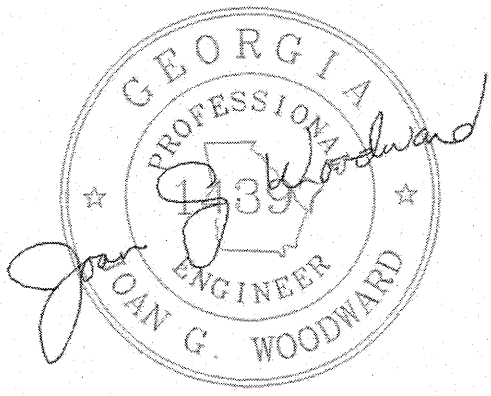
# HYDRAULICS ANALYSIS REPORT FOR **ASHBOROUGH VILLAGE BLDG 1189**

COBB COUNTY, GEORGIA

January 3, 2013




PREPARED BY:
JOAN G. WOODWARD, P.E.
GA P.E. # 14397
WOODWARD CONSULTING, INC
P.O. BOX 1816
ROSWELL, GA 30077
(770)650-8655

# HYDRAULIC ANALYSIS FOR ASHBOROUGH VILLAGE

OBJECTIVE: To determine the impact of a proposed retaining wall/bank restoration on the 100 year base flood elevations for the floodplain located on this subject property located in Cobb County. The streambank of Rottenwood Creek is eroding away and approaching an existing condominium building (1189). A live crib wall composed of timber and plant material cuttings is proposed.

METHODOLOGY: The 100 year storm peak rates of flow for Rottenwood Creek were taken from the existing HEC RAS model used for the current floodplain maps. The model was created by AMEC.

The model was supplied by Cobb County Stormwater. The files appear to have been created in 2005.

This analysis created four models:

- The Duplicate effective model extracted cross sections from downstream of Franklin Road through the site to a cross section approximately 3300 ft upstream of Franklin Road.
- The Effective Model added one cross section in the area of concern using Cobb County GIS (closest record of what the stream bank used to be)
- The Existing Conditions Model which adjusted cross sections for field run survey of the site.
- The Proposed Conditions Model which inserted the proposed live crib walls.

HYDRAULICS:

The HEC-RAS computer program for Rottenwood Creek was used to calculate the 100 year floodplain elevations.

RESULTS:

The proposed retaining wall with associated fill does not create any increases in the 100 year floodplain determined by the AMEC model for Rottenwood Creek.

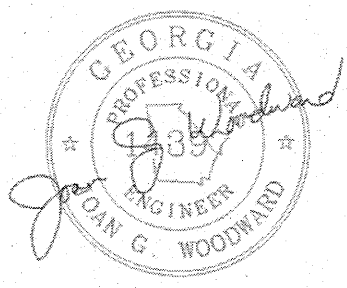
The erosion that has occurred since the original model will suffice for the "cut" portion of the cut fill balance.

A No-rise certification for the proposed stabilization is attached.

ENGINEERING 'NO-RISE' CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the state of Georgia. Is it to further certify that the attached technical data supports the fact that the proposed live crib retaining wall streambank stabilization project at Ashborough Village will not impact the Base Flood Elevations (100-year flood) off the property.

Certifying seal or stamp:




January 3, 2013

V050310

# HEC-RAS
# SUMMARY TABLE

| cross-section station | Q existing | duplicate elevation | effective elevation | existing elevation | proposed elevation |
|---|---|---|---|---|---|
| 35046 | 6550 | 946.54 | 946.59 | 946.04 | 946.1 |
| 34164 | 6550 | 944.60 | 944.72 | 944.59 | 944.70 |
| 33618 | 6700 | N/A | 943.73 | 943.68 | 943.69 |
| 33522 | 6700 | 943.66 | 943.66 | 943.64 | 943.64 |
| 32995 | 6680 | 942.69 | 942.69 | 942.69 | 942.69 |
| 32570 | 6680 | 942.2 | 942.2 | 942.2 | 942.2 |
| 31948 | 6680 | 941.02 | 941.02 | 941.02 | 941.02 |
| 31847 | 6680 | 940.97 | 940.97 | 940.97 | 940.97 |
| 31749 | 6680 | 941 | 941 | 941 | 941 |

# DUPLICATE MODEL

- AMEC model extracted sections from below Franklin Road upstream through the project

HEC-RAS Plan: duplicate River: Rottenwood Reach: 1 Profile: 100 nat

| 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) | |
| 1 | 35046 | 100 nat | 6550.00 | 932.80 | 946.54 | | 946.76 | 0.001676 | 5.60 | 2833.06 | 617.60 | 0.30 |
| 1 | 34164 | 100 nat | 6550.00 | 930.06 | 944.60 | | 945.02 | 0.002361 | 6.13 | 1838.96 | 281.09 | 0.35 |
| 1 | 33522 | 100 nat | 6700.00 | 927.77 | 943.66 | 938.99 | 943.86 | 0.001169 | 4.77 | 2533.01 | 375.16 | 0.25 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 Franklin Rd | | Bridge | | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rottenwood Creek 1
Project File : RottenwoodCreek1.prj
Run Date and Time: 1/3/2013 4:15:44 PM

Project in English units

Project Description:
Cobb County Priority Area 3 Flood Study
Rottenwood Creek
Rottenwood Creek
Watershed

Model extends from just downstream of Cumberland Blvd to 370 feet
upstream of Fairground Street

Plans
Existing Conditions Floodplain (ex
fp)
Existing Conditions Floodway  (ex fw)
Future Conditions Floodplain  (fc
fp)

AMEC Earth and Environmental
EWW - Project Engineer
October
2004

Originally run in HEC-RAS 3.1.1

PLAN DATA

Plan Title: duplicate
Plan File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.p02

Geometry Title: duplicate Existing
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.g02

Flow Title    : ex 100
Flow File     : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.f02

Plan Summary Information:
Number of:  Cross Sections =    8    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    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         =  0.3
    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

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

FLOW DATA

Flow Title: ex 100
Flow File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.f02

Flow Data (cfs)

| River | Reach | RS | 100 nat |
|---|---|---|---|
| Rottenwood | 1 | 35046 | 6550 |
| Rottenwood | 1 | 33522 | 6700 |
| Rottenwood | 1 | 32570 | 6680 |
| Rottenwood | 1 | 31749 | 6680 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Rottenwood | 1 | 100 nat | | Known WS = 941 |

GEOMETRY DATA

Geometry Title: duplicate Existing
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.g02

