J·R ENGINEERING

To: **El Paso County Engineering Division**

From: **Mike Bramlett, PE**

Date: **October 18, 2021**

Subject: Sand Creek Center Tributary Channel Improvements

ACCEPTED for FILE
Engineering Review
11/30/2021 11:06:15 AM
dsdnijkamp
EPC Planning & Community Development Department

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 6th 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 Apartmen*ts 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)

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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

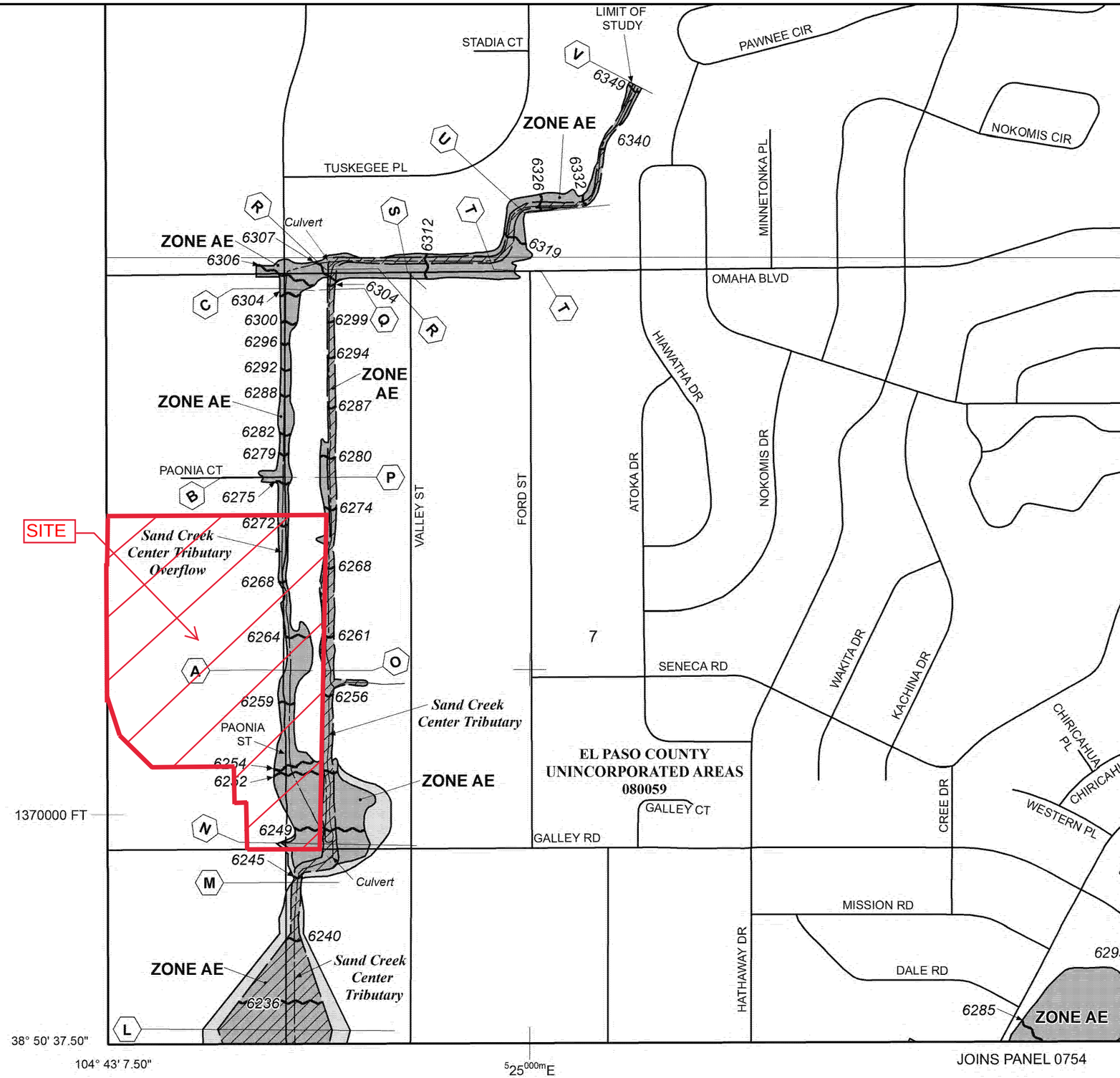
The analysis of the proposed improvements of the Sand Creek Center Tributary Drainageway and its secondary drainageway located in Paonia Street show significant reduction of the flood plain extents, with it now being contained within the channel extents and no longer extensively flooding properties adjacent 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.

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

Sincerely,
JR ENGINEERING, LLC

Mike Bramlett

Mike Bramlett, PE
JR Engineering



MAP SCALE 1" = 500'

0 500 1000 FEET

NFIP

PANEL 0752G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO

AND INCORPORATED AREAS

PANEL 752 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0752	G
EL PASO COUNTY	080059	0752	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0752G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

USBR Type III Drop and Stilling Basin

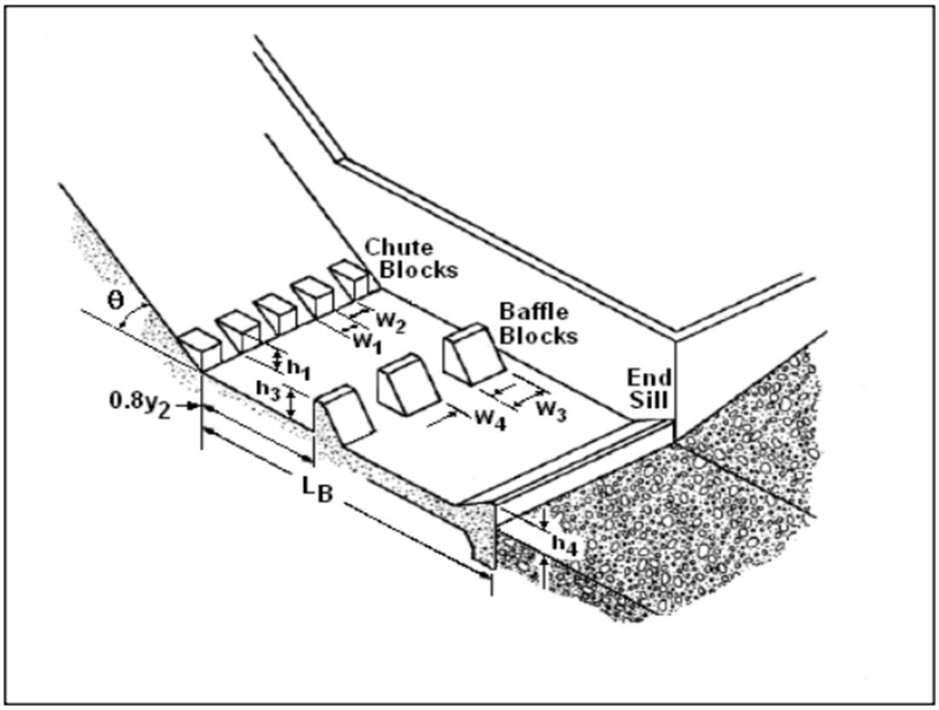
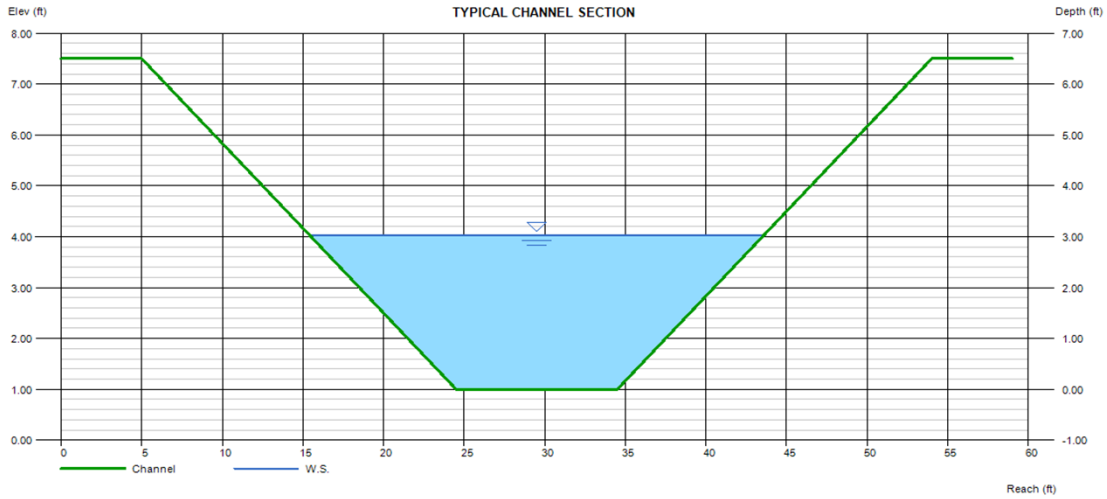


Figure 8.3. USBR Type III Stilling Basin

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 Critieria Checks

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

Basin Parameter Calculations

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

Determine Lb/Y2 value from FHWA Table 8.2

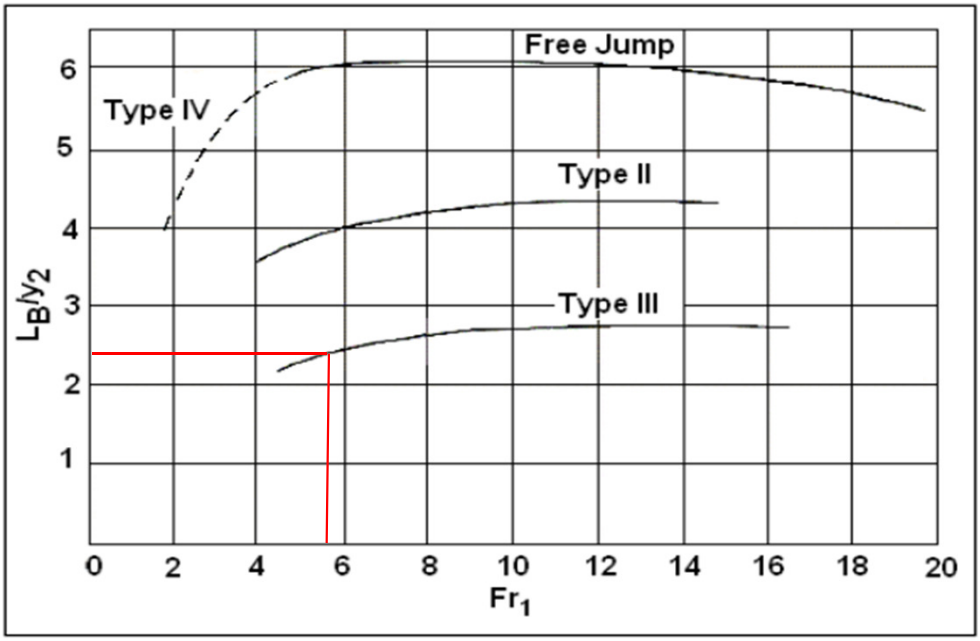


Figure 8.2. Length of Hydraulic Jump on a Horizontal Floor

Lb/Y2: 2.5 Conservative Approximation

Calculate Y2

Y2: $\frac{C * y0}{2}(\sqrt{1+8Fr}-1$ = 12.4437 ft

Length of Basin (Lb): 31.1092536 ft

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 ft

USBR Type III Drop and Stilling Basin (cont…)

Basin Element Sizing

Determine Number of Chute Blocks (Nc):	$\frac{W_b}{2y_1}$	=	2.98 →3
Chute Block Width and Spacing (W1 & W2):	$\frac{W_b}{2N_c}$	=	1.666667
Baffle Block Height(h3):	$y_1(0.168 * Fr + 0.58)$		2.549265 ft
Number of Baffle Blocks (Nb)	$\frac{W_b}{1.5h_3}$	=	2.615133 →3
Baffle Width and Spacing (W3&W4)	$\frac{W_b}{2N_b}$	=	1.666667
End Sill Height (h4)	$y_1(0.0536 * Fr + 1.04)$		2.249657 ft
0.8*Y2	9.95496114 ft		

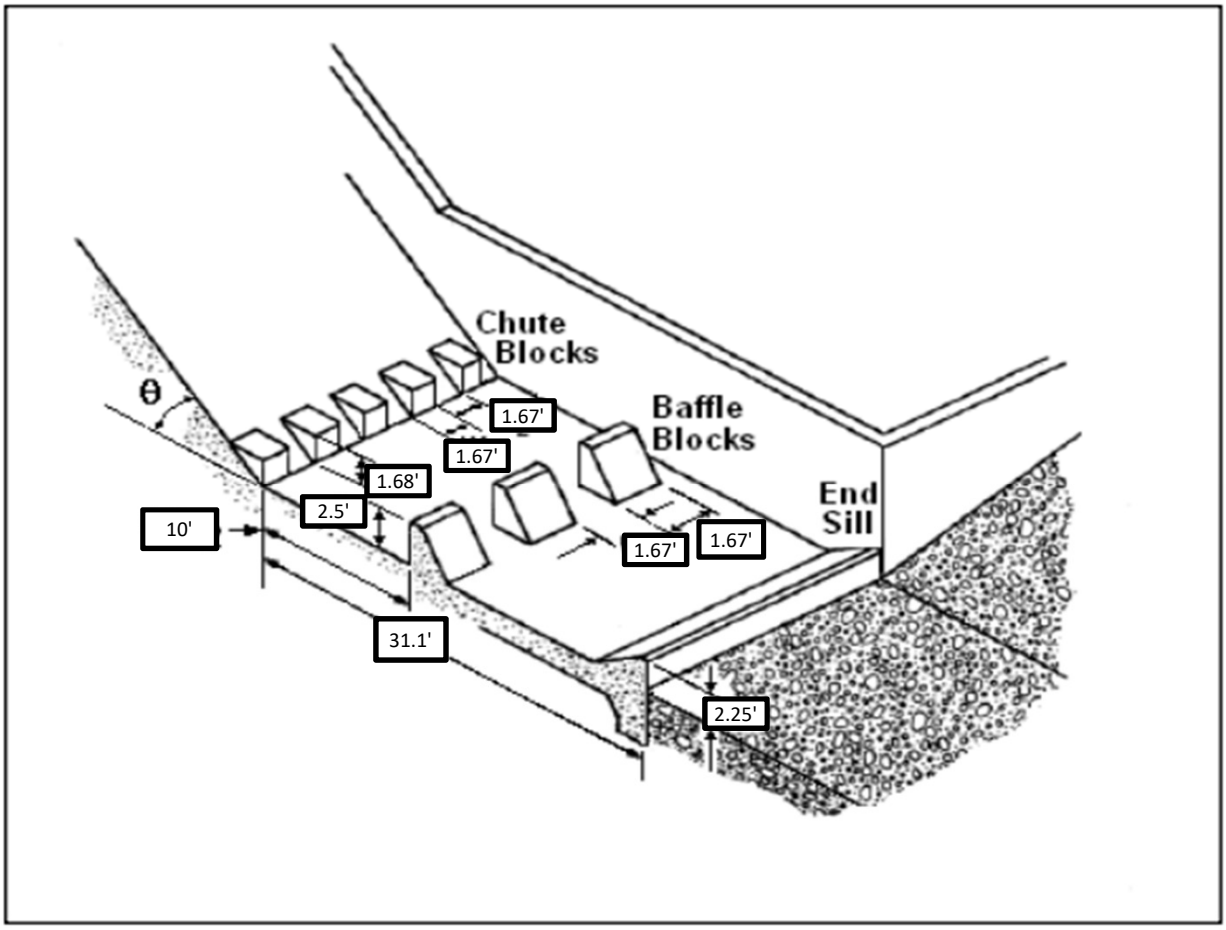
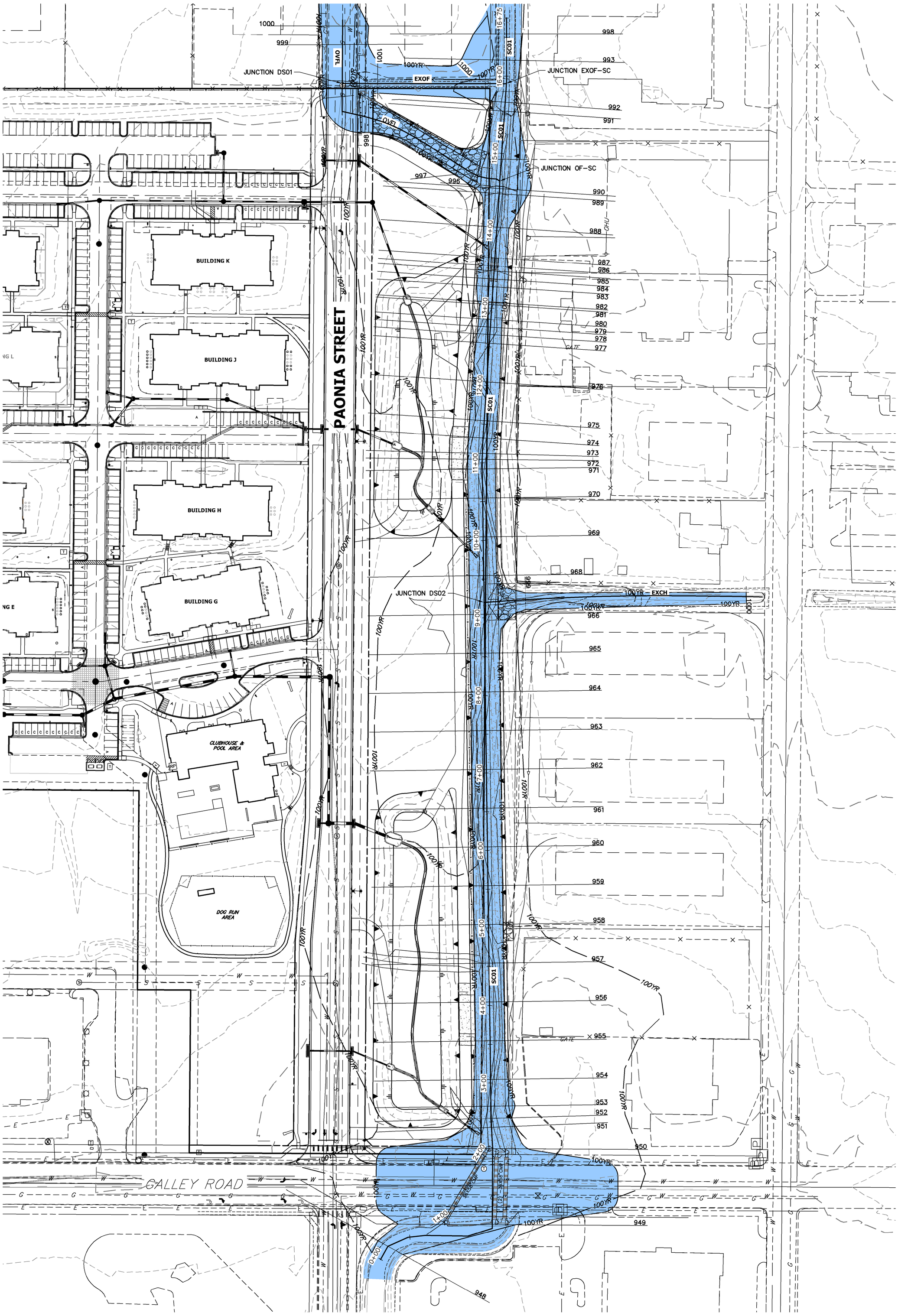


Figure 8.3. USBR Type III Stilling Basin

SAND CREEK CHANNEL
GEOHECRAS MODEL OVERLAY



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

100 50 0 100 200
ORIGINAL SCALE: 1" = 100'

