9								
273. 4	6245. 8	274. 09	6245. 9	274. 78	6246	275. 45	6246. 1	276. 09
6246. 2								
276. 69	6246. 3	277. 28	6246. 4	277. 87	6246. 5	278. 46	6246. 6	279. 05
6246. 7								



279.64	6246.8	280.2	6246.9	280.76	6247	281.31	6247.1	281.85
6247.2								
282.09	6247.3	282.14	6247.4	282.37	6247.3	282.89	6247.4	283.41
6247.5								
283.93	6247.6	284.45	6247.7	284.97	6247.8	285.5	6247.9	286.02
6248								
286.55	6248.1	287.07	6248.2	287.58	6248.3	288.07	6248.4	288.56
6248.5								
289.06	6248.6	289.55	6248.7	290.04	6248.8	290.53	6248.9	291.02
6249								
291.51	6249.1	292	6249.2	292.49	6249.3	292.98	6249.4	293.47
6249.5								
293.95	6249.6	294.43	6249.7	294.91	6249.8	295.38	6249.9	295.85
6250								
296.31	6250.1	296.78	6250.2	297.25	6250.3	297.72	6250.4	298.19
6250.5								
298.66	6250.6	299.13	6250.7	299.6	6250.8	300	6250.8	

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	129.46	.013	169.36	.03

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

129.46	169.36	15.74	15.74	15.74	.1
--------	--------	-------	-------	-------	----

.3 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5.33	6248.55	F
190.45	300	6248.92	F

Left Levee Station= 105.43 Elevation= 6248.84  
Right Levee Station= 173.7 Elevation= 6250.84

#### CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6249.33	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.65	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6248.68	Reach Len. (ft)	15.74
15.74 15.74			
Crit W. S. (ft)	6247.17	Flow Area (sq ft)	13.36
167.37			
E. G. Slope (ft/ft)	0.000511	Area (sq ft)	13.36
167.37			
Q Total (cfs)	1100.00	Flow (cfs)	10.95
1089.05			
Top Width (ft)	60.07	Top Width (ft)	21.25
38.82			
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	0.82
6.51			
Max Chl Dpth (ft)	6.88	Hydr. Depth (ft)	0.63
4.31			

Conv. Total (cfs)	48666.3	Conv. (cfs)	484.5
48181.8			
Length Wtd. (ft)	15.74	Wetted Per. (ft)	21.34
41.87			
Min Ch El (ft)	6242.30	Shear (lb/sq ft)	0.02
0.13			
Alpha	1.13	Stream Power (lb/ft s)	300.00
105.43 173.70			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04
2.43 0.00			
C & E Loss (ft)	0.10	Cum SA (acres)	0.22
0.63 0.01			

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.  
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 952

INPUT

Description:

Station	Elevation	Data	num=	296					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6248.8	1.04	6248.8	3.29	6248.7	5.19	6248.6	7.09	
6248.5									
8.99	6248.4	10.89	6248.3	12.79	6248.2	14.69	6248.1	16.59	
6248									
18.49	6247.9	20.39	6247.8	22.29	6247.7	24.2	6247.6	44.35	
6247.6									
45.86	6247.7	47.38	6247.8	48.9	6247.9	50.41	6248	52.52	
6248.1									
53.98	6248.2	54.41	6248.3	55.51	6248.4	86.44	6248.4	86.61	
6248.5									
86.8	6248.6	87.03	6248.7	89.03	6248.8	91.53	6248.9	94.03	
6249									
96.53	6249.1	99.03	6249.2	101.52	6249.3	104.02	6249.4	106.52	
6249.5									
109.02	6249.6	111.52	6249.7	113	6249.7	114.54	6249.6	116.09	
6249.5									
117.64	6249.4	119.15	6249.3	119.79	6249.2	120.42	6249.1	121.06	
6249									
121.69	6248.9	122.33	6248.8	122.96	6248.7	123.23	6248.6	123.48	
6248.5									
123.73	6248.4	123.98	6248.3	124.23	6248.2	124.48	6248.1	124.73	
6248									



124.98	6247.9	125.22	6247.8	125.47	6247.7	125.72	6247.6	125.97
6247.5								
126.22	6247.4	126.47	6247.3	126.72	6247.2	126.97	6247.1	127.22
6247								
127.46	6246.9	127.71	6246.8	127.96	6246.7	128.21	6246.6	128.46
6246.5								
128.71	6246.4	128.96	6246.3	129.21	6246.2	129.46	6246.1	129.71
6246								
129.95	6245.9	130.2	6245.8	130.45	6245.7	130.7	6245.6	130.95
6245.5								
131.2	6245.4	131.45	6245.3	131.7	6245.2	131.95	6245.1	132.19
6245								
132.44	6244.9	132.67	6244.8	132.9	6244.7	133.14	6244.6	133.37
6244.5								
133.6	6244.4	133.83	6244.3	134.07	6244.2	134.3	6244.1	134.53
6244								
134.76	6243.9	135	6243.8	135.23	6243.7	135.46	6243.6	135.69
6243.5								
135.93	6243.4	136.16	6243.3	136.39	6243.2	136.62	6243.1	136.86
6243								
137.11	6242.9	137.36	6242.8	137.62	6242.7	137.88	6242.6	138.14
6242.5								
138.4	6242.4	138.65	6242.3	138.91	6242.2	160.14	6242.2	160.35
6242.3								
160.56	6242.4	160.78	6242.5	161	6242.6	161.22	6242.7	161.43
6242.8								
161.64	6242.9	161.86	6243	162.07	6243.1	162.28	6243.2	162.5
6243.3								
162.71	6243.4	162.93	6243.5	163.15	6243.6	163.59	6243.8	163.81
6243.9								
164.03	6244	164.25	6244.1	164.47	6244.2	164.68	6244.3	164.9
6244.4								
165.12	6244.5	165.34	6244.6	165.56	6244.7	165.78	6244.8	166
6244.9								
166.22	6245	166.44	6245.1	166.66	6245.2	166.88	6245.3	167.1
6245.4								
167.32	6245.5	167.54	6245.6	167.76	6245.7	167.97	6245.8	168.19
6245.9								
168.41	6246	168.63	6246.1	168.85	6246.2	169.07	6246.3	169.29
6246.4								
169.51	6246.5	169.73	6246.6	169.95	6246.7	170.17	6246.8	170.39
6246.9								
170.61	6247	170.83	6247.1	171.04	6247.2	171.26	6247.3	171.48
6247.4								
171.7	6247.5	171.92	6247.6	172.14	6247.7	172.36	6247.8	172.58
6247.9								
172.8	6248	173.02	6248.1	173.24	6248.2	173.46	6248.3	173.68
6248.4								
173.9	6248.5	174.11	6248.6	174.33	6248.7	174.55	6248.8	174.77
6248.9								
174.99	6249	175.21	6249.1	175.43	6249.2	175.65	6249.3	175.77
6249.35								
175.87	6249.4	176.09	6249.5	176.31	6249.6	176.53	6249.7	176.75
6249.8								