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 35046

INPUT
Description:
Station Elevation Data num= 168

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 991.78 | .03 | 991.78 | 9.39 | 991.49 | 29.93 | 991.12 | 44.65 | 990.75 |
| 59.84 | 990.47 | 75.49 | 990.42 | 83.38 | 990.27 | 97.77 | 989.64 | 114.55 | 989.13 |
| 120.23 | 988.92 | 134.75 | 987.69 | 139.44 | 987.53 | 163.36 | 986.23 | 166.83 | 986.11 |
| 189.96 | 985.12 | 192.22 | 984.94 | 194.45 | 984.81 | 217.92 | 983.15 | 222.29 | 983.01 |
| 239.38 | 981.33 | 244.5 | 981.21 | 256.64 | 980.18 | 261.97 | 979.83 | 267.85 | 979.15 |
| 276.7 | 978.2 | 285.7 | 977.17 | 287.37 | 976.9 | 290.95 | 976.65 | 296.13 | 976.36 |
| 298.2 | 976.25 | 302.15 | 975.82 | 307.95 | 975.28 | 337.43 | 973.5 | 345.9 | 973.16 |
| 364.77 | 972.2 | 382.41 | 971.04 | 396.5 | 970.39 | 412.58 | 969.69 | 418.35 | 969.67 |
| 432.83 | 969.01 | 441.13 | 969.05 | 457.13 | 968.79 | 464.58 | 968.46 | 486.74 | 968.35 |
| 487.83 | 968.33 | 488.83 | 968.32 | 496.21 | 968.18 | 512.49 | 967.96 | 538.92 | 967.25 |
| 540.99 | 967.24 | 566.14 | 966.72 | 567.4 | 966.7 | 568.37 | 966.69 | 596.96 | 966.83 |
| 598.44 | 966.78 | 600.08 | 966.8 | 602.29 | 966.82 | 618.42 | 966.91 | 629.85 | 965.36 |
| 635.64 | 965.29 | 646.38 | 965.13 | 677.54 | 964.67 | 687.5 | 964.66 | 697.23 | 964.8 |
| 706.48 | 964.78 | 715.49 | 964.63 | 720.98 | 964.7 | 733.99 | 964.42 | 745.44 | 964.49 |
| 762.05 | 964.37 | 765.93 | 964.52 | 770.1 | 964.71 | 785.74 | 965.38 | 802.16 | 965.95 |
| 802.43 | 965.95 | 802.75 | 965.95 | 826.92 | 965.66 | 835.31 | 965.66 | 842.94 | 965.61 |
| 872.76 | 965.59 | 881.37 | 965.59 | 912.66 | 965.08 | 913.28 | 965.51 | 1034.43 | 953.97 |
| 1135.05 | 940.49 | 1260.06 | 940.37 | 1343.48 | 940.92 | 1383.31 | 941.88 | 1390.44 | 932.8 |
| 1399.87 | 933.12 | 1410.89 | 933.52 | 1423.5 | 942.99 | 1565.92 | 943.52 | 1575.31 | 943.34 |
| 1597.39 | 943.48 | 1612.13 | 944.09 | 1639.62 | 944.01 | 1649.93 | 944.31 | 1665.08 | 944.64 |
| 1666.73 | 944.73 | 1678.62 | 943.81 | 1679.62 | 943.71 | 1683.91 | 944.65 | 1690.86 | 945.71 |
| 1695.49 | 945.85 | 1702.82 | 946.24 | 1752.25 | 949.44 | 1766.03 | 949.67 | 1775.24 | 949.83 |
| 1777.99 | 949.61 | 1783.28 | 950.18 | 1785.22 | 950.2 | 1793.44 | 951.51 | 1797.04 | 951.87 |
| 1804.59 | 952.76 | 1812.96 | 954.64 | 1821.82 | 955.9 | 1823.76 | 955.97 | 1832.57 | 957.77 |
| 1841.37 | 958.88 | 1844.84 | 958.93 | 1856.88 | 960.2 | 1859.96 | 960.31 | 1875.29 | 962.97 |
| 1888 | 964.62 | 1893.27 | 964.89 | 1910.66 | 966.12 | 1917.41 | 966.58 | 1928.91 | 967.69 |
| 1943.12 | 969.01 | 1947.84 | 969.14 | 1960.22 | 969.65 | 1967.72 | 970.37 | 1978.03 | 970.48 |
| 2000.47 | 971.9 | 2015.96 | 972.88 | 2021.66 | 972.92 | 2035.5 | 973.56 | 2046.4 | 973.64 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2058.5 | 973.86 | 2067.21 | 974.65 | 2075.91 | 975.94 | 2078.92 | 977.59 | 2088.7 | 976.76 |
| 2100.52 | 976.07 | 2113.09 | 973.68 | 2122.34 | 971.74 | 2137.23 | 976.28 | 2145.86 | 979.3 |
| 2149.36 | 979.33 | 2156.02 | 979.5 | 2162.51 | 979.38 | 2174.53 | 979.18 | 2180.35 | 978.87 |
| 2185.32 | 978.58 | 2194.16 | 976.35 | 2216.83 | 970.38 | 2224.21 | 971.26 | 2225.76 | 971.47 |
| 2232.42 | 971.57 | 2263.81 | 971.99 | 2277.33 | 970.66 | 2279.51 | 970.43 | 2281.24 | 970.61 |
| 2297.8 | 972.28 | 2309.94 | 972.05 | 2328.3 | 971.67 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1383.31 | .048 | 1423.5 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1383.31 | 1423.5 | 838.32 | 881.91 | 920.22 | .1 | .3 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 946.76 | Element | | | |
| Vel Head (ft) | 0.21 | Wt. n-Val. | 0.100 | 0.048 | 0.090 |
| W.S. Elev (ft) | 946.54 | Reach Len. (ft) | 838.32 | 881.91 | 920.22 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1597.40 | 443.88 | 791.77 |
| E.G. Slope (ft/ft) | 0.001676 | Area (sq ft) | 1597.40 | 443.88 | 791.77 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 3004.35 | 2486.16 | 1059.49 |
| Top Width (ft) | 617.60 | Top Width (ft) | 293.43 | 40.19 | 283.98 |
| Vel Total (ft/s) | 2.31 | Avg. Vel. (ft/s) | 1.88 | 5.60 | 1.34 |
| Max Chl Dpth (ft) | 13.74 | Hydr. Depth (ft) | 5.44 | 11.04 | 2.79 |
| Conv. Total (cfs) | 159990.6 | Conv. (cfs) | 73384.3 | 60727.1 | 25879.2 |
| Length Wtd. (ft) | 868.18 | Wetted Per. (ft) | 293.85 | 47.78 | 284.25 |
| Min Ch El (ft) | 932.80 | Shear (lb/sq ft) | 0.57 | 0.97 | 0.29 |
| Alpha | 2.59 | Stream Power (lb/ft s) | 2328.30 | 0.00 | 0.00 |
| Frctn Loss (ft) | 1.71 | Cum Volume (acre-ft) | 99.43 | 52.34 | 23.86 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 21.73 | 4.68 | 7.48 |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 34164