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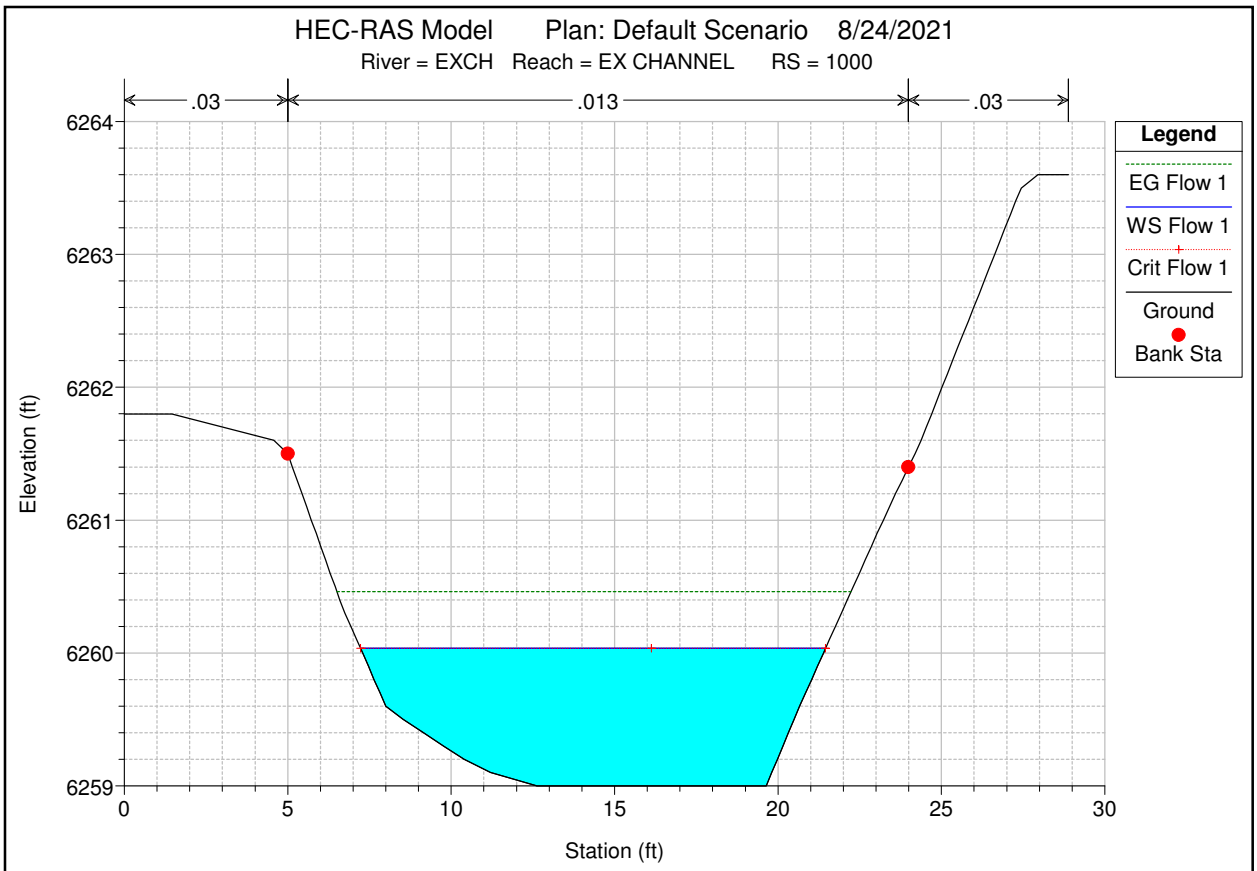
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River = EXCH Reach = EX CHANNEL RS = 1000
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.013
.03
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Bank Sta
Elevation (ft)
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6263
6262
6261
6260
6259
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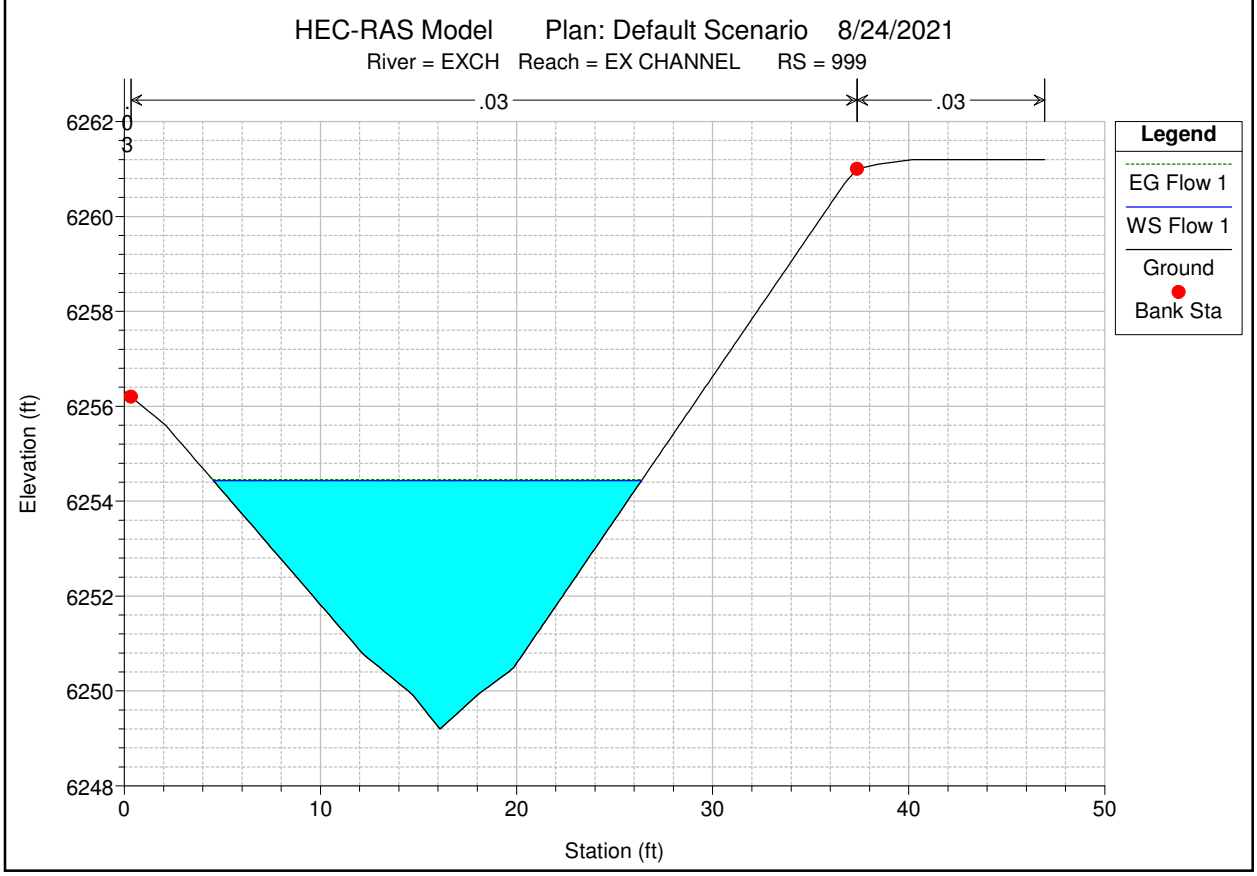
5
10
15
20
25
30
Station (ft)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Ground
Bank Sta
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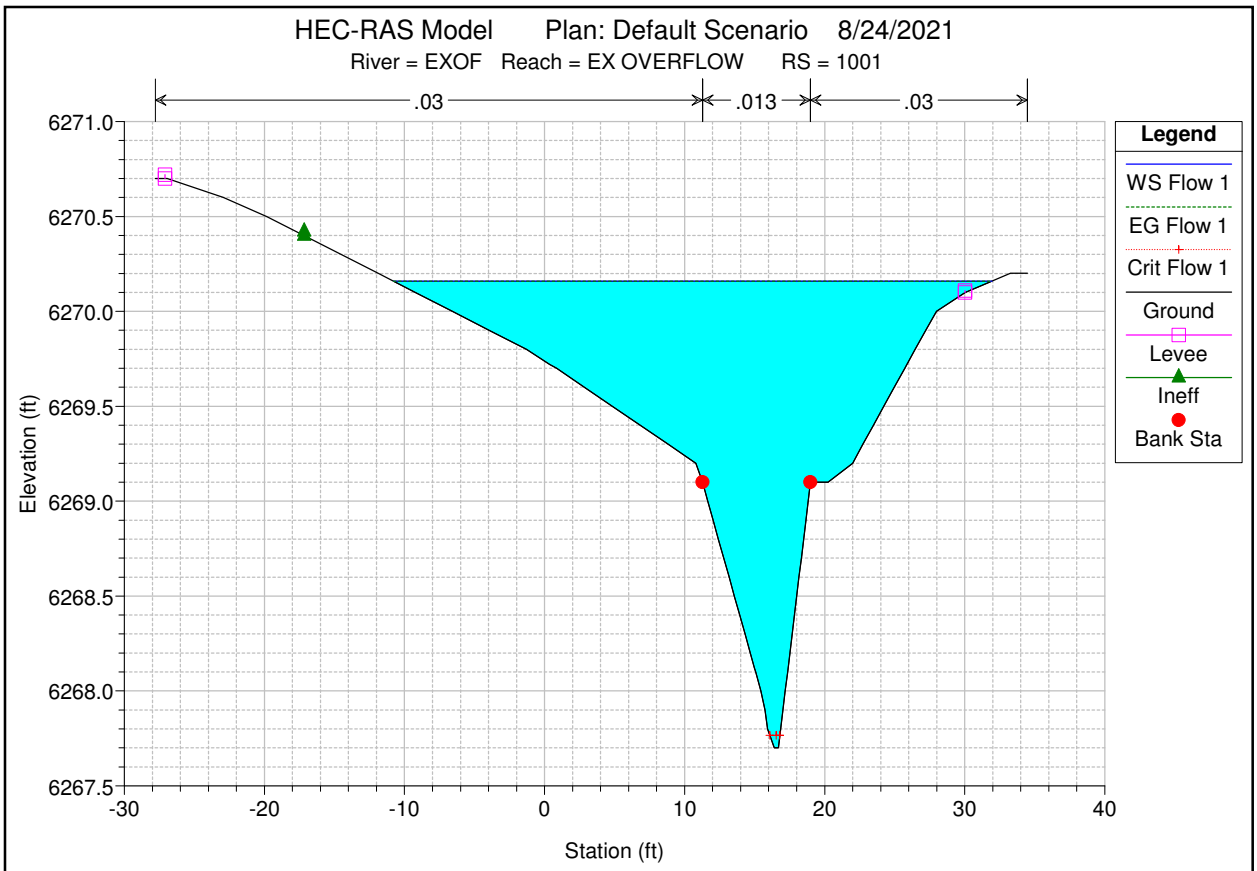
Station (ft)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Station (ft)
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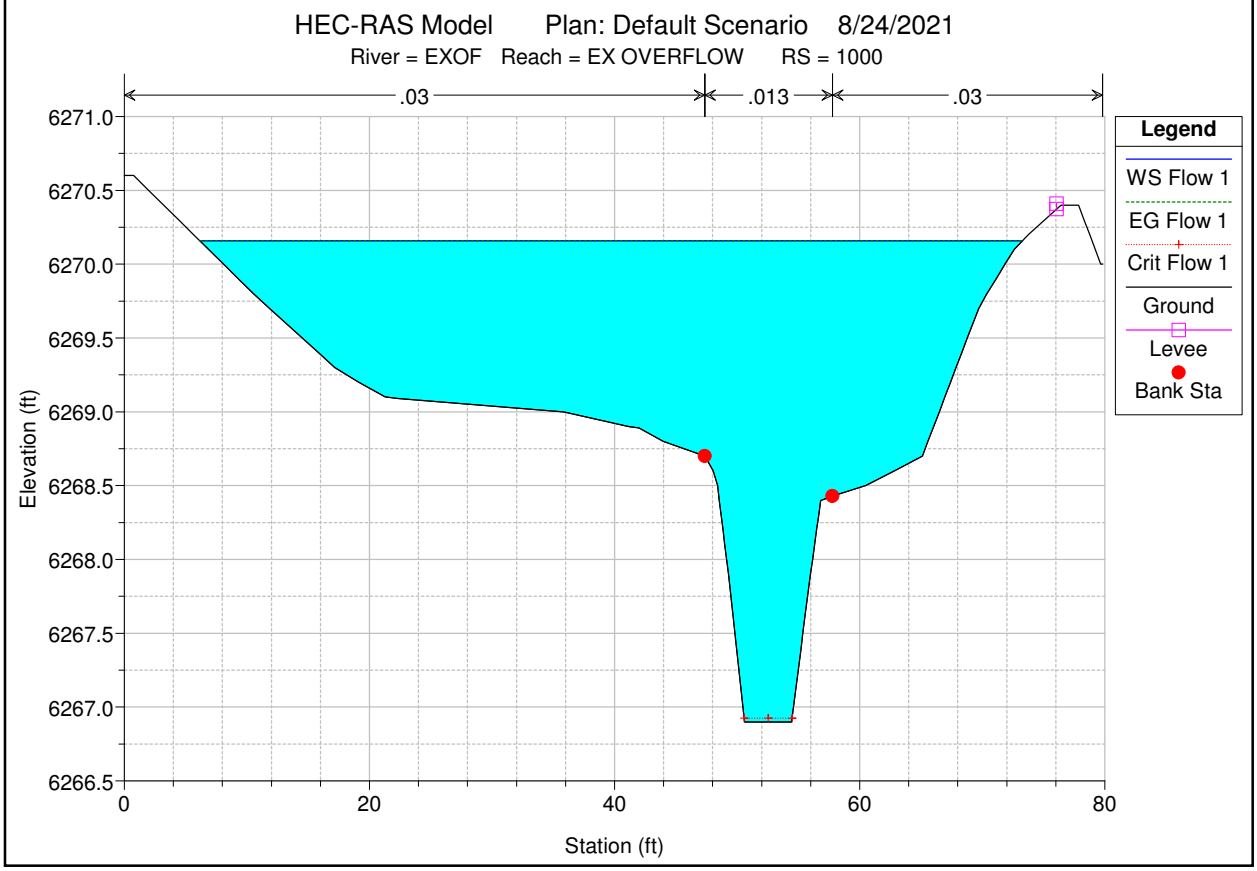
EG Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta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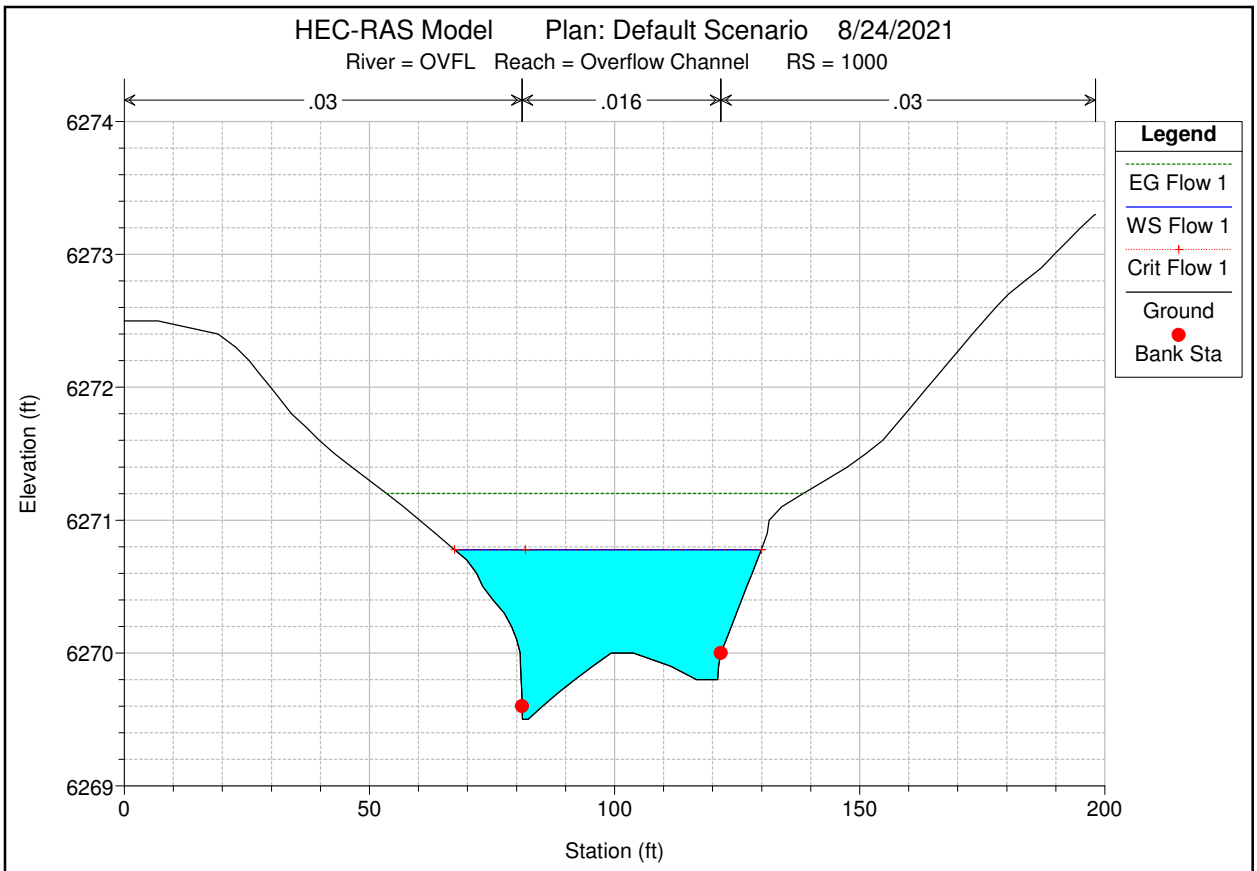
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Crit Flow 1
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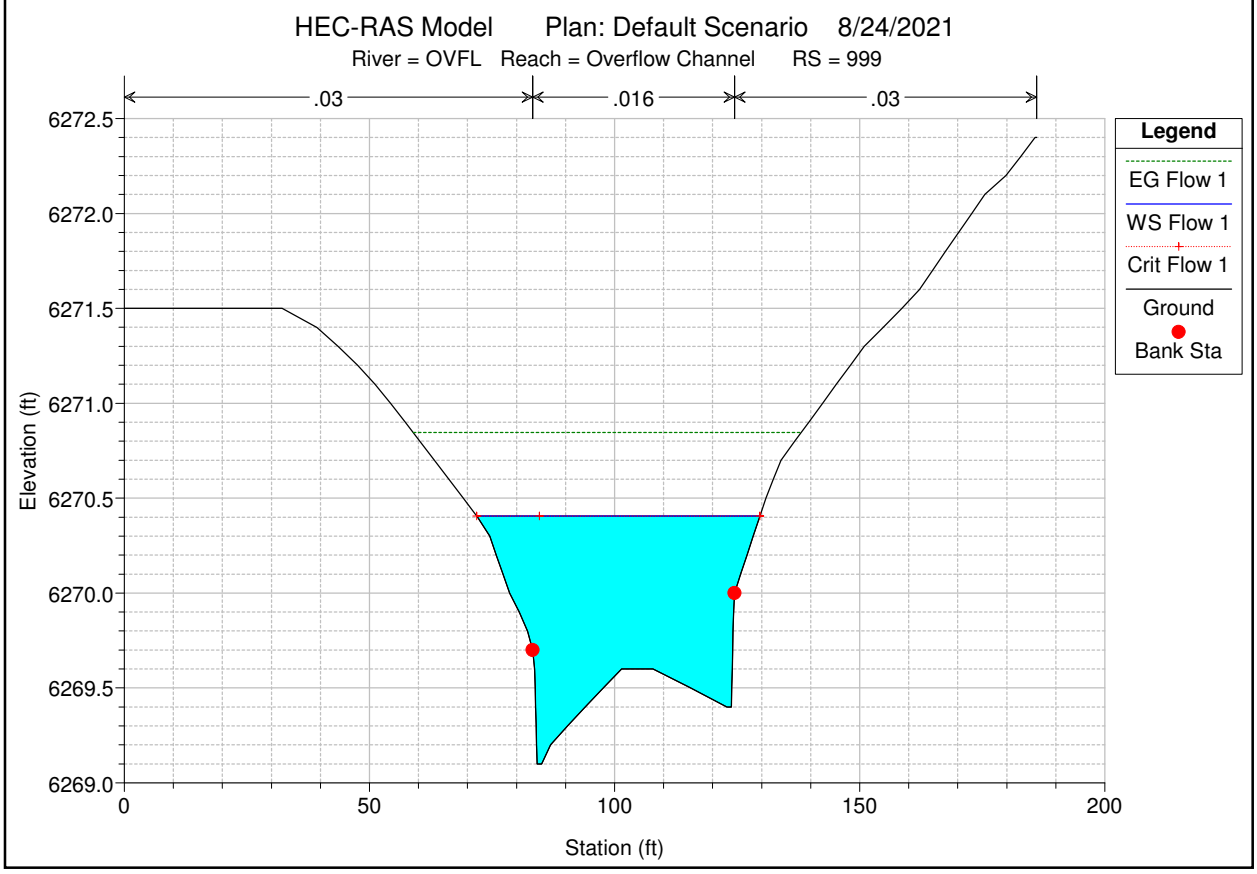
Station (ft)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WS Flow 1
Crit Flow 1
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Bank Sta
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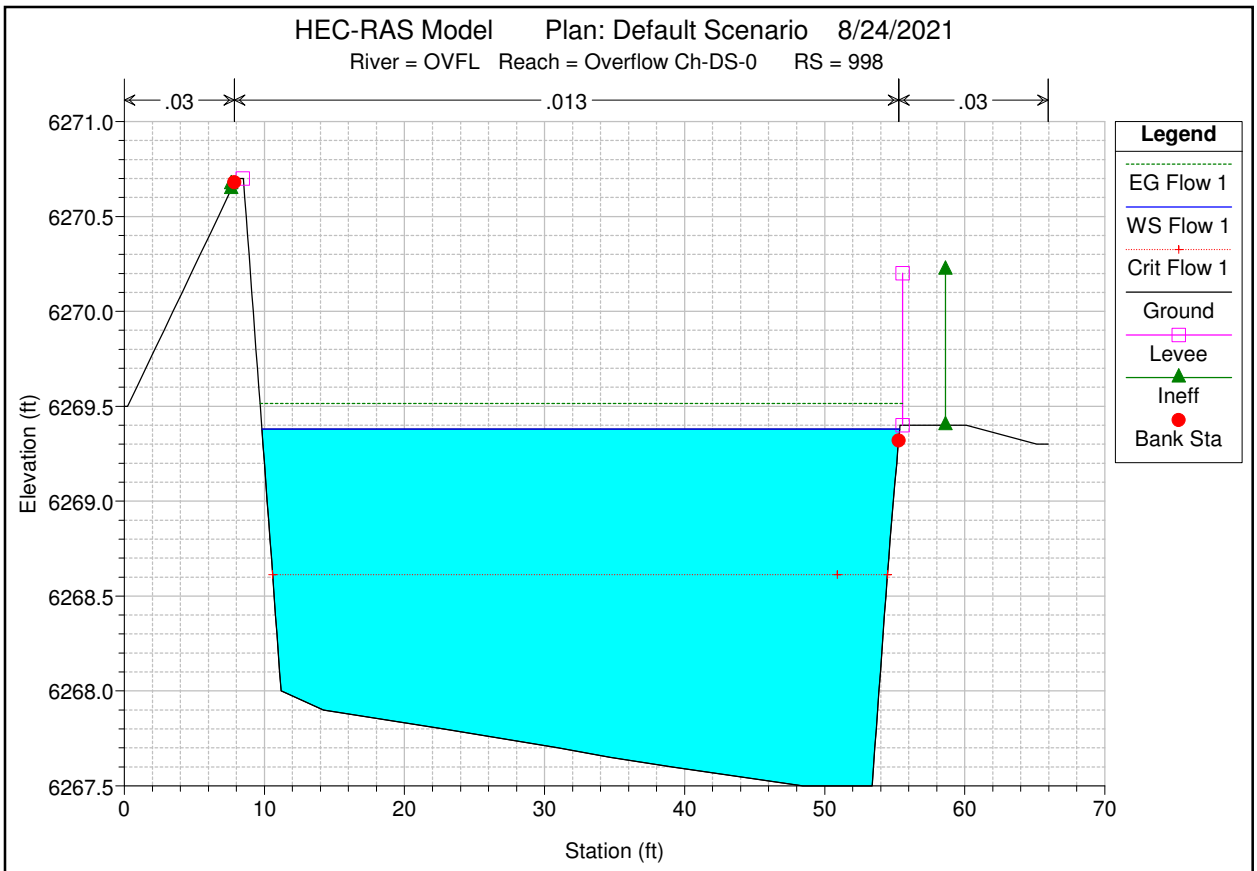
Station (ft)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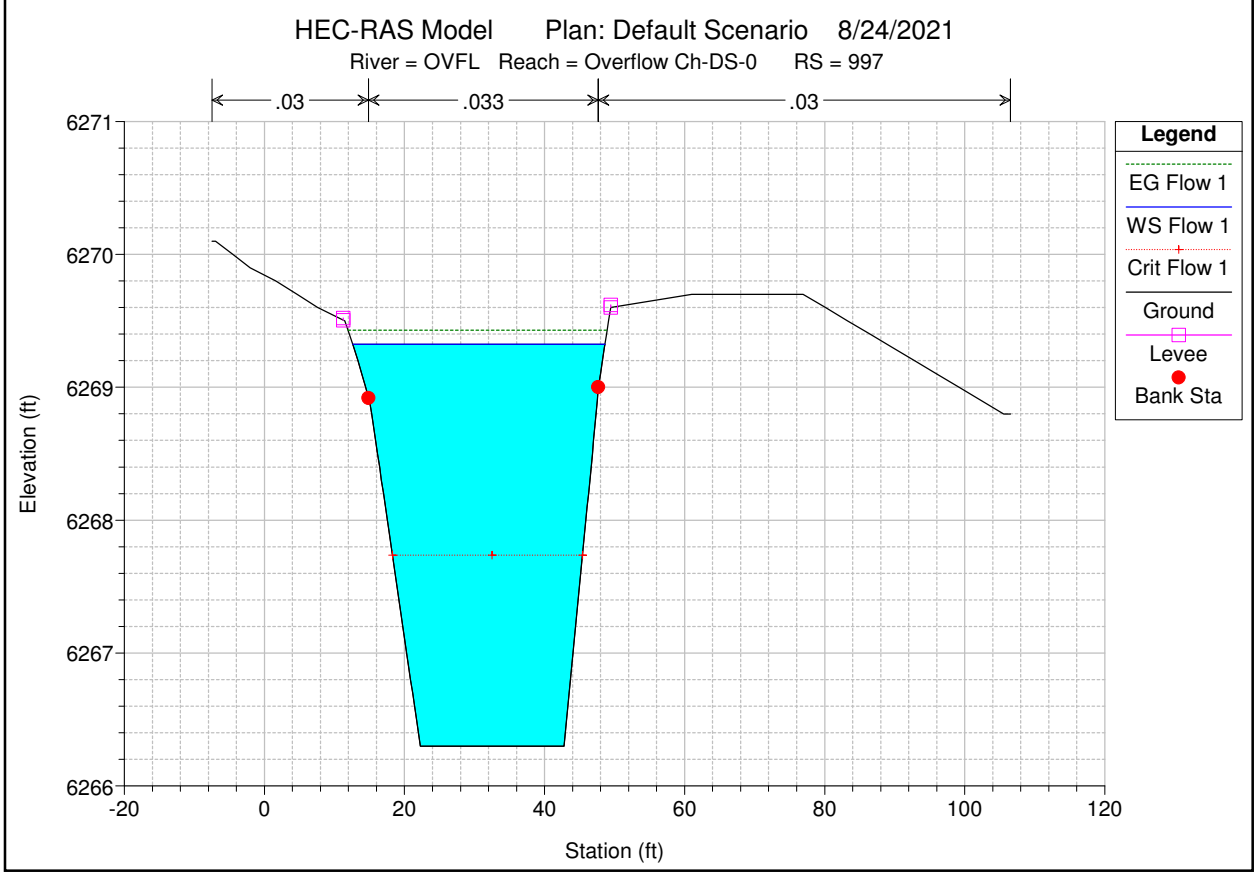
Levee
Ineff
Bank Sta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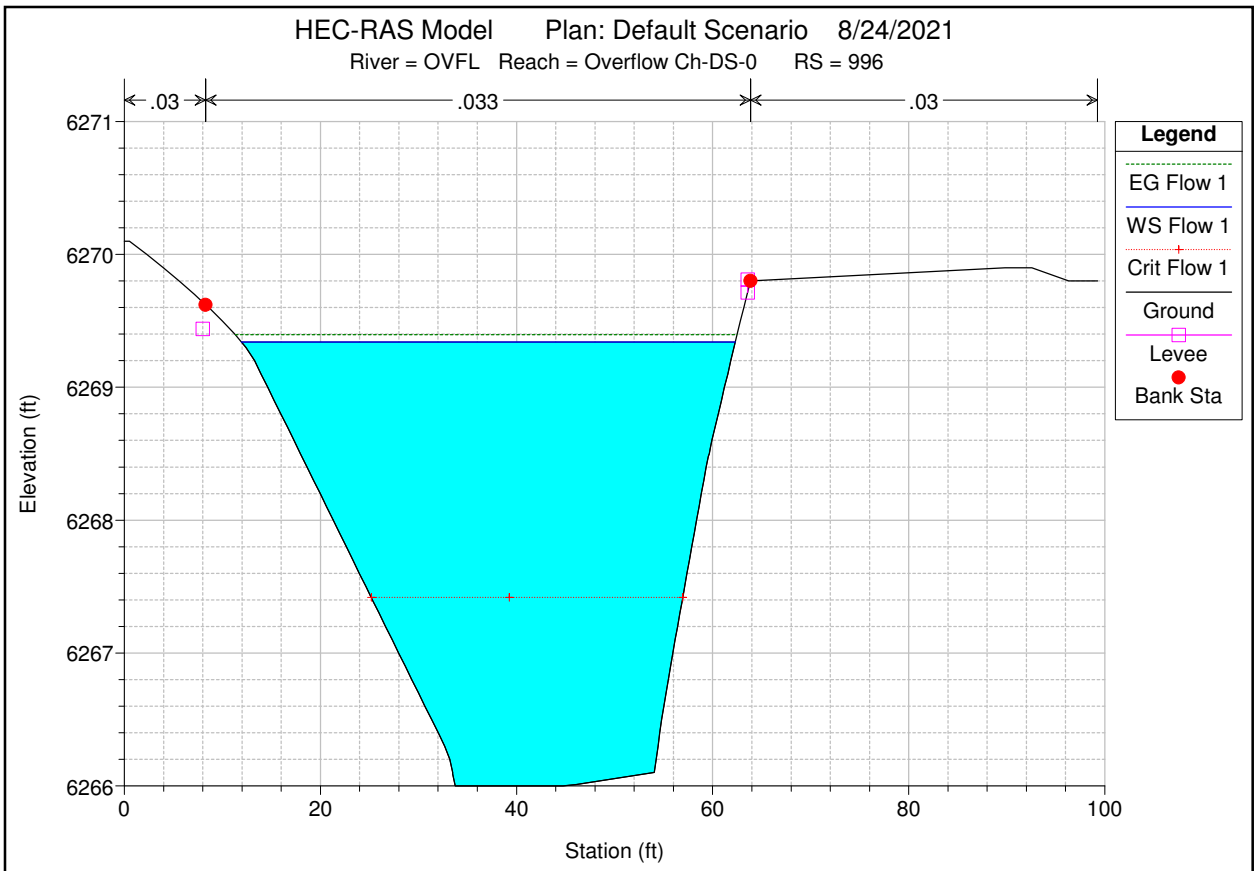
Bank Sta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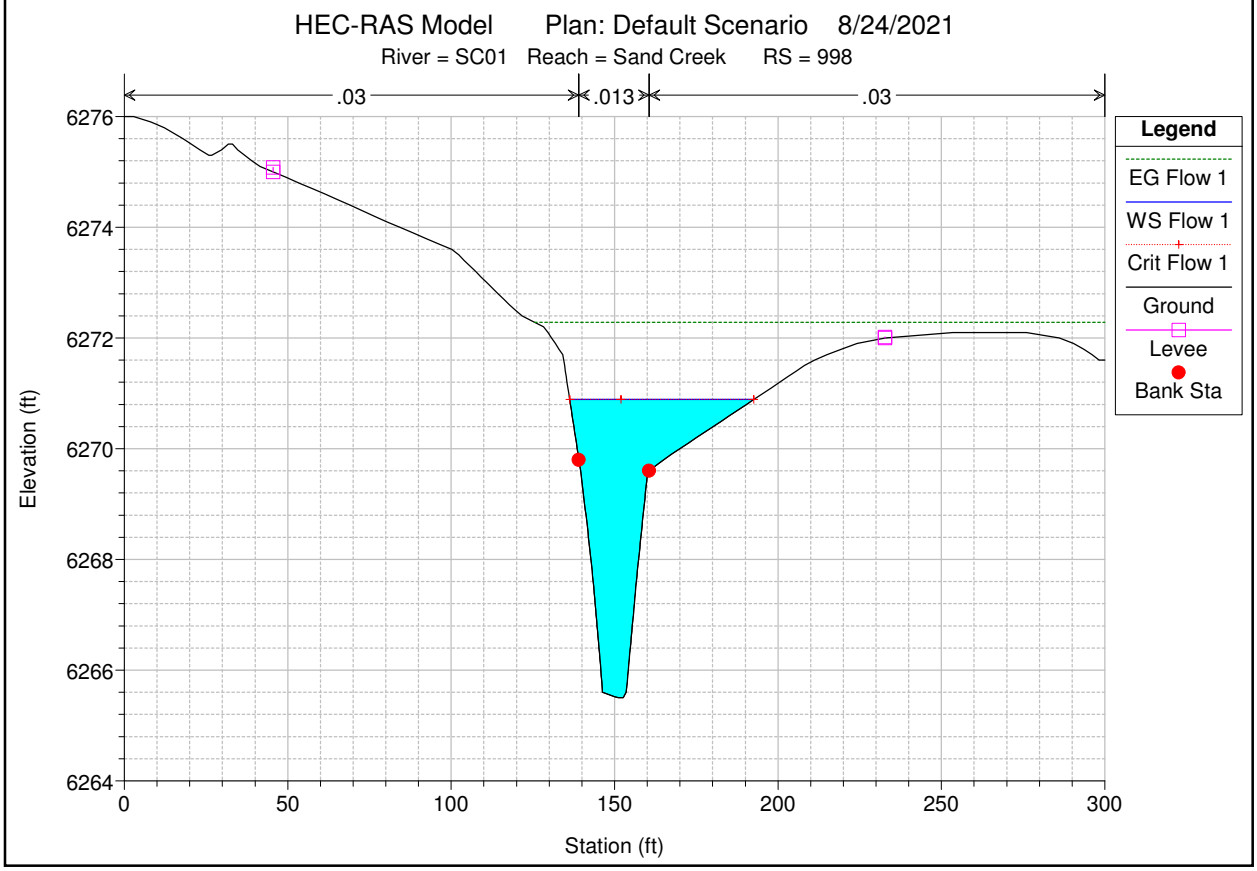
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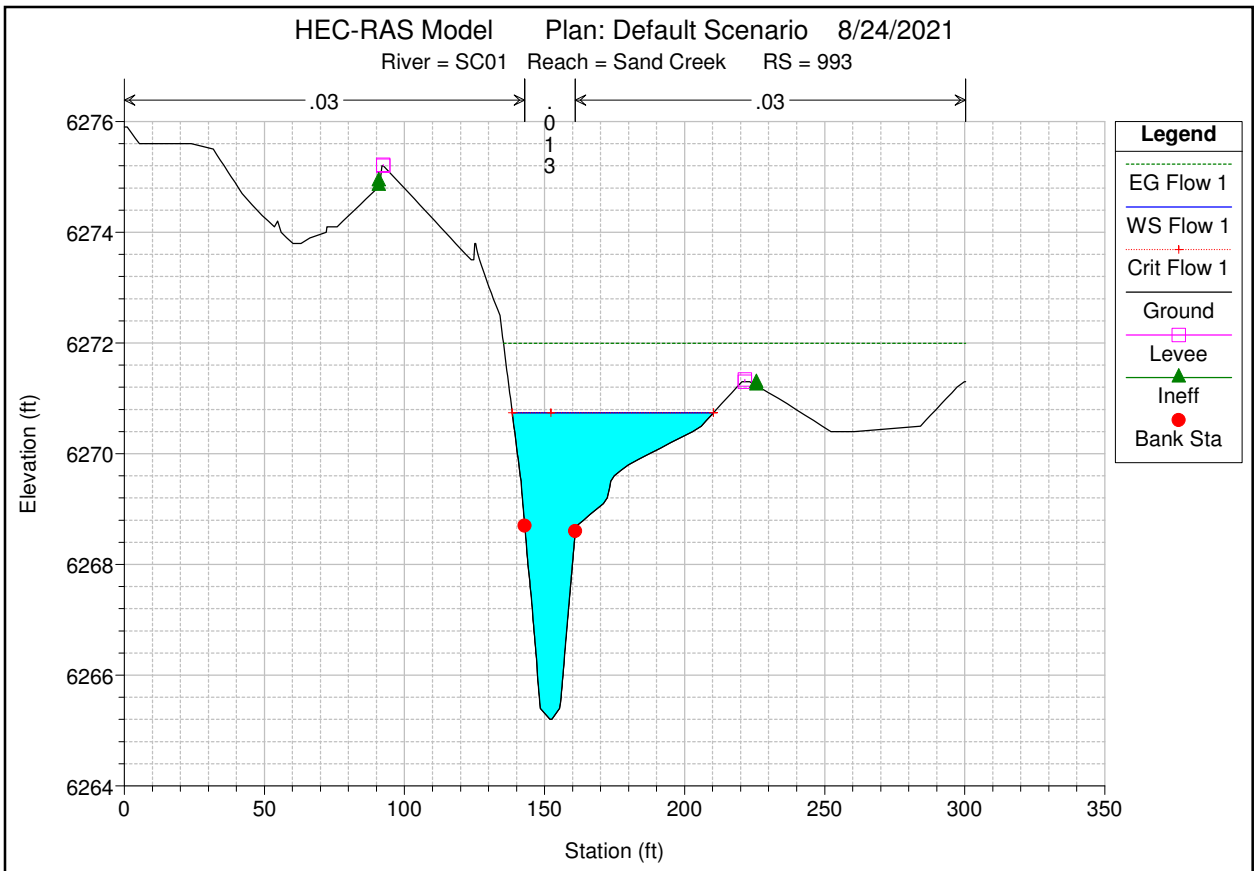
Bank Sta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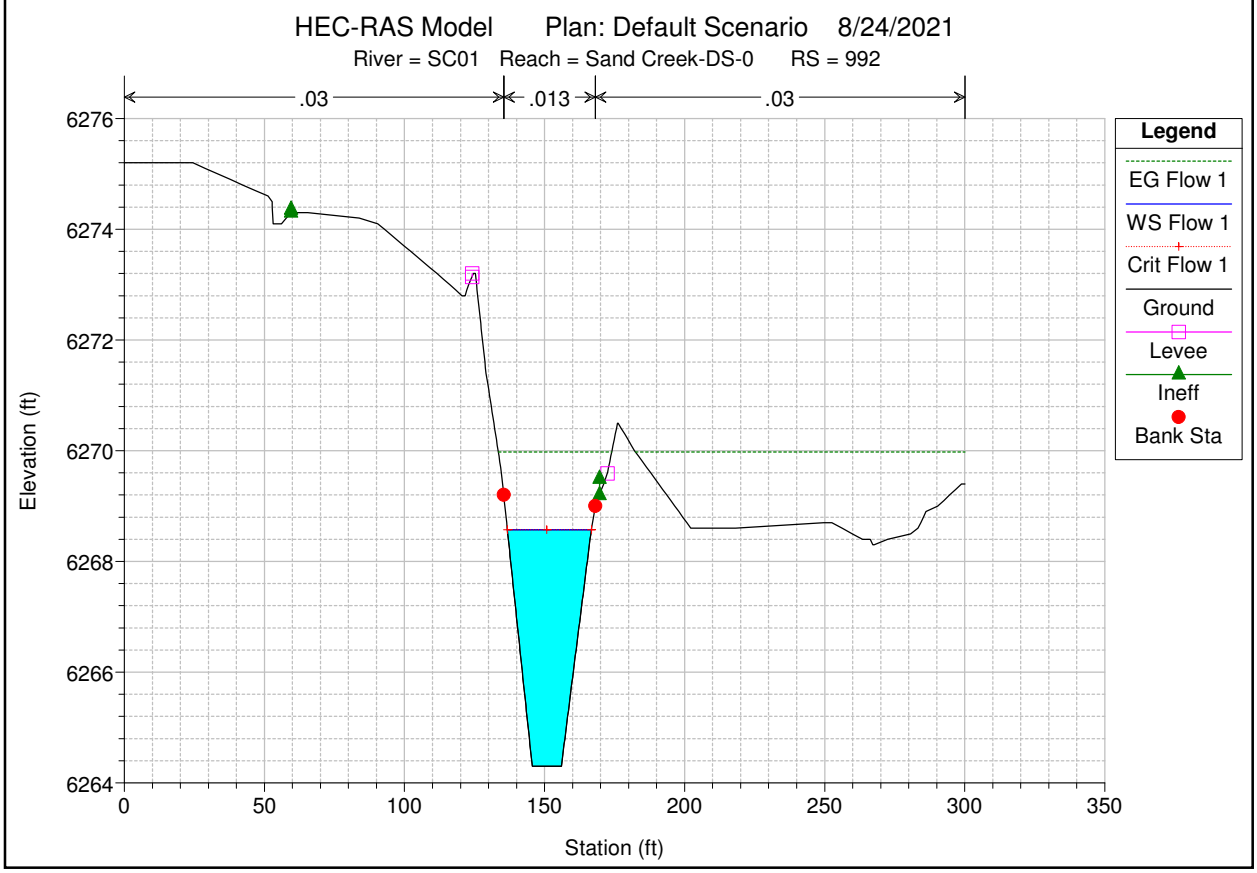
Ineff
Bank Sta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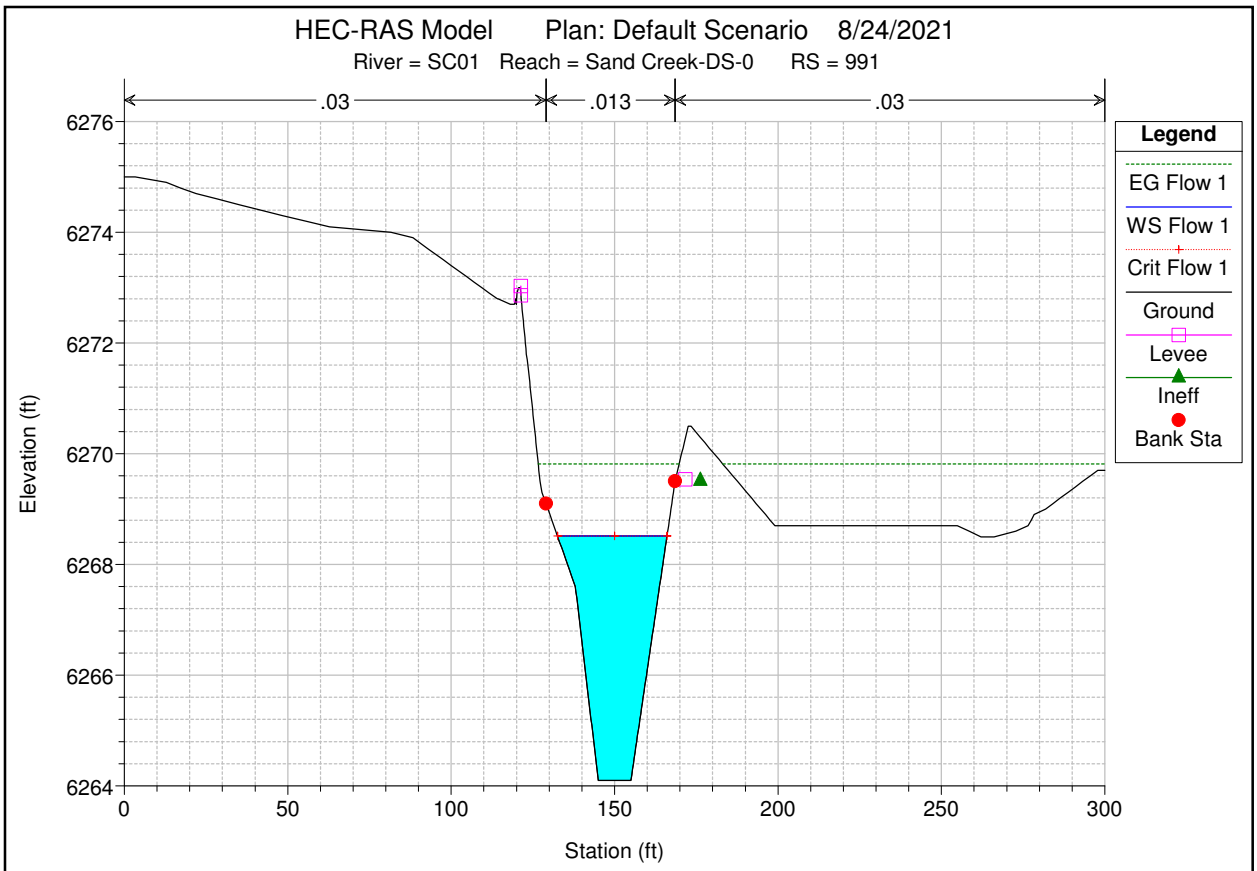
Levee
Ineff
Bank Sta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.03
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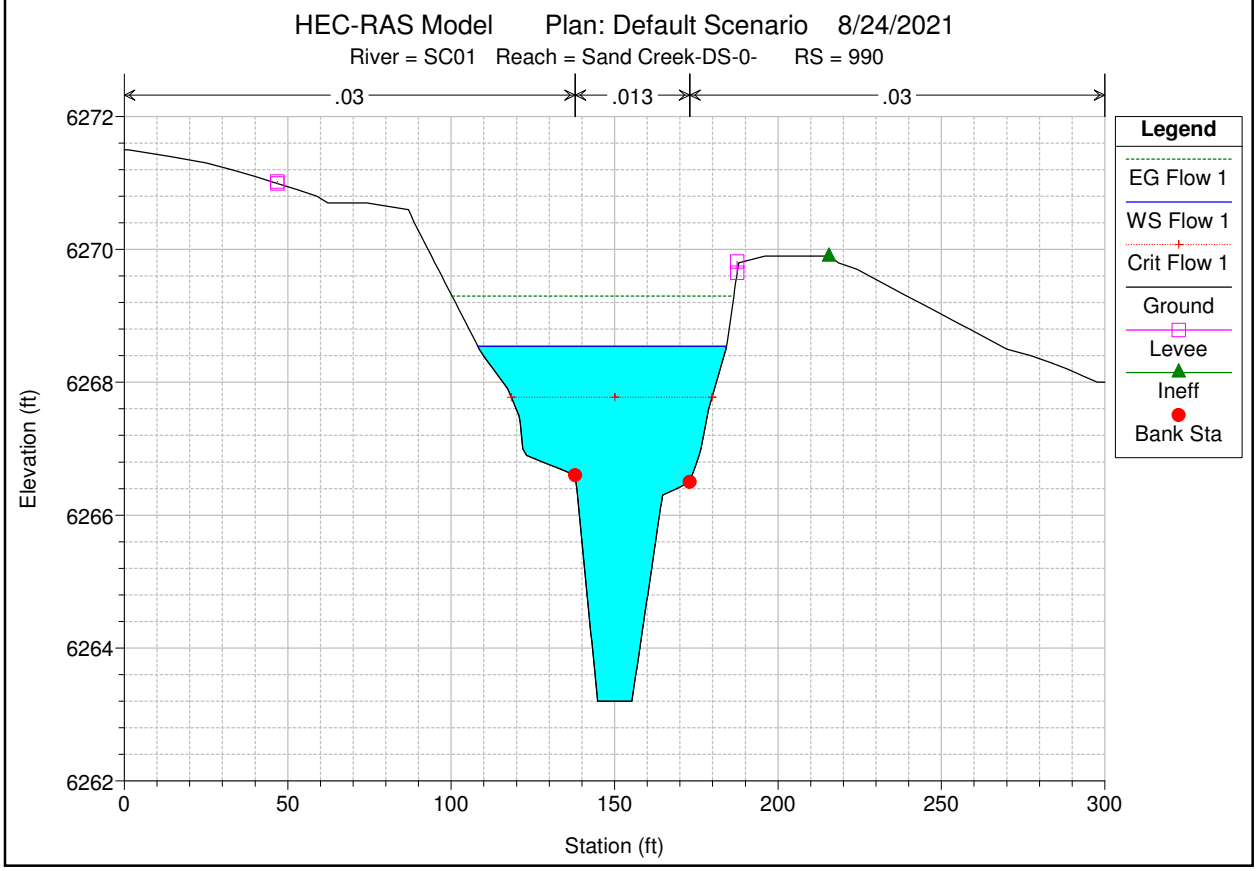
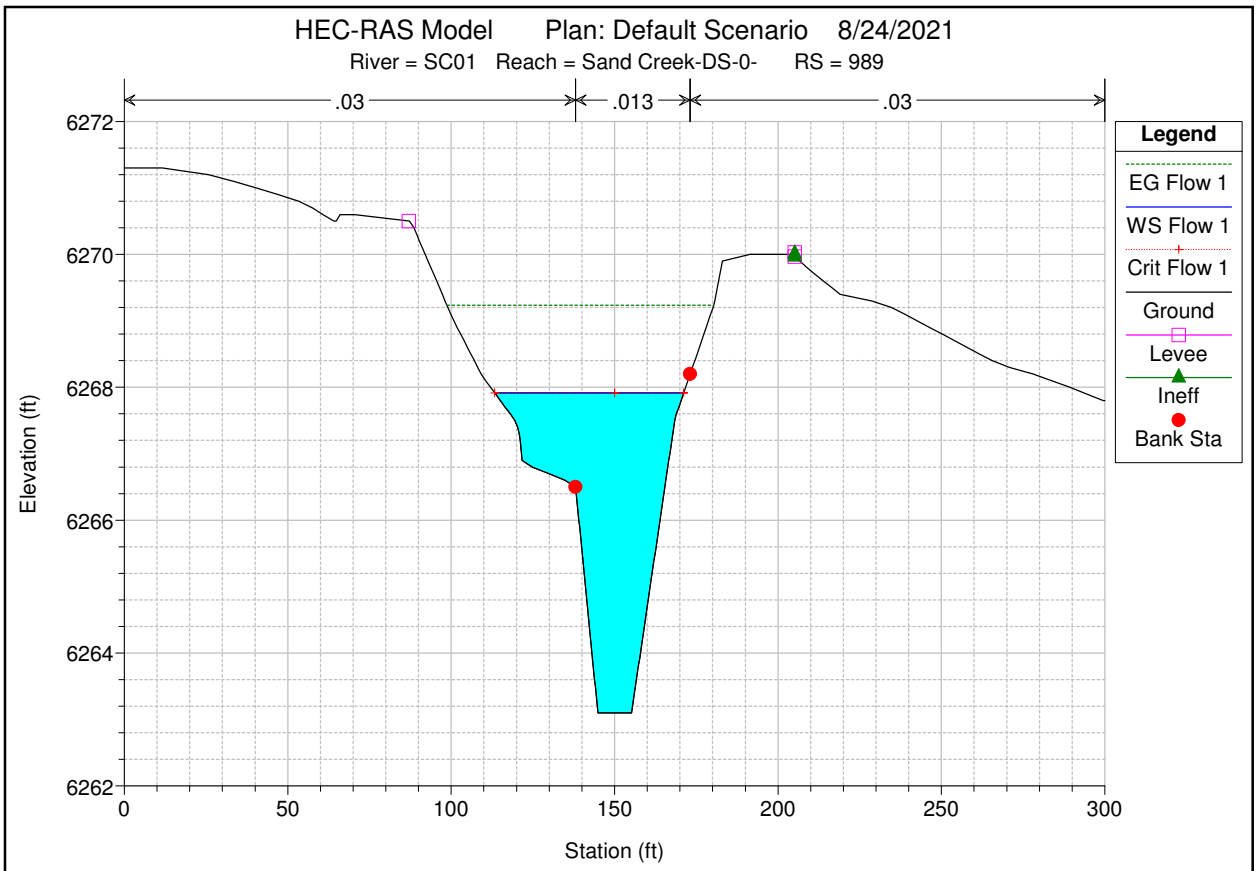
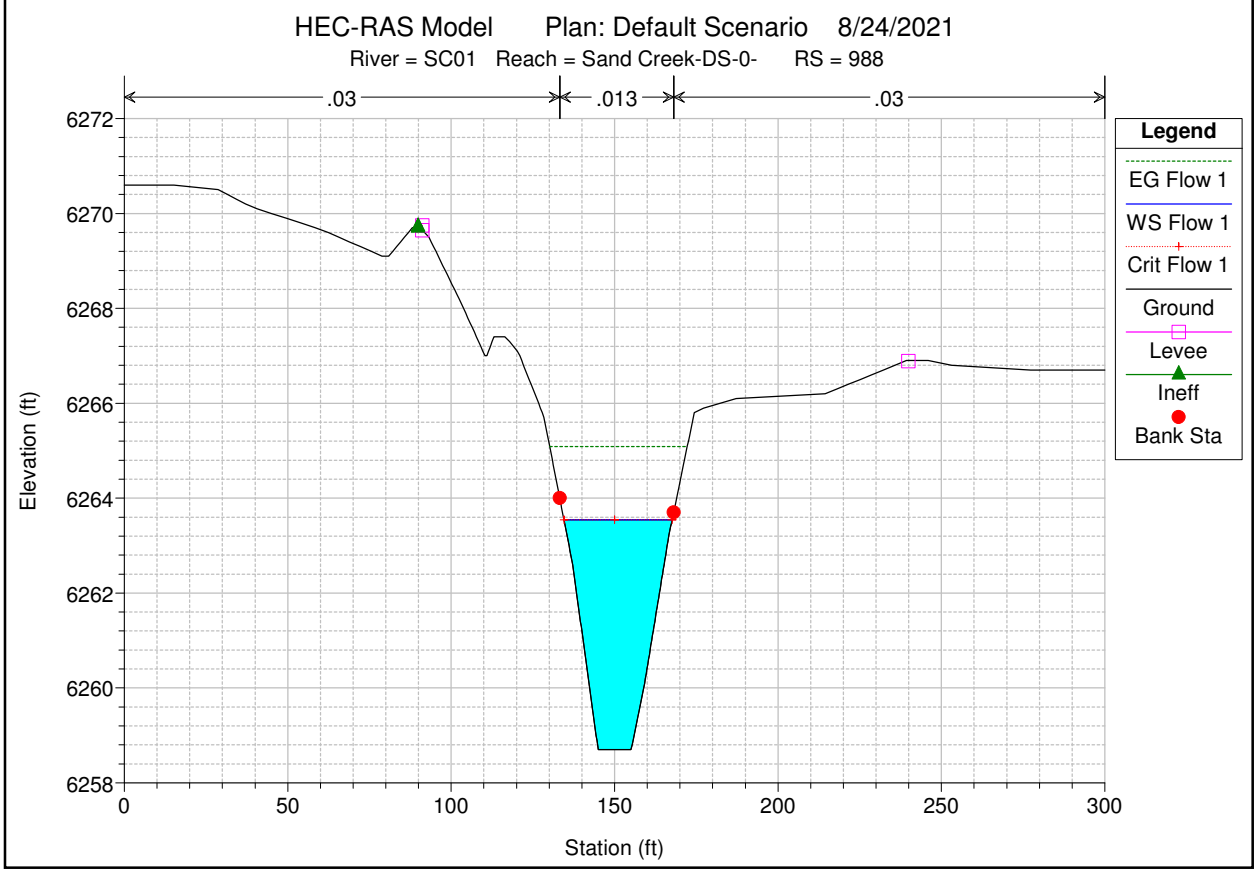
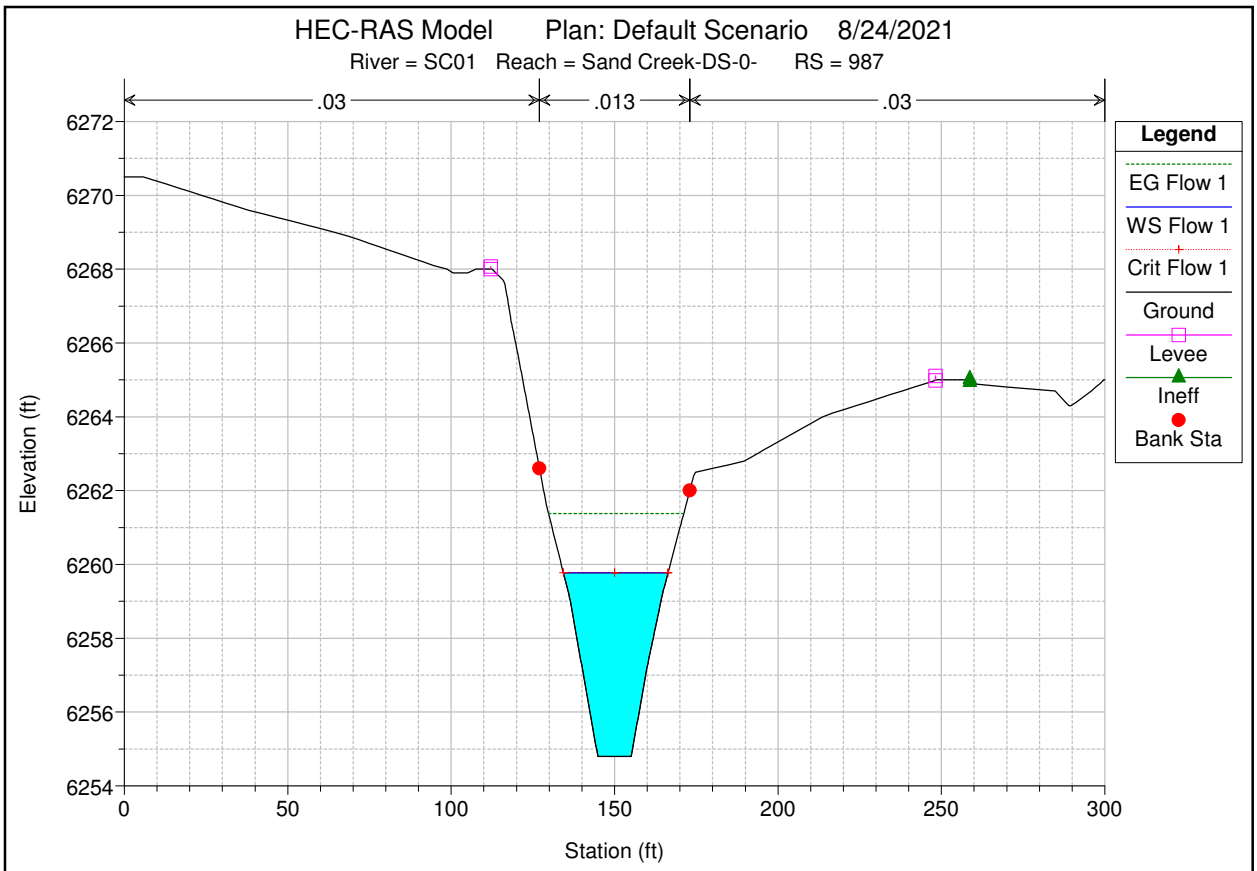
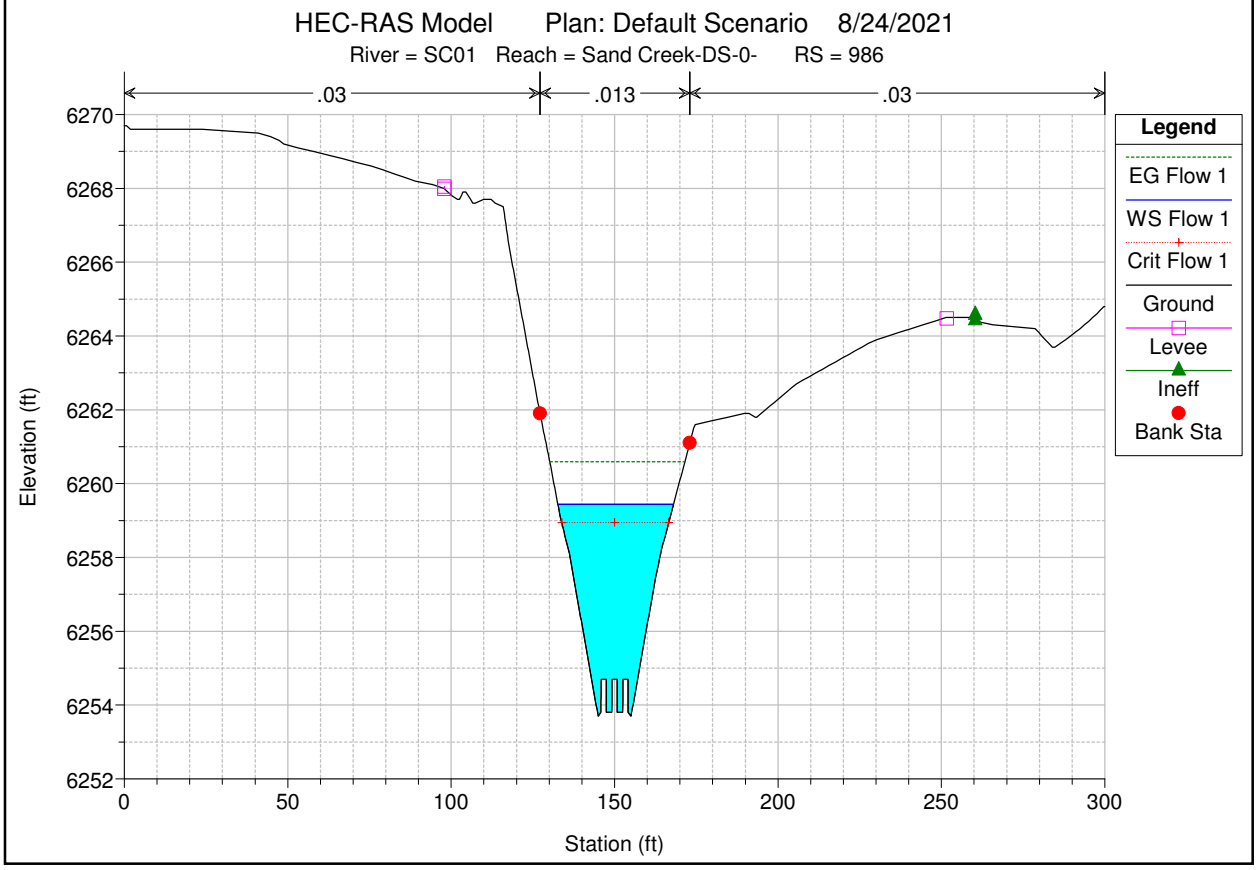
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