176.97	6249.9	177.19	6250	177.4	6250.1	177.62	6250.2	177.84
6250.3								
178.06	6250.4	178.28	6250.5	178.5	6250.6	178.72	6250.7	178.94
6250.8								
181.43	6250.9	191.11	6251	197.5	6251	197.88	6250.9	198.27
6250.8								
198.65	6250.7	199.04	6250.6	199.42	6250.5	199.8	6250.4	200.19
6250.3								
200.57	6250.2	200.99	6250.1	201.42	6250	201.85	6249.9	202.28
6249.8								
202.72	6249.7	203.15	6249.6	203.58	6249.5	204.03	6249.4	204.55
6249.3								
205.06	6249.2	205.57	6249.1	206.09	6249	206.73	6248.9	207.37
6248.8								
208.08	6248.7	208.97	6248.6	210.16	6248.5	210.88	6248.6	211.93
6248.7								
213.03	6248.8	213.39	6248.4	213.97	6248.9	215.11	6249	216.2
6249.1								
217.9	6249.2	219.37	6248.3	219.4	6248.3	219.65	6249.3	222.84
6248.4								
233.6	6248.4	234.07	6248.3	234.69	6248.5	235.79	6248.6	236.88
6248.7								
237.98	6248.8	238.87	6248.2	239.07	6248.9	240.17	6249	243.68
6248.1								
248.49	6248	254.25	6248	255.25	6248.1	256.25	6248.2	257.25
6248.3								
257.76	6248.1	258.24	6248.4	259.24	6248.5	260.24	6248.6	261.24
6248.7								
261.28	6248.2	262.89	6248.8	264	6248.9	264.28	6248.2	264.65
6248.2								
267.02	6248.3	268.85	6248.4	270.38	6248.5	271.85	6248.6	273.03
6248.7								
274.22	6248.8	275.32	6248.9	276.29	6249	277.27	6249.1	278.24
6249.2								
279.12	6249.3	279.95	6249.4	280.79	6249.5	281.62	6249.6	282.45
6249.7								
283.22	6249.8	283.95	6249.9	284.68	6250	285.41	6250.1	286.13
6250.2								
286.86	6250.3	287.57	6250.4	288.5	6250.4	290.96	6250.3	293.43
6250.2								
295.89	6250.1	298.2	6250	299.2	6250	299.2	6250.53	299.47
6250.5								
300	6250.5							
Manning's n Values								
Sta	n Val	Sta	num=	3	Sta	n Val		
0	.03	124.73	.013	175.77		.03		
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.								
Expan.	124.73	175.77		11.7	11.7	11.7		.1
.3								
Ineffective Flow	num=	2						
Sta L	Sta R	Elev	Permanent					







6243.7								
166.56	6243.8	166.82	6243.9	167.08	6244	167.34	6244.1	167.6
6244.2								
167.86	6244.3	168.12	6244.4	168.38	6244.5	168.64	6244.6	168.89
6244.7								
169.15	6244.8	169.41	6244.9	169.67	6245	169.93	6245.1	170.19
6245.2								
170.45	6245.3	170.71	6245.4	170.97	6245.5	171.23	6245.6	171.49
6245.7								
171.75	6245.8	172.01	6245.9	172.27	6246	172.52	6246.1	172.78
6246.2								
173.04	6246.3	173.3	6246.4	173.56	6246.5	173.82	6246.6	174.08
6246.7								
174.34	6246.8	174.6	6246.9	174.86	6247	175.12	6247.1	175.38
6247.2								
175.64	6247.3	175.89	6247.4	176.15	6247.5	176.41	6247.6	176.67
6247.7								
176.93	6247.8	177.19	6247.9	177.45	6248	177.71	6248.1	177.97
6248.2								
178.23	6248.3	178.49	6248.4	178.75	6248.5	179.01	6248.6	179.27
6248.7								
179.52	6248.8	179.78	6248.9	180.04	6249	180.22	6249.07	180.3
6249.1								
180.56	6249.2	180.82	6249.3	181.08	6249.4	181.34	6249.5	181.62
6249.6								
182.14	6249.7	182.65	6249.8	183.17	6249.9	183.68	6250	184.19
6250.1								
184.71	6250.2	185.22	6250.3	185.74	6250.4	186.29	6250.5	186.86
6250.6								
187.43	6250.7	188.01	6250.8	195.73	6250.9	216.8	6251	216.92
6251								
223.77	6250.9	227.73	6250.8	231.69	6250.7	235.66	6250.6	239.62
6250.5								
243.59	6250.4	247.55	6250.3	251.52	6250.2	255.54	6250.1	259.58
6250								
263.66	6249.9	267.91	6249.8	272.15	6249.7	276.39	6249.6	280.64
6249.5								
284.88	6249.4	289.12	6249.3	293.37	6249.2	297.6	6249.1	298.61
6249.1								
298.61	6249.46	299.83	6249.4	300	6249.4			

Manning's n Values		num=	3
Sta n Val	Sta n Val	Sta n Val	
0 .03	122.49	.013	180.22 .03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.
Expan.						
	122.49	180.22		27.44	27.44	27.44
						.1

.3			
Ineffective Flow	num=	2	
Sta L Sta R Elev	Permanent		
0 1.98 6248.7	F		
263.74 300 6251.25	F		
Left Levee	Station=	111.71	Elevation= 6249.89

Right Levee	Station=	219.77	Elevation=	6251
-------------	----------	--------	------------	------

CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6249.20	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.22	Wt. n-Val.	0.030
0.013			
W. S. Elev (ft)	6248.97	Reach Len. (ft)	27.44
27.44 27.44			
Crit W. S. (ft)	6245.61	Flow Area (sq ft)	1.92
289.19			
E. G. Slope (ft/ft)	0.000136	Area (sq ft)	1.92
289.19			
Q Total (cfs)	1100.00	Flow (cfs)	0.67
1099.33			
Top Width (ft)	61.48	Top Width (ft)	4.00
57.48			
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	0.35
3.80			
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	0.48
5.03			
Conv. Total (cfs)	94356.6	Conv. (cfs)	57.2
94299.4			
Length Wtd. (ft)	27.44	Wetted Per. (ft)	4.12
60.02			
Min Ch El (ft)	6242.10	Shear (lb/sq ft)	0.00
0.04			
Alpha	1.01	Stream Power (lb/ft s)	300.00
111.71 219.77			
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04
2.28 0.00			
C & E Loss (ft)	0.03	Cum SA (acres)	0.22
0.60 0.01			

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

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 950

INPUT  
Description:

Station	Elevation	Data	num=	255
Sta	Elev	Sta	Elev	Sta
				Elev
				Sta
				Elev
				Sta



El ev									
0	6249. 2	8. 43	6249. 2	16. 42	6249. 1	22. 67	6249	28. 22	
6248. 9									
33. 39	6248. 8	38. 26	6248. 7	42. 87	6248. 6	47. 48	6248. 5	52. 08	
6248. 4									
66. 43	6248. 3	69. 58	6248. 2	72. 73	6248. 1	75. 88	6248	79. 03	
6247. 9									
82. 18	6247. 8	85. 33	6247. 7	88. 48	6247. 6	105. 48	6247. 6	107. 05	
6247. 7									
108. 63	6247. 8	110. 21	6247. 9	111. 78	6248	113. 3	6248	113. 41	
6248. 1									
113. 53	6248. 2	113. 64	6248. 3	113. 76	6248. 4	116. 31	6248. 4	120. 29	
6248. 3									
124. 27	6248. 2	128. 25	6248. 1	133. 73	6248. 1	136. 25	6248. 2	138. 76	
6248. 3									
141. 27	6248. 4	143. 78	6248. 5	146. 3	6248. 6	148. 85	6248. 7	155. 27	
6248. 7									
158. 06	6248. 6	160. 85	6248. 5	163. 64	6248. 4	165. 54	6248. 3	165. 81	
6248. 2									
166. 08	6248. 1	166. 36	6248	166. 63	6247. 9	166. 9	6247. 8	167. 17	
6247. 7									
167. 45	6247. 6	167. 72	6247. 5	167. 99	6247. 4	168. 26	6247. 3	168. 54	
6247. 2									
168. 81	6247. 1	169. 08	6247	169. 35	6246. 9	169. 63	6246. 8	169. 9	
6246. 7									
169. 92	6246. 7	170. 17	6246. 6	170. 44	6246. 5	170. 72	6246. 4	170. 99	
6246. 3									
171. 26	6246. 2	171. 53	6246. 1	171. 8	6246	172. 08	6245. 9	172. 35	
6245. 8									
172. 62	6245. 7	172. 89	6245. 6	173. 17	6245. 5	173. 44	6245. 4	173. 71	
6245. 3									
173. 98	6245. 2	174. 26	6245. 1	174. 53	6245	174. 8	6244. 9	175. 07	
6244. 8									
175. 34	6244. 7	175. 59	6244. 6	175. 84	6244. 5	176. 09	6244. 4	176. 34	
6244. 3									
176. 59	6244. 2	176. 84	6244. 1	177. 09	6244	177. 34	6243. 9	177. 59	
6243. 8									
177. 84	6243. 7	178. 09	6243. 6	178. 34	6243. 5	178. 59	6243. 4	178. 84	
6243. 3									
179. 09	6243. 2	179. 34	6243. 1	179. 59	6243	179. 84	6242. 9	180. 09	
6242. 8									
180. 34	6242. 7	180. 58	6242. 6	180. 82	6242. 5	181. 07	6242. 4	181. 31	
6242. 3									
181. 55	6242. 2	181. 8	6242. 1	182. 04	6242	217. 25	6242	217. 57	
6242. 1									
217. 86	6242. 2	218. 14	6242. 3	218. 29	6242. 7	218. 43	6242. 4	218. 72	
6242. 5									
219. 01	6242. 6	219. 3	6242. 7	219. 59	6242. 8	219. 76	6243	219. 87	
6242. 9									
220. 16	6243	220. 45	6243. 1	220. 74	6243. 2	221. 03	6243. 3	221. 31	
6243. 4									
221. 6	6243. 5	221. 89	6243. 6	222. 18	6243. 7	222. 47	6243. 8	222. 75	
6243. 9									
223. 04	6244	223. 33	6244. 1	223. 61	6244. 2	223. 88	6244. 3	224. 14	