INPUT
Description:
Station Elevation Data num= 204

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.23 | 19.66 | 962.16 | 34.39 | 962.08 | 39.67 | 962.05 | 52.24 | 961.83 |
| 71.86 | 962.63 | 82.1 | 962.48 | 84.07 | 962.49 | 96.98 | 962.82 | 98 | 962.87 |
| 98.84 | 962.99 | 117.45 | 962.02 | 123.83 | 961.8 | 144.55 | 961.34 | 149.46 | 961.17 |
| 152.04 | 961.09 | 153.56 | 961.06 | 155.34 | 961.01 | 194.7 | 960.43 | 210.53 | 960.25 |
| 241.92 | 960.09 | 243.89 | 960.36 | 249.78 | 961.05 | 255.13 | 961.7 | 261.65 | 962.54 |
| 273.02 | 962.31 | 279.28 | 962.11 | 289.07 | 961.87 | 293.68 | 961.84 | 300.36 | 961.52 |
| 330.41 | 960.96 | 342.03 | 960.59 | 370.12 | 960.28 | 387.02 | 960.8 | 421.49 | 961.79 |
| 430.38 | 961.84 | 440.81 | 960.08 | 475.02 | 958.56 | 487.07 | 960.03 | 490.12 | 960.12 |
| 492.64 | 960.68 | 496.58 | 960.82 | 508.71 | 961.19 | 523.44 | 958.41 | 538.81 | 955.65 |
| 545.31 | 955.55 | 548.9 | 955.4 | 566.72 | 954.76 | 569.85 | 954.64 | 570.48 | 954.63 |
| 572.69 | 954.49 | 586.08 | 953.47 | 590.68 | 953.29 | 607.23 | 952.94 | 620.82 | 952.54 |
| 622.94 | 952.41 | 632.84 | 952.29 | 678.85 | 952.2 | 729.6 | 952.04 | 735.32 | 952.1 |
| 738.49 | 952.19 | 745.21 | 952.32 | 772.28 | 952.92 | 788.62 | 953.64 | 788.79 | 953.64 |
| 797.11 | 952.12 | 803.51 | 950.74 | 805.01 | 950.8 | 820.66 | 952.09 | 824.43 | 953.16 |
| 832.34 | 952.91 | 833.29 | 952.89 | 851.95 | 952.59 | 860.94 | 949.38 | 870.16 | 944.88 |
| 881.32 | 939.88 | 893.83 | 939.29 | 923.32 | 938.57 | 923.34 | 938.57 | 923.36 | 938.56 |
| 931.95 | 938 | 939.7 | 938 | 957.84 | 938 | 958.35 | 938.15 | 961.1 | 939.06 |
| 964.62 | 939.05 | 971.78 | 939.13 | 985.13 | 939.23 | 996.04 | 939.24 | 1025.68 | 938.22 |
| 1027.36 | 938.2 | 1032.6 | 938.3 | 1067.48 | 939.09 | 1070.38 | 939.16 | 1073.32 | 939.22 |
| 1075.83 | 936.87 | 1081.12 | 931.84 | 1081.41 | 931.67 | 1081.61 | 931.67 | 1087 | 930.06 |
| 1094.8 | 931.7 | 1101.41 | 932.37 | 1106.72 | 932.89 | 1124.4 | 934.63 | 1151.66 | 944.53 |
| 1162.42 | 948.46 | 1177.21 | 948.68 | 1194.35 | 949.06 | 1211.15 | 949.35 | 1214.18 | 949.44 |
| 1238.04 | 949.86 | 1251.65 | 949.99 | 1254.58 | 950.08 | 1277.47 | 950.18 | 1311.4 | 949.87 |
| 1315.62 | 949.88 | 1326.18 | 949.8 | 1326.82 | 949.8 | 1336.48 | 949.73 | 1341.06 | 949.78 |
| 1363.09 | 949.46 | 1368.93 | 949.55 | 1416.74 | 951.07 | 1427.63 | 952.28 | 1430.87 | 952.59 |
| 1436.55 | 952.98 | 1450.24 | 952.89 | 1455.11 | 952.71 | 1460.45 | 952.71 | 1465.95 | 952.8 |
| 1469.77 | 952.86 | 1471.77 | 952.89 | 1503.64 | 953.18 | 1515.18 | 953.39 | 1523.21 | 953.53 |
| 1529.35 | 952.35 | 1533.05 | 951.82 | 1543.79 | 951.99 | 1546.29 | 952 | 1560.25 | 951.95 |
| 1582.06 | 952.16 | 1583.13 | 952.19 | 1589.04 | 952.35 | 1589.68 | 952.35 | 1610.45 | 952.68 |
| 1614.34 | 952.79 | 1659.7 | 954.37 | 1664.35 | 954.53 | 1667.66 | 954.53 | 1682.25 | 954.65 |
| 1698.3 | 954.78 | 1704.59 | 954.35 | 1718.74 | 953.7 | 1733.73 | 955.03 | 1734.62 | 955.09 |
| 1736.45 | 955.25 | 1753.14 | 956.8 | 1763.55 | 957.04 | 1771.42 | 957.29 | 1776.31 | 957.34 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1814.34 | 957.72 | 1823.48 | 957.65 | 1865.5 | 957.17 | 1880.42 | 957.5 | 1883.08 | 957.84 | | |
| 1893.43 | 958.99 | 1900.07 | 958.36 | 1905.31 | 957.8 | 1936.39 | 958.36 | 1959.7 | 958.66 | | |
| 1964.35 | 958.76 | 1968.17 | 958.72 | 2010.45 | 959.78 | 2015.2 | 959.9 | 2015.94 | 959.84 | | |
| 2027.94 | 958.84 | 2039.91 | 961.79 | 2055.59 | 965.29 | 2059.05 | 965.19 | 2099.21 | 964.39 | | |
| 2114.44 | 964.06 | 2117.77 | 964 | 2123.79 | 964.03 | 2126.43 | 964.05 | 2143.88 | 964.27 | | |
| 2150.98 | 965.23 | 2168.87 | 967.16 | 2201.12 | 970.66 | 2215.55 | 972.48 | 2224.46 | 974.36 | | |
| 2231.27 | 975.87 | 2266.05 | 975.23 | 2270.45 | 975.15 | 2271.4 | 975.12 | 2271.9 | 975.11 | | |
| 2272.3 | 975.1 | 2274.47 | 975.02 | 2277.7 | 974.89 | 2313.1 | 973.36 | 2315.8 | 972.94 | | |
| 2324.24 | 971.78 | 2325.93 | 972.19 | 2337.67 | 974.93 | 2359.19 | 975.19 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1073.32 | .05 | 1162.42 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1073.32 | 1162.42 | 739.6 | 642.53 | 541.42 | .1 .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 900 | 961.1 | 939.06 | T |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 945.02 | Element | | | |
| Vel Head (ft) | 0.42 | Wt. n-Val. | 0.120 | 0.050 | |
| W.S. Elev (ft) | 944.60 | Reach Len. (ft) | 739.60 | 642.53 | 541.42 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1105.55 | 733.42 | |
| E.G. Slope (ft/ft) | 0.002361 | Area (sq ft) | 1146.38 | 733.42 | |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 2053.57 | 4496.43 | |
| Top Width (ft) | 281.09 | Top Width (ft) | 202.54 | 78.54 | |
| Vel Total (ft/s) | 3.56 | Avg. Vel. (ft/s) | 1.86 | 6.13 | |
| Max Chl Dpth (ft) | 14.54 | Hydr. Depth (ft) | 5.46 | 9.34 | |
| Conv. Total (cfs) | 134806.9 | Conv. (cfs) | 42265.0 | 92541.9 | |
| Length Wtd. (ft) | 681.64 | Wetted Per. (ft) | 203.79 | 83.83 | |
| Min Ch El (ft) | 930.06 | Shear (lb/sq ft) | 0.80 | 1.29 | |
| Alpha | 2.12 | Stream Power (lb/ft s) | 2359.19 | 0.00 | 0.00 |
| Frctn Loss (ft) | 1.09 | Cum Volume (acre-ft) | 73.03 | 40.42 | 15.50 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 16.96 | 3.48 | 4.48 |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 33522