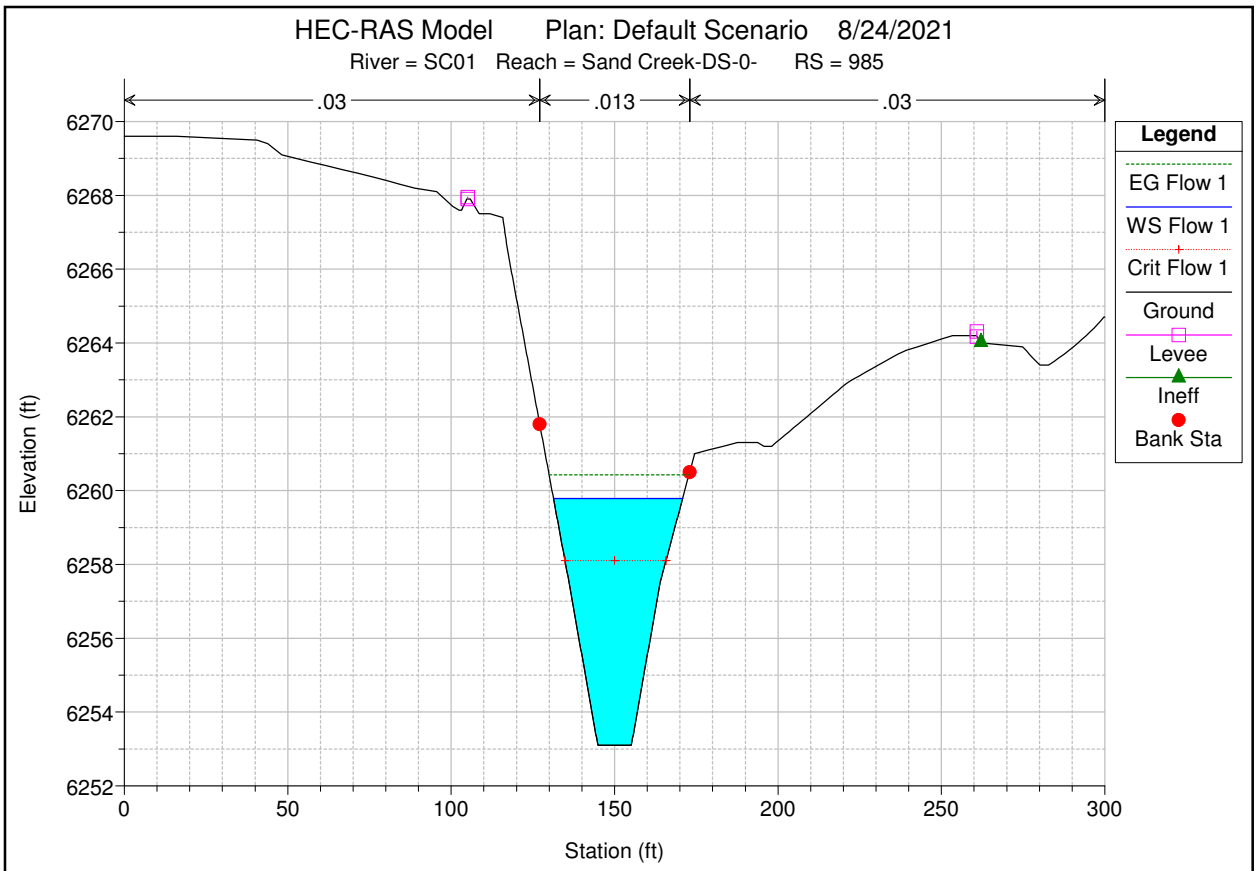

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 990
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

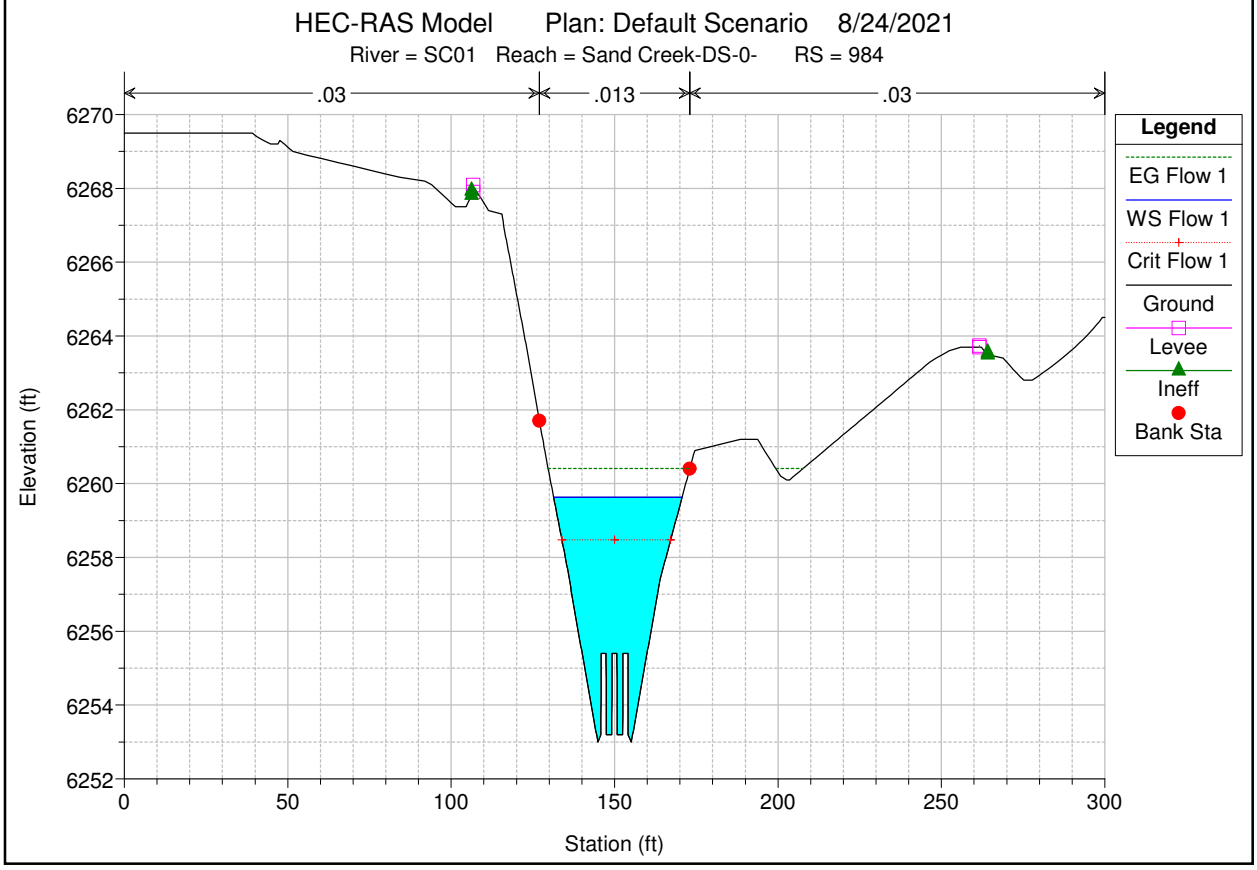

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 989
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

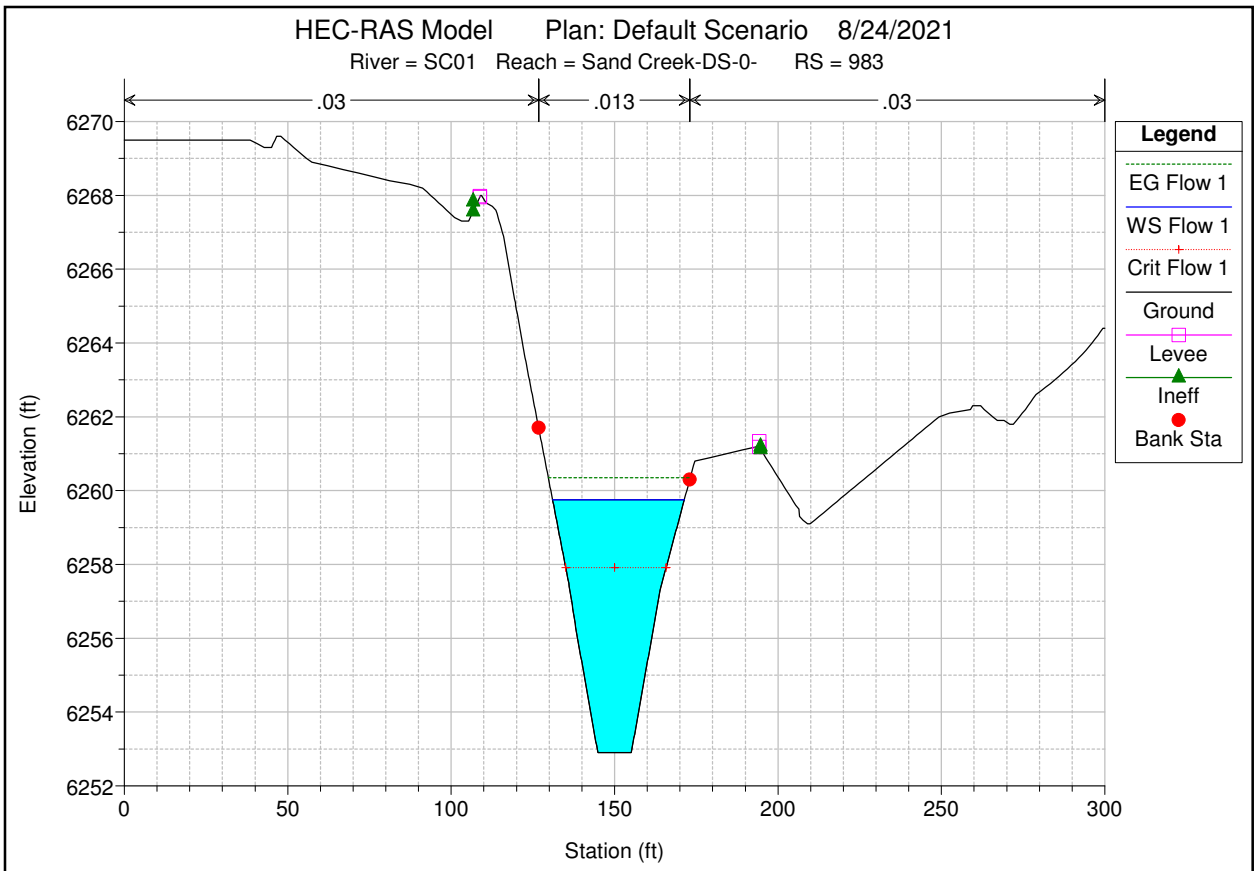

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 988
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

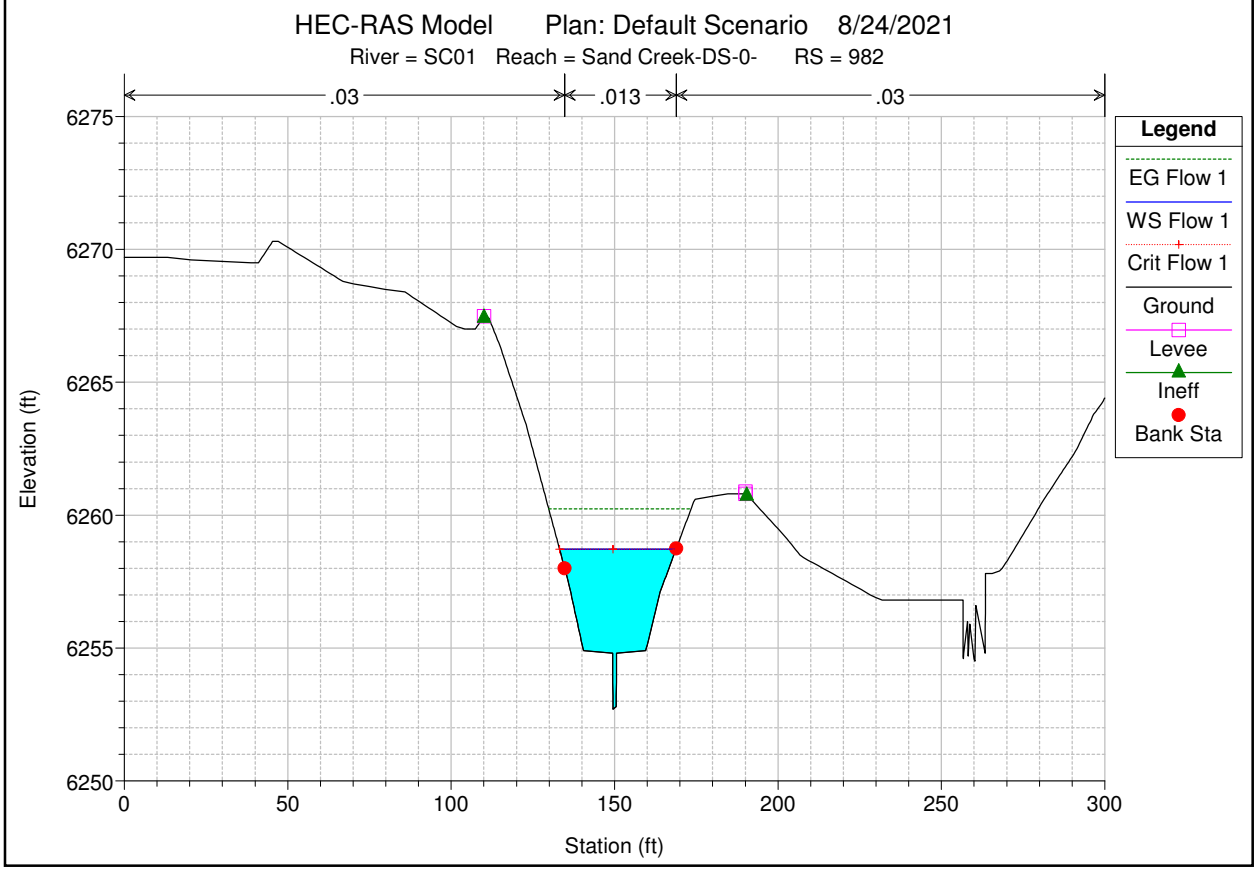

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 987
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

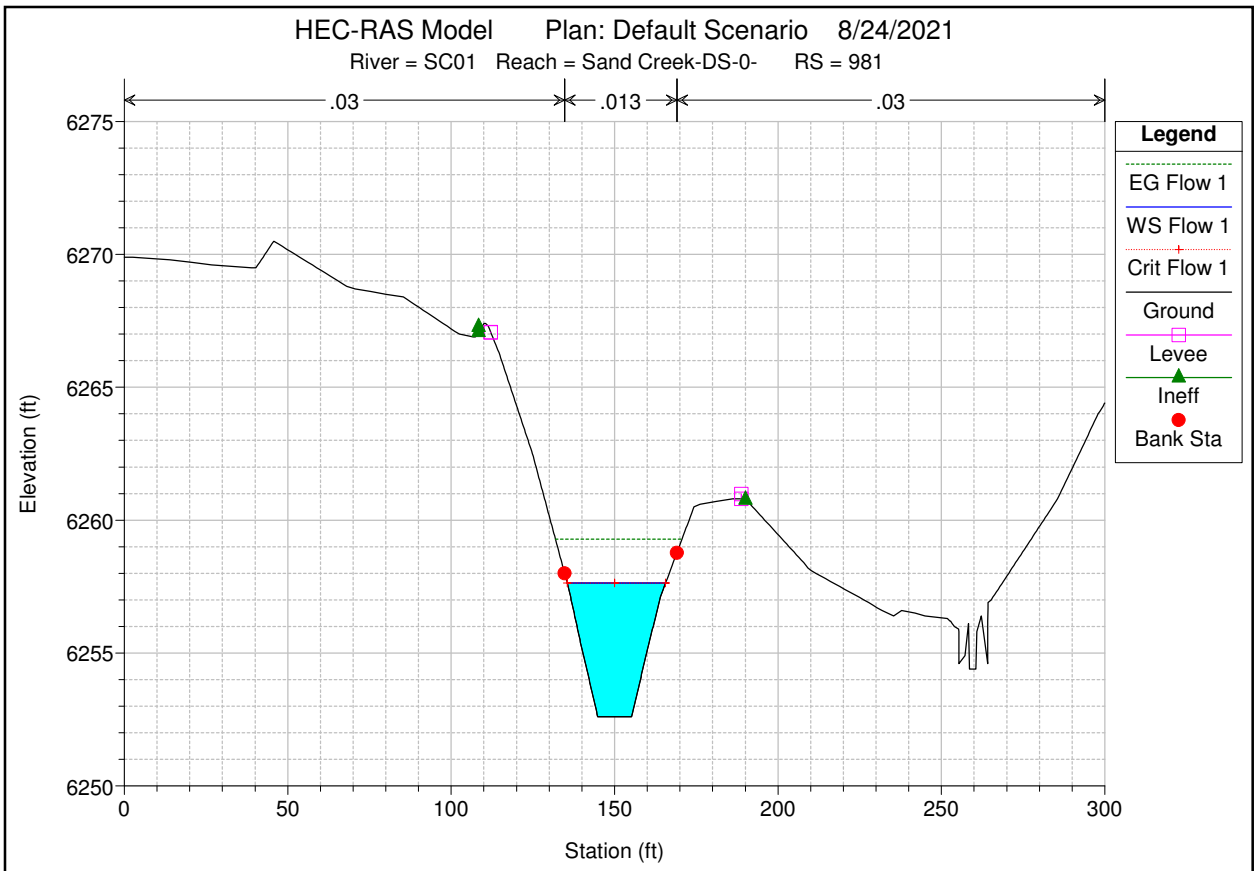

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 986
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

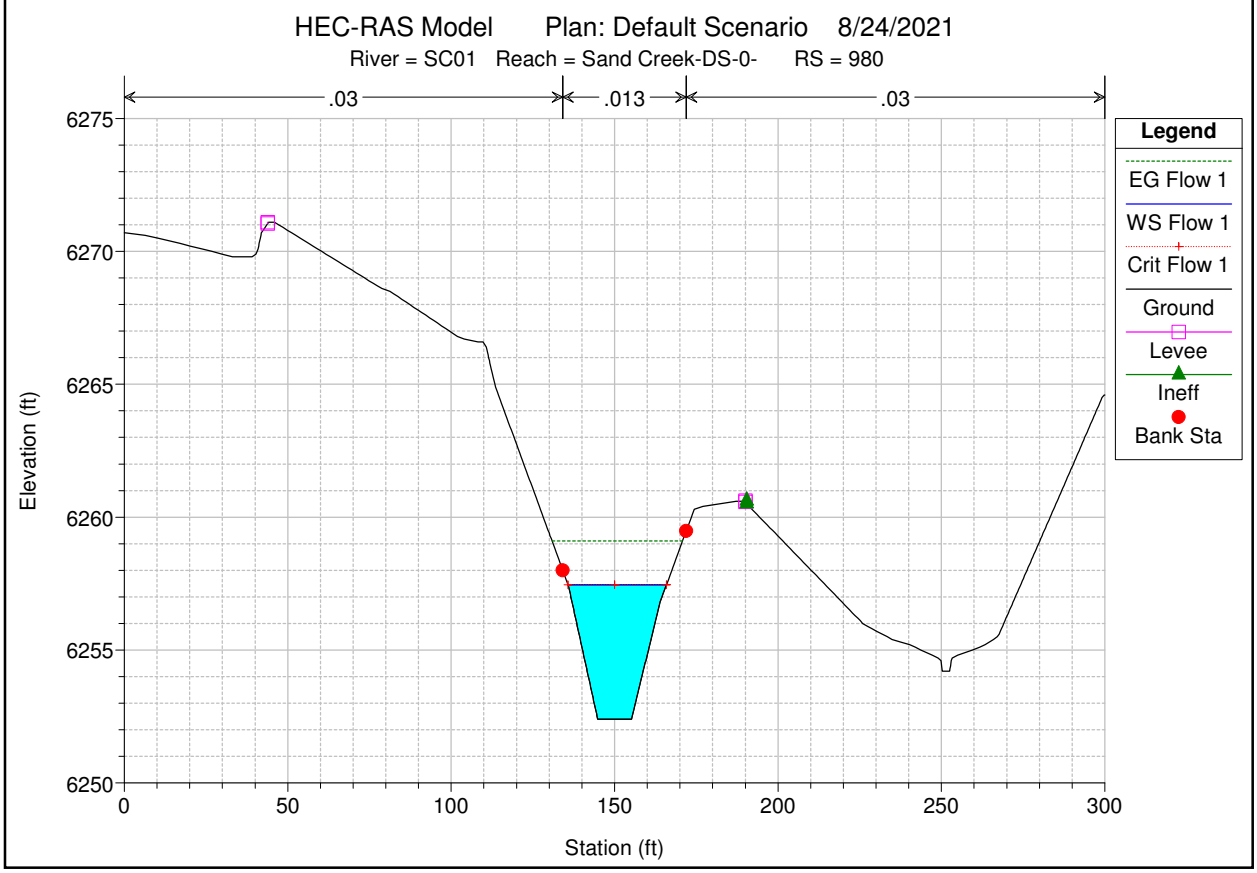

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 985
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

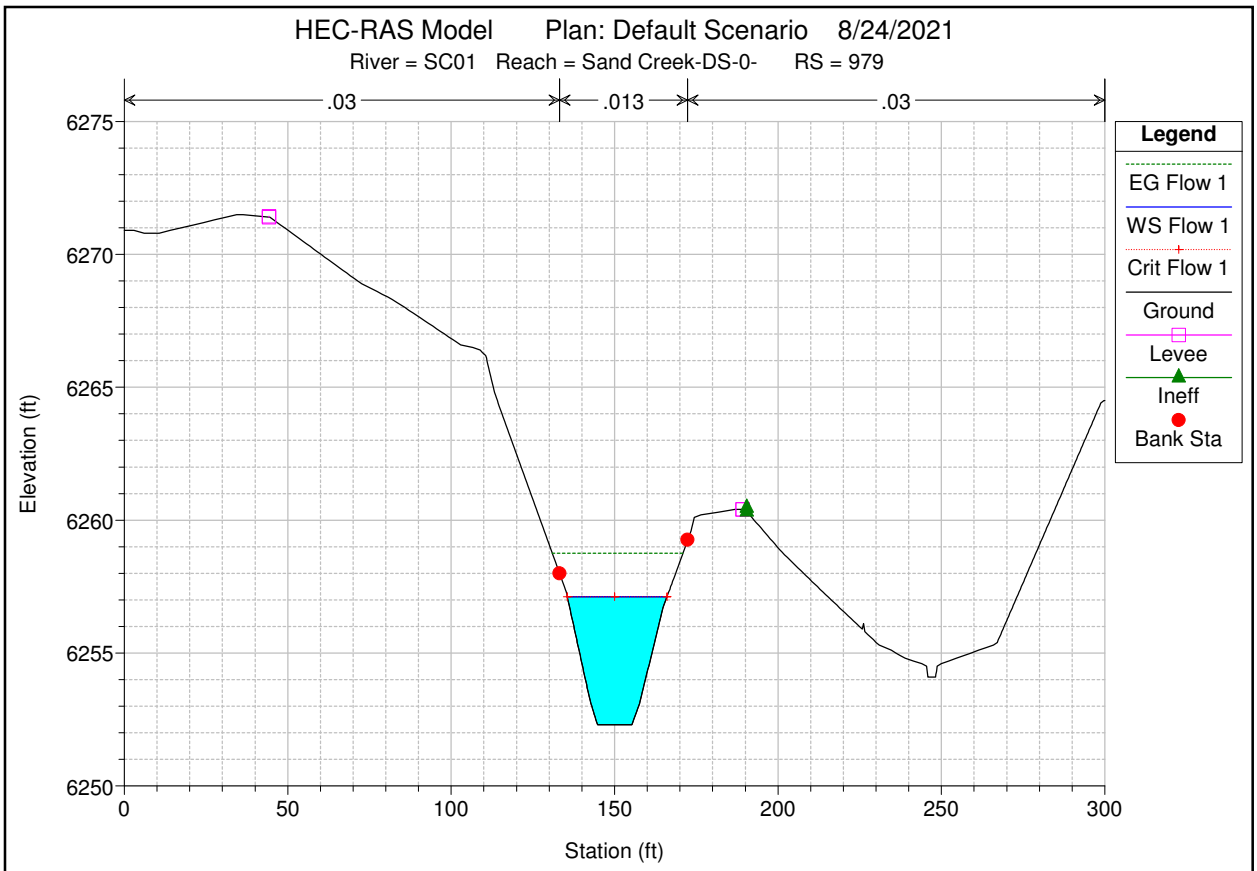

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 984
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

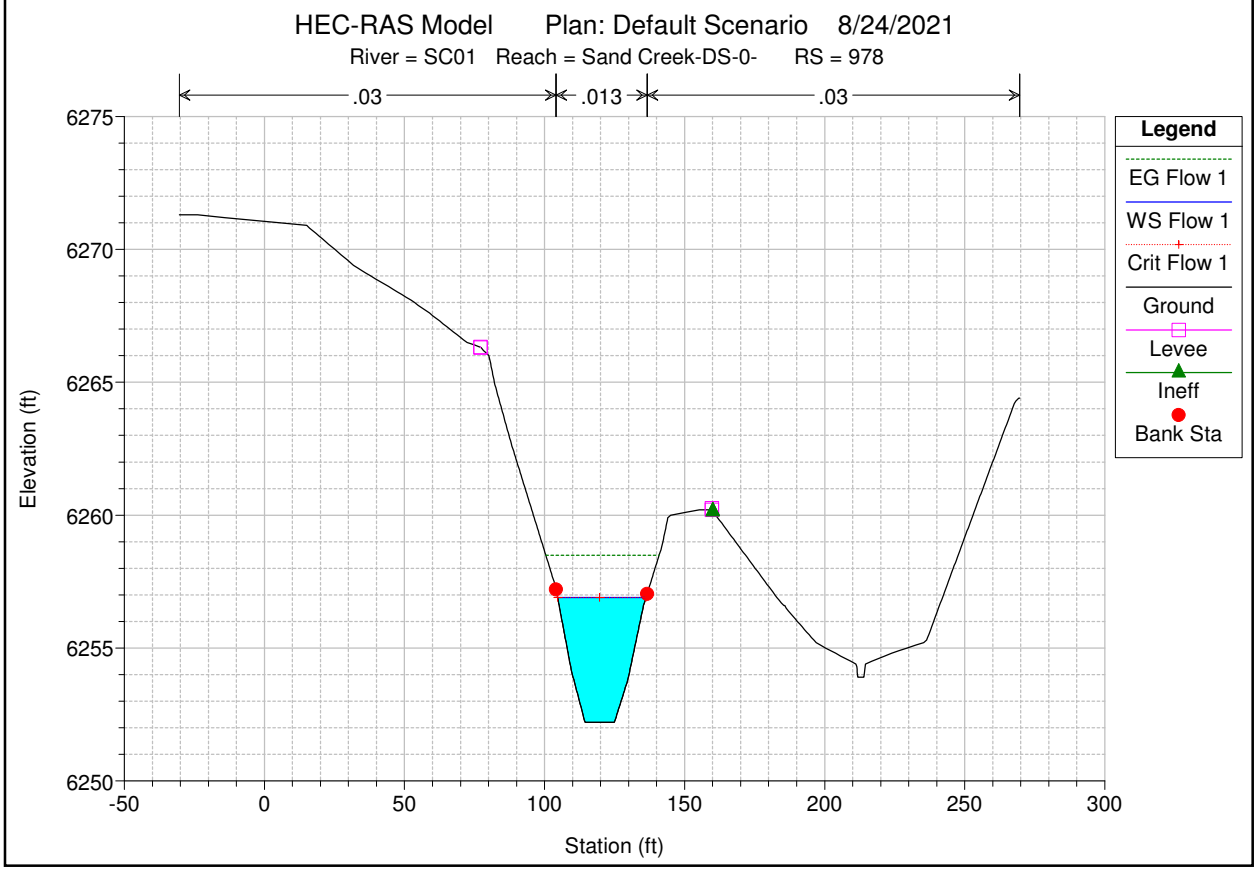

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 983
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

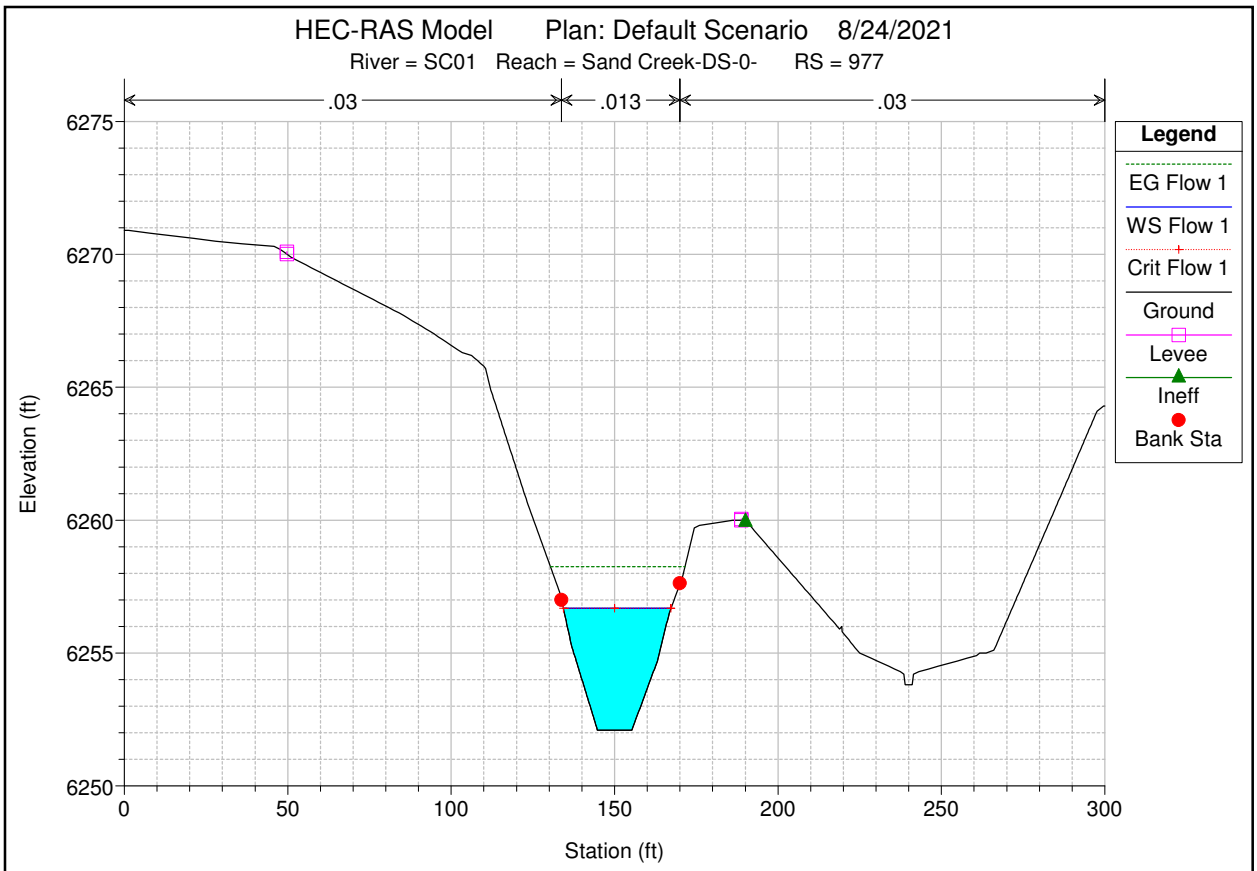

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 982
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