6244. 4									
224. 41	6244. 5	224. 67	6244. 6	224. 94	6244. 7	225. 2	6244. 8	225. 47	
6244. 9									
225. 73	6245	226	6245. 1	226. 24	6245. 2	226. 26	6245. 2	226. 53	
6245. 3									
226. 8	6245. 4	227. 06	6245. 5	227. 33	6245. 6	227. 59	6245. 7	227. 76	
6246. 1									
227. 86	6245. 8	228. 12	6245. 9	228. 36	6245. 99	228. 39	6246	228. 65	
6246. 1									
228. 92	6246. 2	229. 18	6246. 3	229. 45	6246. 4	229. 71	6246. 5	229. 98	
6246. 6									
230. 24	6246. 7	230. 43	6247	230. 51	6246. 8	230. 77	6246. 9	231. 04	
6247									
231. 31	6247. 1	231. 57	6247. 2	231. 84	6247. 3	232. 1	6247. 4	232. 37	
6247. 5									
232. 63	6247. 6	232. 9	6247. 7	233. 16	6247. 8	233. 43	6247. 9	233. 69	
6248									
233. 96	6248. 1	234. 22	6248. 2	234. 49	6248. 3	234. 75	6248. 4	235. 02	
6248. 5									
235. 29	6248. 6	235. 55	6248. 7	235. 82	6248. 8	236. 08	6248. 9	236. 35	
6249									
236. 61	6249. 1	236. 88	6249. 2	237. 14	6249. 3	237. 41	6249. 4	237. 67	
6249. 5									
237. 97	6249. 6	239. 22	6249. 7	240. 48	6249. 8	241. 73	6249. 9	242. 99	
6249. 9									
244. 24	6249. 8	245. 49	6249. 7	246. 74	6249. 6	247. 98	6249. 5	249. 23	
6249. 4									
250. 48	6249. 3	251. 72	6249. 2	252. 97	6249. 1	253. 06	6247. 6	253. 62	
6249									
254. 14	6248. 9	254. 67	6248. 8	255. 19	6248. 7	255. 72	6248. 6	256. 24	
6248. 5									
256. 77	6248. 4	257. 29	6248. 3	257. 82	6248. 2	258. 35	6248. 1	258. 87	
6248									
259. 4	6247. 9	259. 92	6247. 8	260. 45	6247. 7	263. 86	6247. 6	267. 59	
6247. 5									
270. 82	6247. 4	271. 32	6247. 4	275. 06	6247. 3	279. 67	6247. 2	280. 8	
6247. 4									
281. 11	6247. 3	281. 42	6247. 2	282. 67	6247. 2	286. 47	6247. 3	290. 27	
6247. 4									
290. 42	6247. 5	297. 84	6247. 5	308. 3	6247. 6	314. 67	6247. 7	317. 29	
6247. 8									
319. 91	6247. 9	322. 52	6248	327. 2	6248. 1	330. 06	6248. 2	332. 8	
6248. 3									
335. 49	6248. 4	337. 85	6248. 5	339. 94	6248. 6	349. 29	6248. 5	352. 22	
6248. 4									
355. 14	6248. 3	358. 06	6248. 2	375. 36	6248. 1	377. 01	6248	378. 67	
6247. 9									
380. 43	6247. 8	382. 22	6247. 7	386. 33	6247. 7	397. 18	6247. 8	400	
6247. 8									
Manning's n Values									
Sta	n Val		Sta	num=	3	Sta	n Val		
0	.03	171. 8	.013	228. 36			.03		



Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 171.8 228.36 97.99 97.99 97.99 .1

.3  
 Ineffective Flow num= 4  
 Sta L Sta R Elev Permanent  
 167.86 179.01 6247.1 F  
 184.59 192.65 6247.1 F  
 198.23 214.34 6247.1 F  
 219.91 229.83 6247.1 F  
 Left Levee Station= 154.53 Elevation= 6248.7  
 Right Levee Station= 242.21 Elevation= 6249.96

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6249.17	Element	Left OB
Channel Right OB			
Vel Head (ft)	0.13	Wt. n-Val.	0.030
0.013 0.030			
W. S. Elev (ft)	6249.04	Reach Len. (ft)	97.99
97.99 97.99			
Crit W. S. (ft)	6247.11	Flow Area (sq ft)	122.55
355.21 12.28			
E. G. Slope (ft/ft)	0.000061	Area (sq ft)	122.55
355.21 12.28			
Q Total (cfs)	1100.00	Flow (cfs)	41.23
1052.87 5.90			
Top Width (ft)	216.00	Top Width (ft)	151.36
56.56 8.08			
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)	0.34
2.96 0.48			
Max Chl Dpth (ft)	7.04	Hydr. Depth (ft)	0.81
6.28 1.52			
Conv. Total (cfs)	140312.1	Conv. (cfs)	5259.0
134300.9 752.2			
Length Wtd. (ft)	97.99	Wetted Per. (ft)	151.97
59.04 8.92			
Min Ch El (ft)	6242.00	Shear (lb/sq ft)	0.00
0.02 0.01			
Alpha	1.67	Stream Power (lb/ft s)	400.00
154.53 242.21			
Frctn Loss (ft)		Cum Volume (acre-ft)	
2.08			
C & E Loss (ft)		Cum SA (acres)	0.17
0.57 0.01			

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 949.5

## INPUT

Description:

Distance from Upstream XS = 10  
 Deck/Roadway Width = 60  
 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
5.67	6248			0	5.67	6248			0	33.86	6248			0
114.69	6247			0	174	6247			0	262.89	6247			0
284.97	6247			0	341.67	6247.51			0	347.21	6247.51			0
409.46	6247.51			0										

## Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	255										
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
Elev	0	6249.2	8.43	6249.2	16.42	6249.1	22.67	6249	28.22					
6248.9														
33.39	6248.8	38.26	6248.7	42.87	6248.6	47.48	6248.5	52.08						
6248.4														
66.43	6248.3	69.58	6248.2	72.73	6248.1	75.88	6248	79.03						
6247.9														
82.18	6247.8	85.33	6247.7	88.48	6247.6	105.48	6247.6	107.05						
6247.7														
108.63	6247.8	110.21	6247.9	111.78	6248	113.3	6248	113.41						
6248.1														
113.53	6248.2	113.64	6248.3	113.76	6248.4	116.31	6248.4	120.29						
6248.3														
124.27	6248.2	128.25	6248.1	133.73	6248.1	136.25	6248.2	138.76						
6248.3														
141.27	6248.4	143.78	6248.5	146.3	6248.6	148.85	6248.7	155.27						
6248.7														
158.06	6248.6	160.85	6248.5	163.64	6248.4	165.54	6248.3	165.81						
6248.2														
166.08	6248.1	166.36	6248	166.63	6247.9	166.9	6247.8	167.17						
6247.7														
167.45	6247.6	167.72	6247.5	167.99	6247.4	168.26	6247.3	168.54						
6247.2														
168.81	6247.1	169.08	6247	169.35	6246.9	169.63	6246.8	169.9						
6246.7														
169.92	6246.7	170.17	6246.6	170.44	6246.5	170.72	6246.4	170.99						
6246.3														
171.26	6246.2	171.53	6246.1	171.8	6246	172.08	6245.9	172.35						
6245.8														
172.62	6245.7	172.89	6245.6	173.17	6245.5	173.44	6245.4	173.71						
6245.3														
173.98	6245.2	174.26	6245.1	174.53	6245	174.8	6244.9	175.07						
6244.8														
175.34	6244.7	175.59	6244.6	175.84	6244.5	176.09	6244.4	176.34						