INPUT
Description:
Station Elevation Data num= 201

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 958.96 | 16.13 | 957.63 | 35.95 | 956.65 | 43.68 | 956.4 | 59.88 | 956.14 |
| 66.27 | 956.14 | 77.21 | 955.71 | 101.3 | 955.08 | 108.4 | 954.82 | 117.12 | 954.63 |
| 123.77 | 954.31 | 156.55 | 952.85 | 161.48 | 952.8 | 165.51 | 952.66 | 171.09 | 952.44 |
| 192.05 | 952.13 | 210.32 | 951.73 | 219.09 | 952.56 | 257.78 | 951.86 | 260.55 | 951.85 |
| 272.14 | 951.53 | 274.37 | 951.26 | 287.54 | 950.89 | 293.44 | 950.3 | 308.93 | 950.43 |
| 330.36 | 950.67 | 337.04 | 950.69 | 367.92 | 951.08 | 368.68 | 951.09 | 368.8 | 951.09 |
| 379.84 | 951.15 | 382.58 | 951.13 | 423.49 | 950.34 | 441.53 | 949.99 | 447.15 | 949.88 |
| 459.97 | 949.86 | 478.91 | 949.79 | 484.95 | 949.77 | 494.96 | 949.26 | 513.2 | 947.79 |
| 514.15 | 947.75 | 514.75 | 947.73 | 515.71 | 947.74 | 536.34 | 948.01 | 549.33 | 947.96 |
| 572.91 | 946.44 | 589.37 | 945.95 | 601.98 | 945.68 | 621.25 | 944.84 | 630.36 | 944.38 |
| 644.54 | 944.15 | 659.43 | 943.82 | 676.02 | 943.42 | 695.41 | 943.68 | 707.64 | 943.57 |
| 717.54 | 943.93 | 722.13 | 944.41 | 734.97 | 944.42 | 755.82 | 944.65 | 771.02 | 944.66 |
| 777 | 944.8 | 791.42 | 944.94 | 803.62 | 945.3 | 817.93 | 945.47 | 823.65 | 945.73 |
| 832.77 | 945.89 | 863.64 | 946.15 | 864.99 | 946.15 | 871.96 | 944.08 | 898.6 | 936.21 |
| 909.65 | 935.95 | 911.84 | 935.91 | 912.5 | 935.76 | 919.45 | 934.8 | 922.68 | 934.8 |
| 928.73 | 934.8 | 930.5 | 934.8 | 934.51 | 934.8 | 948.74 | 934.8 | 956.7 | 934.8 |
| 969.88 | 934.8 | 973.56 | 934.8 | 982.01 | 934.8 | 984.97 | 936.39 | 985.87 | 936.85 |
| 1019.32 | 935.53 | 1034.08 | 935.09 | 1038.29 | 935.05 | 1057.09 | 934.59 | 1065.18 | 934.48 |
| 1077.13 | 936.13 | 1086.31 | 937.42 | 1105.45 | 935.57 | 1111.82 | 935.25 | 1121.69 | 935.32 |
| 1123.9 | 935.34 | 1142.77 | 935.48 | 1150.43 | 932.96 | 1152.19 | 932.38 | 1160.46 | 929.38 |
| 1171.46 | 927.77 | 1180.88 | 929.38 | 1190.64 | 933.59 | 1192.67 | 934.47 | 1212.5 | 945.97 |
| 1241.53 | 945.51 | 1251.15 | 945.29 | 1259.29 | 945.35 | 1286.69 | 946.74 | 1300.15 | 946.89 |
| 1309.18 | 946.98 | 1338.19 | 947.71 | 1369.1 | 947.97 | 1393.23 | 948.24 | 1409.19 | 948.34 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1422.45 | 948.49 | 1431.13 | 947.68 | 1438.5 | 946.94 | 1445.49 | 947.07 | 1455.51 | 947.38 |
| 1457.29 | 947.42 | 1474.06 | 947.41 | 1489.4 | 947.85 | 1495.56 | 948.17 | 1507.74 | 950.32 |
| 1512.31 | 950.73 | 1514.28 | 950.68 | 1519.05 | 951.53 | 1522.38 | 951.68 | 1524.19 | 951.72 |
| 1541.31 | 951.86 | 1550.76 | 952.07 | 1564 | 952.1 | 1571.49 | 952.07 | 1576.79 | 952.13 |
| 1582.21 | 952.07 | 1582.58 | 952.03 | 1583.43 | 951.98 | 1589.72 | 951.55 | 1595.83 | 951.69 |
| 1611.73 | 952.04 | 1614.35 | 952.06 | 1625.49 | 952.2 | 1634.29 | 952.29 | 1650.1 | 954.06 |
| 1652.89 | 954.09 | 1665.23 | 954.18 | 1666.51 | 954.19 | 1694.7 | 954.08 | 1699.3 | 954.11 |
| 1701.37 | 954.13 | 1713.07 | 953.5 | 1719.06 | 953.38 | 1731.29 | 953.07 | 1753.71 | 953.06 |
| 1776.04 | 953.5 | 1789.97 | 953.78 | 1808.9 | 954.06 | 1831.02 | 954.24 | 1841.52 | 954.41 |
| 1849.37 | 954.51 | 1859.76 | 955.12 | 1872.16 | 954.82 | 1888.39 | 955.1 | 1908.88 | 955.24 |
| 1938.43 | 955.18 | 1947.29 | 955.27 | 1953 | 955.27 | 1984.14 | 956.17 | 1992.38 | 956.49 |
| 1999.94 | 956.65 | 2009.21 | 957.03 | 2019.73 | 957.03 | 2034.17 | 956.98 | 2042.07 | 957.23 |
| 2063.12 | 957.49 | 2066.53 | 957.54 | 2074.54 | 957.53 | 2079.23 | 957.55 | 2091.45 | 957.44 |
| 2092.85 | 957.38 | 2102.18 | 957.17 | 2122.66 | 956.58 | 2125.2 | 956.52 | 2145.73 | 959.03 |
| 2149.45 | 959.56 | 2158.49 | 960.15 | 2178.72 | 961.63 | 2186.99 | 961.79 | 2208.52 | 961.79 |
| 2225.94 | 960.54 | 2228.7 | 960.43 | 2229.94 | 960.41 | 2249.58 | 961.81 | 2279.8 | 963.33 |
| 2290 | 964.05 | 2301.82 | 965.96 | 2309.26 | 967.17 | 2316.32 | 969.03 | 2341.46 | 969.39 |
| 2353.14 | 969.61 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1142.77 | .05 | 1212.5 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1142.77 | 1212.5 | 440.95 | 526.75 | 614.99 | .1 .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 530 | 863.64 | 946.15 | F |
| 863.64 | 1085.57 | 937.32 | F |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 895 | 1084 | 936.85 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.86 | Element | | | |
| Vel Head (ft) | 0.20 | Wt. n-Val. | 0.100 | 0.050 | |
| W.S. Elev (ft) | 943.66 | Reach Len. (ft) | 440.95 | 526.75 | 614.99 |
| Crit W.S. (ft) | 938.99 | Flow Area (sq ft) | 1816.52 | 716.49 | |
| E.G. Slope (ft/ft) | 0.001169 | Area (sq ft) | 1820.37 | 716.49 | |
| Q Total (cfs) | 6700.00 | Flow (cfs) | 3285.26 | 3414.74 | |
| Top Width (ft) | 375.16 | Top Width (ft) | 309.42 | 65.74 | |
| Vel Total (ft/s) | 2.65 | Avg. Vel. (ft/s) | 1.81 | 4.77 | |
| Max Chl Dpth (ft) | 15.89 | Hydr. Depth (ft) | 6.74 | 10.90 | |
| Conv. Total (cfs) | 195935.8 | Conv. (cfs) | 96074.7 | 99861.2 | |
| Length Wtd. (ft) | 497.63 | Wetted Per. (ft) | 270.51 | 70.55 | |
| Min Ch El (ft) | 927.77 | Shear (lb/sq ft) | 0.49 | 0.74 | |
| Alpha | 1.88 | Stream Power (lb/ft s) | 2353.14 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.75 | Cum Volume (acre-ft) | 47.84 | 29.73 | 15.50 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 12.61 | 2.41 | 4.48 |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32995