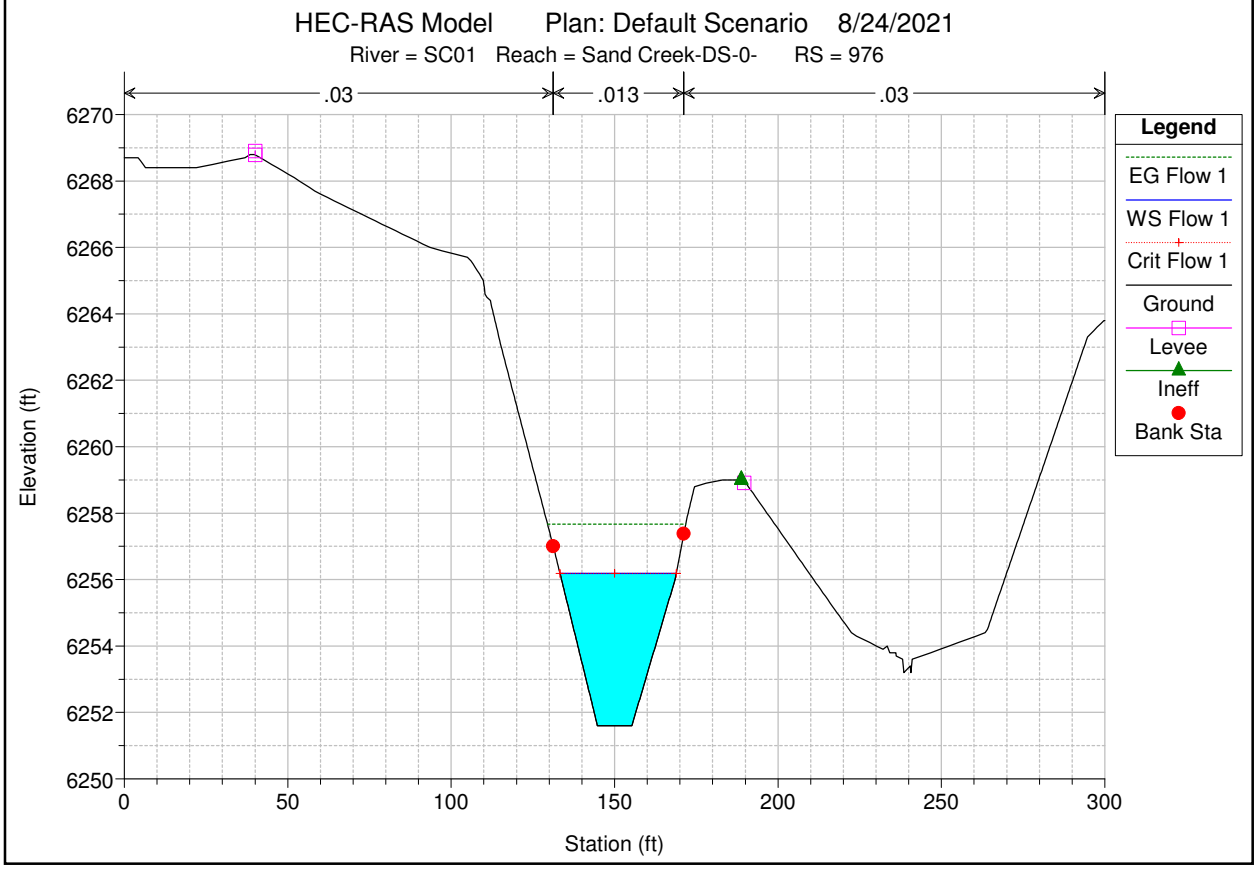

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 981
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

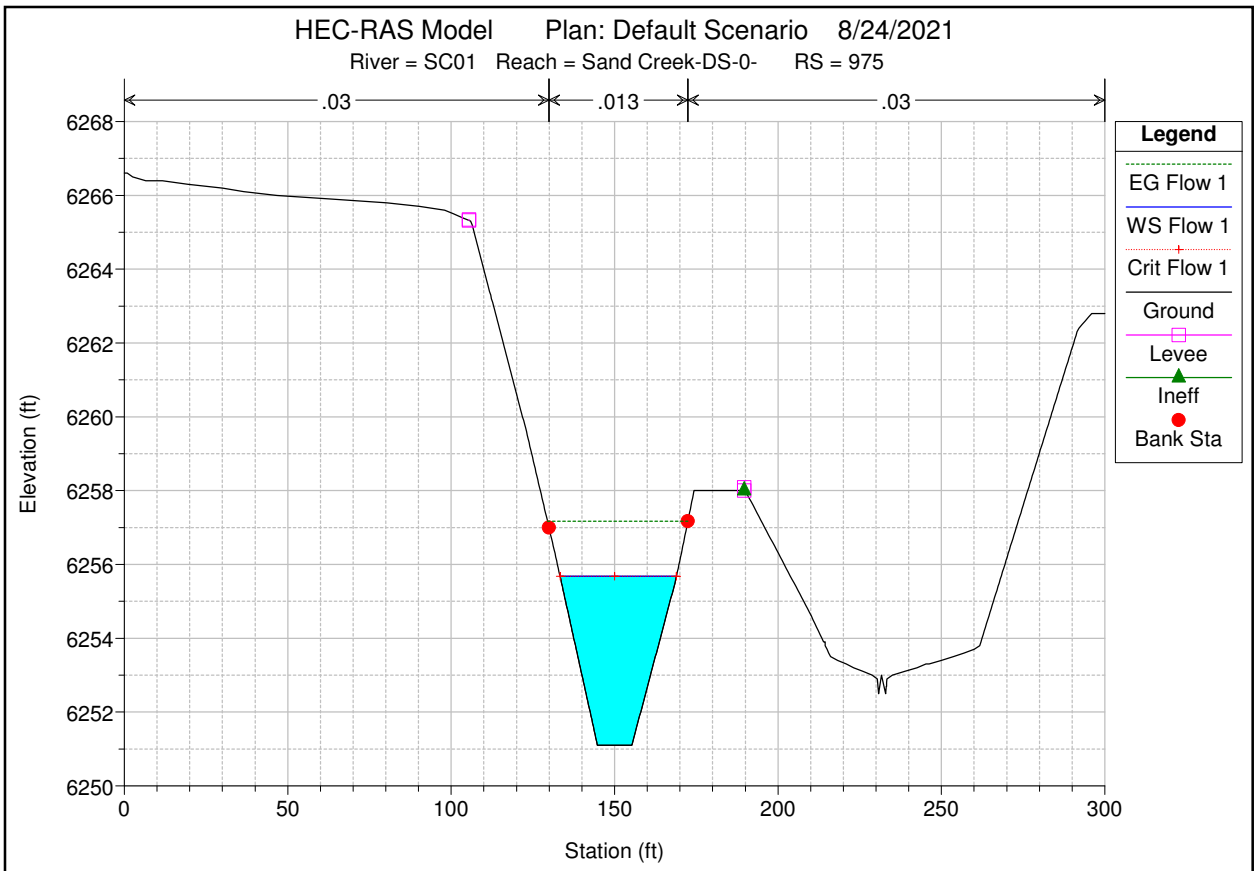

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 980
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

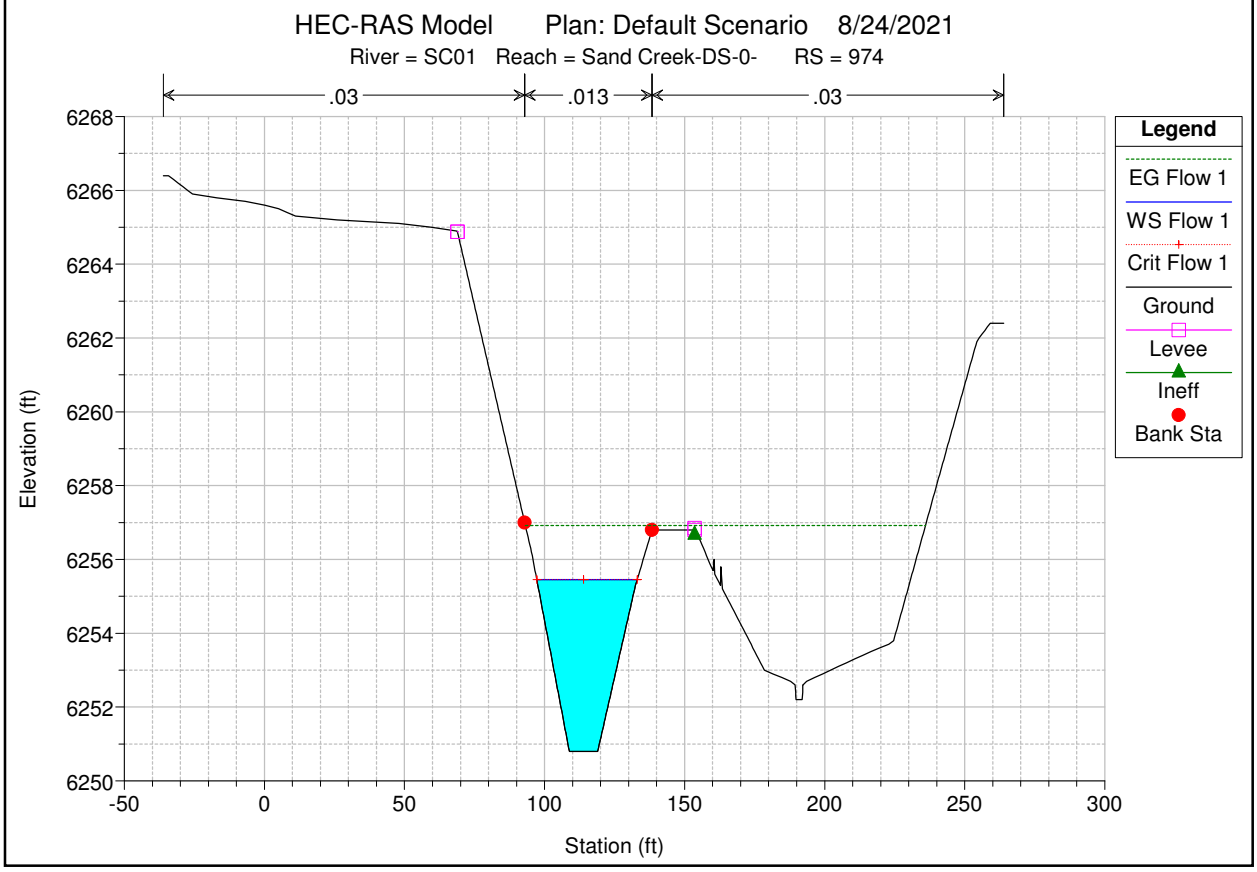

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 979
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

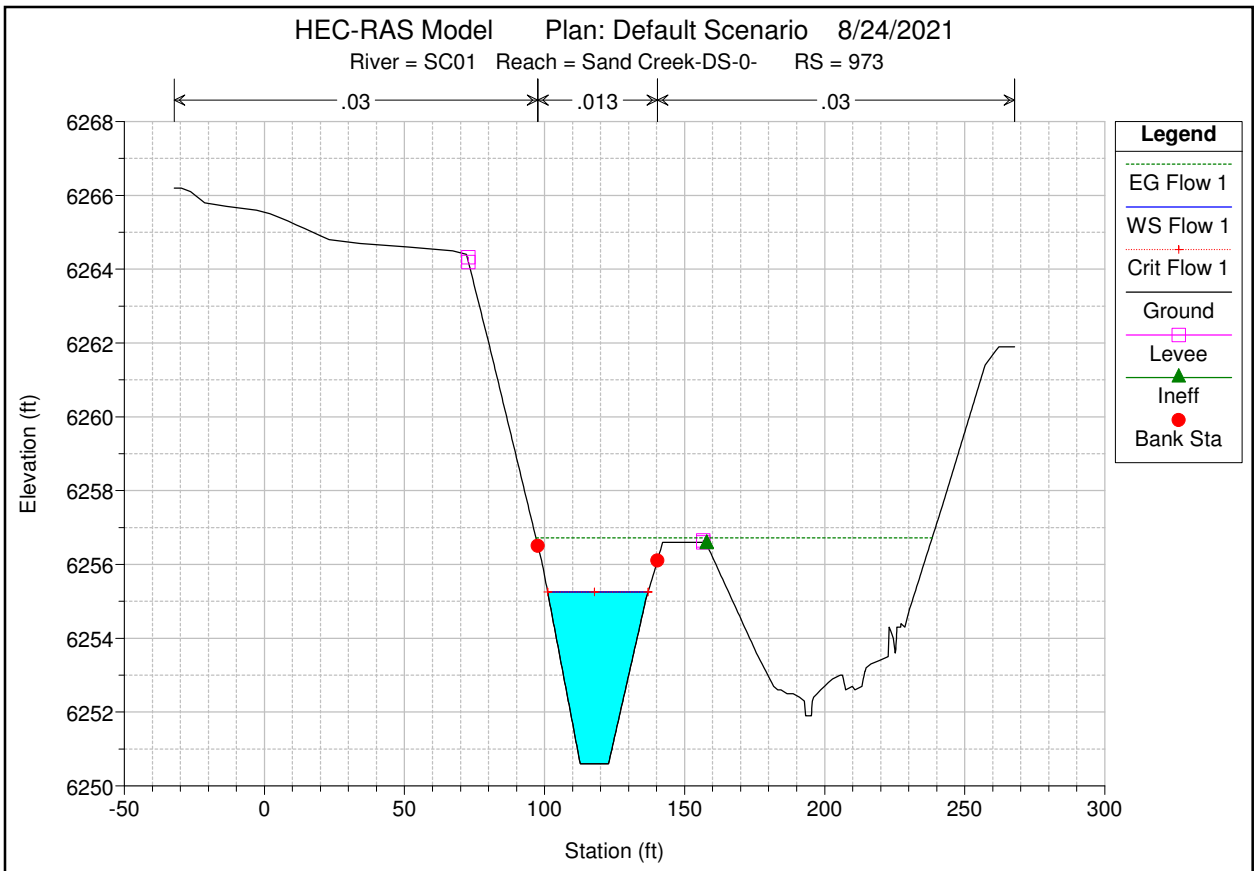

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 978
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

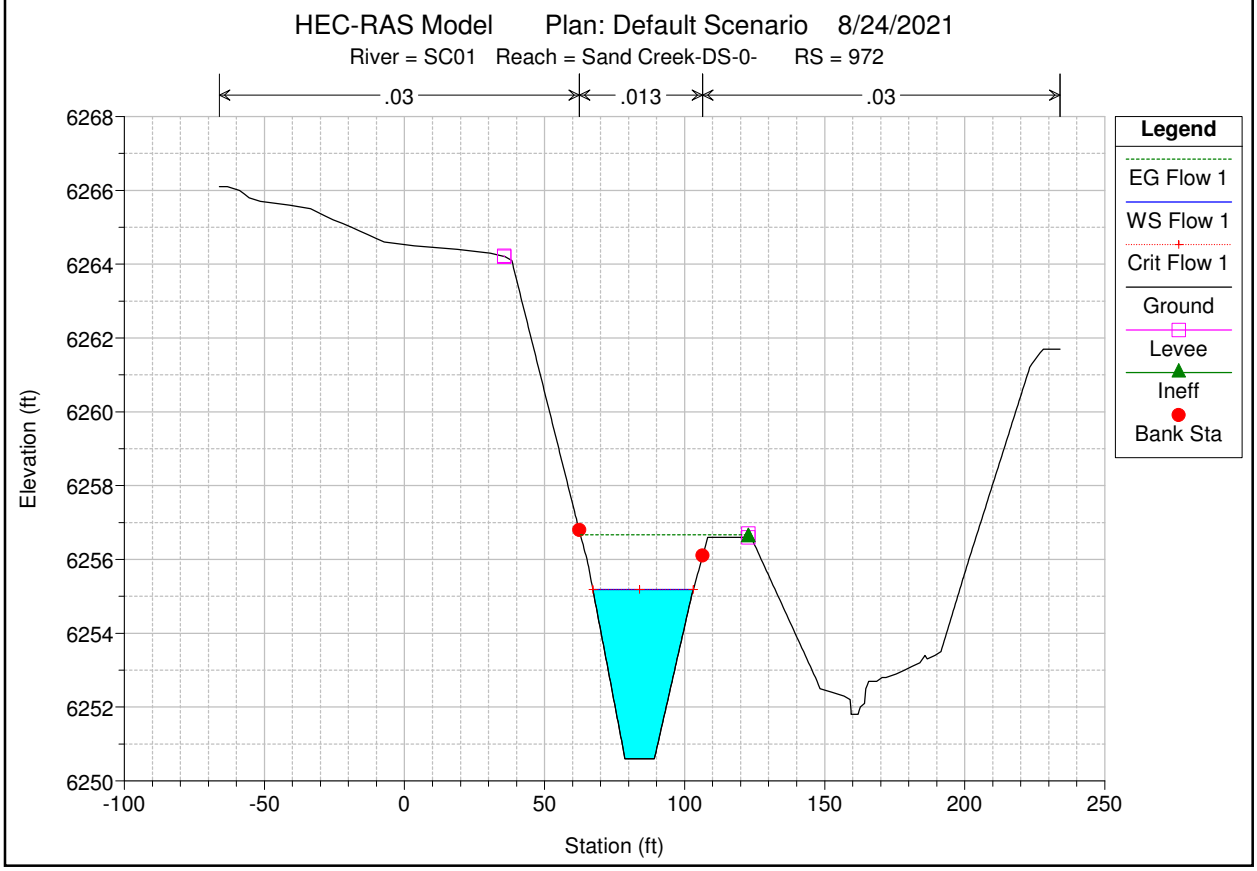

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 977
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

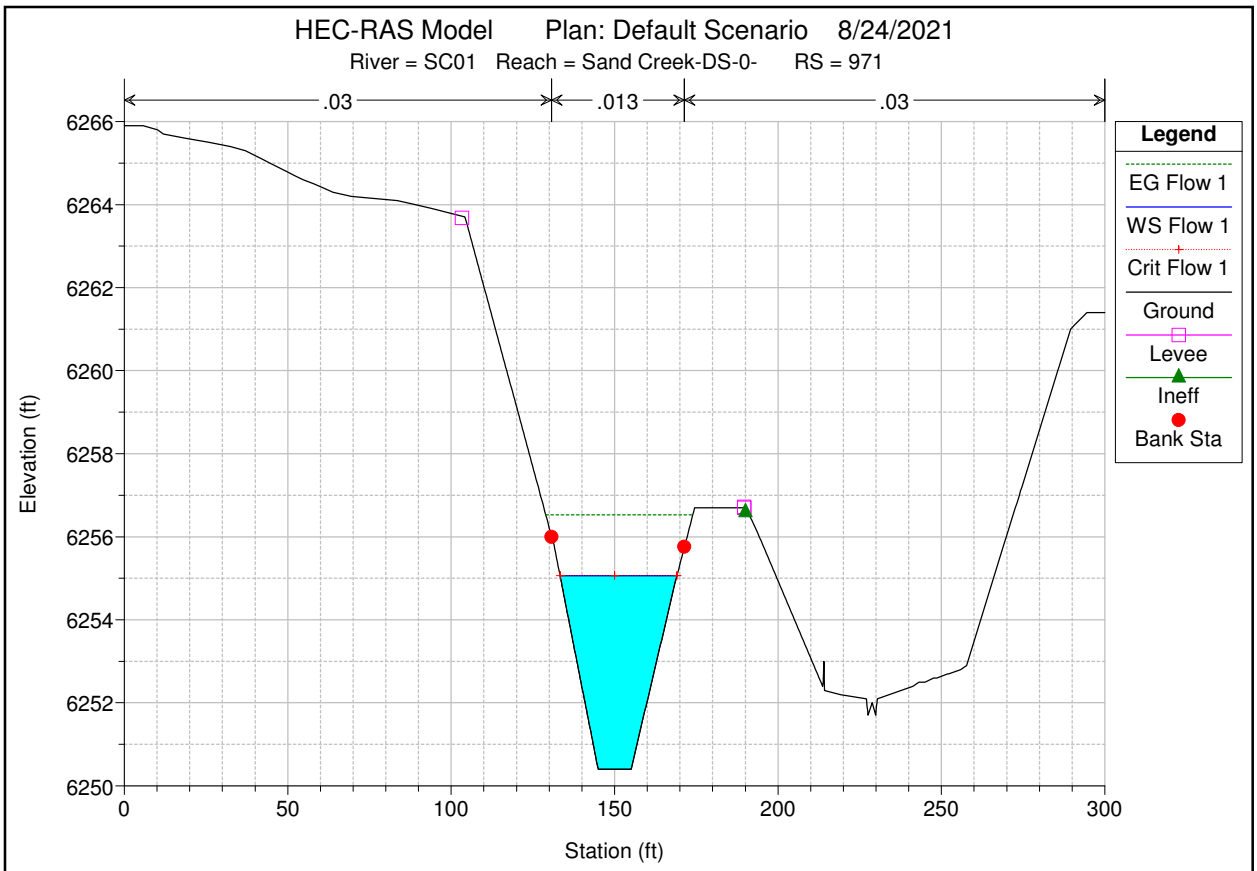

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 976
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

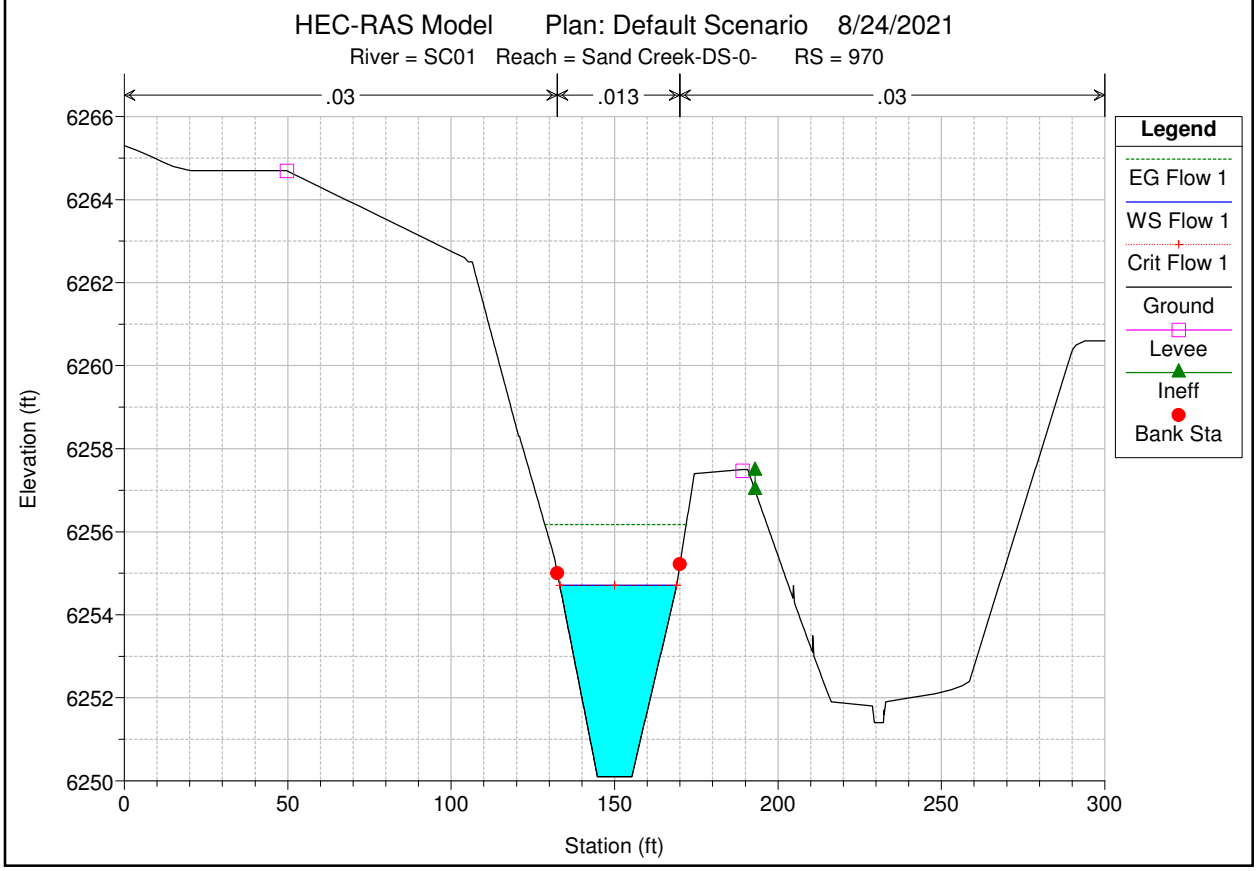

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 975
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

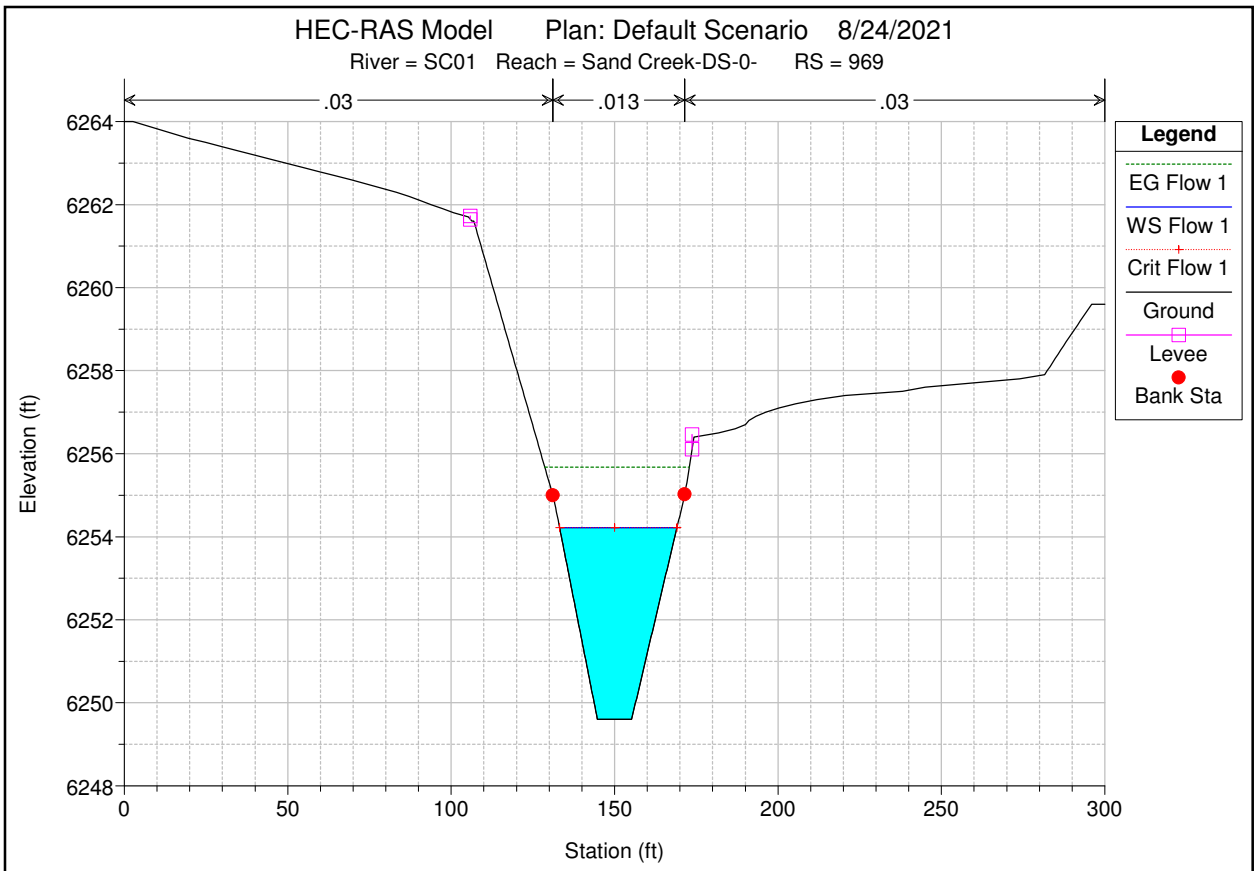

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 974
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

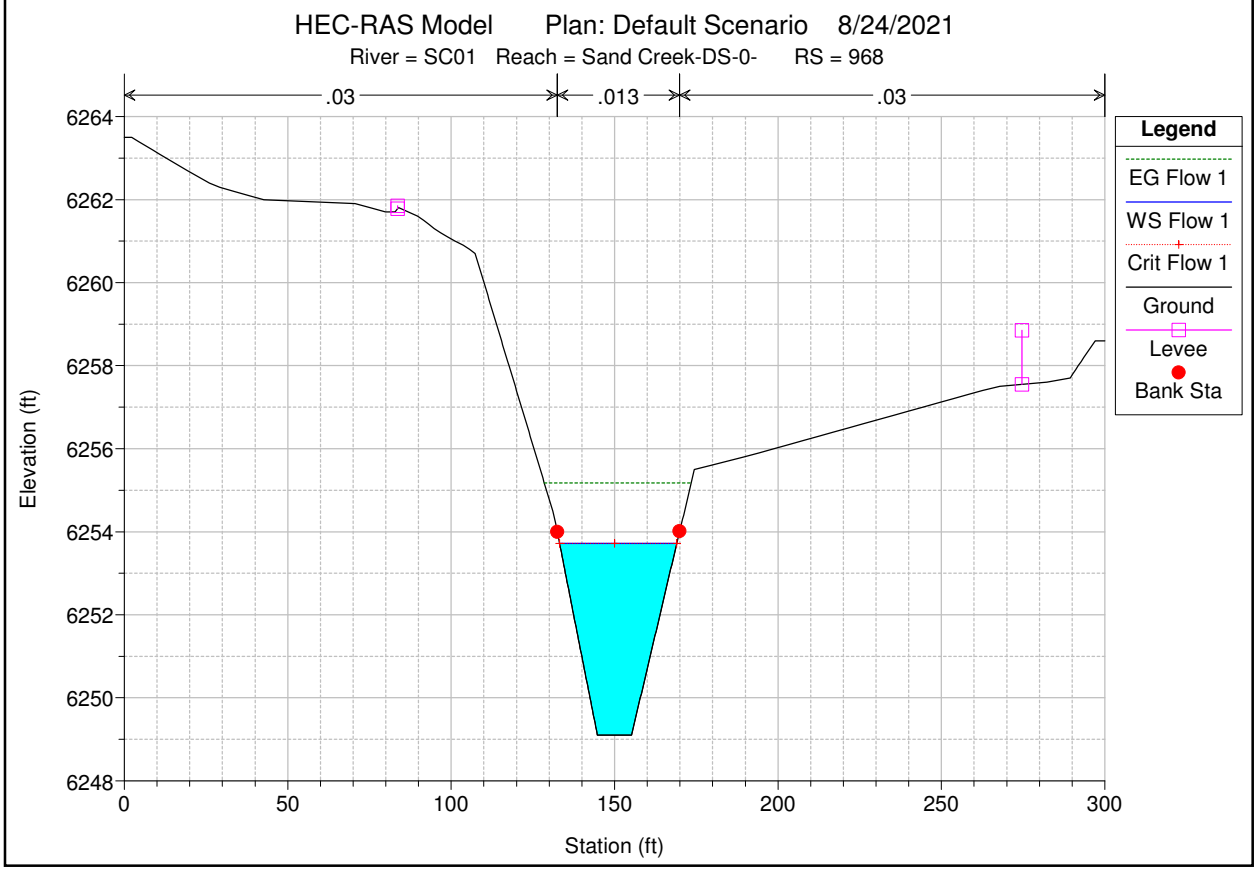

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 973
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

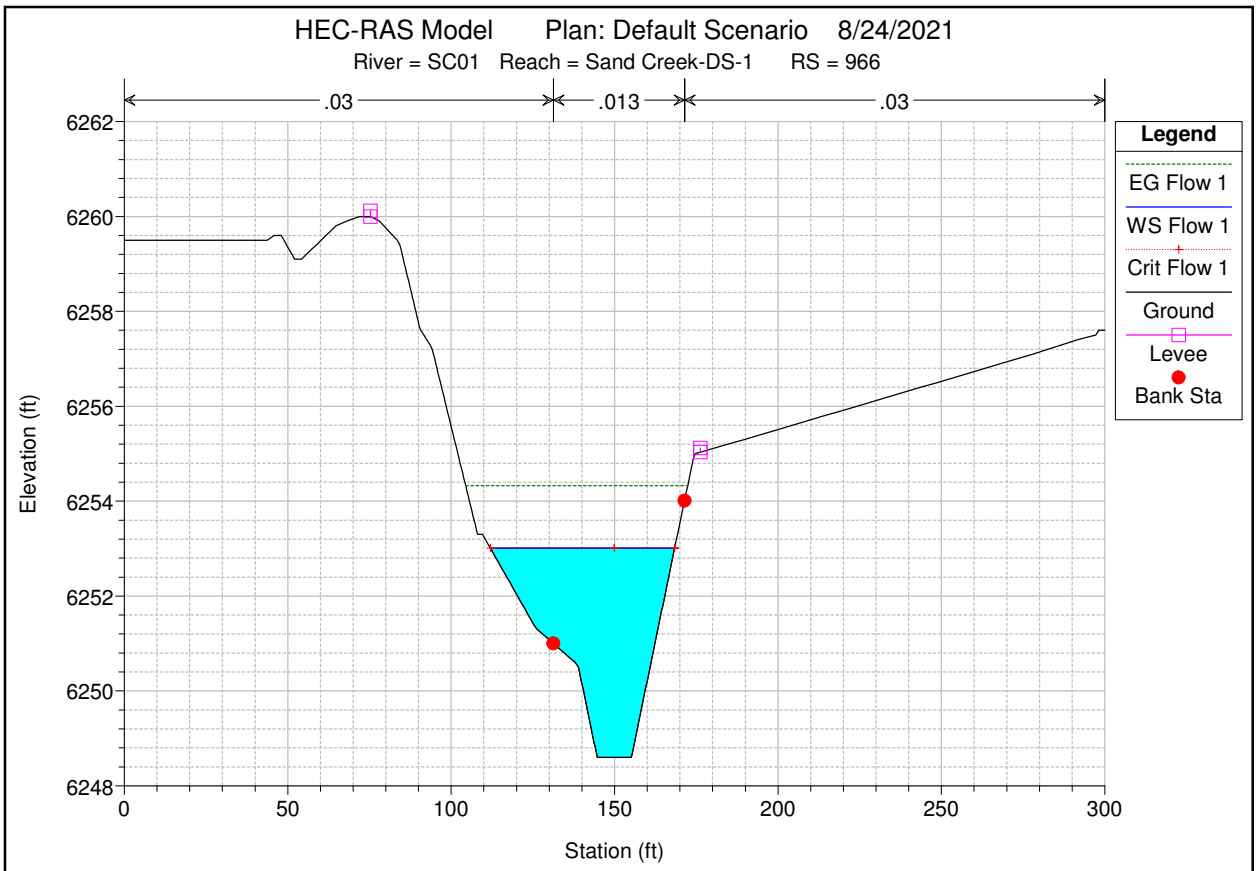

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 972
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

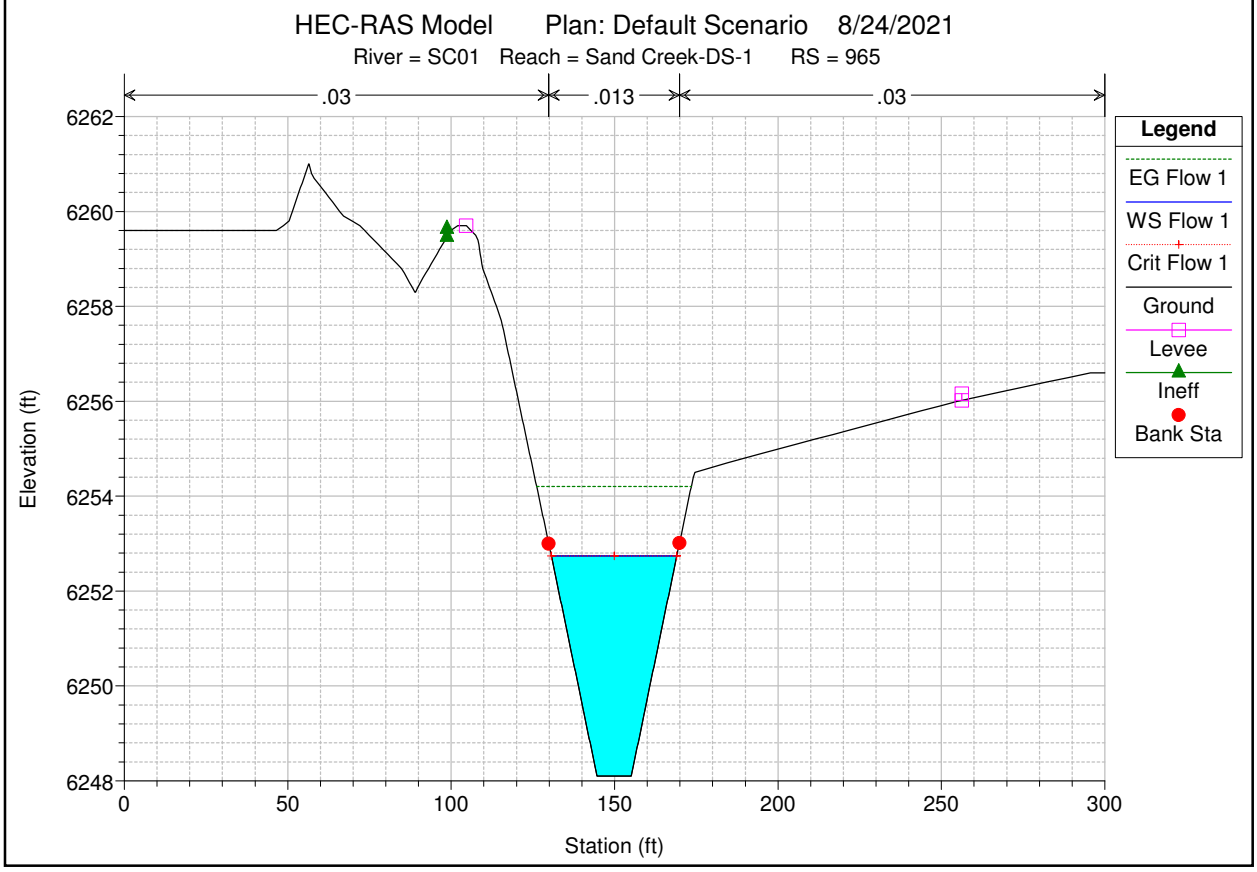

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 971
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