6244.3  
 176.59 6244.2 176.84 6244.1 177.09 6244 177.34 6243.9 177.59  
 6243.8  
 177.84 6243.7 178.09 6243.6 178.34 6243.5 178.59 6243.4 178.84  
 6243.3  
 179.09 6243.2 179.34 6243.1 179.59 6243 179.84 6242.9 180.09  
 6242.8  
 180.34 6242.7 180.58 6242.6 180.82 6242.5 181.07 6242.4 181.31  
 6242.3  
 181.55 6242.2 181.8 6242.1 182.04 6242 217.25 6242 217.57  
 6242.1  
 217.86 6242.2 218.14 6242.3 218.29 6242.7 218.43 6242.4 218.72  
 6242.5  
 219.01 6242.6 219.3 6242.7 219.59 6242.8 219.76 6243 219.87  
 6242.9  
 220.16 6243 220.45 6243.1 220.74 6243.2 221.03 6243.3 221.31  
 6243.4  
 221.6 6243.5 221.89 6243.6 222.18 6243.7 222.47 6243.8 222.75  
 6243.9  
 223.04 6244 223.33 6244.1 223.61 6244.2 223.88 6244.3 224.14  
 6244.4  
 224.41 6244.5 224.67 6244.6 224.94 6244.7 225.2 6244.8 225.47  
 6244.9  
 225.73 6245 226 6245.1 226.24 6245.2 226.26 6245.2 226.53  
 6245.3  
 226.8 6245.4 227.06 6245.5 227.33 6245.6 227.59 6245.7 227.76  
 6246.1  
 227.86 6245.8 228.12 6245.9 228.36 6245.99 228.39 6246 228.65  
 6246.1  
 228.92 6246.2 229.18 6246.3 229.45 6246.4 229.71 6246.5 229.98  
 6246.6  
 230.24 6246.7 230.43 6247 230.51 6246.8 230.77 6246.9 231.04  
 6247  
 231.31 6247.1 231.57 6247.2 231.84 6247.3 232.1 6247.4 232.37  
 6247.5  
 232.63 6247.6 232.9 6247.7 233.16 6247.8 233.43 6247.9 233.69  
 6248  
 233.96 6248.1 234.22 6248.2 234.49 6248.3 234.75 6248.4 235.02  
 6248.5  
 235.29 6248.6 235.55 6248.7 235.82 6248.8 236.08 6248.9 236.35  
 6249  
 236.61 6249.1 236.88 6249.2 237.14 6249.3 237.41 6249.4 237.67  
 6249.5  
 237.97 6249.6 239.22 6249.7 240.48 6249.8 241.73 6249.9 242.99  
 6249.9  
 244.24 6249.8 245.49 6249.7 246.74 6249.6 247.98 6249.5 249.23  
 6249.4  
 250.48 6249.3 251.72 6249.2 252.97 6249.1 253.06 6247.6 253.62  
 6249  
 254.14 6248.9 254.67 6248.8 255.19 6248.7 255.72 6248.6 256.24  
 6248.5  
 256.77 6248.4 257.29 6248.3 257.82 6248.2 258.35 6248.1 258.87  
 6248  
 259.4 6247.9 259.92 6247.8 260.45 6247.7 263.86 6247.6 267.59

6247.5  
 270.82 6247.4 271.32 6247.4 275.06 6247.3 279.67 6247.2 280.8  
 6247.4  
 281.11 6247.3 281.42 6247.2 282.67 6247.2 286.47 6247.3 290.27  
 6247.4  
 290.42 6247.5 297.84 6247.5 308.3 6247.6 314.67 6247.7 317.29  
 6247.8  
 319.91 6247.9 322.52 6248 327.2 6248.1 330.06 6248.2 332.8  
 6248.3  
 335.49 6248.4 337.85 6248.5 339.94 6248.6 349.29 6248.5 352.22  
 6248.4  
 355.14 6248.3 358.06 6248.2 375.36 6248.1 377.01 6248 378.67  
 6247.9  
 380.43 6247.8 382.22 6247.7 386.33 6247.7 397.18 6247.8 400  
 6247.8  
 Manning's n Values num= 3  
 Sta n Val Sta n Val  
 0 .03 171.8 .013 228.36 .03  
 Bank Sta: Left Right Coeff Contr. Expan.  
 171.8 228.36 .1 .3  
 Ineffective Flow num= 4  
 Sta L Sta R Elev Permanent  
 167.86 179.01 6247.1 F  
 184.59 192.65 6247.1 F  
 198.23 214.34 6247.1 F  
 219.91 229.83 6247.1 F  
 Left Levee Station= 154.53 Elevation= 6248.7  
 Right Levee Station= 242.21 Elevation= 6249.96  
 Downstream Deck/Roadway Coordinates num= 9  
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord  
 5.61 6248 0 5.61 6248 0 73.45 6248 0  
 182.55 6247 0 194.99 6247 0 198.01 6247 0  
 220.69 6247 0 347.15 6247 0 409.4 6247 0  
 Downstream Bridge Cross Section Data num= 241  
 Station Elevation Data Sta Elev Sta Elev Sta Elev Sta Elev Sta  
 Elev 0 6249.3 1.53 6249.3 16.17 6249.2 28.39 6249.1 40.61  
 6249 52.83 6248.9 65.06 6248.8 77.28 6248.7 89.5 6248.6 101.72  
 6248.5 113.94 6248.4 126.17 6248.3 138.06 6248.2 145.74 6248.1 146.57  
 6248 147.91 6247.9 149.01 6247.8 150.1 6247.7 151.21 6247.6 152.31  
 6247.5 153.42 6247.4 154.53 6247.3 155.63 6247.2 156.74 6247.1 157.85  
 6247 158.96 6246.9 160.07 6246.8 161.18 6246.7 162.29 6246.6 163.4  
 6246.5



164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38
6246								
166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45
6245.5								
167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52
6245								
168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6
6244.5								
169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67
6244								
170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75
6243.5								
171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83
6243								
173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92
6242.5								
174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02
6242								
175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1
6241.5								
176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18
6241								
177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26
6240.5								
178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34
6240								
179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74
6239.5								
200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25
6239.6								
217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55
6240.1								
225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96
6240.6								
256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92
6240.2								
258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22
6239.7								
261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67
6239.2								
271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5
6239.6								
274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23
6240.1								
276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96
6240.6								
279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24
6241.1								
292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25
6241.6								
297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8
6242.1								
307	6242.2	308.11	6242.3	309.12	6242.4	310.01	6242.5	310.89
6242.6								

311.68	6242.7	312.45	6242.8	313.17	6242.9	313.88	6243	314.55
6243.1								
315.21	6243.2	315.83	6243.3	316.44	6243.4	317.05	6243.5	317.62
6243.6								
318.19	6243.7	318.76	6243.8	319.29	6243.9	319.82	6244	320.35
6244.1								
320.86	6244.2	321.36	6244.3	321.87	6244.4	322.37	6244.5	322.84
6244.6								
323.31	6244.7	323.79	6244.8	324.27	6244.9	324.71	6245	325.17
6245.1								
325.62	6245.2	326.07	6245.3	326.51	6245.4	326.94	6245.5	327.38
6245.6								
327.81	6245.7	328.24	6245.8	328.66	6245.9	329.07	6246	329.49
6246.1								
329.9	6246.2	330.32	6246.3	330.87	6246.4	333.78	6246.5	336.6
6246.6								
339.34	6246.7	344.79	6246.8	346.32	6246.9	347.86	6247	349.39
6247.1								
350.73	6247.2	352.07	6247.3	354.42	6247.4	357.6	6247.5	360.77
6247.6								
363.85	6247.7	366.98	6247.8	380.36	6247.8	381	6247.9	385.21
6248								
385.74	6248	385.82	6247.9	385.9	6247.8	385.98	6247.7	386.06
6247.6								
386.15	6247.5	394.93	6247.5	397.25	6247.6	399.66	6247.7	402.21
6247.8								
405.14	6247.9	408.18	6248	411.21	6248.1	416.26	6248.2	421.39
6248.3								
426.53	6248.4	431.58	6248.5	435.85	6248.6	440.11	6248.7	446.02
6248.8								
462.41	6248.8							