INPUT
Description:
Station Elevation Data num= 192

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 957.44 | 16.27 | 957.03 | 38.57 | 956.3 | 50.98 | 955.82 | 89.48 | 954.64 |
| 128.18 | 953.14 | 141.01 | 952.58 | 153.57 | 952.44 | 182.78 | 953.43 | 195.8 | 954.31 |
| 206.11 | 955.26 | 224.25 | 956.8 | 229.93 | 956.45 | 239.02 | 955.81 | 249.59 | 955.26 |
| 258.29 | 953.69 | 260.4 | 953.35 | 268.66 | 952.75 | 274.39 | 952.49 | 275.07 | 952.45 |
| 287.81 | 951.79 | 292.29 | 951.65 | 298.59 | 951.45 | 311.21 | 951.01 | 335.23 | 950.47 |
| 347.75 | 950.15 | 348.58 | 950.14 | 351.31 | 950.08 | 391.41 | 949.38 | 404.49 | 949.18 |
| 428.68 | 948.86 | 444.69 | 948.72 | 454.87 | 948.44 | 471.79 | 948.4 | 473.65 | 948.35 |
| 492.85 | 949.63 | 496.42 | 949.45 | 498.27 | 949.61 | 513.65 | 948.53 | 516 | 948.37 |
| 518.1 | 948.22 | 521.74 | 947.72 | 526.8 | 946.23 | 530.52 | 946.08 | 553.18 | 944.92 |
| 594.16 | 944.26 | 602.37 | 944.26 | 604.71 | 944.12 | 643.87 | 942.89 | 656.23 | 942.76 |
| 685.14 | 942.96 | 707.77 | 942.88 | 717.7 | 943.51 | 730.99 | 943.91 | 749.65 | 944.14 |
| 750.68 | 944.14 | 754.27 | 944.42 | 765 | 945.77 | 791.52 | 944.49 | 813.78 | 944.22 |
| 832.78 | 943.41 | 833.03 | 943.4 | 833.28 | 943.45 | 834.12 | 943.67 | 852.9 | 948.45 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 856.97 | 949.86 | 873.76 | 942.21 | 885.06 | 937.15 | 912.59 | 935.12 | 921.52 | 934.45 |
| 921.92 | 934.42 | 923.29 | 934.39 | 960.17 | 935.74 | 975.88 | 936.04 | 996.39 | 936.45 |
| 1026.3 | 937.52 | 1031.76 | 937.72 | 1034.98 | 937.76 | 1038.03 | 928.76 | 1038.4 | 927.56 |
| 1039.11 | 927.56 | 1045 | 925.95 | 1053.41 | 927.56 | 1055.24 | 927.98 | 1062.05 | 929.55 |
| 1065.92 | 930.17 | 1069.19 | 930.69 | 1071.47 | 930.95 | 1084.85 | 936.46 | 1085.35 | 936.64 |
| 1085.42 | 936.65 | 1094.81 | 936.76 | 1101.03 | 936.79 | 1105.86 | 936.84 | 1112.37 | 936.96 |
| 1118.36 | 936.73 | 1132.33 | 936.8 | 1147.16 | 936.75 | 1150.47 | 936.86 | 1169 | 939.74 |
| 1180.02 | 941.79 | 1185.92 | 942.1 | 1188.36 | 942.22 | 1191.28 | 942.39 | 1196.05 | 942.48 |
| 1230.86 | 942.87 | 1248.83 | 943.33 | 1268.07 | 944.03 | 1269.27 | 944.07 | 1272.21 | 944.08 |
| 1300.9 | 944.14 | 1306.27 | 944.57 | 1313.51 | 945.19 | 1322.43 | 945.84 | 1330.36 | 945.21 |
| 1354.47 | 944.62 | 1363.48 | 944.25 | 1372.88 | 943.94 | 1392.91 | 943.77 | 1406.33 | 943.43 |
| 1415.8 | 943.18 | 1421.96 | 943.71 | 1428.71 | 944.37 | 1435.47 | 944.99 | 1438.4 | 945.51 |
| 1447.59 | 946.34 | 1449.85 | 946.37 | 1458.45 | 946.53 | 1465.91 | 946.76 | 1492.86 | 947.21 |
| 1509.28 | 947.37 | 1517.52 | 947.64 | 1559.33 | 947.96 | 1583.81 | 947.53 | 1613.18 | 947.59 |
| 1621.14 | 947.88 | 1659.34 | 948.64 | 1669.52 | 948.87 | 1674.35 | 948.98 | 1679.6 | 949 |
| 1685.66 | 948.9 | 1717.17 | 948.39 | 1721.02 | 948.23 | 1728.91 | 947.44 | 1758.48 | 947.89 |
| 1771.17 | 948.32 | 1781.68 | 948.64 | 1813.42 | 948.82 | 1822.66 | 948.84 | 1825.5 | 948.84 |
| 1829.88 | 948.82 | 1876.81 | 948.7 | 1898.52 | 948.84 | 1907.04 | 948.83 | 1927.9 | 949.34 |
| 1941.75 | 949.43 | 1959.12 | 949.24 | 1975.93 | 948.87 | 2007.91 | 948.61 | 2009.49 | 948.62 |
| 2011.08 | 948.57 | 2038.29 | 951.62 | 2043.25 | 952.46 | 2050.54 | 953.47 | 2069.42 | 956.04 |
| 2079.22 | 957 | 2087.5 | 958.11 | 2099.52 | 959.95 | 2100.46 | 960.07 | 2101.72 | 960.24 |
| 2103.58 | 960.49 | 2105.91 | 960.81 | 2117.17 | 961.98 | 2131.28 | 964.25 | 2132.16 | 964.23 |
| 2132.57 | 964.24 | 2147.65 | 964.09 | 2148.76 | 964.2 | 2155.66 | 964.29 | 2169.19 | 964.46 |
| 2179.4 | 964.32 | 2182 | 964.33 | 2186.18 | 962.68 | 2195.4 | 959.3 | 2210.74 | 958.59 |
| 2230.49 | 957.4 | 2240.21 | 957.01 | 2244.79 | 956.54 | 2253.93 | 959.03 | 2277.66 | 965.52 |
| 2288.23 | 965.63 | 2297.78 | 965.91 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1034.98 | .05 | 1085.42 | .12 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1034.98 | 1085.42 | 424.42 | 425.55 | 426.3 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 856.97 | 949.86 | F |
| 1322.43 | 2297.78 | 945.84 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.10 | Element | | | |
| Vel Head (ft) | 0.41 | Wt. n-Val. | 0.120 | 0.050 | 0.120 |
| W.S. Elev (ft) | 942.69 | Reach Len. (ft) | 424.42 | 425.55 | 426.30 |
| Crit W.S. (ft) | 938.66 | Flow Area (sq ft) | 1034.39 | 635.38 | 496.55 |
| E.G. Slope (ft/ft) | 0.001987 | Area (sq ft) | 1034.39 | 635.38 | 496.55 |
| Q Total (cfs) | 6700.00 | Flow (cfs) | 1952.22 | 4077.27 | 670.51 |
| Top Width (ft) | 342.06 | Top Width (ft) | 162.27 | 50.44 | 129.34 |
| Vel Total (ft/s) | 3.09 | Avg. Vel. (ft/s) | 1.89 | 6.42 | 1.35 |
| Max Chl Dpth (ft) | 16.74 | Hydr. Depth (ft) | 6.37 | 12.60 | 3.84 |
| Conv. Total (cfs) | 150298.4 | Conv. (cfs) | 43793.4 | 91463.8 | 15041.3 |
| Length Wtd. (ft) | 425.25 | Wetted Per. (ft) | 163.61 | 59.60 | 129.78 |
| Min Ch El (ft) | 925.95 | Shear (lb/sq ft) | 0.78 | 1.32 | 0.47 |
| Alpha | 2.75 | Stream Power (lb/ft s) | 2297.78 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.59 | Cum Volume (acre-ft) | 33.40 | 21.56 | 11.99 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 10.23 | 1.71 | 3.57 |

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32570

INPUT
Description:
Station Elevation Data num= 169

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.79 | 14.12 | 962.14 | 18.61 | 961.95 | 18.96 | 961.93 | 21.12 | 962.04 |
| 53.28 | 962.16 | 53.96 | 962.19 | 58.73 | 961.95 | 73.19 | 962.27 | 98.31 | 962.34 |
| 103.58 | 962.38 | 105.92 | 962.39 | 107.8 | 962.33 | 117.36 | 962.3 | 130.46 | 962.26 |
| 134.36 | 961.3 | 137.7 | 960.58 | 140.02 | 960.59 | 148.33 | 960.68 | 190.79 | 960.77 |
| 205.55 | 960.92 | 240.56 | 961 | 246.46 | 960.93 | 268.35 | 960.74 | 282.99 | 960.32 |
| 293.42 | 959.3 | 311.25 | 956.86 | 312.78 | 956.86 | 325.88 | 956.34 | 363.82 | 954.44 |
| 371.51 | 953.95 | 412.04 | 952.43 | 420.7 | 951.99 | 421.43 | 951.93 | 421.58 | 951.91 |
| 423.13 | 951.82 | 431.64 | 951.16 | 432.89 | 951.06 | 444.74 | 949.52 | 459.72 | 948.54 |
| 468.97 | 947.93 | 474.55 | 947.63 | 504.5 | 946.45 | 516.4 | 946.12 | 528.5 | 944.3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 530.14 | 943.99 | 537.46 | 943.34 | 575.69 | 942.13 | 581.07 | 941.87 | 583.63 | 941.86 |
| 625.63 | 941.41 | 636.18 | 940.97 | 649.42 | 940.83 | 688.78 | 940.49 | 690.51 | 940.5 |
| 691.24 | 940.49 | 691.9 | 940.48 | 727.42 | 940.68 | 747.28 | 940.62 | 799.31 | 940.43 |
| 800.44 | 940.43 | 802.71 | 940.41 | 804.15 | 940.41 | 805.34 | 940.39 | 852.84 | 940.03 |
| 864.2 | 940.46 | 878.48 | 941.18 | 903.62 | 942.32 | 910.74 | 941.62 | 929.54 | 940.03 |
| 930.2 | 939.72 | 935.16 | 937.26 | 943.64 | 933.07 | 944.42 | 932.73 | 973.57 | 933.74 |
| 976.36 | 933.92 | 982.61 | 934.1 | 998.97 | 934.74 | 1020.72 | 934.95 | 1046.66 | 935.84 |
| 1061.88 | 935.71 | 1067.19 | 935.71 | 1076.23 | 935.6 | 1098.34 | 934.83 | 1104.36 | 934.95 |
| 1112.92 | 934.71 | 1123.42 | 934.1 | 1128.35 | 932.39 | 1134.79 | 929.65 | 1136.91 | 928.77 |
| 1138.22 | 928.23 | 1139.07 | 927.18 | 1156 | 925.57 | 1176.39 | 927.18 | 1178.79 | 928.5 |
| 1199.2 | 940.99 | 1208.97 | 941.03 | 1210.22 | 941.05 | 1210.68 | 941.16 | 1219.08 | 943.16 |
| 1232.58 | 942.41 | 1232.87 | 942.39 | 1233.14 | 942.39 | 1239.36 | 942.43 | 1259.73 | 942.46 |
| 1266.88 | 942.56 | 1288.79 | 942.86 | 1312.58 | 943.59 | 1338.78 | 944.72 | 1364.1 | 944.75 |
| 1391.31 | 943.29 | 1396.06 | 942.85 | 1406.25 | 942.05 | 1407.59 | 942.24 | 1437.11 | 946.65 |
| 1459.44 | 947.11 | 1482.2 | 947.61 | 1482.72 | 947.78 | 1520.49 | 961.93 | 1523.55 | 962.06 |
| 1552.09 | 962.38 | 1563.93 | 962.37 | 1584.33 | 962 | 1608.83 | 962.1 | 1644.11 | 962.12 |
| 1668.54 | 962.23 | 1705.29 | 962.22 | 1730.2 | 962.44 | 1761.32 | 962.44 | 1785.98 | 962.62 |
| 1811.96 | 962.63 | 1835.49 | 962.81 | 1861.29 | 962.92 | 1861.54 | 962.92 | 1861.96 | 962.97 |
| 1875.22 | 964.1 | 1927.13 | 964.52 | 1938.87 | 964.65 | 1968.88 | 964.97 | 1993.71 | 965.15 |
| 2041.5 | 965.67 | 2048.13 | 965.74 | 2097.24 | 965.74 | 2107.13 | 965.74 | 2133.73 | 965.74 |
| 2143.25 | 965.74 | 2147.29 | 965.76 | 2161.5 | 965.79 | 2171.19 | 964.87 | 2172 | 964.78 |
| 2172.39 | 964.78 | 2188.91 | 964.87 | 2199.43 | 964.94 | 2228.5 | 965.1 | 2233.02 | 964.78 |
| 2240.31 | 964.71 | 2247.6 | 964.18 | 2258.44 | 963.65 | 2273.73 | 961.57 | 2286.64 | 959.44 |
| 2291.27 | 959.7 | 2293.87 | 959.98 | 2307.56 | 964.16 | 2319.85 | 967.45 | 2362.04 | 967.71 |
| 2368.01 | 967.75 | 2369 | 967.62 | 2382.24 | 966.04 | 2382.57 | 966.1 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1123.42 | .05 | 1199.2 | .11 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1123.42 | 1199.2 | 614.58 | 621.16 | 617.04 | .1 | .3 |