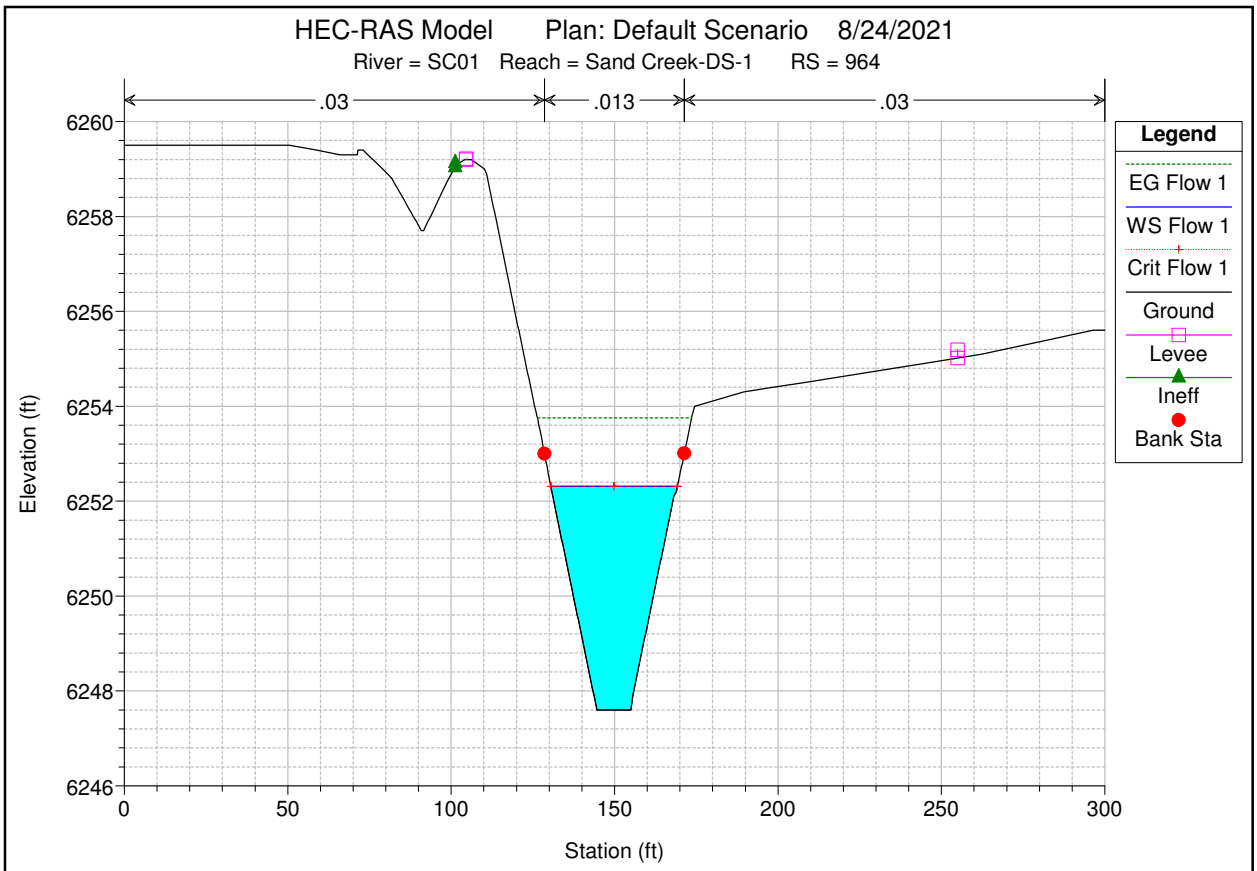

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 970
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

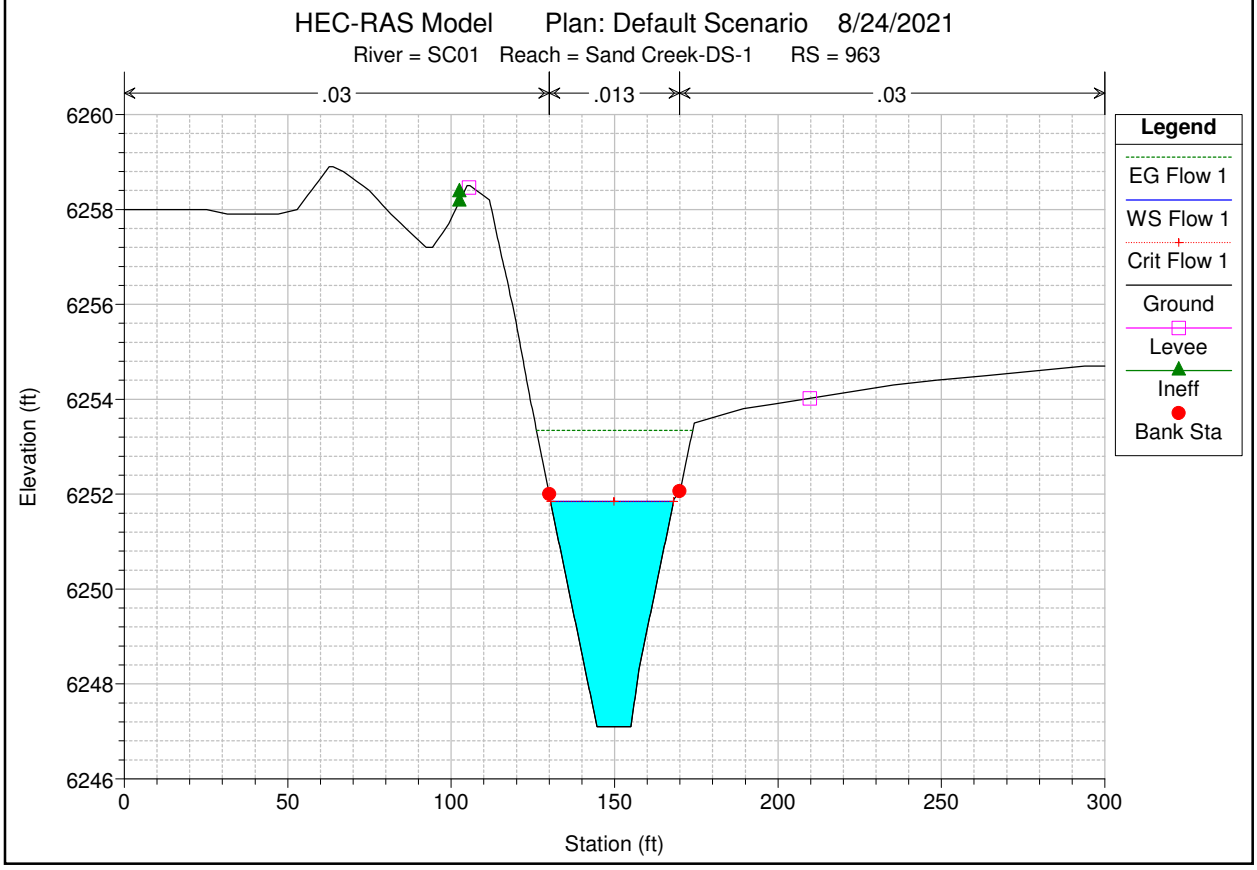

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 969
.03
.013
.03
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Bank Sta
Elevation (ft)
6264
6262
6260
6258
6256
6254
6252
6250
6248
0
50
100
150
200
250
300
Station (ft)

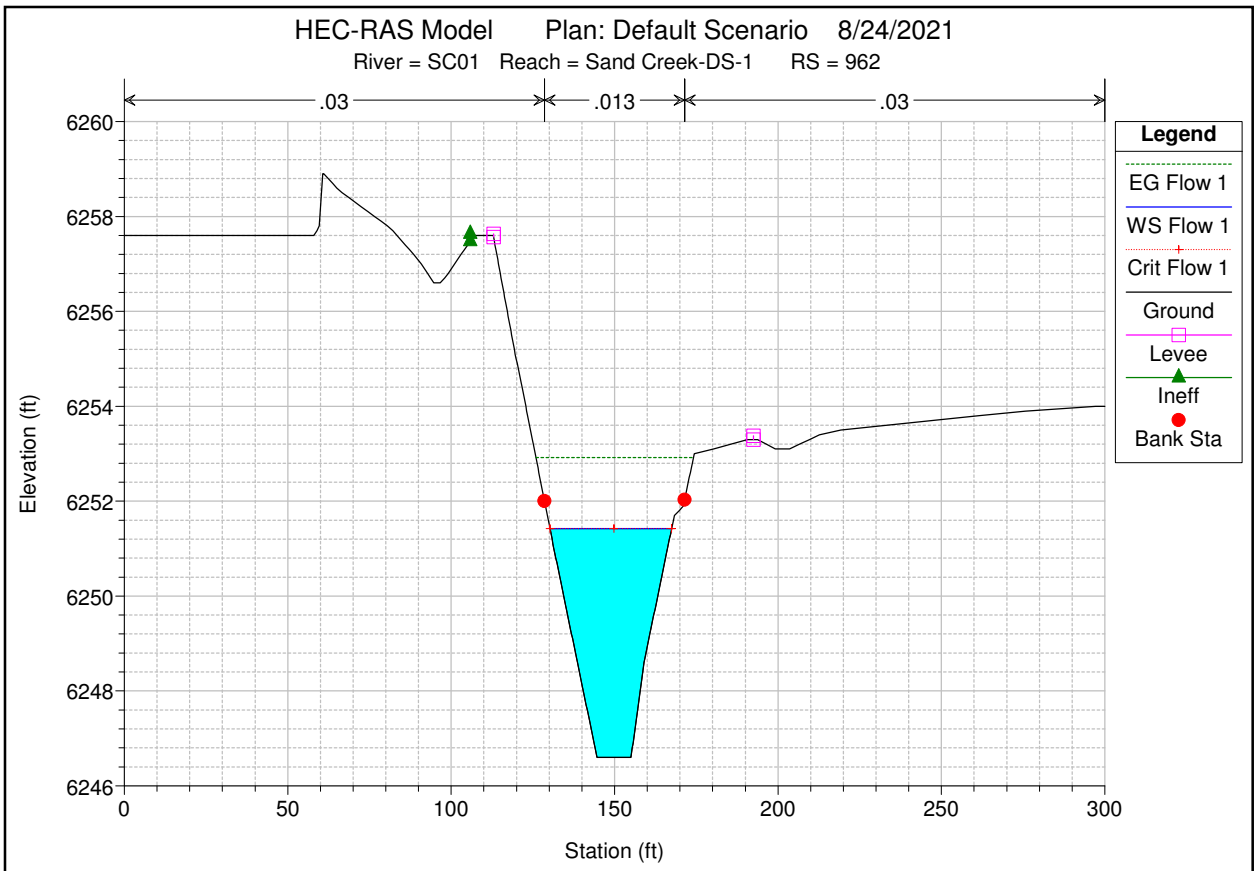

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-0- RS = 968
.03
.013
.03
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Bank Sta
Elevation (ft)
6264
6262
6260
6258
6256
6254
6252
6250
6248
0
50
100
150
200
250
300
Station (ft)

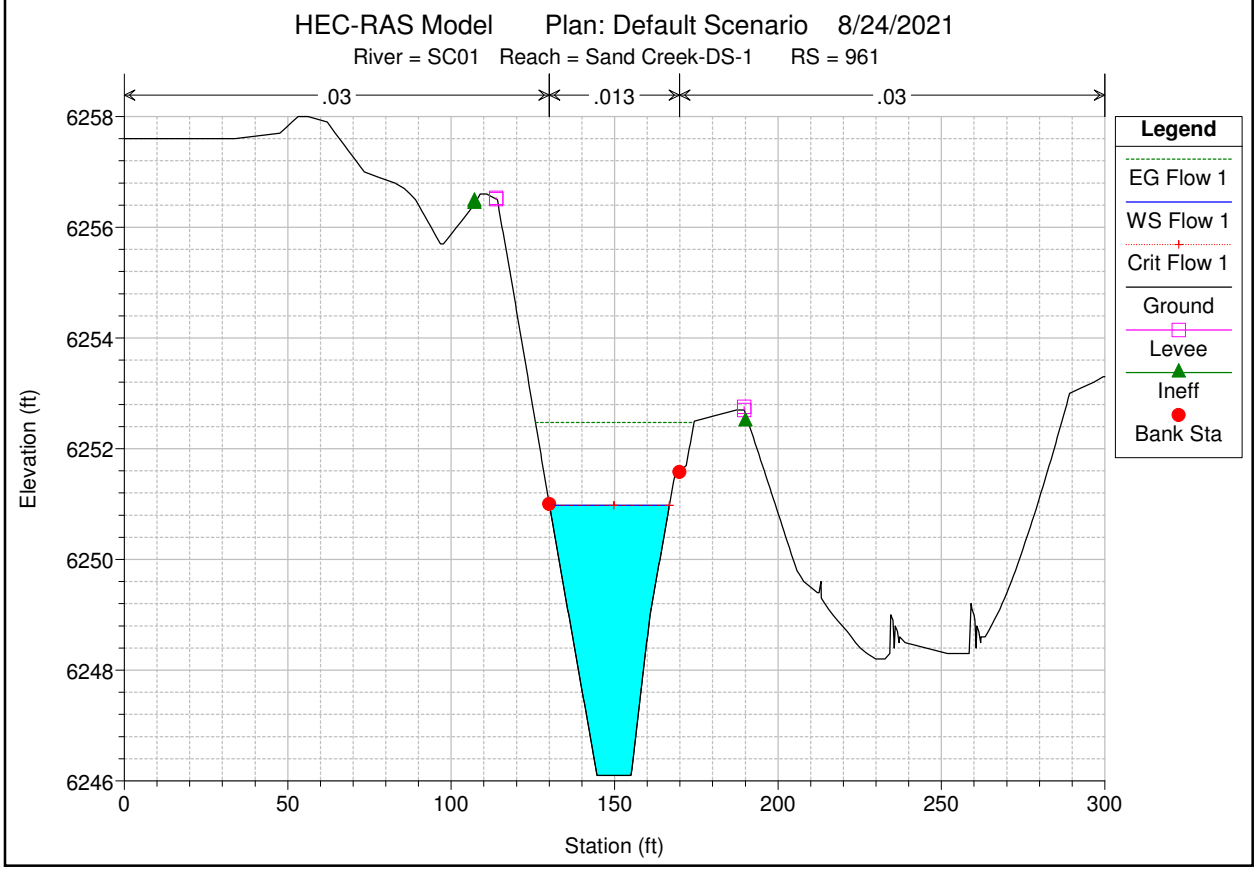

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 966
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Bank Sta

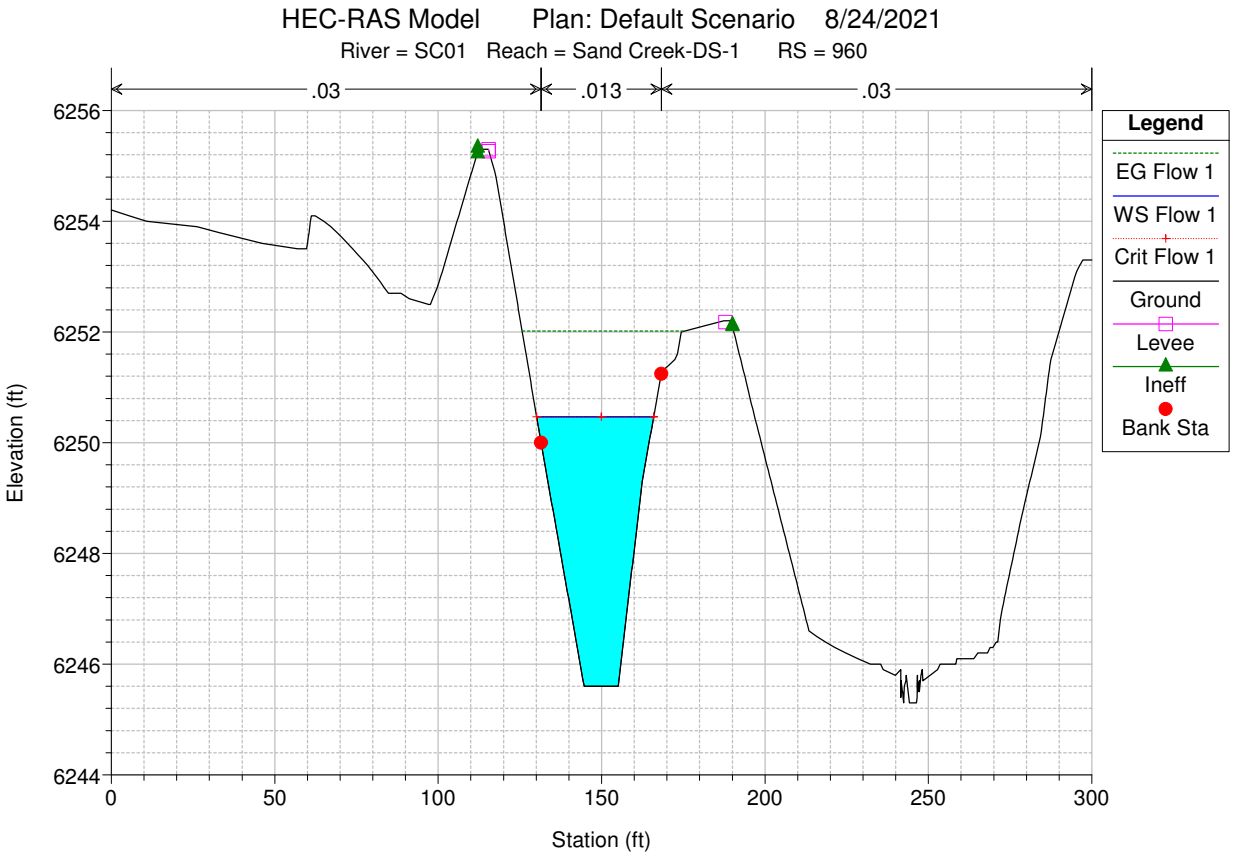

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 965
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

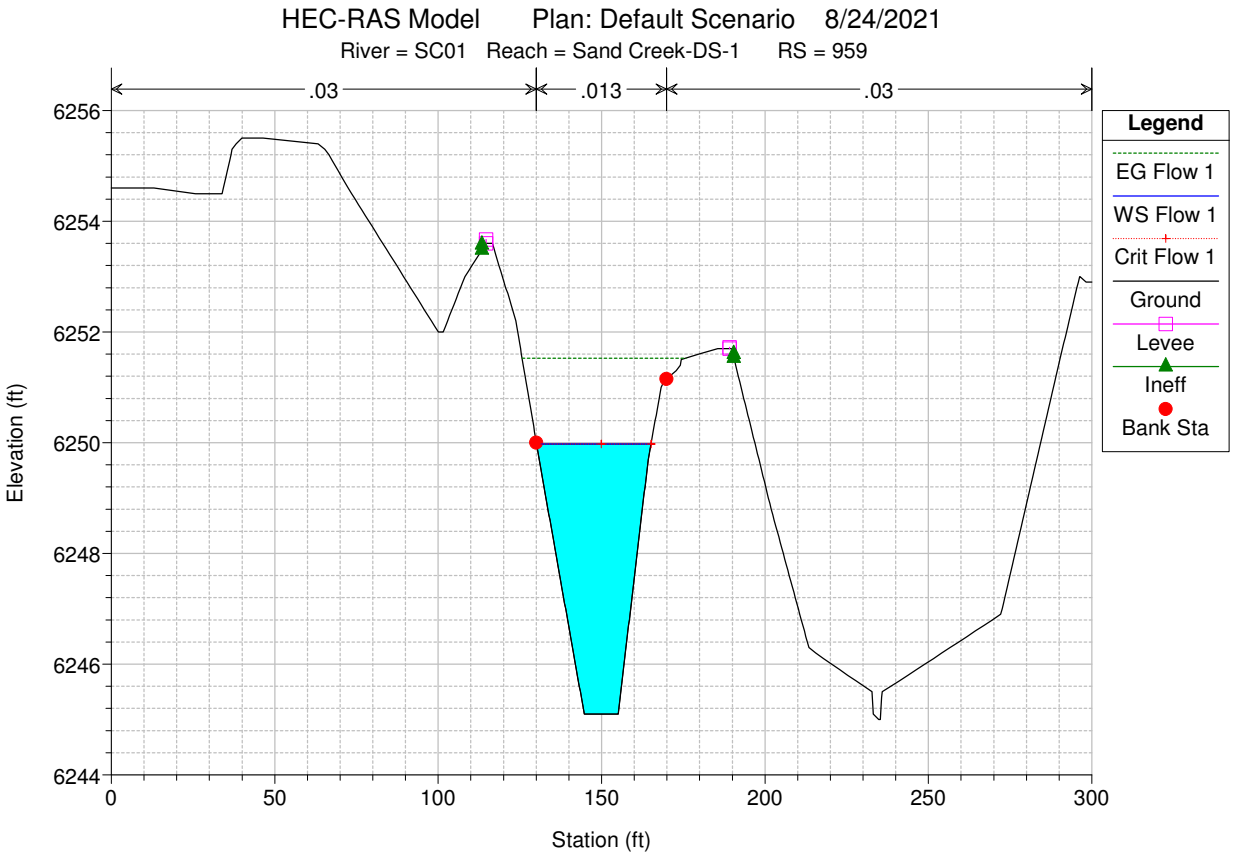

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 964
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

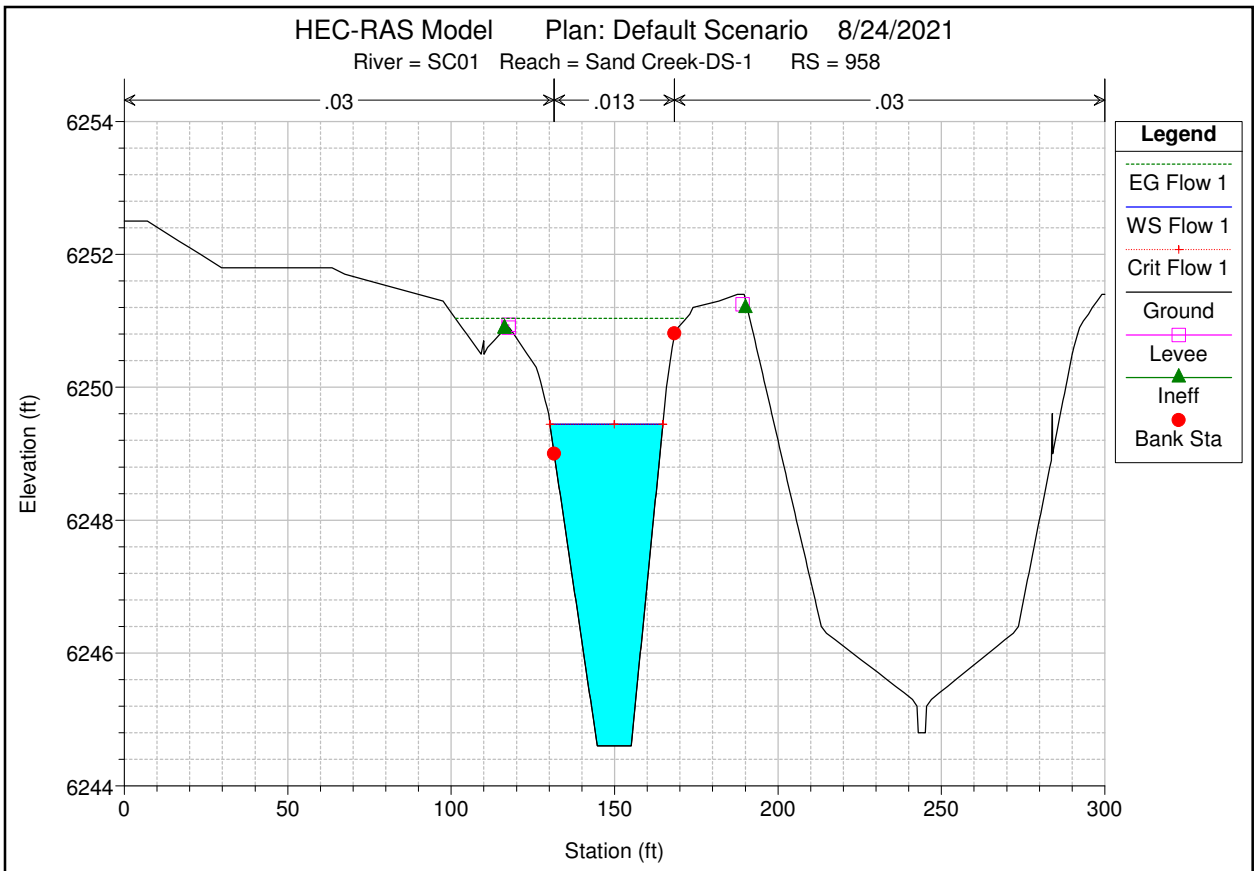

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 963
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

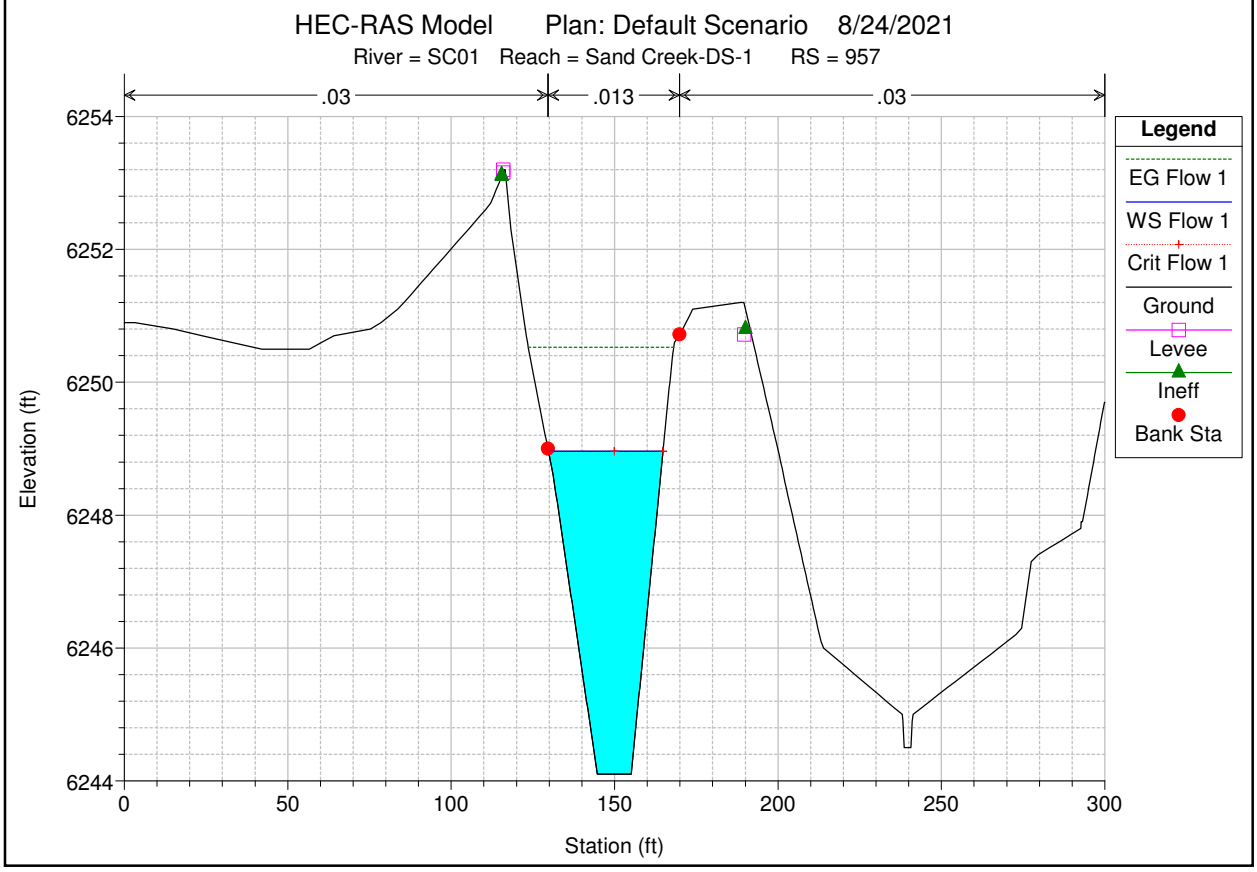

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 962
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

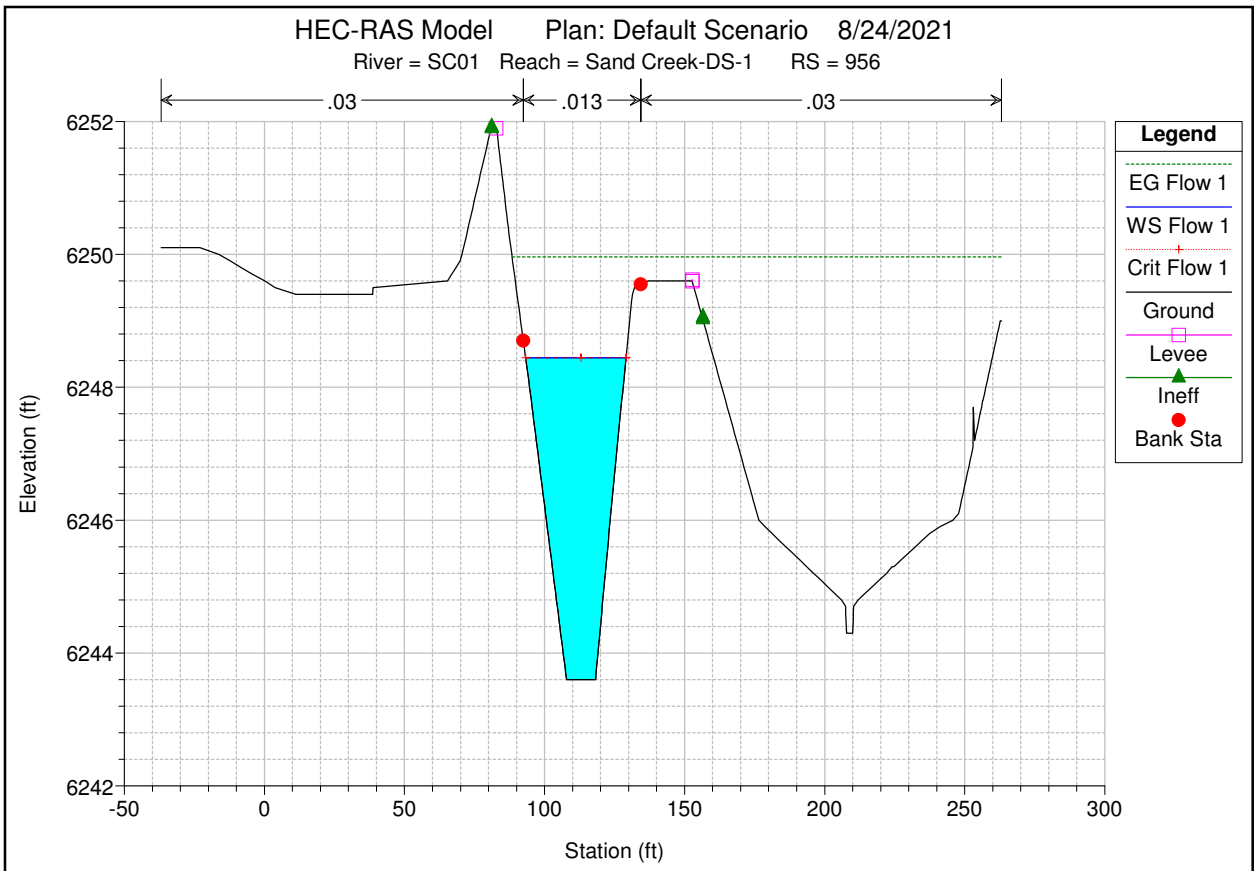

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 961
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

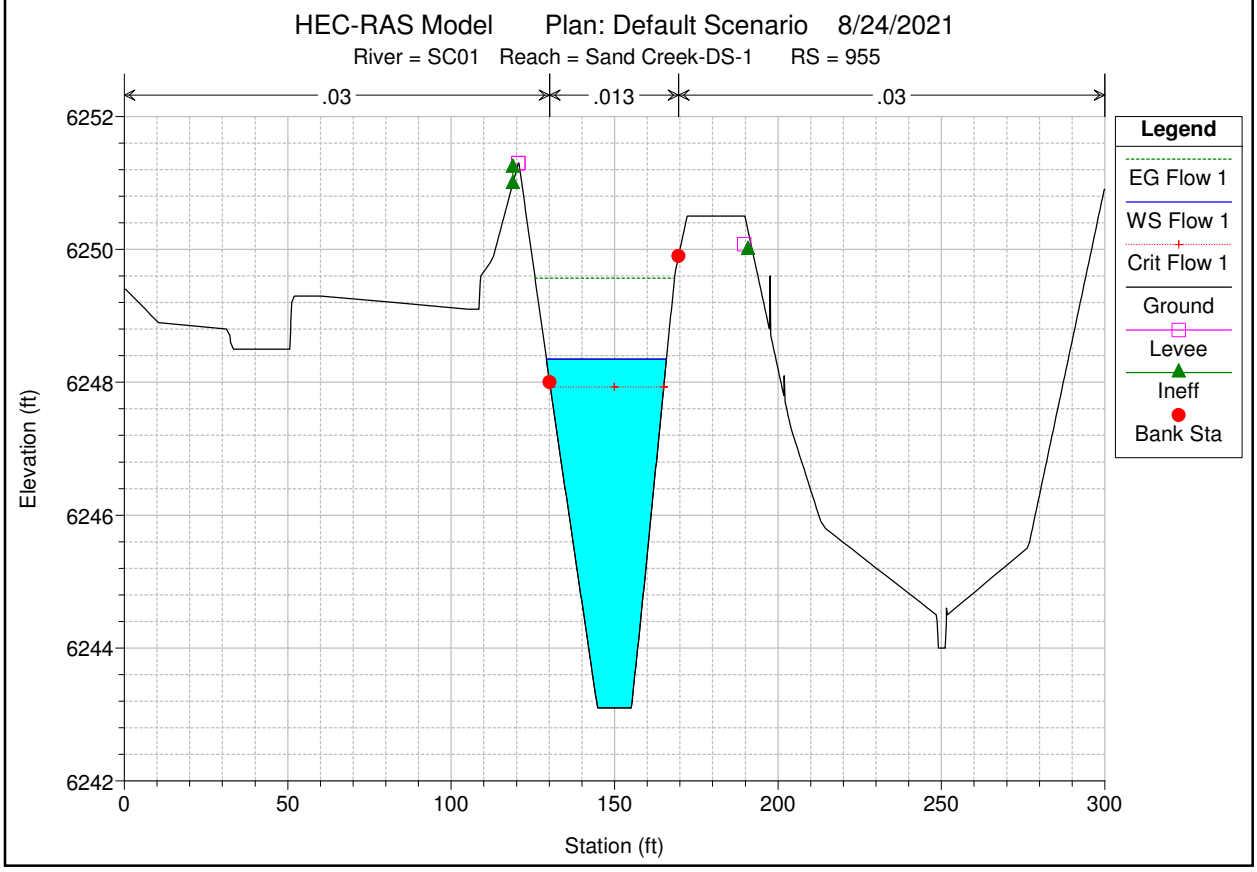

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 960
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

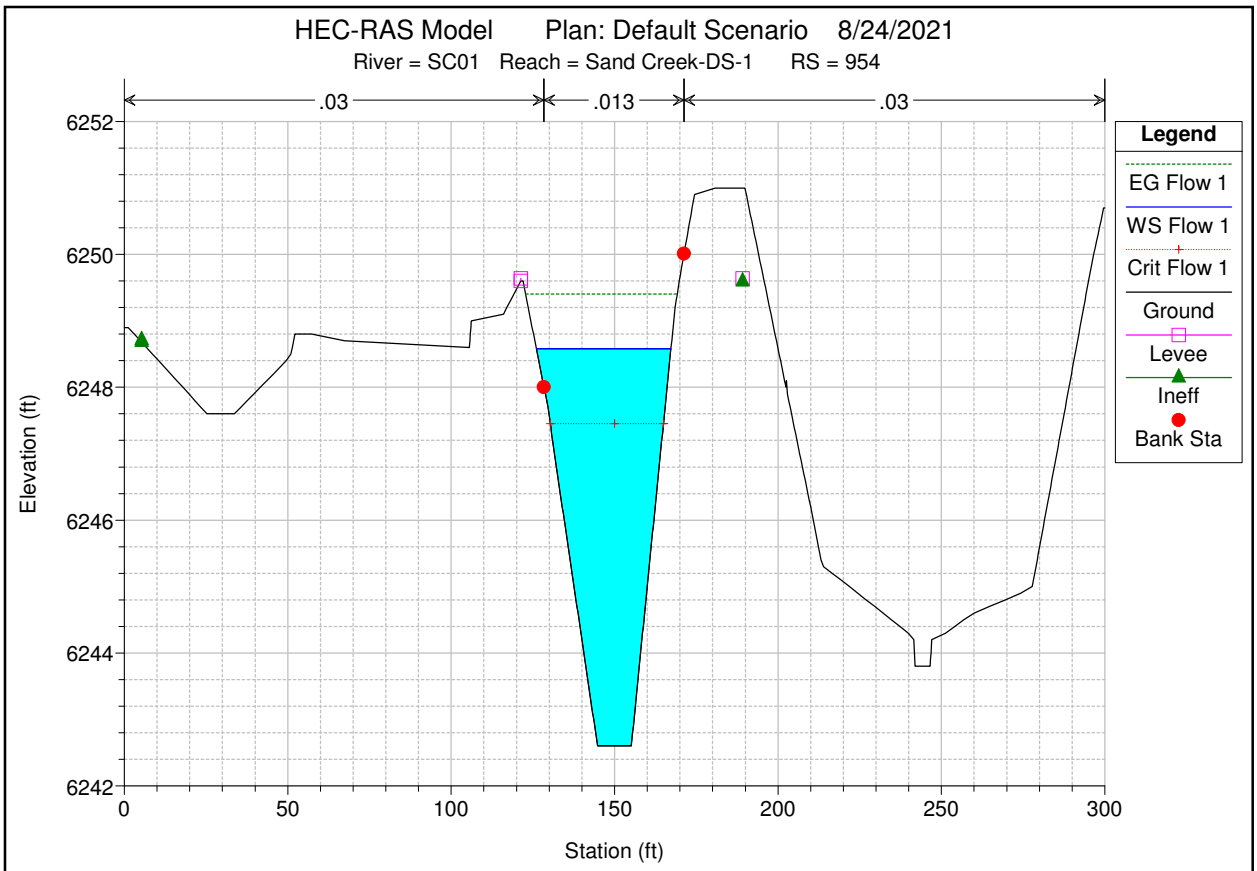

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 959
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