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.03	166.38	.013
		329.07	.03

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	166.38	329.07		.1	.3

Ineffective Flow	num=	4
Sta L	Sta R	Elev
154.72	180.75	6247.14
185.71	194.38	6247.14
199.34	250.16	6247.14
255.11	344.35	6247.14

Left Levee	Station=	145.97	Elevation=	6248.02
Right Levee	Station=	385.22	Elevation=	6248

Upstream Embankment side slope	=	1 horiz. to 1.0 vertical
Downstream Embankment side slope	=	2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow	=	.98
Elevation at which weir flow begins	=	
Energy head used in spillway design	=	
Spillway height used in design	=	
Weir crest shape	=	Broad Crested



Number of Culverts = 3

Culvert Name      Shape      Rise      Span  
Culvert #1      Circular      4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
FHWA Scale # 1 - Headwall

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss
Coef	Exit Loss Coef				

1	1	90	.024	.024	0	.5
---	---	----	------	------	---	----

Upstream      Elevation = 6241.91  
Centerline Station = 217.23  
Downstream      Elevation = 6240.16  
Centerline Station = 252.53

Culvert Name      Shape      Rise      Span  
Culvert #2      Circular      4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
FHWA Scale # 1 - Headwall

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss
Coef	Exit Loss Coef				

3.64	90	.024	.024	0	.5
------	----	------	------	---	----

Upstream      Elevation = 6242.06  
Centerline Station = 195.75  
Downstream      Elevation = 6239.73  
Centerline Station = 197.35

Culvert Name      Shape      Rise      Span  
Culvert #3      Circular      4  
FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
FHWA Scale # 1 - Headwall

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss
Coef	Exit Loss Coef				

3.9	90	.024	.024	0	.5
-----	----	------	------	---	----

Upstream      Elevation = 6242.32  
Centerline Station = 182.04  
Downstream      Elevation = 6240.12  
Centerline Station = 183.71

CULVERT OUTPUT    Profile #Flow 1    Culv Group:    Culvert #1

Q Culv Group (cfs)	67.74	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.39
Q Barrel (cfs)	67.74	Culv Vel DS (ft/s)	5.39
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6241.91
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.16
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00

Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.23
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.64	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6245.91	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.16	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.49	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT    Profile #Flow 1    Culv Group:    Culvert #2

Q Culv Group (cfs)	67.53	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.37
Q Barrel (cfs)	67.53	Culv Vel DS (ft/s)	5.37
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.06
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6239.73
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6245.77	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.06	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6243.73	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CULVERT OUTPUT    Profile #Flow 1    Culv Group:    Culvert #3

Q Culv Group (cfs)	67.62	Culv Full Len (ft)	90.00
# Barrels	1	Culv Vel US (ft/s)	5.38
Q Barrel (cfs)	67.62	Culv Vel DS (ft/s)	5.38
E.G. US. (ft)	6249.16	Culv Inv El Up (ft)	6242.32
W.S. US. (ft)	6249.04	Culv Inv El Dn (ft)	6240.12
E.G. DS (ft)	6248.25	Culv Frctn Ls (ft)	0.68
W.S. DS (ft)	6245.51	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.90	Culv Entr Loss (ft)	0.22
Delta WS (ft)	3.52	Q Weir (cfs)	897.12
E.G. IC (ft)	6246.04	Weir Sta Lft (ft)	10.85
E.G. OC (ft)	6249.16	Weir Sta Rgt (ft)	236.80
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	6246.32	Weir Max Depth (ft)	2.17
Culv WS Outlet (ft)	6244.12	Weir Avg Depth (ft)	1.23
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	276.92
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	6247.01

CROSS SECTION



RIVER: SC01  
REACH: Sand Creek-DS-1 RS: 949

INPUT

Description:

Station	Elevation	Data	num=	241					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
Elev									
0	6249.3	1.53	6249.3	16.17	6249.2	28.39	6249.1	40.61	
6249									
52.83	6248.9	65.06	6248.8	77.28	6248.7	89.5	6248.6	101.72	
6248.5									
113.94	6248.4	126.17	6248.3	138.06	6248.2	145.74	6248.1	146.57	
6248									
147.91	6247.9	149.01	6247.8	150.1	6247.7	151.21	6247.6	152.31	
6247.5									
153.42	6247.4	154.53	6247.3	155.63	6247.2	156.74	6247.1	157.85	
6247									
158.96	6246.9	160.07	6246.8	161.18	6246.7	162.29	6246.6	163.4	
6246.5									
164.51	6246.4	165.62	6246.3	165.95	6246.2	166.16	6246.1	166.38	
6246									
166.59	6245.9	166.8	6245.8	167.02	6245.7	167.23	6245.6	167.45	
6245.5									
167.66	6245.4	167.88	6245.3	168.09	6245.2	168.31	6245.1	168.52	
6245									
168.74	6244.9	168.95	6244.8	169.17	6244.7	169.38	6244.6	169.6	
6244.5									
169.81	6244.4	170.03	6244.3	170.24	6244.2	170.46	6244.1	170.67	
6244									
170.89	6243.9	171.1	6243.8	171.32	6243.7	171.53	6243.6	171.75	
6243.5									
171.97	6243.4	172.18	6243.3	172.4	6243.2	172.62	6243.1	172.83	
6243									
173.05	6242.9	173.27	6242.8	173.48	6242.7	173.7	6242.6	173.92	
6242.5									
174.14	6242.4	174.36	6242.3	174.58	6242.2	174.8	6242.1	175.02	
6242									
175.24	6241.9	175.45	6241.8	175.67	6241.7	175.88	6241.6	176.1	
6241.5									
176.32	6241.4	176.53	6241.3	176.75	6241.2	176.97	6241.1	177.18	
6241									
177.4	6240.9	177.61	6240.8	177.83	6240.7	178.05	6240.6	178.26	
6240.5									
178.48	6240.4	178.69	6240.3	178.91	6240.2	179.13	6240.1	179.34	
6240									
179.56	6239.9	180.92	6239.8	185.83	6239.7	190.76	6239.6	195.74	
6239.5									
200.03	6239.43	201.64	6239.4	202.69	6239.4	209.86	6239.5	216.25	
6239.6									
217.71	6239.7	219.17	6239.8	220.63	6239.9	222.09	6240	223.55	
6240.1									
225.01	6240.2	226.41	6240.3	227.16	6240.4	231.88	6240.5	236.96	
6240.6									

256.33	6240.6	256.73	6240.5	257.13	6240.4	257.53	6240.3	257.92	
6240.2									
258.32	6240.1	258.72	6240	259.12	6239.9	259.52	6239.8	260.22	
6239.7									
261.38	6239.6	262.54	6239.5	263.7	6239.4	264.86	6239.3	270.67	
6239.2									
271.32	6239.2	271.86	6239.3	272.41	6239.4	272.95	6239.5	273.5	
6239.6									
274.05	6239.7	274.59	6239.8	275.14	6239.9	275.68	6240	276.23	
6240.1									
276.78	6240.2	277.32	6240.3	277.87	6240.4	278.41	6240.5	278.96	
6240.6									
279.51	6240.7	280.05	6240.8	284.18	6240.9	291.75	6241	292.24	
6241.1									
292.72	6241.2	293.19	6241.3	293.67	6241.4	294.14	6241.5	296.25	
6241.6									
297.56	6241.7	298.86	6241.8	302.26	6241.9	304.38	6242	305.8	
6242.1									
307	6242.2	308.11	6242.3	309.12	6242.4	310.01	6242.5	310.89	
6242.6									
311.68	6242.7	312.45	6242.8	313.17	6242.9	313.88	6243	314.55	
6243.1									
315.21	6243.2	315.83	6243.3	316.44	6243.4	317.05	6243.5	317.62	
6243.6									
318.19	6243.7	318.76	6243.8	319.29	6243.9	319.82	6244	320.35	
6244.1									
320.86	6244.2	321.36	6244.3	321.87	6244.4	322.37	6244.5	322.84	
6244.6									
323.31	6244.7	323.79	6244.8	324.27	6244.9	324.71	6245	325.17	
6245.1									
325.62	6245.2	326.07	6245.3	326.51	6245.4	326.94	6245.5	327.38	
6245.6									
327.81	6245.7	328.24	6245.8	328.66	6245.9	329.07	6246	329.49	
6246.1									
329.9	6246.2	330.32	6246.3	330.87	6246.4	333.78	6246.5	336.6	
6246.6									
339.34	6246.7	344.79	6246.8	346.32	6246.9	347.86	6247	349.39	
6247.1									
350.73	6247.2	352.07	6247.3	354.42	6247.4	357.6	6247.5	360.77	
6247.6									
363.85	6247.7	366.98	6247.8	380.36	6247.8	381	6247.9	385.21	
6248									
385.74	6248	385.82	6247.9	385.9	6247.8	385.98	6247.7	386.06	
6247.6									
386.15	6247.5	394.93	6247.5	397.25	6247.6	399.66	6247.7	402.21	
6247.8									
405.14	6247.9	408.18	6248	411.21	6248.1	416.26	6248.2	421.39	
6248.3									
426.53	6248.4	431.58	6248.5	435.85	6248.6	440.11	6248.7	446.02	
6248.8									
462.41	6248.8								