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1338.78 | 1425 | 944.72 | F |
| 1217.9 | 1338.78 | 942.88 | F |
| 550 | 903.62 | 942.32 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 942.46 | Element | 0.120 | 0.050 | 0.110 |
| Vel Head (ft) | 0.27 | Wt. n-Val. | 614.58 | 621.16 | 617.04 |
| W.S. Elev (ft) | 942.20 | Reach Len. (ft) | 1447.93 | 950.84 | 15.78 |
| Crit W.S. (ft) | 936.13 | Flow Area (sq ft) | 1900.25 | 950.84 | 16.00 |
| E.G. Slope (ft/ft) | 0.001026 | Area (sq ft) | 2014.16 | 4659.06 | 6.78 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 545.81 | 75.78 | 18.72 |
| Top Width (ft) | 640.30 | Top Width (ft) | 1.39 | 4.90 | 0.43 |
| Vel Total (ft/s) | 2.77 | Avg. Vel. (ft/s) | 6.63 | 12.55 | 1.00 |
| Max Chl Dpth (ft) | 16.63 | Hydr. Depth (ft) | 62886.9 | 145467.5 | 211.6 |
| Conv. Total (cfs) | 208566.0 | Conv. (cfs) | 220.42 | 81.41 | 15.97 |
| Length Wtd. (ft) | 619.38 | Wetted Per. (ft) | 0.42 | 0.75 | 0.06 |
| Min Ch El (ft) | 925.57 | Shear (lb/sq ft) | 2382.57 | 0.00 | 0.00 |
| Alpha | 2.26 | Stream Power (lb/ft s) | 19.10 | 13.81 | 9.48 |
| Frctn Loss (ft) | 0.80 | Cum Volume (acre-ft) | 6.78 | 1.09 | 2.84 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | | | |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31948

INPUT
Description:
Station Elevation Data num= 172

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 965.57 | 11.54 | 965.68 | 13.15 | 965.83 | 16.76 | 965.83 | 20.7 | 965.8 |
| 57.77 | 967.52 | 69.14 | 967.55 | 77.67 | 967.31 | 96.2 | 965.92 | 98.12 | 965.49 |
| 102.83 | 965.52 | 151.12 | 962.43 | 152.79 | 962.48 | 156.49 | 962.61 | 159.32 | 962.68 |
| 174.82 | 963.37 | 189.1 | 960.93 | 189.88 | 960.8 | 192.5 | 960.83 | 236.97 | 961.17 |
| 264.78 | 960.96 | 286.81 | 959.86 | 337.02 | 957.83 | 339.99 | 957.67 | 353.6 | 957.31 |
| 386.03 | 956.44 | 400.02 | 955.71 | 441.17 | 954.47 | 457 | 953.76 | 464.47 | 953.77 |
| 468.41 | 953.72 | 476.03 | 950.86 | 486.37 | 947.41 | 486.78 | 947.27 | 487.1 | 947.17 |
| 507.64 | 946.29 | 515.7 | 946.06 | 522.04 | 944.99 | 534.14 | 941.98 | 544.09 | 941.96 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 569.89 | 941.27 | 605.14 | 940.85 | 605.29 | 940.84 | 605.45 | 940.84 | 607.05 | 940.83 |
| 655.65 | 940.67 | 672.39 | 940.67 | 677.7 | 940.69 | 681.62 | 940.75 | 703.21 | 940.93 |
| 708.06 | 940.95 | 728.16 | 941.3 | 752.86 | 941.63 | 760.3 | 941.46 | 779.56 | 940.57 |
| 793.46 | 939.8 | 815.24 | 938.67 | 818.96 | 938.71 | 826.47 | 938.54 | 839.68 | 938.27 |
| 853.81 | 937.92 | 884.86 | 937.1 | 897.77 | 936.72 | 905.99 | 936.05 | 910.45 | 935.69 |
| 913.32 | 935.5 | 915.48 | 935.6 | 918.2 | 935.77 | 924.03 | 936.03 | 929.43 | 932.47 |
| 936.37 | 927.89 | 939.14 | 925.84 | 948.17 | 924.24 | 958.19 | 925.84 | 968.24 | 930.86 |
| 969.46 | 931.43 | 970.61 | 931.97 | 973.09 | 932.14 | 982.84 | 932.73 | 991.38 | 934.12 |
| 1009.97 | 937.51 | 1014.71 | 937.65 | 1023.85 | 937.78 | 1034.04 | 937.77 | 1035.03 | 937.76 |
| 1049.71 | 937.7 | 1067.26 | 937.78 | 1103.79 | 937.88 | 1116.39 | 937.91 | 1125.82 | 938.6 |
| 1130.51 | 938.55 | 1136.37 | 938.35 | 1138.28 | 937.89 | 1146.81 | 935.69 | 1154 | 934.54 |
| 1156.12 | 934.09 | 1158.11 | 934.69 | 1162.93 | 935.85 | 1171.66 | 937.99 | 1194.18 | 944.84 |
| 1194.33 | 944.88 | 1194.35 | 944.88 | 1233.85 | 945.23 | 1266.05 | 944.9 | 1276.21 | 945.09 |
| 1281.78 | 945.23 | 1319.45 | 945.59 | 1333.46 | 946.69 | 1341.87 | 947.63 | 1344.88 | 947.74 |
| 1362.48 | 947.57 | 1370.59 | 947.49 | 1373.79 | 947.61 | 1380.49 | 948.09 | 1384.83 | 948.78 |
| 1385.38 | 948.85 | 1388.66 | 949.28 | 1388.99 | 950.12 | 1389.48 | 951.25 | 1398.54 | 951.54 |
| 1417.47 | 952.17 | 1437.22 | 952.86 | 1461.58 | 953.73 | 1495.38 | 953.64 | 1500.3 | 953.66 |
| 1536.96 | 954 | 1550.2 | 954.37 | 1570.79 | 955.15 | 1579.58 | 955.33 | 1582.35 | 955.6 |
| 1587.85 | 956.58 | 1604.44 | 960.26 | 1636.01 | 961.38 | 1638.1 | 961.46 | 1638.58 | 961.46 |
| 1639.11 | 961.47 | 1639.49 | 961.47 | 1640.02 | 961.47 | 1642.63 | 961.46 | 1683.85 | 960.87 |
| 1702.07 | 960.35 | 1706.75 | 960.35 | 1731.35 | 960 | 1732.75 | 959.95 | 1734.21 | 960.02 |
| 1735.7 | 960.1 | 1736.48 | 963.29 | 1736.65 | 963.95 | 1736.77 | 964.47 | 1746.81 | 964.75 |
| 1768.92 | 964.84 | 1783.87 | 965.33 | 1794.66 | 965.39 | 1833.91 | 965.1 | 1875.26 | 965.26 |
| 1883.92 | 965.28 | 1926.65 | 965.76 | 1933.94 | 965.74 | 1940.86 | 965.76 | 1983.95 | 965.5 |
| 1989.59 | 965.51 | 2033.99 | 966.04 | 2043.05 | 966.08 | 2051.16 | 966.17 | 2080.08 | 966.48 |
| 2088.19 | 971.92 | 2088.98 | 972.46 | 2093.27 | 972.64 | 2112.76 | 973.38 | 2119.5 | 973.59 |
| 2125.63 | 973.49 | 2144.07 | 973.08 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 924.03 | .042 | 970.61 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 924.03 | 970.61 | 83.8 | 101.77 | 116.75 | .3 | .5 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 1138 | 1172 | 938 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.63 | Element | | | |
| Vel Head (ft) | 0.61 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.02 | Reach Len. (ft) | 83.80 | 101.77 | 116.75 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 479.32 | 605.74 | 787.15 |
| E.G. Slope (ft/ft) | 0.001673 | Area (sq ft) | 479.32 | 605.74 | 787.15 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 707.58 | 4538.87 | 1433.56 |
| Top Width (ft) | 533.80 | Top Width (ft) | 276.20 | 46.58 | 211.03 |
| Vel Total (ft/s) | 3.57 | Avg. Vel. (ft/s) | 1.48 | 7.49 | 1.82 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 1.74 | 13.00 | 3.73 |
| Conv. Total (cfs) | 163337.8 | Conv. (cfs) | 17301.5 | 110983.3 | 35053.0 |
| Length Wtd. (ft) | 101.78 | Wetted Per. (ft) | 276.35 | 51.40 | 212.04 |
| Min Ch El (ft) | 924.24 | Shear (lb/sq ft) | 0.18 | 1.23 | 0.39 |
| Alpha | 3.07 | Stream Power (lb/ft s) | 2144.07 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.14 | Cum Volume (acre-ft) | 2.31 | 2.71 | 3.79 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 0.98 | 0.22 | 1.22 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31847