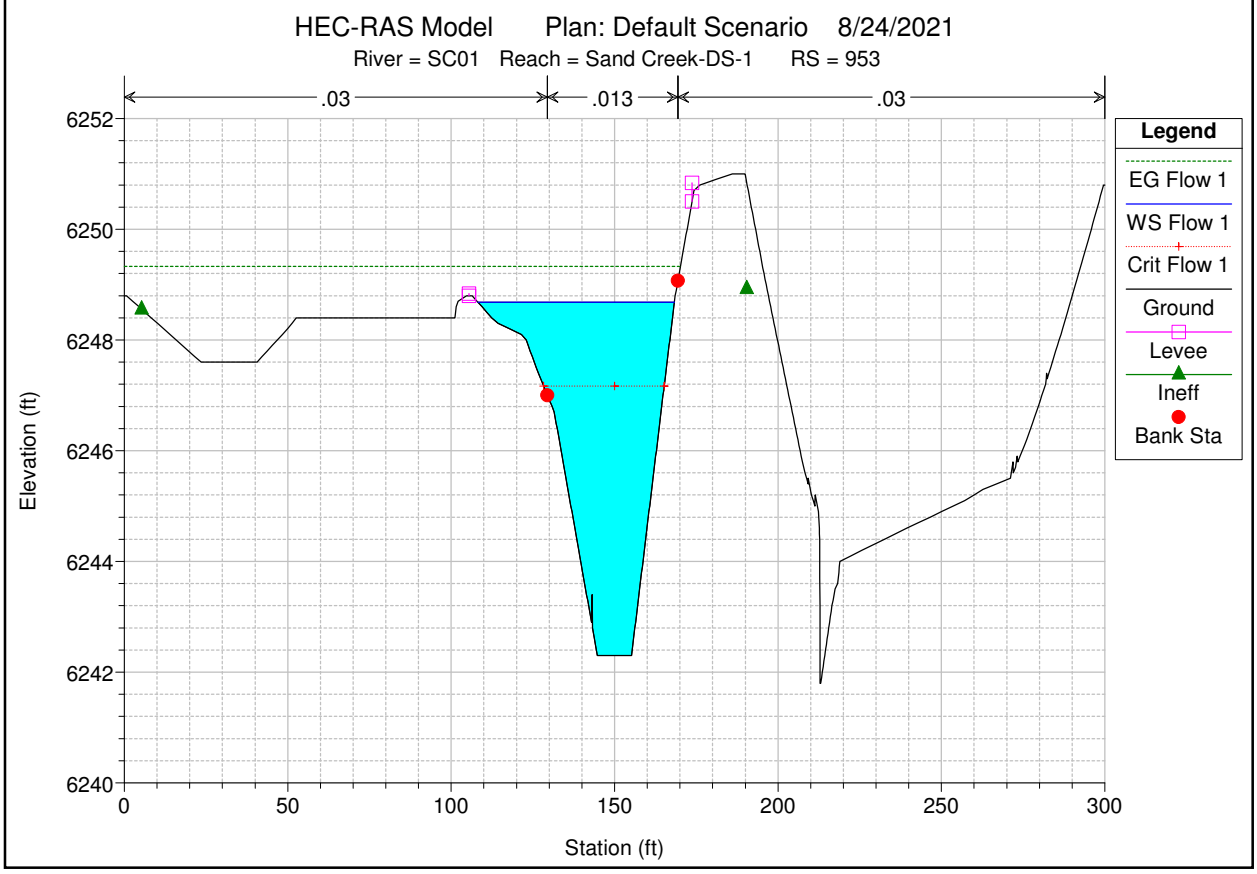

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 958
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

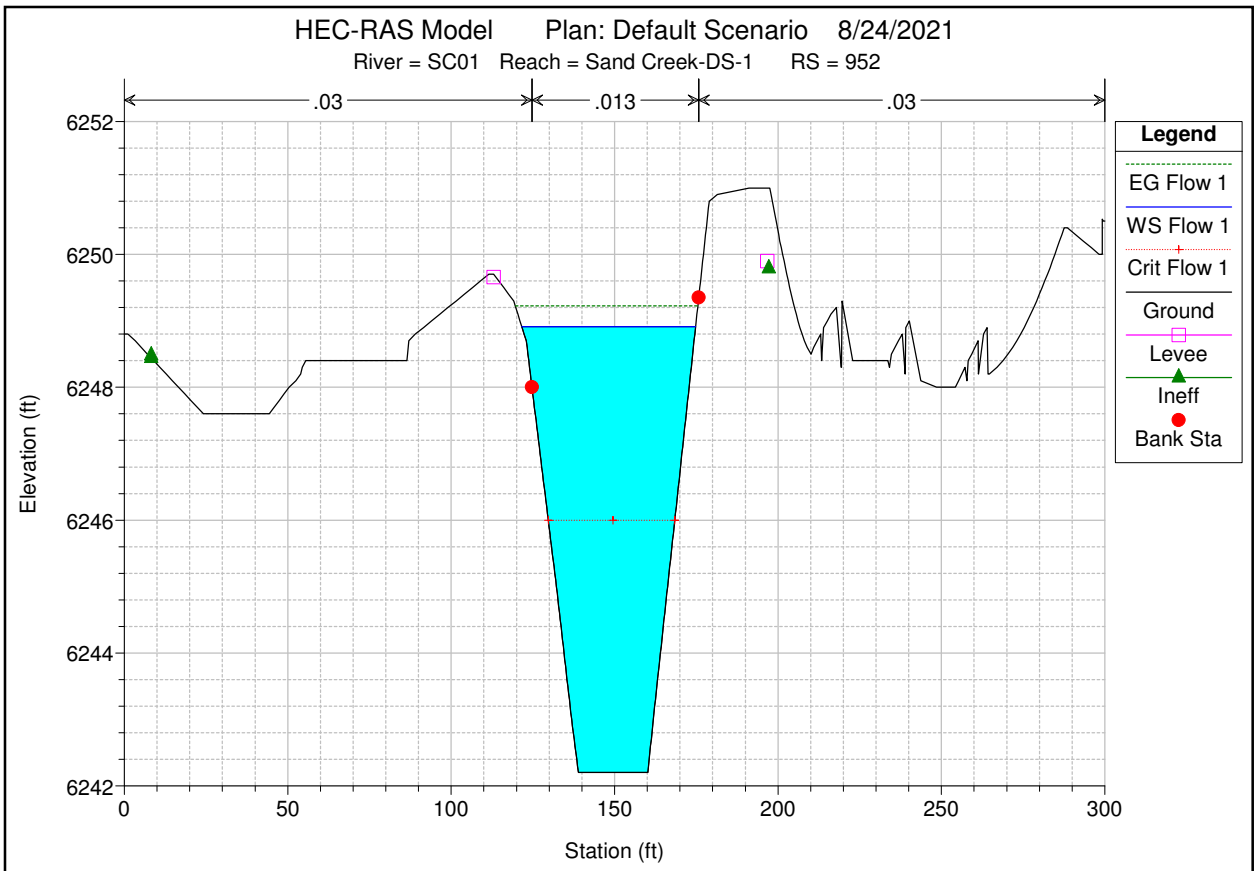

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 957
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

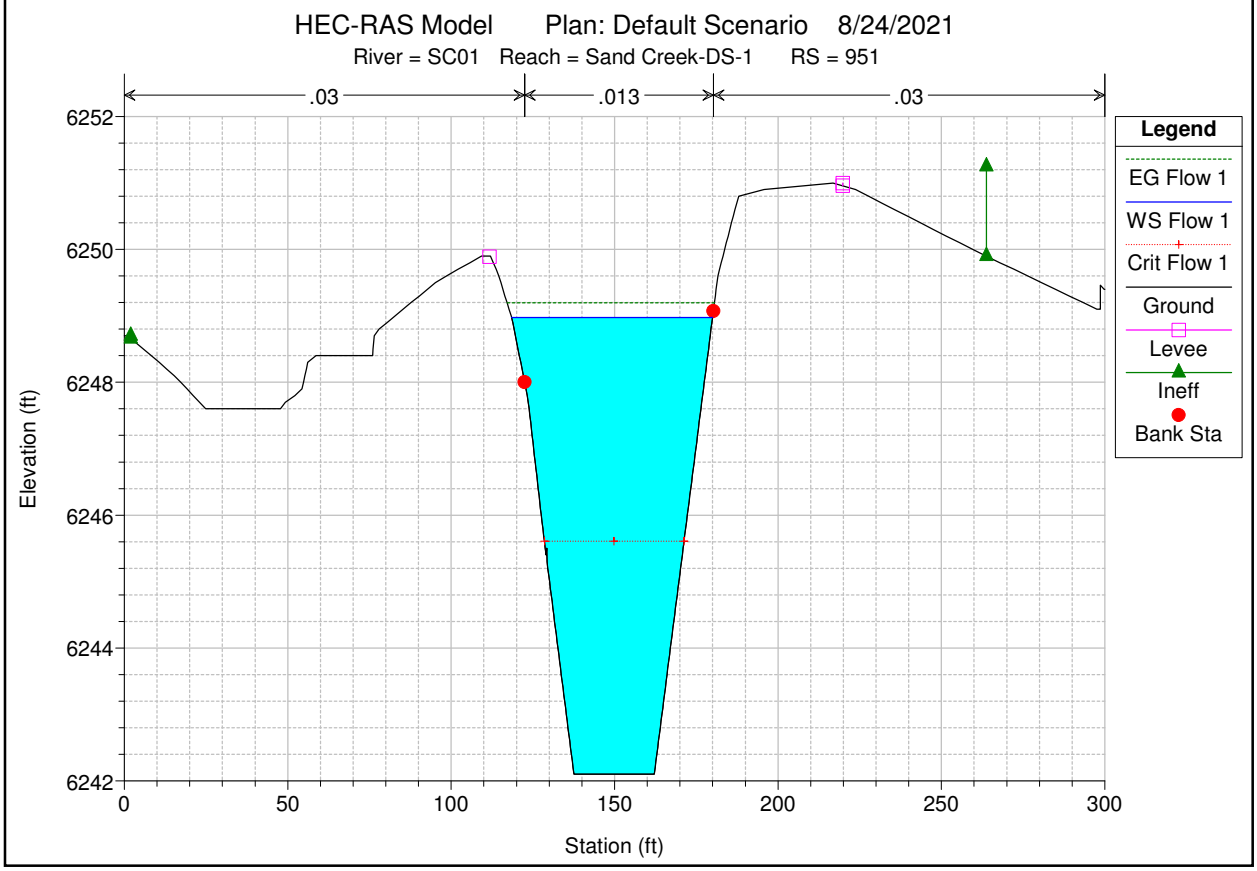

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 956
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

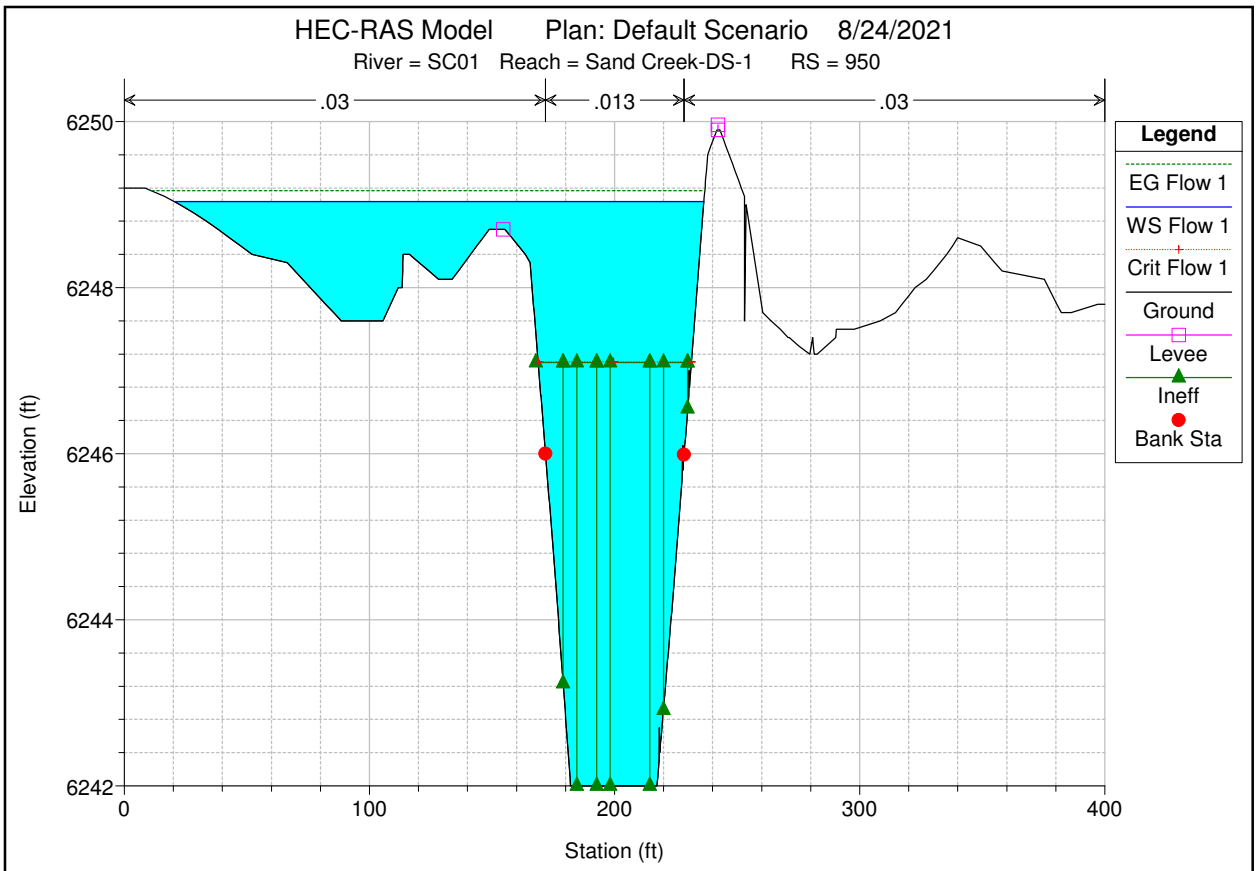

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 955
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

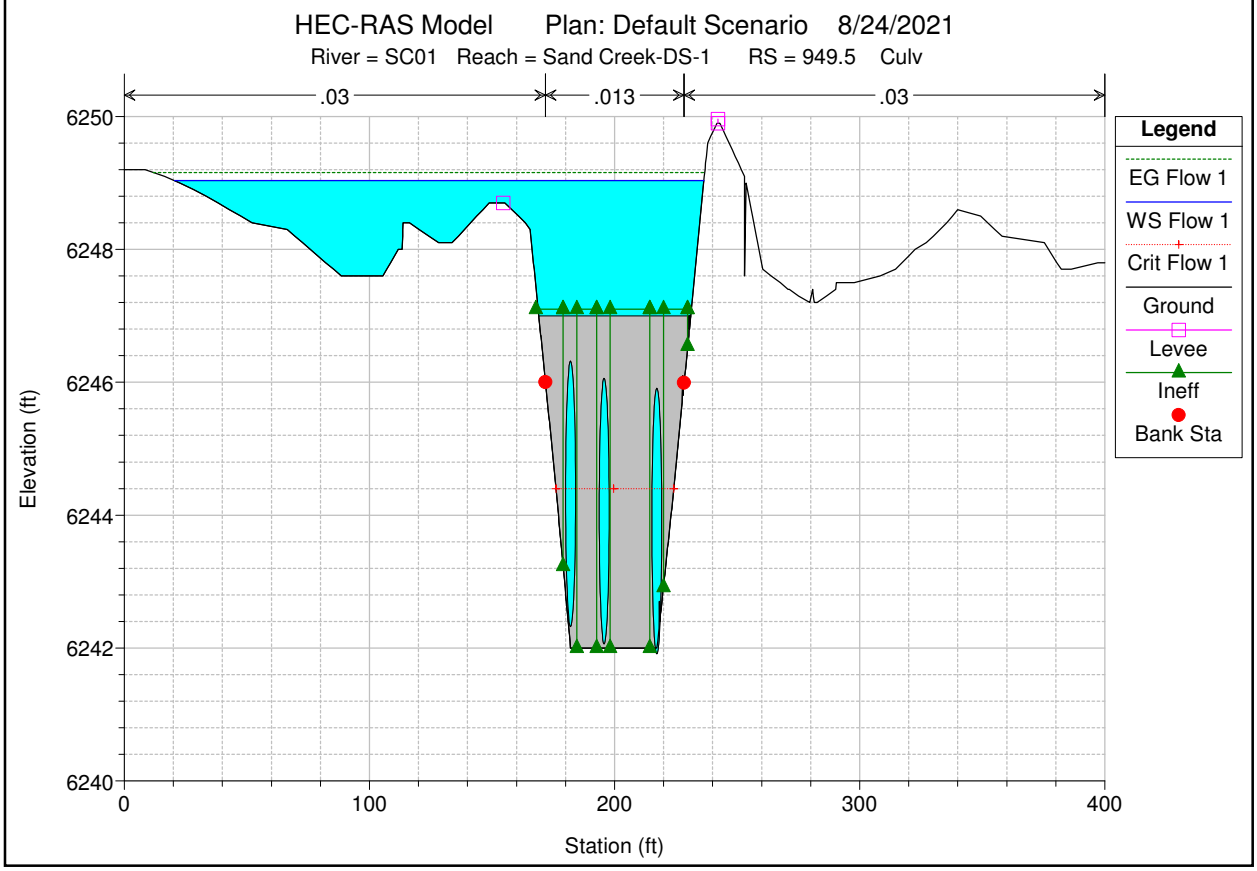

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 954
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

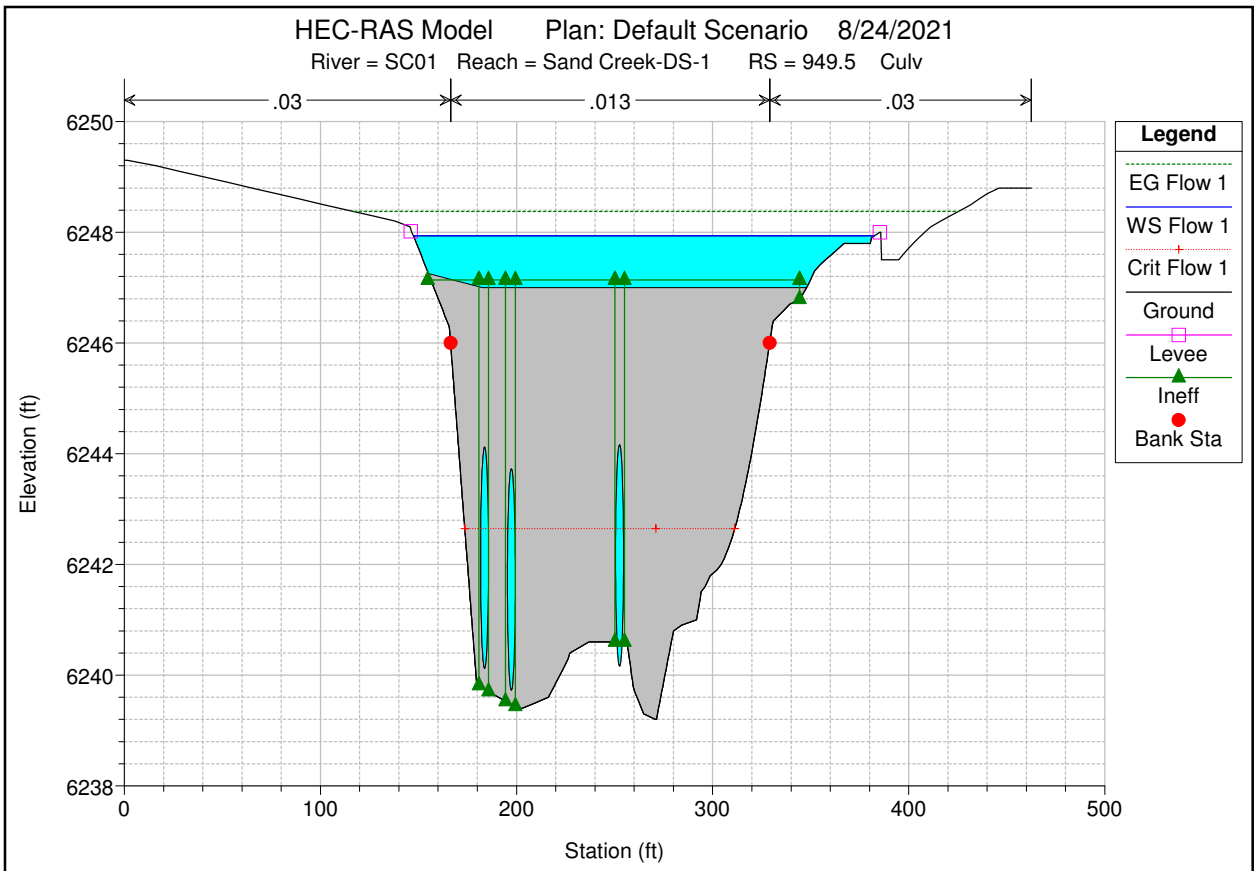

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 953
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

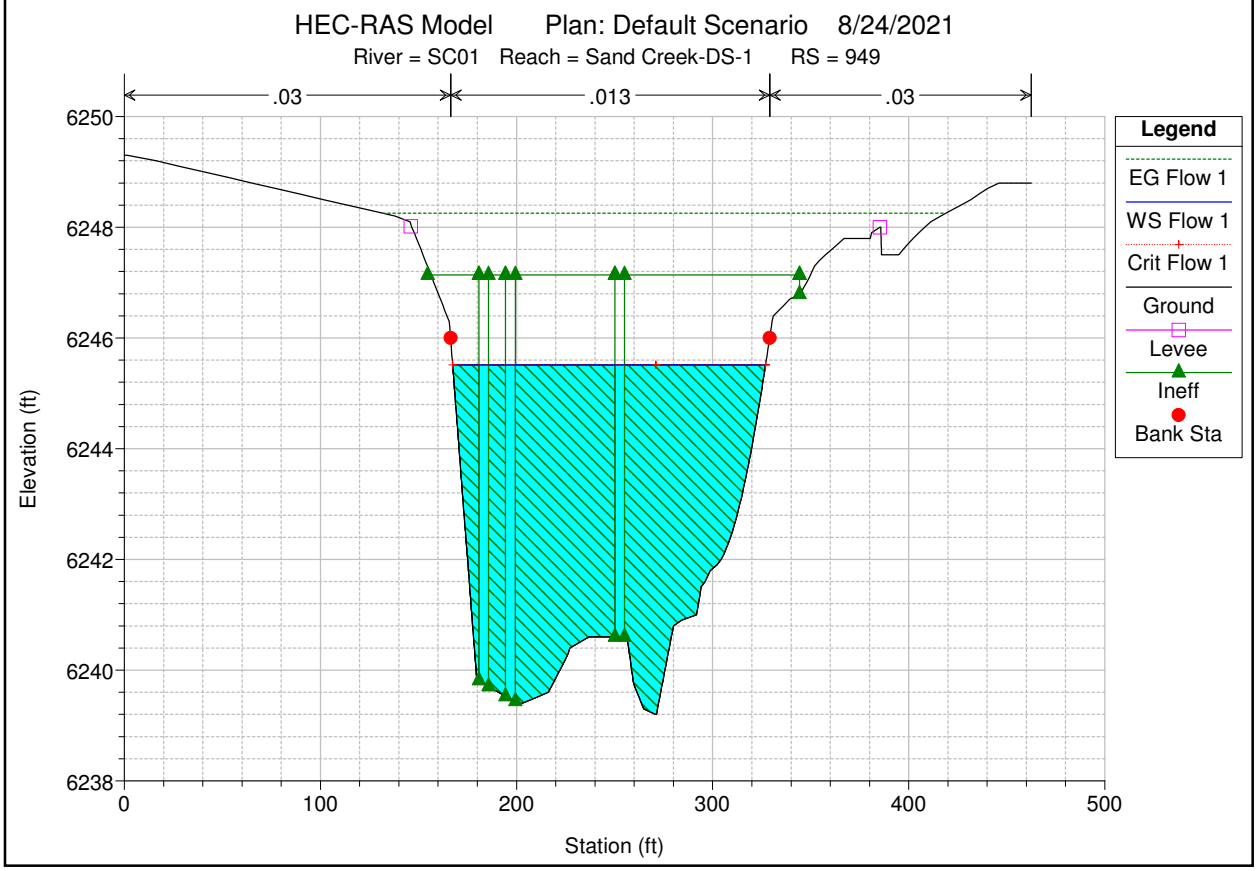

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 952
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

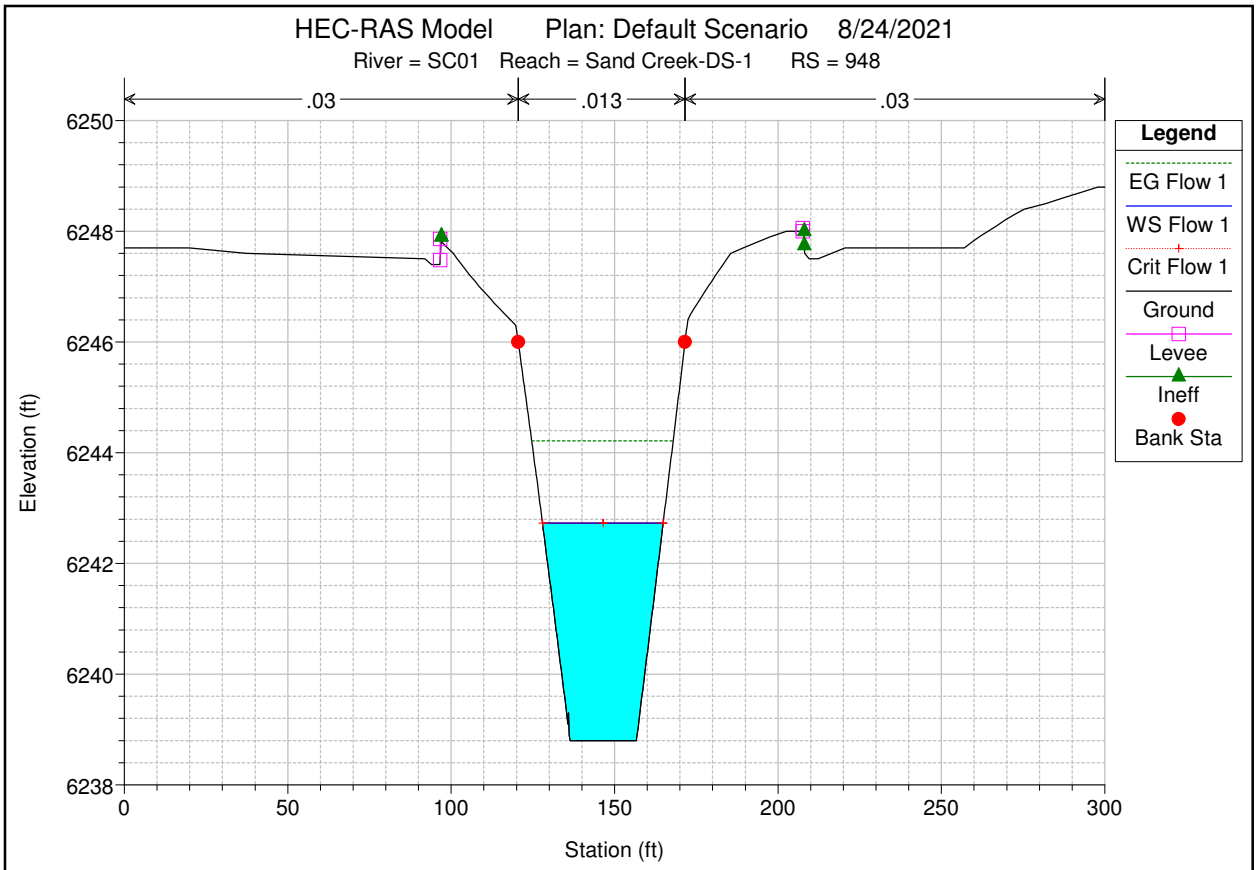

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 951
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

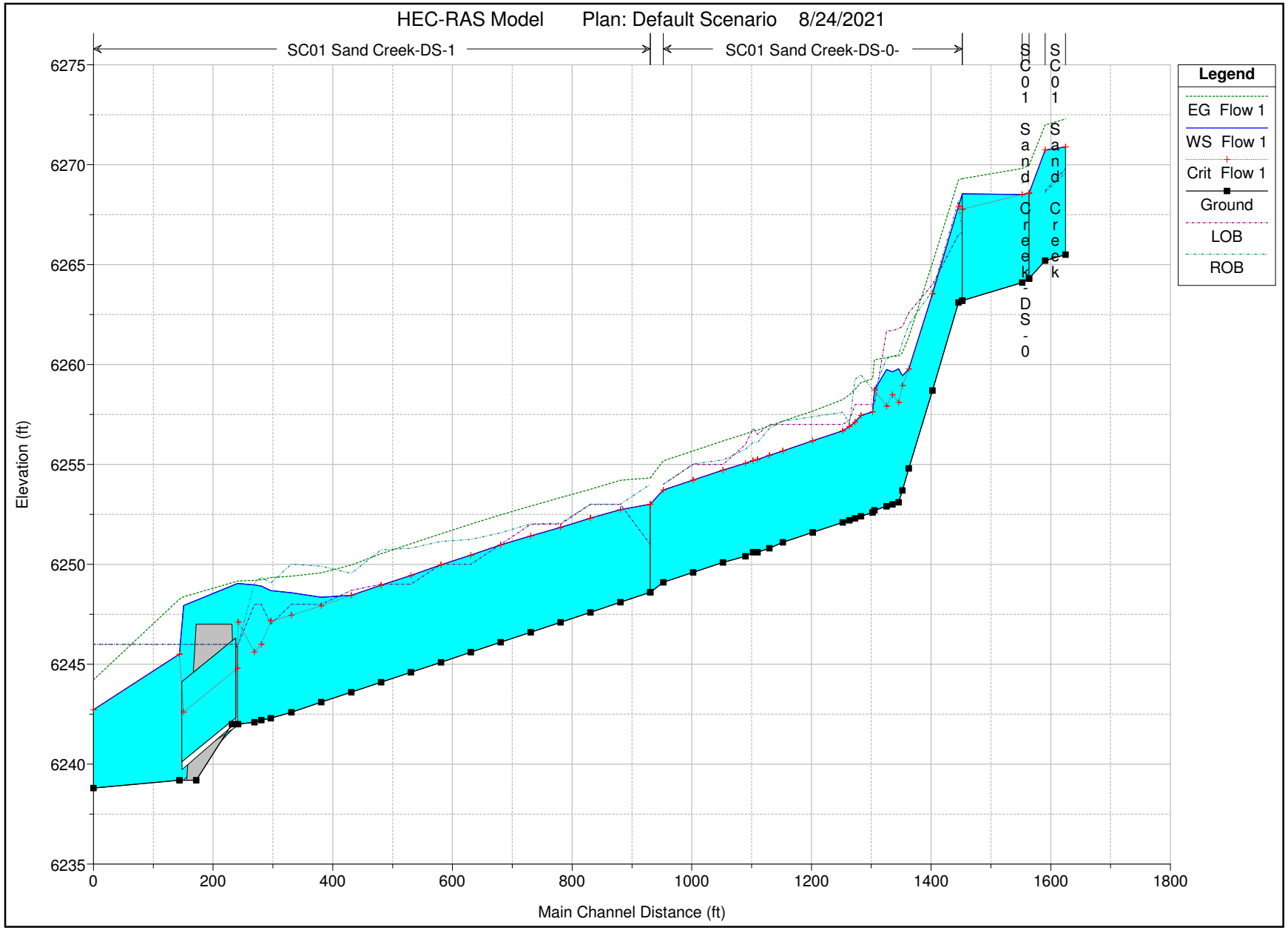

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 950
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta

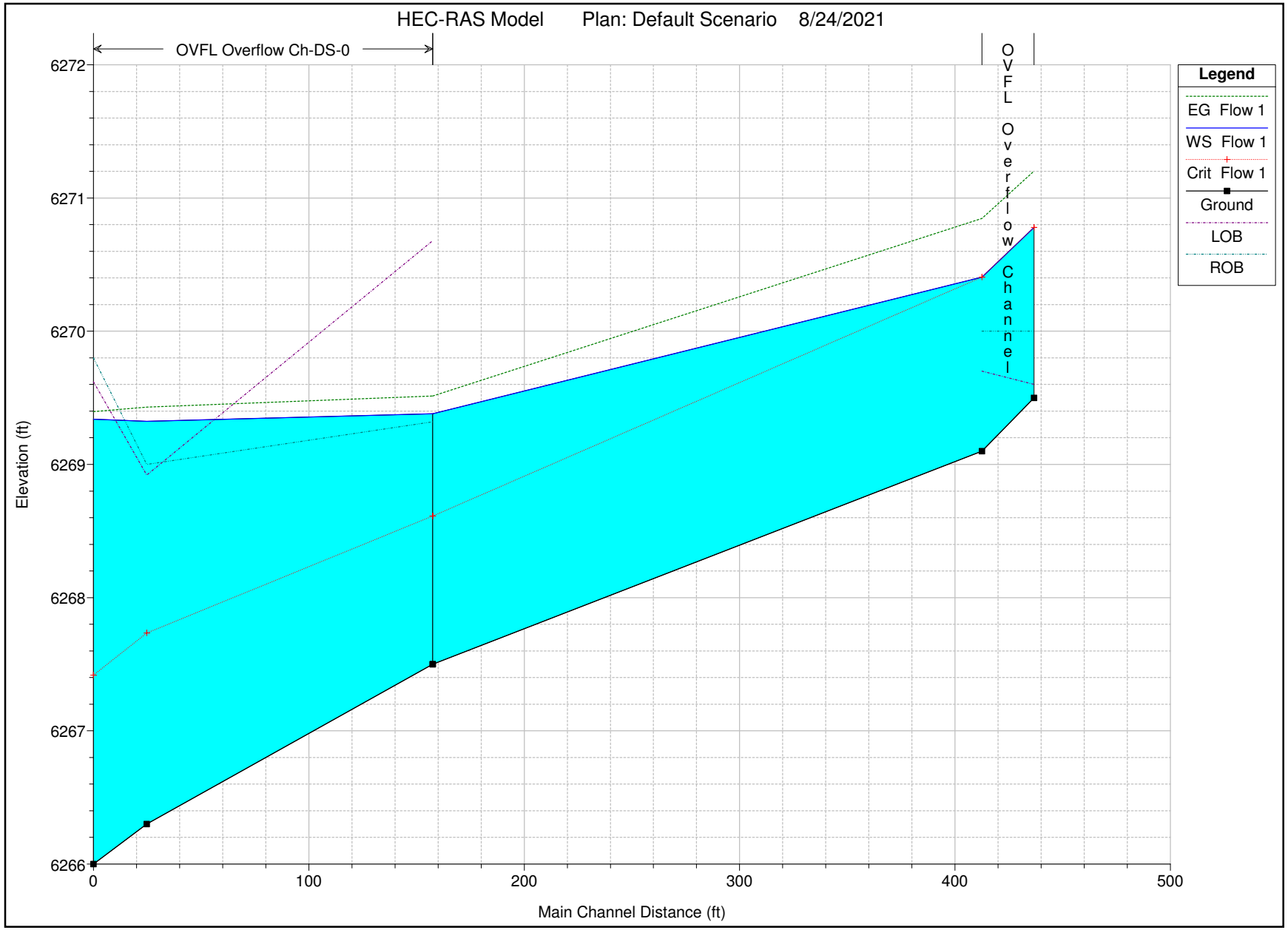

HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 949.5 Culv
.03
.013
.03
Elevation (ft)
Station (ft)
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: Default Scenario 8/24/2021
River = SC01 Reach = Sand Creek-DS-1 RS = 949.5 Culv
.03
.013
.03
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 = 949
.03
.013
.03
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
.03
.013
.03
Elevation (ft)
6250
6248
6246
6244
6242
6240
6238
0
50
100
150
200
250
300
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
SC01 Sand Creek-DS-1
SC01 Sand Creek-DS-0-
SC01 Sand Creek-DS-0
SC01 Sand Creek
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
LOB
ROB
Elevation (ft)
6275
6270
6265
6260
6255
6250
6245
6240
6235
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)


HEC-RAS Model Plan: Default Scenario 8/24/2021
OVFL Overflow Ch-DS-0
OVFL Overflow Channel
Legend
EG Flow 1
WS Flow 1
Crit Flow 1
Ground
LOB
ROB
Elevation (ft)
6272
6271
6270
6269
6268
6267
6266
0
100
200
300
400
500
Main Channel Distance (ft)

HEC-RAS Plan: Default Scenario Profile: Flow 1

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
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	105.88	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

SOLACE APARTMENTS - SAND CREEK CENTER TRIBUTARY

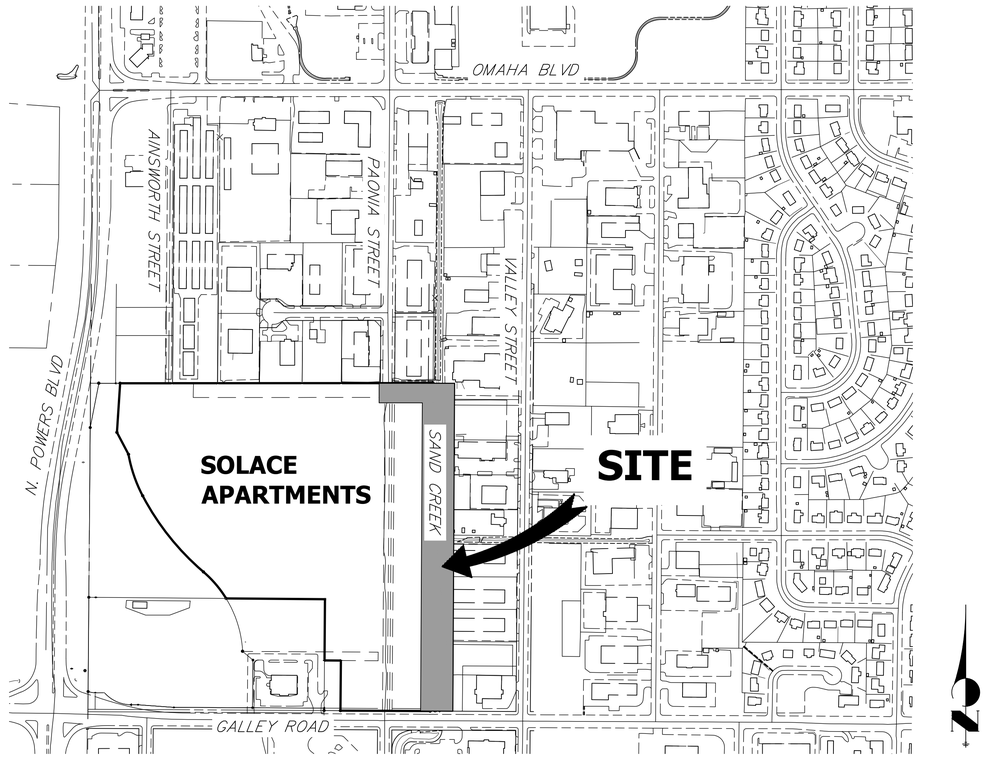
A PORTION OF SECTION 7, TOWNSHIP 14 SOUTH, RANGE 65 WEST OF THE 6TH P.M.