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val



0 .03 166.38 .013 329.07 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr.  
 Expan. 166.38 329.07 143.6 143.6 143.6 .1

.3  
 Ineffective Flow num= 4  
 Sta L Sta R Elev Permanent  
 154.72 180.75 6247.14 F  
 185.71 194.38 6247.14 F  
 199.34 250.16 6247.14 F  
 255.11 344.35 6247.14 F  
 Left Levee Station= 145.97 Elevation= 6248.02  
 Right Levee Station= 385.22 Elevation= 6248

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6248.25	Element	Left OB
Channel Right OB			
Vel Head (ft)	2.74	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6245.51	Reach Len. (ft)	143.60
143.60 143.60			
Crit W. S. (ft)	6245.51	Flow Area (sq ft)	
82.78			
E. G. Slope (ft/ft)	0.001370	Area (sq ft)	
743.70			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	159.57	Top Width (ft)	
159.57			
Vel Total (ft/s)	13.29	Avg. Vel. (ft/s)	
13.29			
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	
5.57			
Conv. Total (cfs)	29717.5	Conv. (cfs)	
29717.5			
Length Wtd. (ft)	143.60	Wetted Per. (ft)	
14.87			
Min Ch El (ft)	6239.20	Shear (lb/sq ft)	
0.48			
Alpha	1.00	Stream Power (lb/ft s)	462.41
145.97 385.22			
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	
1.41			
C & E Loss (ft)	0.38	Cum SA (acres)	
0.32			

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

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.  
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.  
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.  
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

## CROSS SECTION

RIVER: SC01  
 REACH: Sand Creek-DS-1 RS: 948

INPUT  
 Description:  
 Station Elevation Data num= 218  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 Elev 0 6247.7 19.86 6247.7 37.29 6247.6 91.94 6247.5 94.02  
 6247.4  
 96.56 6247.4 96.65 6247.5 96.74 6247.6 96.82 6247.7 96.91  
 6247.8  
 97 6247.9 97.05 6247.9 97.27 6247.8 98.86 6247.7 100.65  
 6247.6  
 101.78 6247.5 103.19 6247.4 104.44 6247.3 105.78 6247.2 107.35  
 6247.1  
 108.58 6247 110.16 6246.9 111.78 6246.8 113.16 6246.7 114.83  
 6246.6  
 116.49 6246.5 118.15 6246.4 119.78 6246.3 120.02 6246.2 120.26  
 6246.1  
 120.5 6246 120.74 6245.9 120.97 6245.8 121.21 6245.7 121.44  
 6245.6  
 121.67 6245.5 121.9 6245.4 122.14 6245.3 122.37 6245.2 122.6  
 6245.1  
 122.84 6245 123.07 6244.9 123.3 6244.8 123.54 6244.7 123.76  
 6244.6  
 123.99 6244.5 124.21 6244.4 124.43 6244.3 124.66 6244.2 124.89  
 6244.1  
 125.12 6244 125.35 6243.9 125.57 6243.8 125.8 6243.7 126.03  
 6243.6  
 126.26 6243.5 126.48 6243.4 126.7 6243.3 126.91 6243.2 127.13  
 6243.1  
 127.35 6243 127.57 6242.9 127.78 6242.8 128 6242.7 128.21  
 6242.6  
 128.43 6242.5 128.64 6242.4 128.86 6242.3 129.07 6242.2 129.29  
 6242.1  
 129.51 6242 129.73 6241.9 129.95 6241.8 130.17 6241.7 130.39  
 6241.6



130.62	6241.5	130.83	6241.4	131.05	6241.3	131.26	6241.2	131.47
6241.1								
131.69	6241	131.9	6240.9	132.11	6240.8	132.33	6240.7	132.54
6240.6								
132.75	6240.5	132.97	6240.4	133.18	6240.3	133.39	6240.2	133.6
6240.1								
133.82	6240	134.03	6239.9	134.25	6239.8	134.47	6239.7	134.68
6239.6								
134.89	6239.5	135.1	6239.4	135.3	6239.3	135.51	6239.2	135.72
6239.1								
135.93	6239.3	136.14	6238.9	136.35	6238.8	156.69	6238.8	156.9
6238.9								
157.11	6239	157.32	6239.1	157.53	6239.2	157.74	6239.3	157.95
6239.4								
158.16	6239.5	158.37	6239.6	158.58	6239.7	158.79	6239.8	159
6239.9								
159.21	6240	159.41	6240.1	159.62	6240.2	159.83	6240.3	160.04
6240.4								
160.25	6240.5	160.46	6240.6	160.66	6240.7	160.87	6240.8	161.08
6240.9								
161.29	6241	161.5	6241.1	161.71	6241.2	161.92	6241.3	162.12
6241.4								
162.33	6241.5	162.54	6241.6	162.74	6241.7	162.95	6241.8	163.16
6241.9								
163.36	6242	163.57	6242.1	163.77	6242.2	163.98	6242.3	164.19
6242.4								
164.39	6242.5	164.6	6242.6	164.8	6242.7	165.01	6242.8	165.22
6242.9								
165.42	6243	165.63	6243.1	165.84	6243.2	166.04	6243.3	166.25
6243.4								
166.46	6243.5	166.66	6243.6	166.87	6243.7	167.07	6243.8	167.28
6243.9								
167.48	6244	167.69	6244.1	167.89	6244.2	168.09	6244.3	168.3
6244.4								
168.5	6244.5	168.71	6244.6	168.91	6244.7	169.12	6244.8	169.32
6244.9								
169.52	6245	169.73	6245.1	169.93	6245.2	170.14	6245.3	170.34
6245.4								
170.55	6245.5	170.75	6245.6	170.96	6245.7	171.16	6245.8	171.36
6245.9								
171.57	6246	171.77	6246.1	171.98	6246.2	172.18	6246.3	172.39
6246.4								
173.2	6246.5	174.29	6246.6	175.38	6246.7	176.47	6246.8	177.56
6246.9								
178.63	6247	179.73	6247.1	180.89	6247.2	182.05	6247.3	183.21
6247.4								
184.36	6247.5	185.52	6247.6	189.36	6247.7	193.38	6247.8	197.73
6247.9								
202.55	6248	207.78	6248	207.88	6247.9	207.98	6247.8	208.09
6247.7								
208.2	6247.6	209.55	6247.5	212.3	6247.5	216.4	6247.6	220.51
6247.7								
257.02	6247.7	259.18	6247.8	261.66	6247.9	264.27	6248	266.87
6248.1								

269.48	6248.2	272.27	6248.3	275.37	6248.4	281.83	6248.5	287.18
6248.6								
292.54	6248.7	297.89	6248.8	300	6248.8			

Manning's n	Values	num=	3
Sta n Val	Sta n Val	Sta n Val	Sta n Val
0 .03	120.5 .013	171.57	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	120.5	171.57		0	0	0	.1

Ineffective Flow	num=	2
Sta L Sta R Elev	Permanent	
0 97.05 6247.91	F	
208.04 300 6248	F	
Left Levee Station=	96.63	Elevation= 6247.86
Right Levee Station=	207.62	Elevation= 6248.06