INPUT
Description:
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 954.14 | 1003.14 | 97.38 | 97.38 100.28 | .3 | .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.41 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 940.97 | Reach Len. (ft) | 19.00 | 19.00 | 19.00 |
| Crit W.S. (ft) | 935.30 | Flow Area (sq ft) | 872.09 | 681.99 | 757.70 |
| E.G. Slope (ft/ft) | 0.001088 | Area (sq ft) | 872.09 | 681.99 | 757.70 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 1295.58 | 4409.23 | 975.19 |
| Top Width (ft) | 527.84 | Top Width (ft) | 230.67 | 49.00 | 248.16 |
| Vel Total (ft/s) | 2.89 | Avg. Vel. (ft/s) | 1.49 | 6.47 | 1.29 |
| Max Chl Dpth (ft) | 16.75 | Hydr. Depth (ft) | 3.78 | 13.92 | 3.05 |
| Conv. Total (cfs) | 202492.9 | Conv. (cfs) | 39273.4 | 133658.2 | 29561.3 |
| Length Wtd. (ft) | 19.00 | Wetted Per. (ft) | 231.00 | 52.31 | 248.89 |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.26 | 0.89 | 0.21 |
| Alpha | 3.38 | Stream Power (lb/ft s) | 2200.56 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 1.01 | 1.21 | 1.72 |
| C & E Loss (ft) | | Cum SA (acres) | 0.49 | 0.11 | 0.60 |

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

BRIDGE

RIVER: Rottenwood
REACH: 1 RS: 31798

INPUT
Description: B170716100, Franklin Road, L 63' & W 50.1'

Distance from Upstream XS = 19
Deck/Roadway Width = 50.1
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |
| 567.59 | 945.23 | | 603.22 | 944.32 | | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | | 1115.63 | 937.59 | |
| 1134.19 | 937.66 | | 1145.77 | 937.76 | | 1161.82 | 938.1 | |
| 1168.82 | 938.26 | | 1178.47 | 938.42 | | 1193.35 | 938.75 | |
| 1206.69 | 938.97 | | 1225.72 | 939.43 | | 1233.28 | 939.64 | |
| 1250.81 | 940.2 | | 1262.2 | 940.55 | | 1265.14 | 940.65 | |
| 1279.57 | 941.13 | | 1293.32 | 941.6 | | 1308.26 | 942.13 | |
| 1315.37 | 942.44 | | 1317.28 | 942.5 | | 1326.64 | 942.81 | |
| 1335.16 | 943.04 | | 1347.23 | 943.25 | | 1356.21 | 943.56 | |
| 1369.09 | 944.02 | | 1381.94 | 944.65 | | 1392.51 | 945.02 | |
| 1398.97 | 945.2 | | 1407.33 | 945.44 | | 1409.58 | 945.53 | |
| 1411.68 | 945.61 | | 1421.64 | 946.11 | | 1423.87 | 946.21 | |
| 1425.78 | 946.3 | | 1440.45 | 946.5 | | 1460.22 | 947.14 | |
| 1462.14 | 947.22 | | 1464.35 | 947.31 | | 1466.73 | 947.4 | |
| 1482.53 | 947.88 | | 1488.72 | 948.15 | | 1499.91 | 948.87 | |
| 1510.85 | 949.13 | | 1529.63 | 949.72 | | 1538.53 | 950.12 | |
| 1545.34 | 950.33 | | 1551.59 | 950.48 | | 1575.81 | 951.16 | |
| 1580.59 | 951.28 | | 1581.27 | 951.3 | | 1600.88 | 951.74 | |
| 1606.65 | 951.99 | | 1612.04 | 952.15 | | 1633.56 | 953.03 | |
| 1641.79 | 953.25 | | 1648.55 | 953.33 | | 1657.81 | 953.78 | |
| 1660.85 | 953.89 | | 1663.66 | 954 | | 1666.07 | 954.1 | |
| 1675.44 | 954.46 | | 1677.98 | 954.59 | | 1698.47 | 955.2 | |
| 1701.05 | 955.22 | | 1709.01 | 955.45 | | 1711.54 | 955.46 | |
| 1714.44 | 955.47 | | 1727.16 | 955.84 | | 1729.98 | 956.03 | |
| 1743.08 | 956.72 | | 1750.55 | 956.87 | | 1758.09 | 957.12 | |
| 1775.12 | 957.6 | | 1788.49 | 957.95 | | 1804.39 | 958.38 | |
| 1811.13 | 958.76 | | 1826.91 | 959.33 | | 1835.75 | 959.66 | |
| 1846.37 | 960.1 | | 1856.96 | 960.52 | | 1883.46 | 961.62 | |
| 1890.39 | 961.98 | | 1899.57 | 962.42 | | 1915.61 | 963.02 | |
| 1926.29 | 963.32 | | 1941.17 | 963.85 | | 1958.27 | 964.4 | |
| 1967.8 | 964.69 | | 1981.81 | 965.16 | | 1990.04 | 965.52 | |
| 2002.08 | 965.92 | | 2008.23 | 966.11 | | 2023.45 | 966.59 | |
| 2029.35 | 966.78 | | 2048.73 | 967.11 | | 2059.59 | 967.54 | |
| 2068.73 | 968.47 | | 2088.73 | 969.34 | | 2103.12 | 969.83 | |
| 2120.8 | 970.45 | | 2132.88 | 970.97 | | 2146.72 | 971.66 | |
| 2156.56 | 972.02 | | 2168.27 | 972.39 | | 2181.5 | 972.76 | |
| 2190.49 | 973.18 | | 2196.76 | 973.4 | | 2207.46 | 973.85 | |
| 2209.45 | 973.96 | | 2213.33 | 974.19 | | 2216.57 | 974.39 | |
| 2227.79 | 974.61 | | | | | | | |

Upstream Bridge Cross Section Data
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Coeff Contr. Expan.