EL PASO COUNTY, COLORADO

CHANNEL IMPROVEMENTS

ABBREVIATIONS

AC	ACRE
AD	ALGEBRAIC DIFFERENCE
AH	AHEAD
ARCH	ARCHITECT
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASS'Y	ASSEMBLY
AVE	AVENUE
BB	BOX BASE
BK	BACK
BNDY	BOUNDARY
BOP	BOTTOM OF PIPE
BOV	BLOW OFF VALVE
BFV	BUTTERFLY VALVE
BLVD	BOULEVARD
BW	BOTTOM OF WALL
C&G	CURB & GUTTER
CATV	CABLE TELEVISION
CB	CATCH BASIN
CBC	CONCRETE BOX CULVERT
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION
CDS	CUL-DE-SAC
CFS	CUBIC FEET PER SECOND
CL	CENTER LINE
CLOMR	CONDITIONAL LETTER OF MAP REVISION
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CONC	CONCRETE
CR	CIRCLE
CSP	CORRUGATED STEEL PIPE
CT	COURT
CTRB	CONCRETE THRUST REDUCER BLOCK
CY	CUBIC YARD
DBPS	DRAINAGE BASIN PLANNING STUDY
DE	DRAINAGE EASEMENT
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE
DRC	DESIGN REVIEW COMMITTEE
DU	DWELLING UNITS
E	EAST
EA	EACH
EGL	ENERGY GRADE LINE
EL	ELEVATION
ELEC	ELECTRIC
EOA	EDGE OF ASPHALT
ESMT	EASEMENT
EST	ESTIMATE
EX	EXISTING
FDP	FINAL DEVELOPMENT PLAN
FDR	FINAL DRAINAGE REPORT
FES	FLARED END SECTION
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOWLINE
FIL	FILING
FO	FIBER OPTIC CABLE
GB	GRADE BREAK
GE	GAS EASEMENT
GIS	GEOGRAPHIC INFORMATION SYSTEM
GL	GAS LINE
GPS	GLOBAL POSITIONING SYSTEM
GV	GATE VALVE
HC	HANDICAP
HDC	HIGH DEFLECTION COUPLING
HDPE	HIGH DENSITY POLYETHYLENE
HGL	HYDRAULIC GRADE LINE
HOA	HOME OWNERS ASSOCIATION
HP	HIGH POINT
I	INLET
IE	IRRIGATION EASEMENT
INT	INTERSECTION
INV	INVERT
IRR	IRRIGATION
KB	KICK (THRUST) BLOCK
LE	LANDSCAPE EASEMENT
LF	LINEAR FEET
LN	LANE
LOMR	LETTER OF MAP REVISION
LP	LOW POINT
LS	LUMP SUM
LT	LEFT
MAX	MAXIMUM
MDDP	MASTER DEVELOPMENT DRAINAGE PLAN
MH	MANHOLE
MIN	MINIMUM
N	NORTH
NRCP	NON-REINFORCED CONCRETE PIPE
ODP	OFFICIAL DEVELOPMENT PLAN
OHE	OVERHEAD ELECTRIC
OHU	OVERHEAD UTILITY
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	POINT OF CURB RETURN
PDP	PRELIMINARY DEVELOPMENT PLAN
PE	PROFESSIONAL ENGINEER
PI	POINT OF INTERSECTION
PKWY	PARKWAY
PL	PROPERTY LINE
PR	PROPOSED
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
ROW	RIGHT OF WAY
RT	RIGHT
S	SOUTH
STE	STEEL
SAN	SANITARY SEWER
SF	SQUARE FEET
ST	STREET
STA	STATION
STM	STORM SEWER
SY	SQUARE YARD
SY-IN	SQUARE YARD INCH
TB	THRUST BLOCK
TBC	TOP BACK OF CURB
TBW	TOP BACK OF WALK
TEL	TELEPHONE
TOA	TOP OF ASPHALT
TOB	TOP OF BOX
TOC	TOP OF CURB OR CONCRETE
TOF	TOP OF FOUNDATION
TOP	TOP OF PIPE
TW	TOP OF WALL
TYP	TYPICAL
UDFCD	URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
UE	UTILITY EASEMENT
U&DE	UTILITY & DRAINAGE EASEMENT
UGE	UNDERGROUND ELECTRIC
VCP	VITRIFIED CLAY PIPE
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
VTC	VEHICLE TRACKING CONTROL
W	WEST
WL	WATER LINE
WM	WATER MAIN
WRD	WATER RESOURCES DEPARTMENT
WS	WATER SURFACE
WSE	WATER SURFACE ELEVATION
WTR	WATER
YR	YEAR



VICINITY MAP
SCALE: 1" = 300'

APPLICANT/OWNER

JACKSON DEARBORN PARTNERS
404 S. WELLS ST.
SUITE 400
CHICAGO, IL 60607
P~734.216.2577

CIVIL ENGINEER

JR ENGINEERING
5475 TECH CENTER DR
SUITE 235
COLORADO SPRINGS, CO 80919
CONTACT: MIKE BRAMLETT
C~719.659.7679

J·R ENGINEERING

PLANNER

N.E.S. INC.
619 N. CASCADE AVE
SUITE 200
COLORADO SPRINGS, CO 80903
CONTACT: TAMARA BAXTER
P~719.471.0073

GEOTECHNICAL ENGINEER

CTL THOMPSON, INC
5170 MARK DABLING BLVD
COLORADO SPRINGS, CO 80918
P~719.528.8300

CTL | THOMPSON INCORPORATED

SHEET INDEX

1	COVER SHEET
2	GENERAL NOTES
3	SITE AND DEMO PLAN
4–6	CHANNEL PLAN AND PROFILES
7	CHANNEL DETAILS
8	DROP STRUCTURES PLAN AND PROFILE
9	DROP STRUCTURE DETAIL SHEETS
10	PAONIA STREET OVERFLOW PLAN
TOTAL	10

BASIS OF BEARINGS

THE EASTERLY LINE OF LOT 2, POWERS & GALLEY PLAZA FILING NO. 1 RECORDED IN PLAT BOOK A-4 AT PAGE 30, SAID LINE BEING MONUMENTED BY A 1-1/4" YELLOW PLASTIC CAP STAMPED "LS 22106" AT THE SOUTH END AND A 1" O.D. PIPE AT THE NORTH END, SAID LINE BEARING N00°27'47"E AS SHOWN ON SAID PLAT.

BENCHMARK

FIMS MONUMENT F81, BEING MONUMENTED BY A 3-1/4" ALUMINUM CAP IN RANGE BOX WITH NO TOP, LOCATED 900 FEET EAST OF THE INTERSECTION OF E. PLATTE AVENUE AND VALLEY STREET, APPROXIMATLEY 80 FEET NORTH OF THE CENTERLINE OF E PLATTE AVENUE. SAID MONUMENT HAVING A PUBLISHED ELEVATION OF 6275.86 FEET, NAVD88.

THE LOCATIONS OF EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL ABOVE GROUND AND UNDERGROUND UTILITIES.

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

OWNER/DEVELOPER STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

DANE OLMSTEAD — DATE

JACKSON DEARBORN PARTNERS
404 S. WELLS STREET, SUITE 400
CHICAGO, IL 60607

EL PASO COUNTY STATEMENT

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.

IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JENNIFER IRVINE, P.E. — DATE

COUNTY ENGINEER/ECM ADMINISTRATOR

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

COLORADO REGISTERED PROFESSIONAL ENGINEER MIKE A. BRAMLETT 32314

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

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

PREPARED FOR
JACKSON DEARBORN PARTNERS
404 S. WELLS ST.
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J·R ENGINEERING
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Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	1"=300'
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

SAND CREEK CENTER TRIBUTARY
COVER SHEET

SHEET 1 OF 10

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	TV	TV
ELECTRIC	E	E
FIBER OPTIC	FO	FO
GAS MAIN	G	G
IRRIGATION MAIN	IRR	IRR
OVERHEAD UTILITY	OHU	OHU
SANITARY SEWER	S	
STORM DRAIN		
TELEPHONE	T	T
WATER MAIN	W	
SWALE/WATERWAY FLOWLINE		
DIVERSION DITCH		
TOP OF SLOPE		
TOE OF SLOPE		
100 YEAR FLOODPLAIN	100YR	100YR
5 YEAR HGL		
100 YEAR HGL		

UTILITIES LEGEND

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

MONUMENTATION LEGEND

ALUMINUM CAP – FOUND	AC
BRASS CAP – FOUND	BC
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	NAIL & WASHER
PANEL – FOUND	
PK NAIL – FOUND	PK NAIL
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)

ANALISYS 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	FP	

STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS

1. 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.

2. 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).

3. 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:
   - 3.1. EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
   - 3.2. CITY OF COLORADO SPRINGS/ EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
   - 3.3. COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS AND BRIDGE CONSTRUCTION
   - 3.4. CDOT M&S STANDARDS

4. 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 EINGEER9NG 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.

5. 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.

6. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.

7. 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.

8. CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCD. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.

9. ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PLANNING AND COMMUNITY DEVELOPMENT.

10. CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT.

11. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.

12. 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.

13. SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS AND MUTCD CRITERIA.

14. 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.

15. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWENER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

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

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

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

DATE

COLORADO LICENSED PROFESSIONAL ENGINEER MIKE A. BRAMLETT 32314

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

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 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

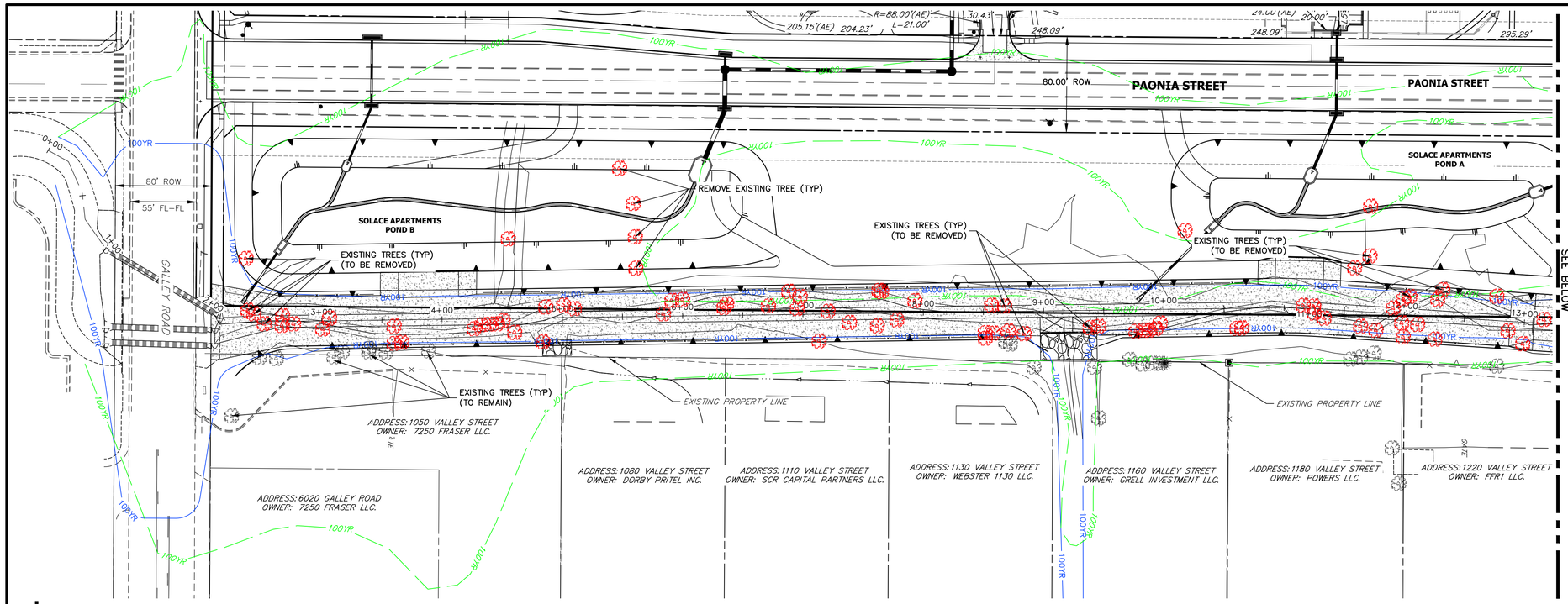
H-SCALE	N/A
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JRM
DRAWN BY	JRM
CHECKED BY	

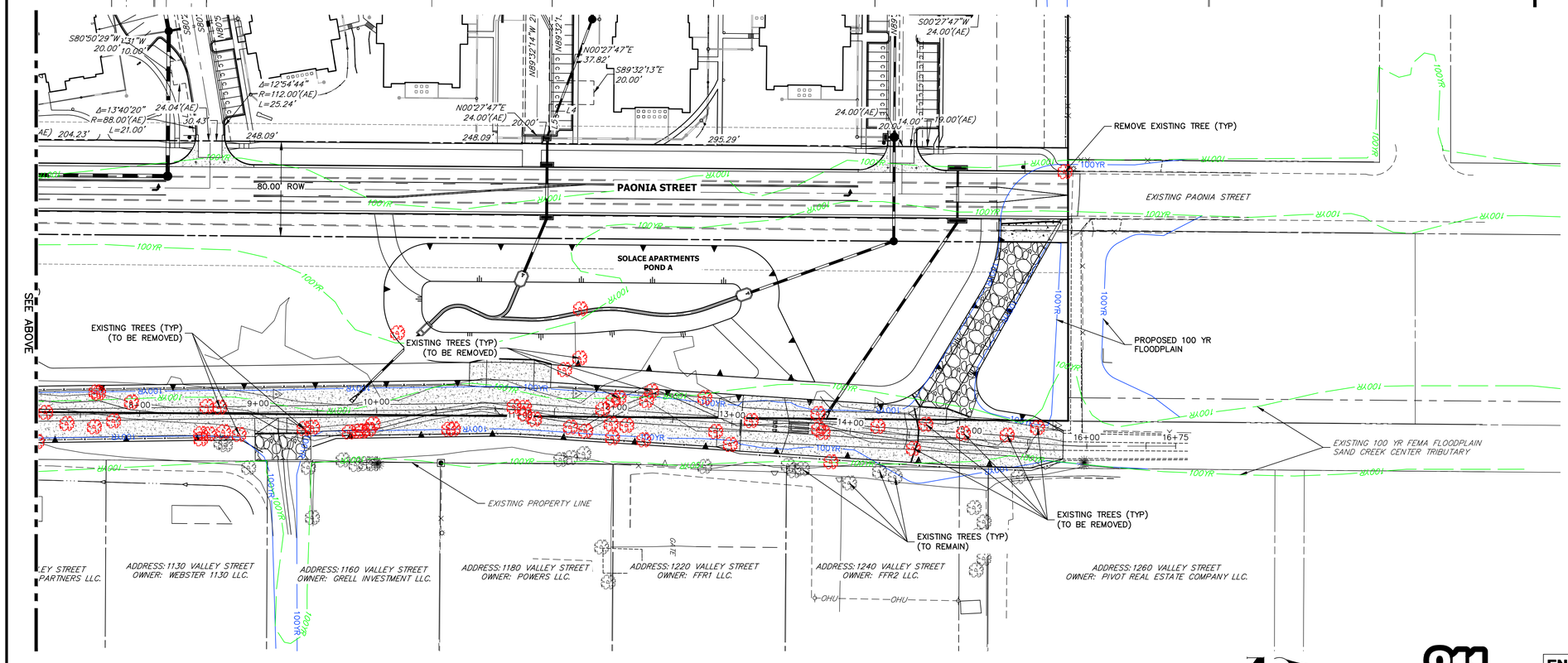
SAND CREEK CENTER TRIBUTARY

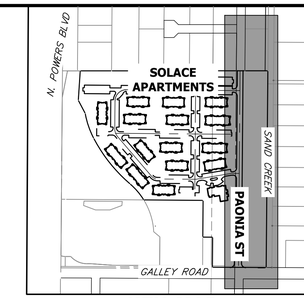
GENERAL NOTES

SHEET 2 OF 10

JOB NO. 25174.00







KEY MAP
SCALE 1"=500'

50 25 0 50 100
ORIGINAL SCALE: 1" = 50'

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

ENGINEER'S STATEMENT

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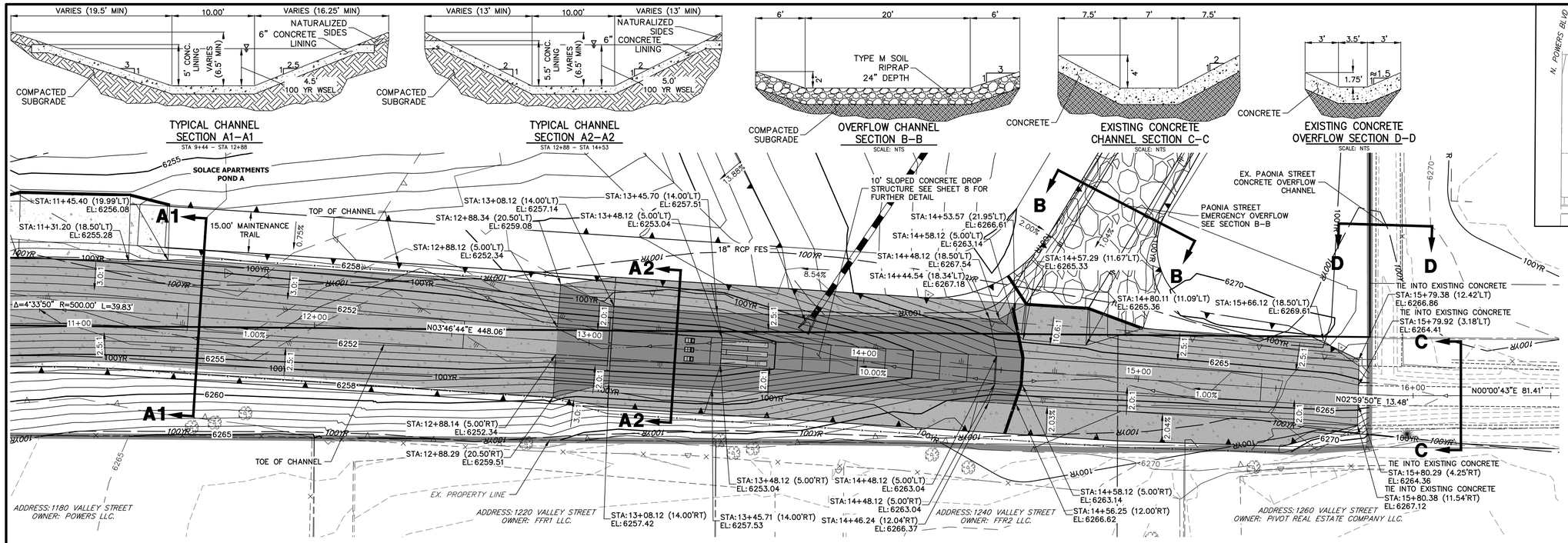
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

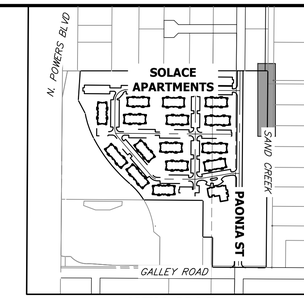
SAND CREEK CENTER TRIBUTARY

SITE AND DEMO PLAN

SHEET 3 OF 10

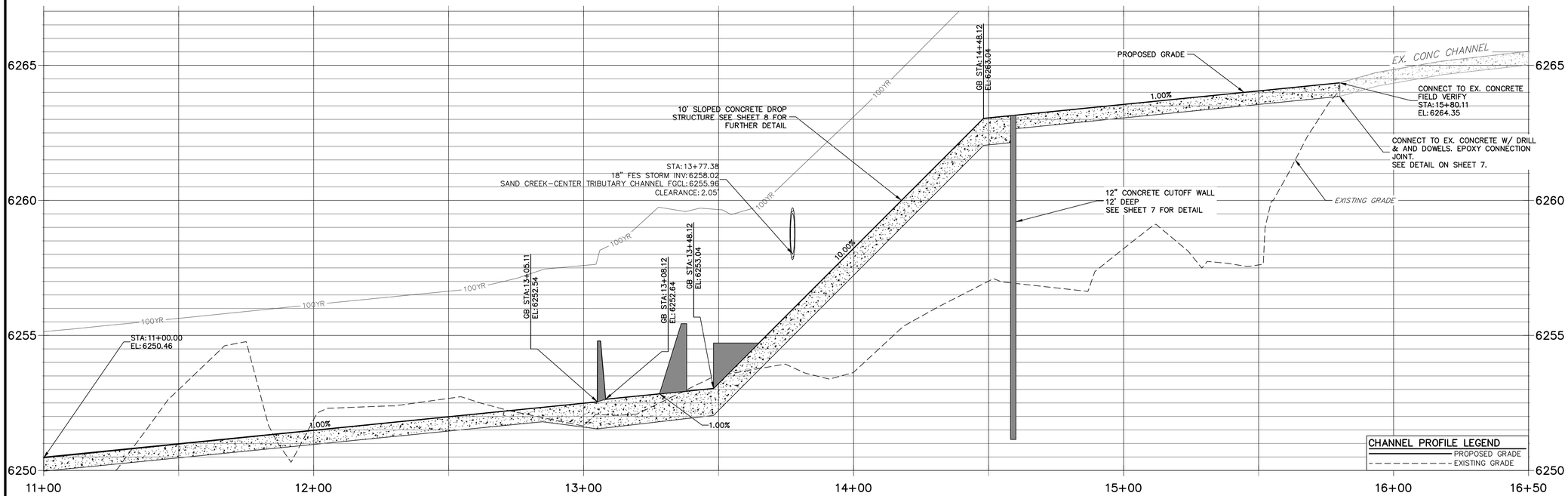
JOB NO. 25174.00





KEY MAP
SCALE 1"=500'

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



Know what's below. Call before you dig.

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 SRINGS SP–20–001, BY NES.

HORIZONTAL
ORIGINAL SCALE: 1" = 20'
VERTICAL
ORIGINAL SCALE: 1" = 2'

LEGEND

- PROPOSED MAJOR CONTOURS
- EXISTING MAJOR CONTOUR
- LIMITS OF GRADING
- 6" THICK CONCRETE CHANNEL LINING
- 12" THICK CONCRETE CHANNEL LINING

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

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

DATE

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V–SCALE	1"=2'
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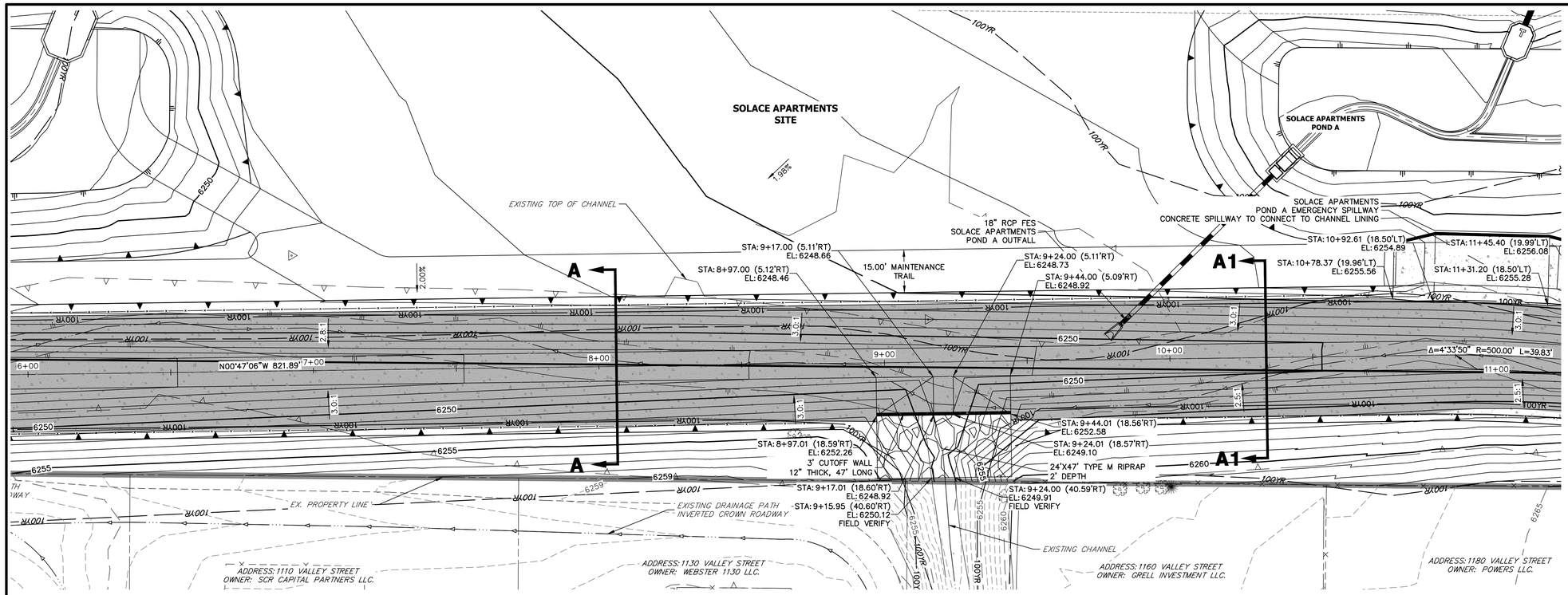
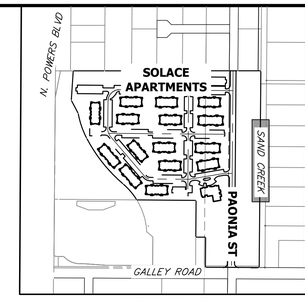
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

SAND CREEK CENTER TRIBUTARY
CHANNEL PLAN AND PROFILES

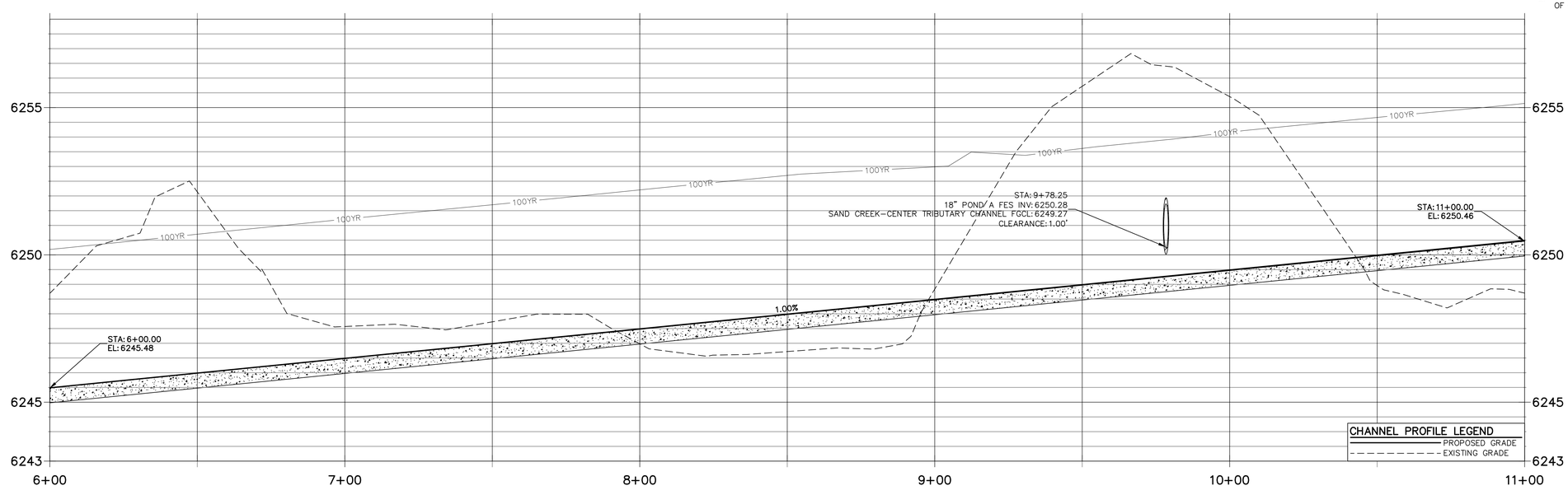
SHEET 4 OF 10
JOB NO. 25174.00





KEY MAP
SCALE 1"=500'

SAND CREEK-CENTER TRIBUTARY CHANNEL PROFILE (3)
STA 6+00.00 TO 11+00.00



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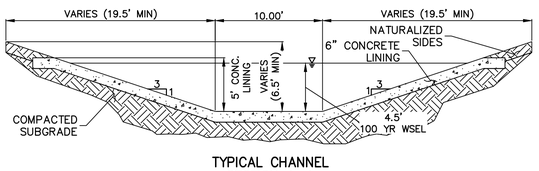
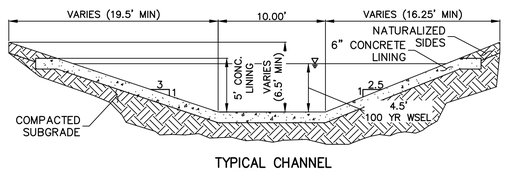


TYPICAL CHANNEL SECTION A-A
STA 5+50 - STA 9+44



TYPICAL CHANNEL SECTION A1-A1
STA 9+44 - STA 12+88

20 10 0 20 40
HORIZONTAL ORIGINAL SCALE: 1" = 20'
VERTICAL ORIGINAL SCALE: 1" = 2'

LEGEND

PROPOSED MAJOR CONTOURS 6100
EXISTING MAJOR CONTOUR 6100
LIMITS OF GRADING
6" THICK CONCRETE CHANNEL LINING
12" THICK CONCRETE CHANNEL LINING

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

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

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

COLORADO REGISTERED PROFESSIONAL ENGINEER MIKE A. BRAMLETT 32314

DATE

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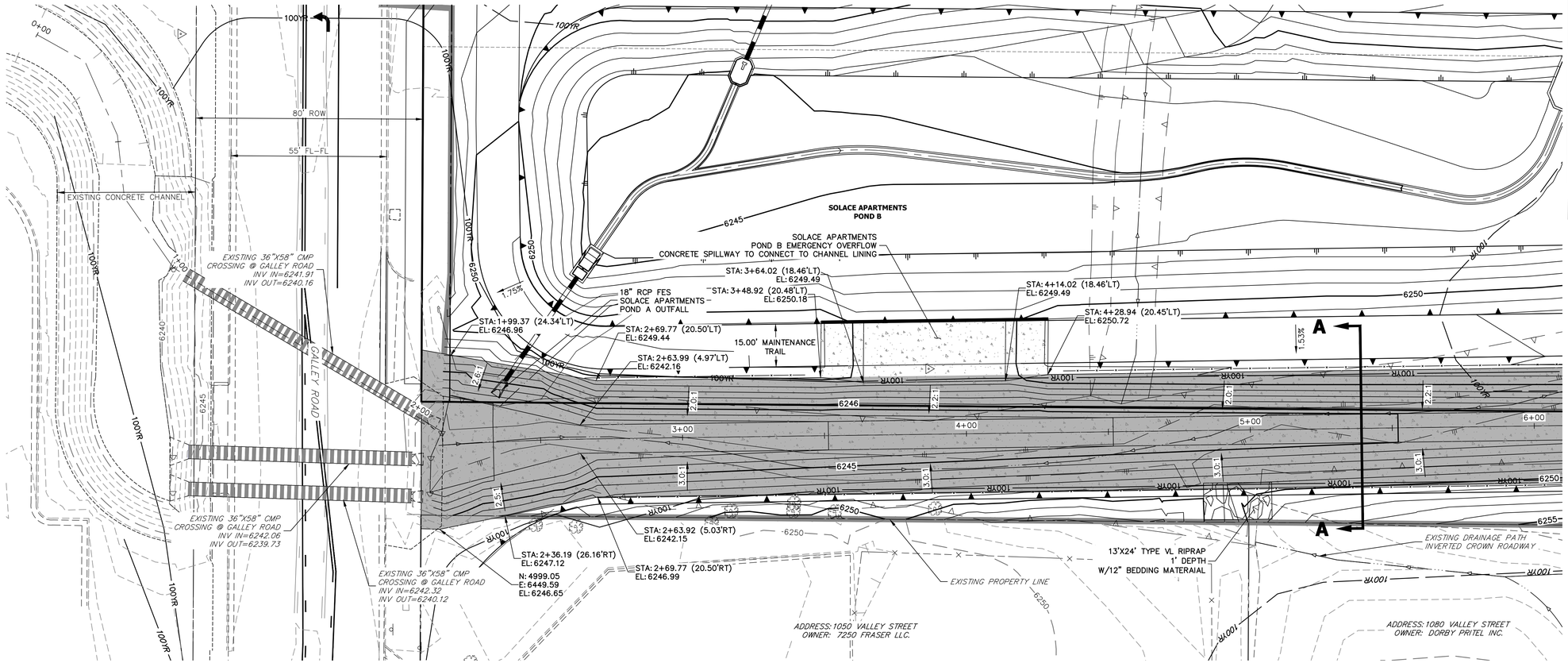
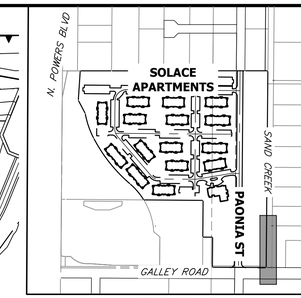
DRAWN BY	JBP
CHECKED BY	

SAND CREEK CENTER TRIBUTARY
CHANNEL PLAN AND PROFILES

SHEET 5 OF 10
JOB NO. 25174.00





KEY MAP
SCALE 1"=500'

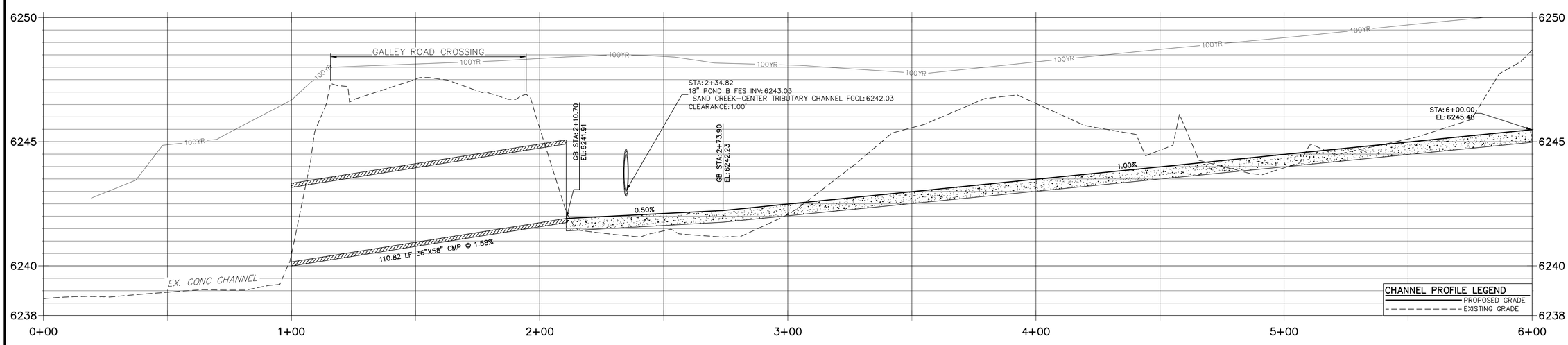
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

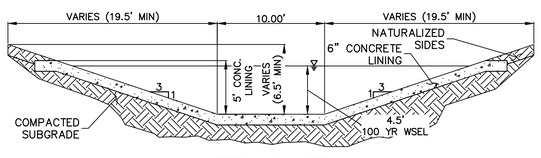
PREPARED FOR
JACKSON DEARBORN PARTNERS
404 S. WELLS ST.
SUITE 400
CHICAGO, ILL 60607
OFFICE PHONE
(734) 216-2577

J·R ENGINEERING
A Westrian Company
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

SAND CREEK-CENTER TRIBUTARY CHANNEL PROFILE
STA 0+00.00 TO 6+00.00





TYPICAL CHANNEL SECTION A-A
STA 5+50 - STA 9+44

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 SRINGS SP-20-001, BY NES.

LEGEND

PROPOSED MAJOR CONTOURS — 6100
EXISTING MAJOR CONTOUR — 6100
LIMITS OF GRADING
6" THICK CONCRETE CHANNEL LINING
12" THICK CONCRETE CHANNEL LINING

20 10 0 20 40
HORIZONTAL ORIGINAL SCALE: 1" = 20'
VERTICAL ORIGINAL SCALE: 1" = 2'

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

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

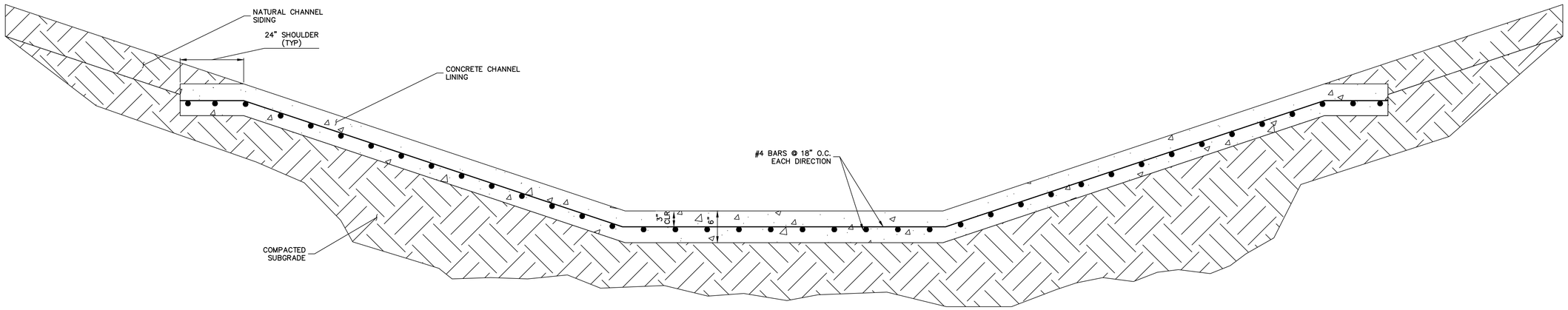
MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, LLC

DATE

SAND CREEK CENTER TRIBUTARY
CHANNEL PLAN AND PROFILES

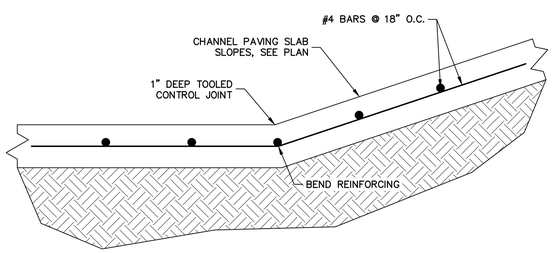
H-SCALE	1"=20'
V-SCALE	1"=2'
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

SHEET 6 OF 10
JOB NO. 25174.00



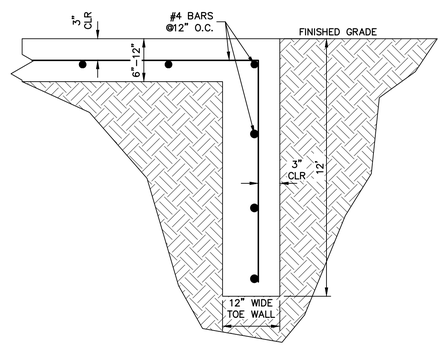
TYPICAL CONCRETE CHANNEL SECTION

SCALE: N.T.S.