# CROSS SECTION OUTPUT Profile #Flow 1

E. G. Elev (ft)	6244.22	Element	Left OB
Channel Right OB			
Vel Head (ft)	1.49	Wt. n-Val.	
0.013			
W. S. Elev (ft)	6242.73	Reach Len. (ft)	
Crit W. S. (ft)	6242.73	Flow Area (sq ft)	
112.41			
E. G. Slope (ft/ft)	0.001785	Area (sq ft)	
112.41			
Q Total (cfs)	1100.00	Flow (cfs)	
1100.00			
Top Width (ft)	36.93	Top Width (ft)	
36.93			
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)	
9.79			
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)	
3.04			
Conv. Total (cfs)	26034.1	Conv. (cfs)	
26034.1			
Length Wtd. (ft)		Wetted Per. (ft)	
38.97			
Min Ch El (ft)	6238.80	Shear (lb/sq ft)	
0.32			
Alpha	1.00	Stream Power (lb/ft s)	300.00
96.63 207.62			
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	



Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

#### SUMMARY OF MANNING' S N VALUES

Ri ver: EXCH

Reach	Ri ver Sta.	n1	n2	n3
EX CHANNEL	1000	.03	.013	.03
EX CHANNEL	999	.03	.03	.03

Ri ver: EXOF

Reach	Ri ver Sta.	n1	n2	n3
EX OVERFLOW	1001	.03	.013	.03
EX OVERFLOW	1000	.03	.013	.03

Ri ver: OVFL

Reach	Ri ver Sta.	n1	n2	n3
Overflow Channel	1000	.03	.016	.03
Overflow Channel	999	.03	.016	.03
Overflow Ch-DS-0	998	.03	.013	.03
Overflow Ch-DS-0	997	.03	.033	.03
Overflow Ch-DS-0	996	.03	.033	.03

Ri ver: SC01

Reach	Ri ver Sta.	n1	n2	n3
Sand Creek	998	.03	.013	.03
Sand Creek	993	.03	.013	.03
Sand Creek-DS-0	992	.03	.013	.03
Sand Creek-DS-0	991	.03	.013	.03
Sand Creek-DS-0-	990	.03	.013	.03
Sand Creek-DS-0-	989	.03	.013	.03
Sand Creek-DS-0-	988	.03	.013	.03
Sand Creek-DS-0-	987	.03	.013	.03
Sand Creek-DS-0-	986	.03	.013	.03
Sand Creek-DS-0-	985	.03	.013	.03
Sand Creek-DS-0-	984	.03	.013	.03
Sand Creek-DS-0-	983	.03	.013	.03
Sand Creek-DS-0-	982	.03	.013	.03
Sand Creek-DS-0-	981	.03	.013	.03

Sand Creek-DS-0-	980	.03	.013	.03
Sand Creek-DS-0-	979	.03	.013	.03
Sand Creek-DS-0-	978	.03	.013	.03
Sand Creek-DS-0-	977	.03	.013	.03
Sand Creek-DS-0-	976	.03	.013	.03
Sand Creek-DS-0-	975	.03	.013	.03
Sand Creek-DS-0-	974	.03	.013	.03
Sand Creek-DS-0-	973	.03	.013	.03
Sand Creek-DS-0-	972	.03	.013	.03
Sand Creek-DS-0-	971	.03	.013	.03
Sand Creek-DS-0-	970	.03	.013	.03
Sand Creek-DS-0-	969	.03	.013	.03
Sand Creek-DS-0-	968	.03	.013	.03
Sand Creek-DS-1	966	.03	.013	.03
Sand Creek-DS-1	965	.03	.013	.03
Sand Creek-DS-1	964	.03	.013	.03
Sand Creek-DS-1	963	.03	.013	.03
Sand Creek-DS-1	962	.03	.013	.03
Sand Creek-DS-1	961	.03	.013	.03
Sand Creek-DS-1	960	.03	.013	.03
Sand Creek-DS-1	959	.03	.013	.03
Sand Creek-DS-1	958	.03	.013	.03
Sand Creek-DS-1	957	.03	.013	.03
Sand Creek-DS-1	956	.03	.013	.03
Sand Creek-DS-1	955	.03	.013	.03
Sand Creek-DS-1	954	.03	.013	.03
Sand Creek-DS-1	953	.03	.013	.03
Sand Creek-DS-1	952	.03	.013	.03
Sand Creek-DS-1	951	.03	.013	.03
Sand Creek-DS-1	950	.03	.013	.03
Sand Creek-DS-1	949.5	Cul vert		
Sand Creek-DS-1	949	.03	.013	.03
Sand Creek-DS-1	948	.03	.013	.03

#### SUMMARY OF REACH LENGTHS

Ri ver: EXCH

Reach	Ri ver Sta.	Left	Channel	Ri ght
EX CHANNEL	1000	284.89	284.89	284.89
EX CHANNEL	999	0	0	0

Ri ver: EXOF

Reach	Ri ver Sta.	Left	Channel	Ri ght
EX OVERFLOW	1001	138.8	138.8	138.8
EX OVERFLOW	1000	0	0	0



River: OVFL

Reach	River Sta.	Left	Channel	Right
Overflow Channel	1000	24.16	24.16	24.16
Overflow Channel	999	0	0	0
Overflow Ch-DS-0	998	132.75	132.75	132.75
Overflow Ch-DS-0	997	24.72	24.72	24.72
Overflow Ch-DS-0	996	0	0	0

River: SC01

Reach	River Sta.	Left	Channel	Right
Sand Creek	998	33.99	33.99	33.99
Sand Creek	993	40.51	40.51	40.51
Sand Creek-DS-0	992	11.58	11.58	11.58
Sand Creek-DS-0	991	100	100	100
Sand Creek-DS-0-	990	6.48	6.48	6.48
Sand Creek-DS-0-	989	43.52	43.52	43.52
Sand Creek-DS-0-	988	39.44	39.44	39.44
Sand Creek-DS-0-	987	10.56	10.56	10.56
Sand Creek-DS-0-	986	6.48	6.48	6.48
Sand Creek-DS-0-	985	24.63	24.63	24.63
Sand Creek-DS-0-	984	7.25	7.25	7.25
Sand Creek-DS-0-	983	8.69	8.69	8.69
Sand Creek-DS-0-	982	10.14	10.14	10.14
Sand Creek-DS-0-	981	12.04	12.04	12.04
Sand Creek-DS-0-	980	10	10	10
Sand Creek-DS-0-	979	8.17	8.17	8.17
Sand Creek-DS-0-	978	12.6	12.6	12.6
Sand Creek-DS-0-	977	50	50	50
Sand Creek-DS-0-	976	50	50	50
Sand Creek-DS-0-	975	22.55	22.55	22.55
Sand Creek-DS-0-	974	19.92	19.92	19.92
Sand Creek-DS-0-	973	7.53	7.53	7.53
Sand Creek-DS-0-	972	12.38	12.38	12.38
Sand Creek-DS-0-	971	37.63	37.63	37.63
Sand Creek-DS-0-	970	50	50	50
Sand Creek-DS-0-	969	50	50	50
Sand Creek-DS-0-	968	50	50	50
Sand Creek-DS-1	966	50	50	50
Sand Creek-DS-1	965	50	50	50
Sand Creek-DS-1	964	50	50	50
Sand Creek-DS-1	963	50	50	50
Sand Creek-DS-1	962	50	50	50
Sand Creek-DS-1	961	50	50	50
Sand Creek-DS-1	960	50	50	50
Sand Creek-DS-1	959	50	50	50
Sand Creek-DS-1	958	50	50	50
Sand Creek-DS-1	957	50	50	50

Sand Creek-DS-1	956	50	50	50
Sand Creek-DS-1	955	50	50	50
Sand Creek-DS-1	954	34.26	34.26	34.26
Sand Creek-DS-1	953	15.74	15.74	15.74
Sand Creek-DS-1	952	11.7	11.7	11.7
Sand Creek-DS-1	951	27.44	27.44	27.44
Sand Creek-DS-1	950	97.99	97.99	97.99
Sand Creek-DS-1	949.5	Culvert		
Sand Creek-DS-1	949	143.6	143.6	143.6
Sand Creek-DS-1	948	0	0	0

#### SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: EXCH

Reach	River Sta.	Contr.	Expan.
EX CHANNEL	1000	.1	.3
EX CHANNEL	999	.1	.3

River: EXOF

Reach	River Sta.	Contr.	Expan.
EX OVERFLOW	1001	.1	.3
EX OVERFLOW	1000	.1	.3

River: OVFL

Reach	River Sta.	Contr.	Expan.
Overflow Channel	1000	.1	.3
Overflow Channel	999	.1	.3
Overflow Ch-DS-0	998	.1	.3
Overflow Ch-DS-0	997	.1	.3
Overflow Ch-DS-0	996	.1	.3

River: SC01

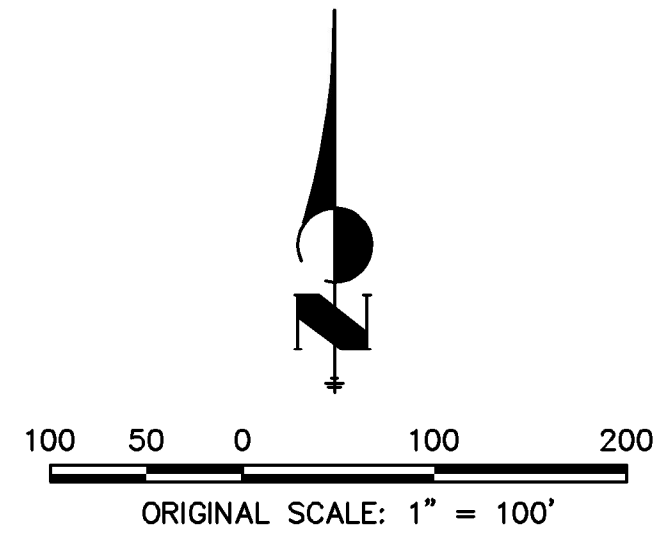
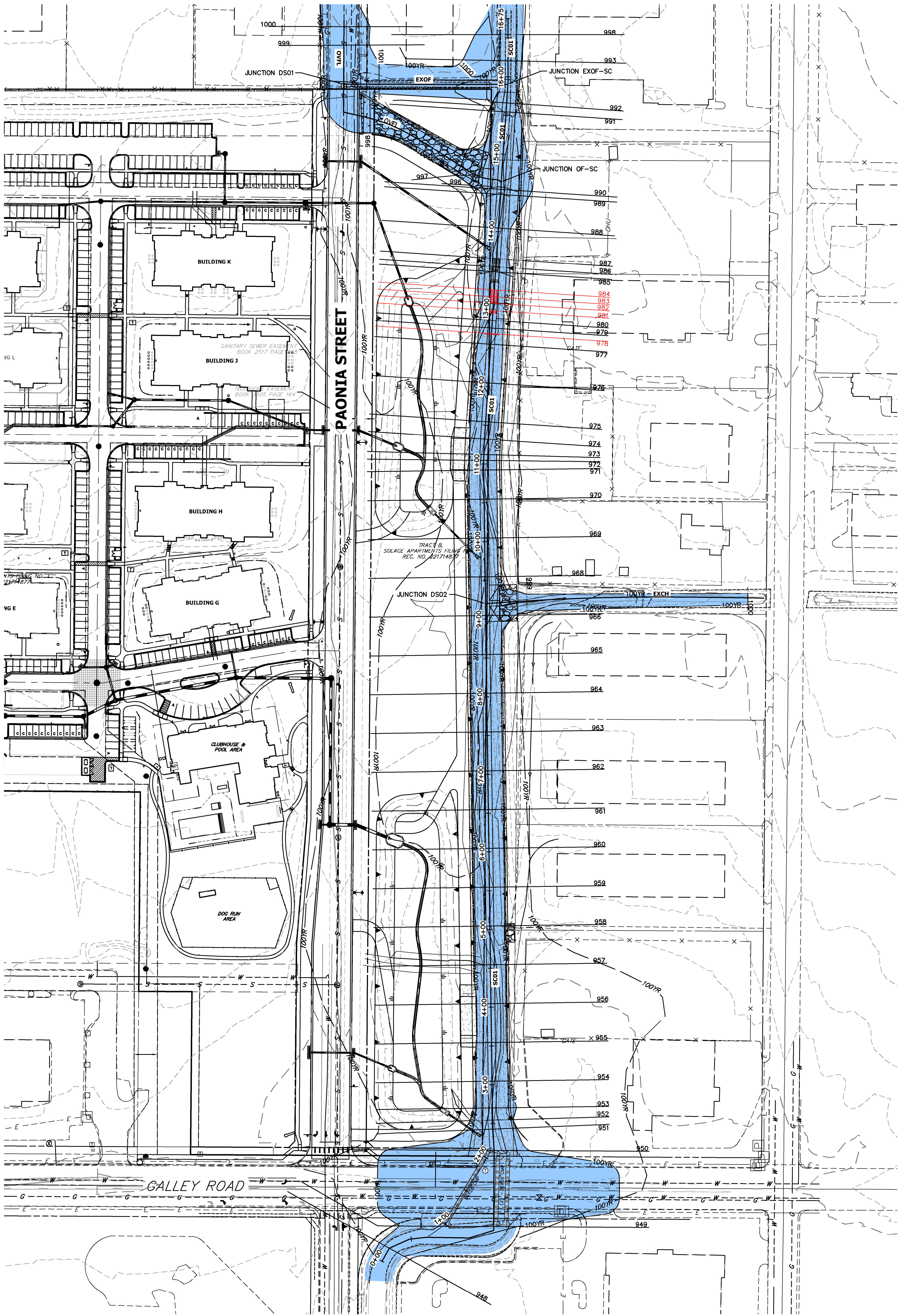
Reach	River Sta.	Contr.	Expan.
Sand Creek	998	.1	.3
Sand Creek	993	.1	.3
Sand Creek-DS-0	992	.1	.3
Sand Creek-DS-0	991	.1	.3
Sand Creek-DS-0-	990	.1	.3
Sand Creek-DS-0-	989	.1	.3



Sand Creek-DS-0-	988	.1	.3
Sand Creek-DS-0-	987	.1	.3
Sand Creek-DS-0-	986	.1	.3
Sand Creek-DS-0-	985	.1	.3
Sand Creek-DS-0-	984	.1	.3
Sand Creek-DS-0-	983	.1	.3
Sand Creek-DS-0-	982	.1	.3
Sand Creek-DS-0-	981	.1	.3
Sand Creek-DS-0-	980	.1	.3
Sand Creek-DS-0-	979	.1	.3
Sand Creek-DS-0-	978	.1	.3
Sand Creek-DS-0-	977	.1	.3
Sand Creek-DS-0-	976	.1	.3
Sand Creek-DS-0-	975	.1	.3
Sand Creek-DS-0-	974	.1	.3
Sand Creek-DS-0-	973	.1	.3
Sand Creek-DS-0-	972	.1	.3
Sand Creek-DS-0-	971	.1	.3
Sand Creek-DS-0-	970	.1	.3
Sand Creek-DS-0-	969	.1	.3
Sand Creek-DS-0-	968	.1	.3
Sand Creek-DS-1	966	.1	.3
Sand Creek-DS-1	965	.1	.3
Sand Creek-DS-1	964	.1	.3
Sand Creek-DS-1	963	.1	.3
Sand Creek-DS-1	962	.1	.3
Sand Creek-DS-1	961	.1	.3
Sand Creek-DS-1	960	.1	.3
Sand Creek-DS-1	959	.1	.3
Sand Creek-DS-1	958	.1	.3
Sand Creek-DS-1	957	.1	.3
Sand Creek-DS-1	956	.1	.3
Sand Creek-DS-1	955	.1	.3
Sand Creek-DS-1	954	.1	.3
Sand Creek-DS-1	953	.1	.3
Sand Creek-DS-1	952	.1	.3
Sand Creek-DS-1	951	.1	.3
Sand Creek-DS-1	950	.1	.3
Sand Creek-DS-1	949.5	Culvert	
Sand Creek-DS-1	949	.1	.3
Sand Creek-DS-1	948	.1	.3



# SAND CREEK CHANNEL REVISED GEOHECRAS MODEL OVERLAY



REVISED GEOHECRAS MODEL  
OVERLAY  
SAND CREEK CHANNEL  
JOB NO. 25174.00  
10/03/22  
SHEET 1 OF 1

**J-R ENGINEERING**  
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593  
Fort Collins 970-491-9888 • [www.jrengineering.com](http://www.jrengineering.com)