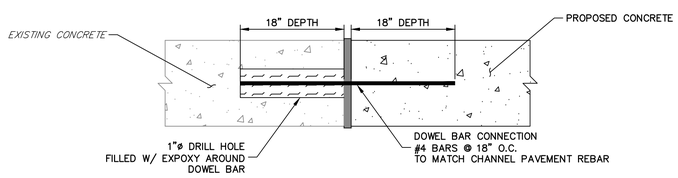
SLOPE CHANGE AT CHANNEL PAVING SLAB

SCALE: N.T.S.



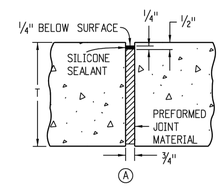
CUTOFF/APRON TOE WALL

SCALE: N.T.S.

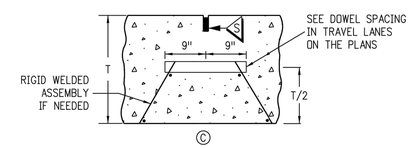


DOWEL CONNECTION TO EXISTING

SCALE: N.T.S.

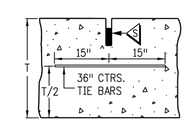


EXPANSION JOINT



DOWELED TRANSVERSE CONSTRUCTION OR CONTRACTION JOINT

(TRANSVERSE WEAKENED PLANE JOINT)

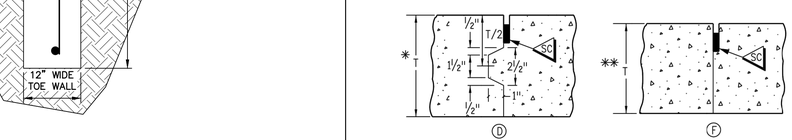


LONGITUDINAL CONTRACTION JOINT

(LONGITUDINAL WEAKENED PLANE JOINT)

LONGITUDINAL CONSTRUCTION JOINT

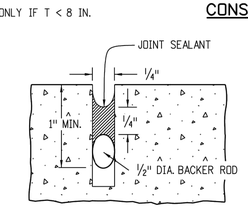
* USE ONLY IF T ≥ 8 IN. FORM ONLY FEMALE KEYWAY



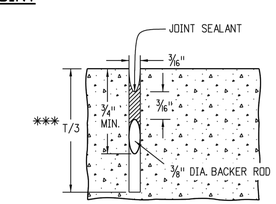
LONGITUDINAL CONSTRUCTION JOINT

** USE ONLY IF T < 8 IN.

LONGITUDINAL CONSTRUCTION JOINT



SEAL AT CONSTRUCTION JOINT



SAWED JOINT

*** USE T/4 WHEN T < 8 IN.

Know what's below. Call before you dig.

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

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

COLORADO REGISTERED MIKE A. BRAMLETT 32314 PROFESSIONAL ENGINEER

DATE

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

PREPARED FOR
JACKSON DEARBORN PARTNERS
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Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

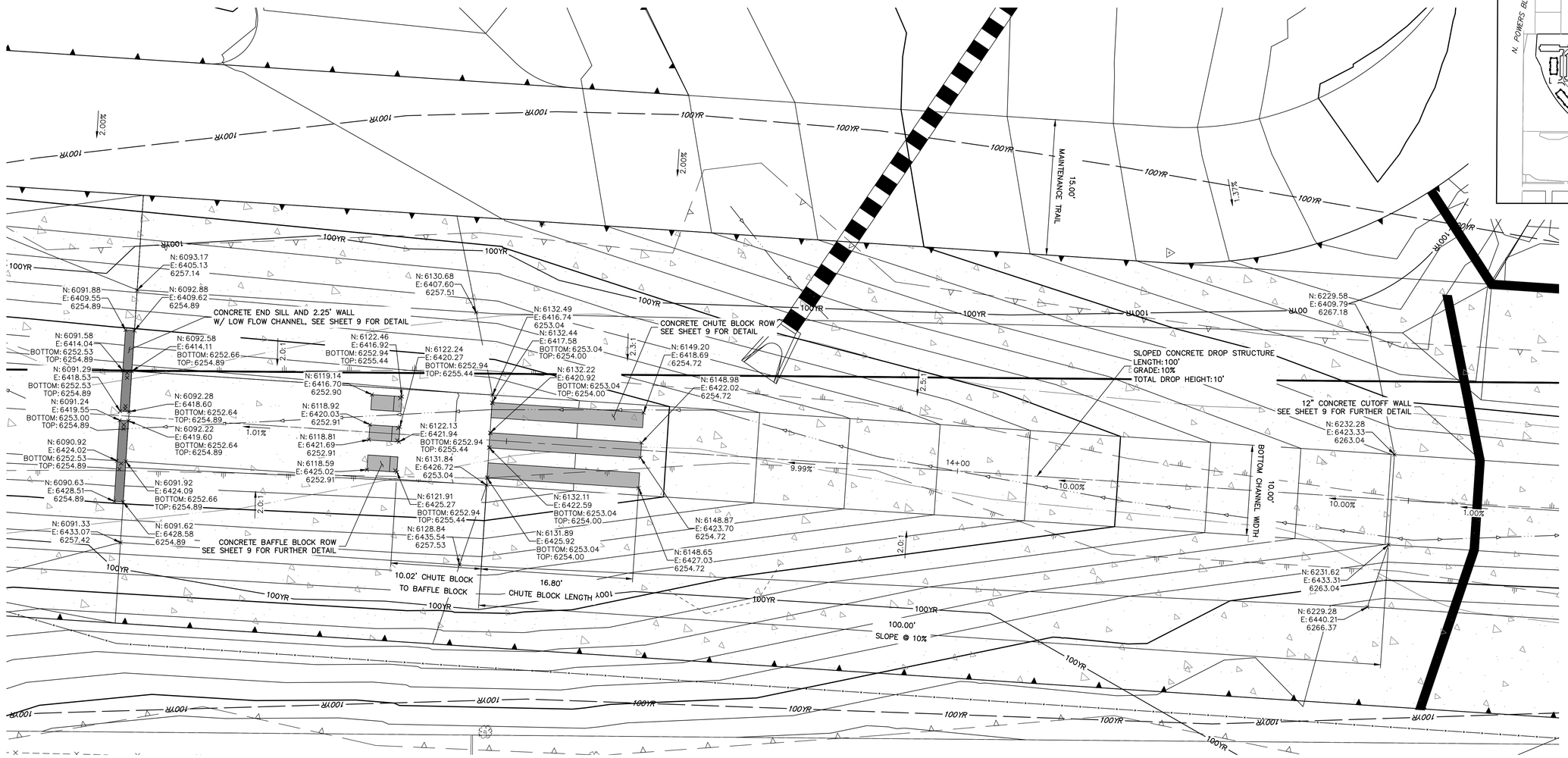
H-SCALE	N/A
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

SAND CREEK CENTER TRIBUTARY

CHANNEL DETAILS

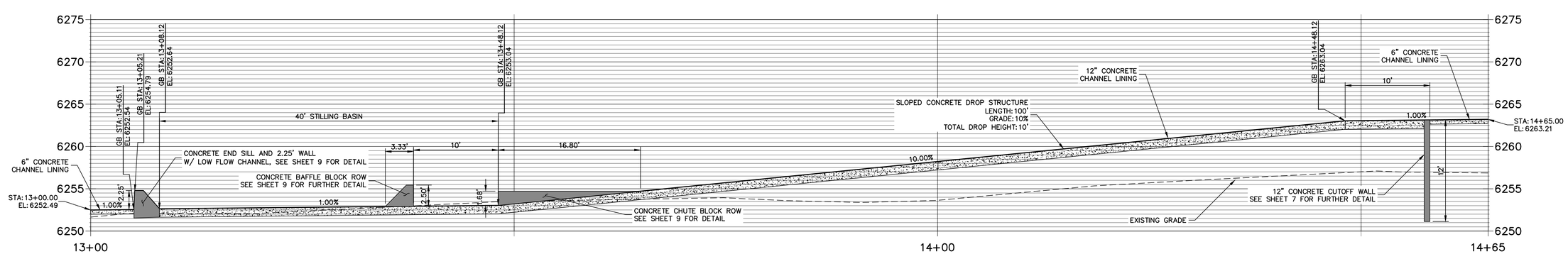
SHEET 7 OF 10

JOB NO. 25174.00



KEY MAP
SCALE 1"=500'

DROP 1 PROFILE
STA 13+00.00 TO 14+65.00



6 3 0 6 12
HORIZONTAL
ORIGINAL SCALE: 1" = 6
VERTICAL
ORIGINAL SCALE: 1" = 6

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

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

COLORADO REGISTERED PROFESSIONAL ENGINEER
MIKE A. BRAMLETT
32314

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

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Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

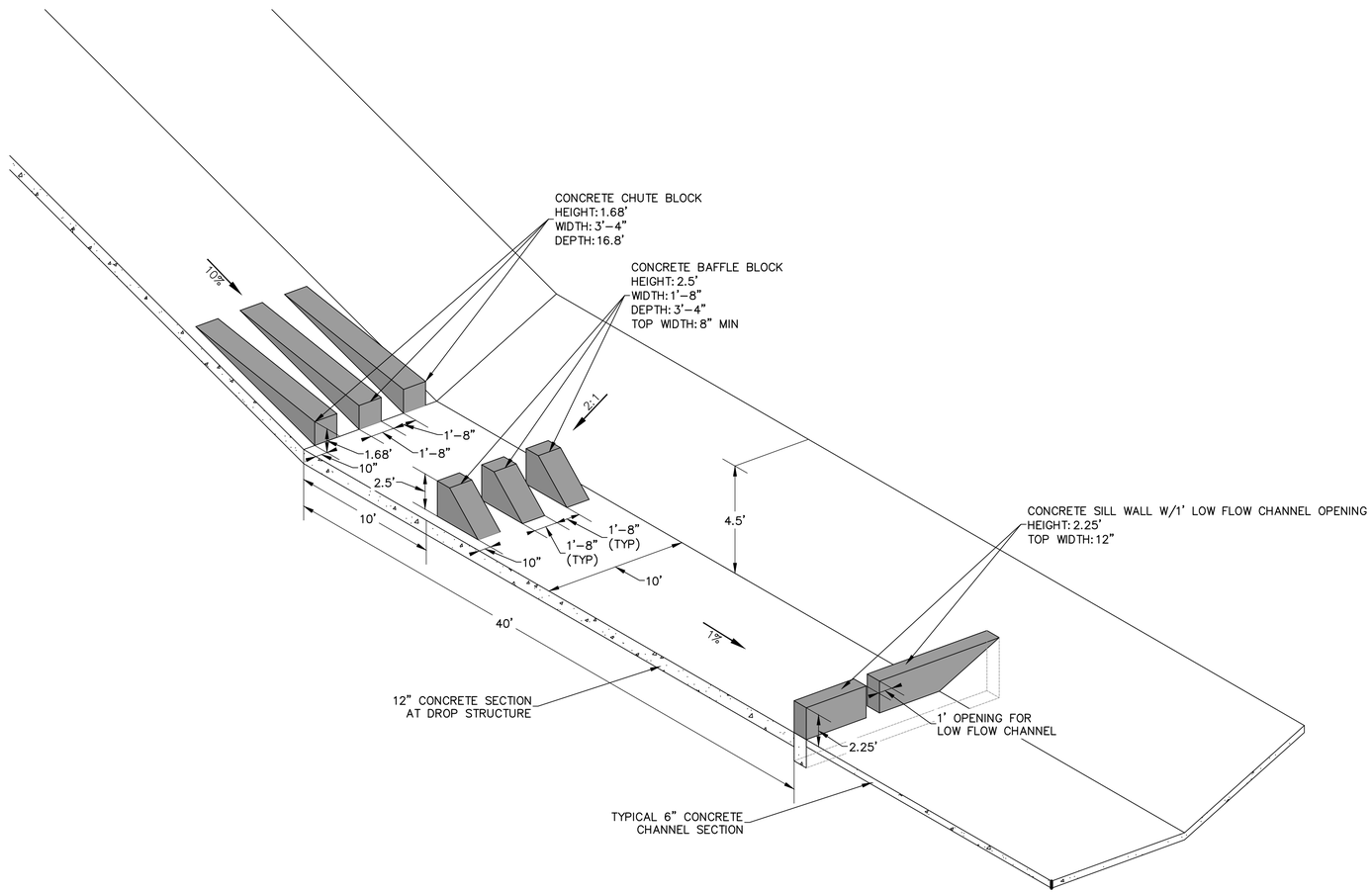
H-SCALE	1"=6'
V-SCALE	1"=6'
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

SAND CREEK CENTER
TRIBUTARY

DROP STRUCTURES PLAN
AND PROFILE

SHEET 8 OF 10

JOB NO. 25174.00



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ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

COLORADO LICENSED PROFESSIONAL ENGINEER MIKE A. BRAMLETT 32314

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

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No.	REVISION	BY	DATE

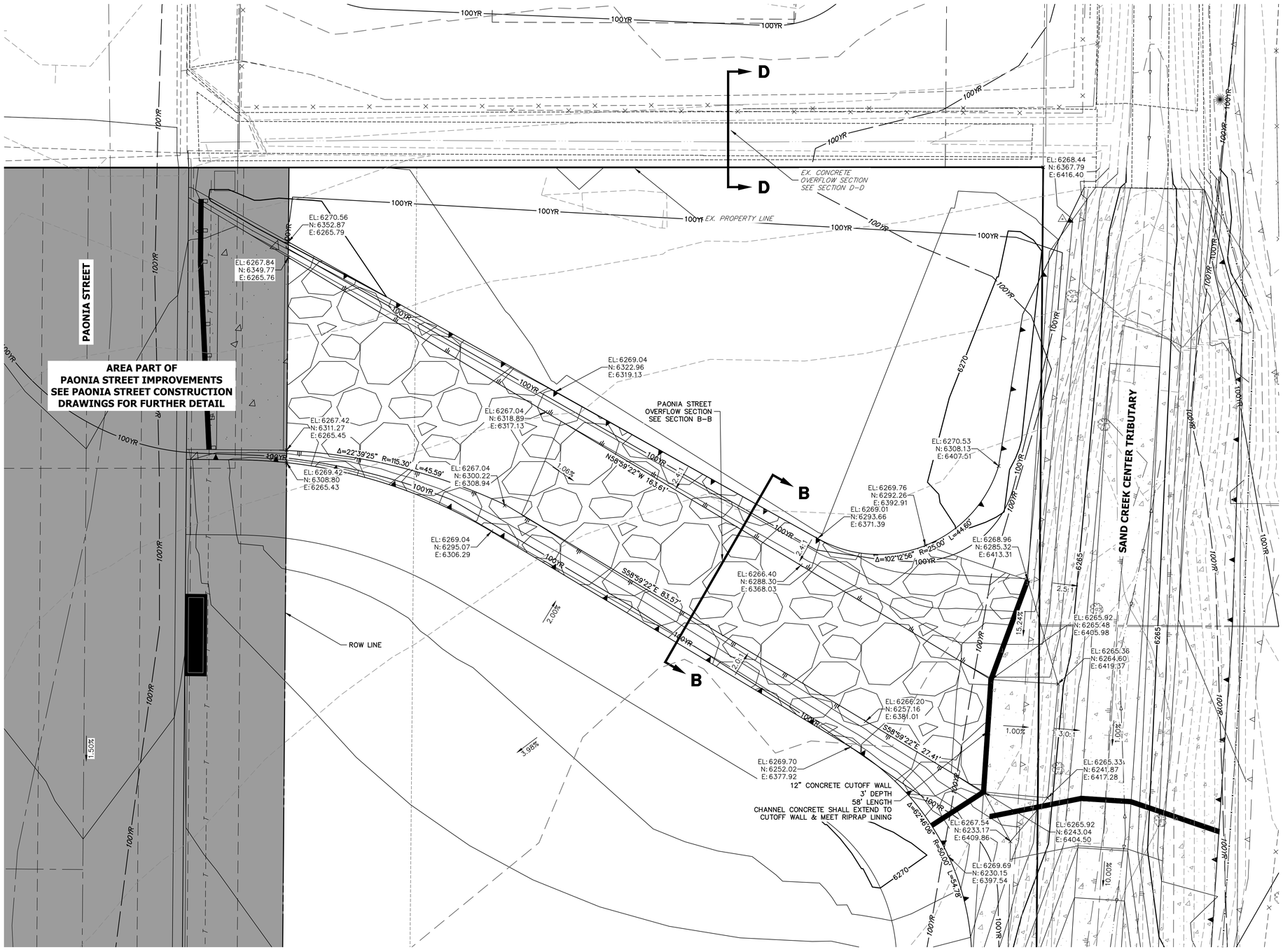
H-SCALE	N/A
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

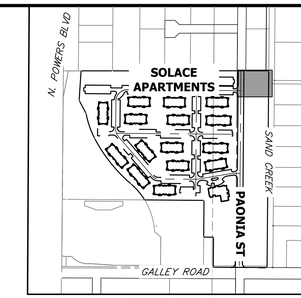
SAND CREEK CENTER TRIBUTARY

DROP STRUCTURE DETAIL SHEETS

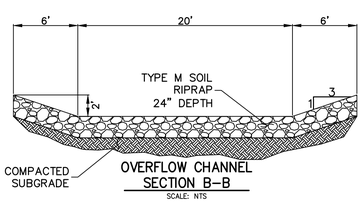
SHEET 9 OF 10

JOB NO. 25174.00

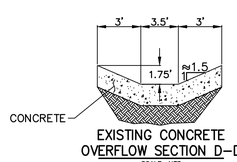




KEY MAP
SCALE 1"=500'



OVERFLOW CHANNEL
SECTION B-B
SCALE: NTS



EXISTING CONCRETE
OVERFLOW SECTION D-D
SCALE: NTS

10 5 0 10 20
ORIGINAL SCALE: 1" = 10'

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ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

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

DATE

COLORADO REGISTERED MIKE A. BRAMLETT 32314 PROFESSIONAL ENGINEER

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No.	REVISION	BY	DATE

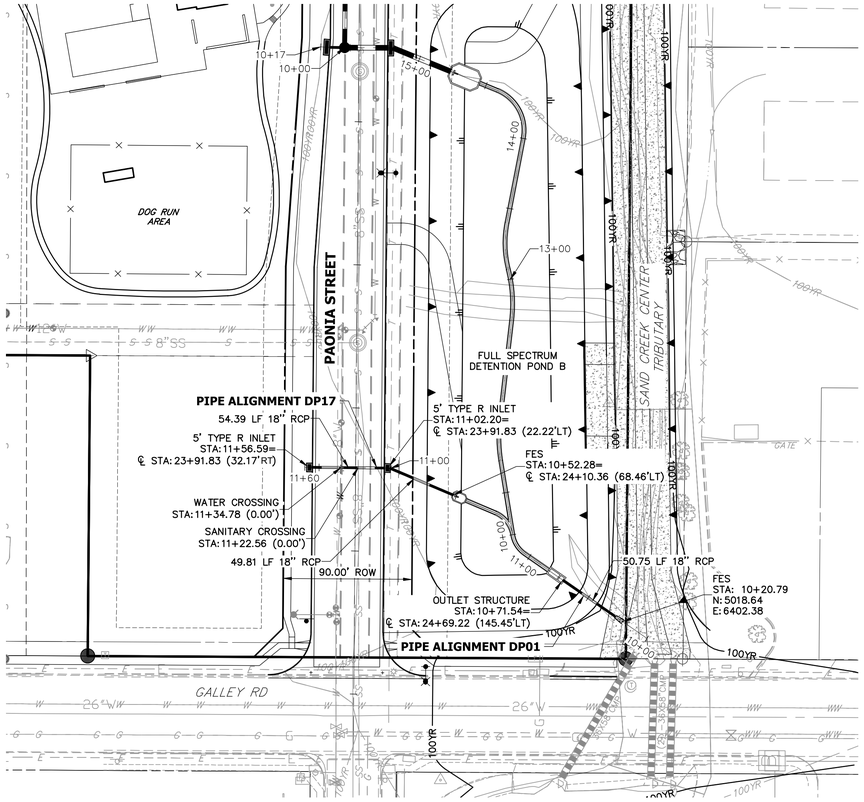
H-SCALE	1"=10'
V-SCALE	N/A
DATE	11/16/20
DESIGNED BY	JBP
DRAWN BY	JBP
CHECKED BY	

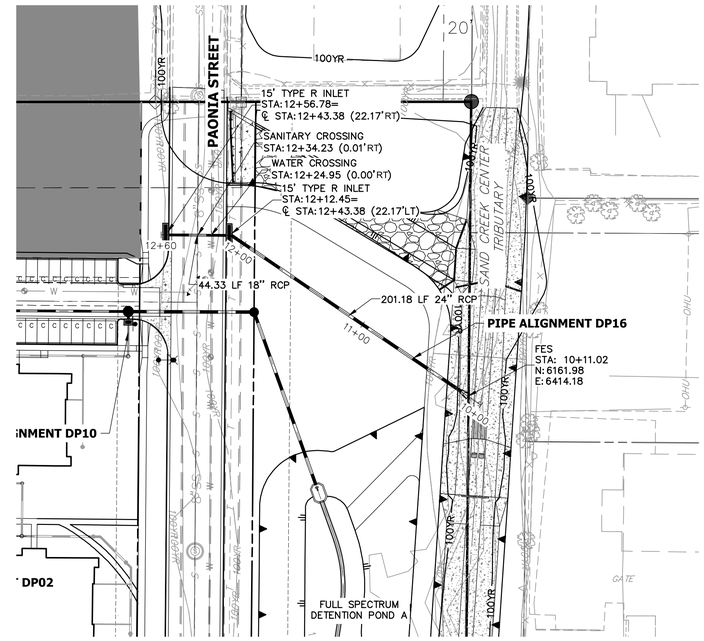
SAND CREEK CENTER TRIBUTARY
PAONIA STREET OVERFLOW PLAN

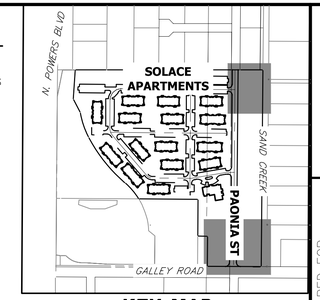
SHEET 10 OF 10
JOB NO. 25174.00

STORM SEWER NOTES

1. SEE DETAIL SHEET 29 FOR APPLICABLE STORM SEWER DETAILS.
2. PIPE LENGTHS MEASURED FROM CENTER OF MANHOLES TO CENTER OF MANHOLES, INSIDE FACE OF INLETS, OUTLET END OF FLARED END SECTIONS AND FACE OF WALLS WHERE APPLICABLE.
3. ℄ STATIONS & OFFSETS ARE LABELED AT CENTER OF STRUCTURE.
4. CONTRACTOR TO FIELD VERIFY EXISTING UTILITY LOCATIONS, PRIOR TO EXTENSION OF MAINS AND SERVICE CONNECTIONS. CONTRACTOR TO COORDINATE CONNECTIONS WITH UTILITY PROVIDER.
5. ALL PUBLIC WATER LINES ARE OWNED BY CHEROKEE METROPOLITAN DISTRICT.

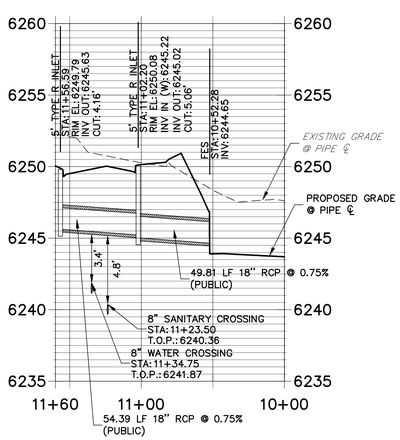






KEY MAP
SCALE 1"=500'

DP17 PROFILE
STA 10+00.00 TO 11+60.00



DP01 PROFILE (1)
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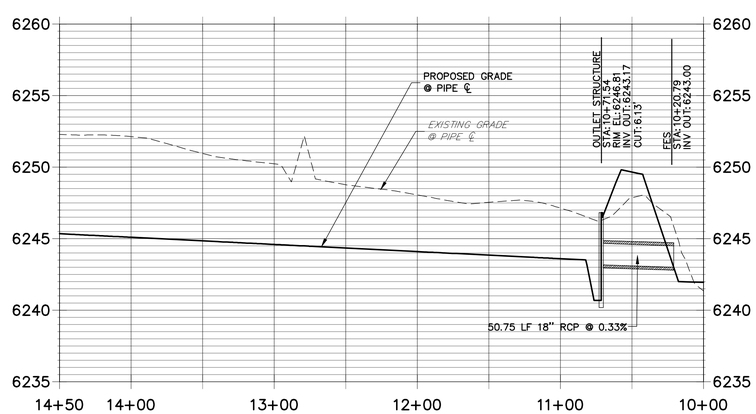

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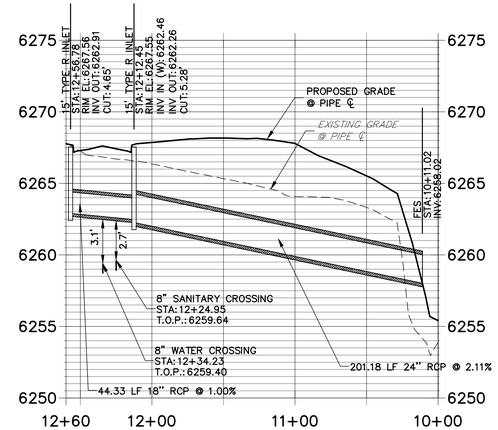

HORIZONTAL
ORIGINAL SCALE: 1" = 50'
VERTICAL
ORIGINAL SCALE: 1" = 5'

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

ENGINEER'S STATEMENT
PREPARED UNDER MY SUPERVISION

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

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No.	REVISION	BY	DATE

H-SCALE	1"=50'
V-SCALE	1"=5'
DATE	11/20/20
DESIGNED BY	JRM
DRAWN BY	JRM
CHECKED BY	

SOLACE APARTMENTS – FILING NO. 1

STORM SEWER PLAN AND PROFILE

SHEET 15 OF 32

JOB NO. 25174.00

X:\2510000.all\25174\0\Drawings\sheet dwgs\Construction Drawings\25174\0\DP01.dwg, DP01-11, 11/25/2020 12:01:26 PM, GE

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                    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
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          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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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:
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uo
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g&quot;,0],PARAMETER[&quot;false_northing&quot;,0],UNIT[&quot;International
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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 Channel1000                  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	Reach	Upstream Boundary	Downstream Boundary
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

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

Name: EXOF-SC
Description:
Energy computation Method

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

Name: OF-SC
Description:
Energy computation Method

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

Name: Junc-DS02
Description:
Energy computation Method

River	Length across Junction Reach	Tributary River	Reach	Length	Angle
SC01	Sand Creek-DS-0-	to SC01	Sand Creek-DS-1	21.51	0
EXCH	EX CHANNEL	to SC01	Sand Creek-DS-1	0	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
       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
       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    2.31
6255.5
    2.52  6255.4    2.73  6255.3    2.94  6255.2    3.15  6255.1    3.36
6255
    3.56  6254.9    3.77  6254.8    3.98  6254.7    4.19  6254.6     4.4
6254.5
    4.61  6254.4    4.82  6254.3    5.03  6254.2    5.24  6254.1    5.44
6254
    5.65  6253.9    5.86  6253.8    6.07  6253.7    6.28  6253.6    6.49
6253.5
     6.7  6253.4    6.91  6253.3    7.11  6253.2    7.32  6253.1    7.53
6253
    7.74  6252.9    7.95  6252.8    8.16  6252.7    8.37  6252.6    8.58
6252.5
    8.79  6252.4    8.99  6252.3     9.2  6252.2    9.41  6252.1    9.62
6252
    9.83  6251.9   10.04  6251.8   10.25  6251.7   10.46  6251.6   10.66
6251.5
   10.87  6251.4   11.08  6251.3   11.29  6251.2    11.5  6251.1   11.71
6251
   11.92  6250.9   12.13  6250.8   12.41  6250.7    12.7  6250.6      13
6250.5
   13.29  6250.4   13.59  6250.3   13.88  6250.2   14.18  6250.1   14.47
6250
   14.74  6249.9   14.93  6249.8   15.12  6249.7   15.32  6249.6   15.51
6249.5
    15.7  6249.4    15.9  6249.3   16.09  6249.2   16.11  6249.2   16.37
6249.3
   16.64  6249.4    16.9  6249.5   17.17  6249.6   17.43  6249.7   17.57
6249.75
    17.7  6249.8   17.97  6249.9   18.27    6250    18.6  6250.1   18.93
6250.2
   19.26  6250.3    19.6  6250.4   19.87  6250.5   20.03  6250.6    20.2
6250.7
   20.36  6250.8   20.53  6250.9   20.69    6251   20.86  6251.1   21.02
6251.2
   21.19  6251.3   21.35  6251.4   21.52  6251.5   21.68  6251.6   21.85
6251.7
   22.02  6251.8   22.18  6251.9   22.35    6252   22.51  6252.1   22.68
6252.2
   22.84  6252.3   23.01  6252.4   23.17  6252.5   23.34  6252.6    23.5
6252.7
   23.67  6252.8   23.83  6252.9      24    6253   24.17  6253.1   24.33
6253.2
    24.5  6253.3   24.66  6253.4   24.83  6253.5   24.99  6253.6   25.16
6253.7
   25.32  6253.8   25.49  6253.9   25.65    6254   25.82  6254.1   25.98
6254.2
   26.15  6254.3   26.32  6254.4   26.48  6254.5   26.65  6254.6   26.81
6254.7
   26.98  6254.8   27.14  6254.9   27.31    6255   27.47  6255.1   27.64
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   29.29
6256.2
   29.46  6256.3   29.62  6256.4   29.79  6256.5   29.95  6256.6   30.12
6256.7
   30.28  6256.8   30.45  6256.9   30.62    6257   30.78  6257.1   30.95
6257.2
   31.11  6257.3   31.28  6257.4   31.44  6257.5   31.61  6257.6   31.77
6257.7
   31.94  6257.8    32.1  6257.9   32.27    6258   32.43  6258.1    32.6
6258.2
   32.76  6258.3   32.93  6258.4    33.1  6258.5   33.26  6258.6   33.43
6258.7
   33.59  6258.8   33.76  6258.9   33.92    6259   34.09  6259.1   34.25
6259.2
   34.42  6259.3   34.58  6259.4   34.75  6259.5   34.91  6259.6   35.08
6259.7
   35.25  6259.8   35.41  6259.9   35.58    6260   35.74  6260.1   35.91
6260.2
   36.07  6260.3   36.24  6260.4    36.4  6260.5   36.57  6260.6   36.74
6260.7
   36.95  6260.8   37.16  6260.9   37.37    6261   38.47  6261.1   40.19
6261.2
   46.94  6261.2

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

```
   -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
       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     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
        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        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
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
```

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  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
```

```
  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     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     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
```

```
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
       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
  205.11     300 6270.01       F
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
1.29
  C & E Loss (ft)             0.02    Cum SA (acres)              0.01
0.39
```

```
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=     232
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
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
  137.17  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	145.81	6253.8	145.83	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	

```
6257.3
  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
```

Description:
Station Elevation Data num= 316

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	136.07	6257.5	136.27	6257.4	136.47	6257.3	136.67	6257.2
136.87	6257.1	137.07	6257	137.27	6256.9	137.47	6256.8	137.67	6256.7
137.87	6256.6	138.07	6256.5	138.27	6256.4	138.47	6256.3	138.67	6256.2
138.87	6256.1	139.07	6256	139.27	6255.9	139.47	6255.8	139.67	6255.7
139.87	6255.6	140.07	6255.5	140.27	6255.4	140.47	6255.3	140.67	6255.2
140.87	6255.1	141.07	6255	141.27	6254.9	141.47	6254.8	141.67	6254.7
141.87	6254.6	142.07	6254.5	142.27	6254.4	142.47	6254.3	142.67	6254.2
142.87	6254.1	143.07	6254	143.27	6253.9	143.47	6253.8	143.67	6253.7
143.87	6253.6	144.07	6253.5	144.27	6253.4	144.47	6253.3	144.67	6253.2
144.87	6253.1	155.13	6253.1	155.33	6253.2	155.53	6253.3	155.73	6253.4
155.93	6253.5	156.13	6253.6	156.33	6253.7	156.53	6253.8	156.73	6253.9
156.93	6254	157.13	6254.1	157.33	6254.2	157.53	6254.3	157.73	6254.4
157.93	6254.5	158.13	6254.6	158.33	6254.7	158.53	6254.8	158.73	6254.9
158.93	6255	159.13	6255.1	159.33	6255.2	159.53	6255.3	159.73	6255.4
159.93	6255.5	160.13	6255.6	160.33	6255.7	160.53	6255.8	160.73	6255.9
160.93	6256	161.13	6256.1	161.33	6256.2	161.53	6256.3	161.73	6256.4
161.93	6256.5	162.13	6256.6	162.33	6256.7	162.53	6256.8	162.73	6256.9
162.93	6257	163.13	6257.1	163.33	6257.2	163.53	6257.3	163.73	6257.4
163.93	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

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  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            10.39   10.39   10.39             .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)           6260.43    Element                    Left OB
Channel   Right OB
  Vel Head (ft)               0.65    Wt. n-Val.
0.013
  W.S. Elev (ft)           6259.79    Reach Len. (ft)            10.39
10.39      10.39
  Crit W.S. (ft)           6258.11    Flow Area (sq ft)
160.82
  E.G. Slope (ft/ft)      0.000539    Area (sq ft)
160.82
  Q Total (cfs)            1037.00    Flow (cfs)
1037.00
  Top Width (ft)             39.52    Top Width (ft)
39.52
  Vel Total (ft/s)            6.45    Avg. Vel. (ft/s)
6.45
  Max Chl Dpth (ft)           6.69    Hydr. Depth (ft)
4.07
  Conv. Total (cfs)        44648.3    Conv. (cfs)
44648.3
  Length Wtd. (ft)           10.39    Wetted Per. (ft)
42.49
  Min Ch El (ft)           6253.10    Shear (lb/sq ft)
0.13
  Alpha                       1.00    Stream Power (lb/ft s)    300.00
105.01     260.81
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.01
1.04
  C & E Loss (ft)             0.01    Cum SA (acres)              0.00
0.32


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=     380
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  6269.5   39.13  6269.5   40.55  6269.4    42.6  6269.3   44.71
6269.2
      47  6269.2   47.54  6269.3    47.6  6269.3   48.91  6269.2   50.23
6269.1
   51.54    6269   55.82  6268.9   60.57  6268.8   65.32  6268.7   70.07
6268.6
   74.82  6268.5   79.57  6268.4   84.35  6268.3   91.89  6268.2   94.03
6268.1
   95.24    6268   96.46  6267.9   97.67  6267.8   98.89  6267.7  100.11
6267.6
  101.32  6267.5  104.55  6267.5  105.08  6267.6   105.6  6267.7  106.13
6267.8
  106.66  6267.9  107.18    6268  107.22    6268  107.92  6267.9  108.62
6267.8
  109.32  6267.7  110.02  6267.6  110.71  6267.5  111.41  6267.4  115.49
6267.3
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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

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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.
```

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= 442

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	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   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
.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      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
  -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
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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
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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
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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
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180.84 6257.2 181.54 6257.1 182.25 6257 182.95 6256.9 183.75
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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
       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
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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
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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
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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
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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
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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

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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
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6257.6
  275.21  6257.7  275.56  6257.8  275.91  6257.9  276.26    6258  276.62
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  276.97  6258.2  277.32  6258.3  277.67  6258.4  278.02  6258.5  278.37
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  278.72  6258.7  279.08  6258.8  279.43  6258.9  279.78    6259  280.13
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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)
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
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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

```
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     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    7.53             .1
.3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  157.85  267.82 6256.56       F
Left Levee      Station=   72.83      Elevation= 6264.32
Right Levee     Station=  156.59      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
     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
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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

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  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   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
       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        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   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
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        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
```

```
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
       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  131.12    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 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
       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      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     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
```

```
         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
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0    6258    25.2    6258   31.54  6257.9   47.12  6257.9    52.9
6258
   53.98  6258.1   55.07  6258.2   56.15  6258.3   57.24  6258.4   58.32
6258.5
   59.41  6258.6   60.49  6258.7   61.58  6258.8   62.66  6258.9   63.86
6258.9
      67  6258.8   68.99  6258.7   70.97  6258.6   72.96  6258.5   74.95
6258.4
    76.3  6258.3   77.62  6258.2   78.95  6258.1   80.27    6258    81.6
6257.9
   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
6257.4
   97.29  6257.5   98.28  6257.6   99.26  6257.7   99.96  6257.8  100.66
6257.9
  101.36    6258  102.06  6258.1  102.76  6258.2  103.46  6258.3  104.16
6258.4
  104.86  6258.5  105.78  6258.5  107.75  6258.4  109.71  6258.3  111.68
6258.2
  112.05  6258.1  112.36    6258  112.67  6257.9  112.98  6257.8  113.29
6257.7
  113.59  6257.6   113.9  6257.5  114.21  6257.4  114.52  6257.3  114.83
6257.2
  115.13  6257.1  115.46    6257  115.81  6256.9  116.15  6256.8   116.5
6256.7
  116.85  6256.6   117.2  6256.5  117.51  6256.4  117.76  6256.3  118.01
6256.2
  118.35  6256.1  118.78    6256   119.1  6255.9  119.36  6255.8  119.63
6255.7
   119.9  6255.6  120.17  6255.5  120.44  6255.4   120.7  6255.3  120.97
6255.2
  121.24  6255.1  121.51    6255  121.78  6254.9  122.05  6254.8  122.31
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     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
       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        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
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
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
```

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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
       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)
```

```
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      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
```

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
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
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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

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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
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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
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  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
       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
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  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
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
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  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    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
       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     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
```

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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      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
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  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
       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
```

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