954.14 1003.14 .3 .5

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

Downstream Deck/Roadway Coordinates

num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 567.59 | 945.23 | | 603.22 | 944.32 | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | 1115.63 | 937.59 | |
| 1134.19 | 937.66 | | 1145.77 | 937.76 | 1161.82 | 938.1 | |
| 1168.82 | 938.26 | | 1178.47 | 938.42 | 1193.35 | 938.75 | |
| 1206.69 | 938.97 | | 1225.72 | 939.43 | 1233.28 | 939.64 | |
| 1250.81 | 940.2 | | 1262.2 | 940.55 | 1265.14 | 940.65 | |
| 1279.57 | 941.13 | | 1293.32 | 941.6 | 1308.26 | 942.13 | |
| 1315.37 | 942.44 | | 1317.28 | 942.5 | 1326.64 | 942.81 | |
| 1335.16 | 943.04 | | 1347.23 | 943.25 | 1356.21 | 943.56 | |
| 1369.09 | 944.02 | | 1381.94 | 944.65 | 1392.51 | 945.02 | |
| 1398.97 | 945.2 | | 1407.33 | 945.44 | 1409.58 | 945.53 | |
| 1411.68 | 945.61 | | 1421.64 | 946.11 | 1423.87 | 946.21 | |
| 1425.78 | 946.3 | | 1440.45 | 946.5 | 1460.22 | 947.14 | |
| 1462.14 | 947.22 | | 1464.35 | 947.31 | 1466.73 | 947.4 | |
| 1482.53 | 947.88 | | 1488.72 | 948.15 | 1499.91 | 948.87 | |
| 1510.85 | 949.13 | | 1529.63 | 949.72 | 1538.53 | 950.12 | |
| 1545.34 | 950.33 | | 1551.59 | 950.48 | 1575.81 | 951.16 | |
| 1580.59 | 951.28 | | 1581.27 | 951.3 | 1600.88 | 951.74 | |
| 1606.65 | 951.99 | | 1612.04 | 952.15 | 1633.56 | 953.03 | |
| 1641.79 | 953.25 | | 1648.55 | 953.33 | 1657.81 | 953.78 | |
| 1660.85 | 953.89 | | 1663.66 | 954 | 1666.07 | 954.1 | |
| 1675.44 | 954.46 | | 1677.98 | 954.59 | 1698.47 | 955.2 | |
| 1701.05 | 955.22 | | 1709.01 | 955.45 | 1711.54 | 955.46 | |
| 1714.44 | 955.47 | | 1727.16 | 955.84 | 1729.98 | 956.03 | |
| 1743.08 | 956.72 | | 1750.55 | 956.87 | 1758.09 | 957.12 | |
| 1775.12 | 957.6 | | 1788.49 | 957.95 | 1804.39 | 958.38 | |
| 1811.13 | 958.76 | | 1826.91 | 959.33 | 1835.75 | 959.66 | |
| 1846.37 | 960.1 | | 1856.96 | 960.52 | 1883.46 | 961.62 | |
| 1890.39 | 961.98 | | 1899.57 | 962.42 | 1915.61 | 963.02 | |
| 1926.29 | 963.32 | | 1941.17 | 963.85 | 1958.27 | 964.4 | |
| 1967.8 | 964.69 | | 1981.81 | 965.16 | 1990.04 | 965.52 | |
| 2002.08 | 965.92 | | 2008.23 | 966.11 | 2023.45 | 966.59 | |
| 2029.35 | 966.78 | | 2048.73 | 967.11 | 2059.59 | 967.54 | |
| 2068.73 | 968.47 | | 2088.73 | 969.34 | 2103.12 | 969.83 | |
| 2120.8 | 970.45 | | 2132.88 | 970.97 | 2146.72 | 971.66 | |
| 2156.56 | 972.02 | | 2168.27 | 972.39 | 2181.5 | 972.76 | |
| 2190.49 | 973.18 | | 2196.76 | 973.4 | 2207.46 | 973.85 | |
| 2209.45 | 973.96 | | 2213.33 | 974.19 | 2216.57 | 974.39 | |
| 2227.79 | 974.61 | | | | | | |

Downstream Bridge Cross Section Data
Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Coeff Contr. Expan.
954.14 1003.14 .3 .5

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

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

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

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31749

INPUT
Description:
Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 954.14 | 1003.14 | 31660.84 | 31769.51 | .3 | .5 |

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.33 | Element | | | |
| Vel Head (ft) | 0.33 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.00 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 935.31 | Flow Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| E.G. Slope (ft/ft) | 0.000889 | Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 994.10 | 3998.03 | 1687.86 |
| Top Width (ft) | 625.72 | Top Width (ft) | 250.39 | 49.00 | 326.33 |
| Vel Total (ft/s) | 2.43 | Avg. Vel. (ft/s) | 1.22 | 5.85 | 1.35 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 3.26 | 13.95 | 3.83 |
| Conv. Total (cfs) | 224039.2 | Conv. (cfs) | 33341.1 | 134089.3 | 56608.9 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 250.77 | 52.31 | 328.02 |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.18 | 0.73 | 0.21 |
| Alpha | 3.59 | Stream Power (lb/ft s) | 2255.66 | 0.00 | 0.00 |
| 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:Rottenwood

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| 1 | 35046 | .1 | .048 | .09 |
| 1 | 34164 | .12 | .05 | .09 |
| 1 | 33522 | .1 | .05 | .09 |
| 1 | 32995 | .12 | .05 | .12 |
| 1 | 32570 | .12 | .05 | .11 |
| 1 | 31948 | .08 | .042 | .08 |
| 1 | 31847 | .08 | .042 | .08 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | .08 | .042 | .08 |

SUMMARY OF REACH LENGTHS

River: Rottenwood

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| 1 | 35046 | 838.32 | 881.91 | 920.22 |
| 1 | 34164 | 739.6 | 642.53 | 541.42 |
| 1 | 33522 | 440.95 | 526.75 | 614.99 |
| 1 | 32995 | 424.42 | 425.55 | 426.3 |
| 1 | 32570 | 614.58 | 621.16 | 617.04 |
| 1 | 31948 | 83.8 | 101.77 | 116.75 |
| 1 | 31847 | 97.38 | 97.38 | 100.28 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | 31660.84 | 31769.51 | 31788.64 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Rottenwood

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| 1 | 35046 | .1 | .3 |
| 1 | 34164 | .1 | .3 |
| 1 | 33522 | .1 | .3 |
| 1 | 32995 | .1 | .3 |
| 1 | 32570 | .1 | .3 |
| 1 | 31948 | .3 | .5 |
| 1 | 31847 | .3 | .5 |
| 1 | 31798 | Bridge | |
| 1 | 31749 | .3 | .5 |

Profile Output Table - Standard Table 2

| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| 1 | 35046 | 100 nat | 946.76 | 946.54 | 0.21 | 1.71 | 0.02 | 3004.35 | 2486.16 | 1059.49 | 617.60 |
| 1 | 34164 | 100 nat | 945.02 | 944.60 | 0.42 | 1.09 | 0.06 | 2053.57 | 4496.43 | | 281.09 |
| 1 | 33522 | 100 nat | 943.86 | 943.66 | 0.20 | 0.75 | 0.02 | 3285.26 | 3414.74 | | 375.16 |
| 1 | 32995 | 100 nat | 943.10 | 942.69 | 0.41 | 0.59 | 0.04 | 1952.22 | 4077.27 | 670.51 | 342.06 |
| 1 | 32570 | 100 nat | 942.46 | 942.20 | 0.27 | 0.80 | 0.03 | 2014.16 | 4659.06 | 6.78 | 640.30 |
| 1 | 31948 | 100 nat | 941.63 | 941.02 | 0.61 | 0.14 | 0.08 | 707.58 | 4538.87 | 1433.56 | 533.80 |
| 1 | 31847 | 100 nat | 941.41 | 940.97 | 0.44 | | | 1295.58 | 4409.23 | 975.19 | 527.84 |
| 1 | 31798 | Franklin Rd | | Bridge | | | | | | | |
| 1 | 31749 | 100 nat | 941.33 | 941.00 | 0.33 | | | 994.10 | 3998.03 | 1687.86 | 625.72 |

Profile Output Table - Standard Table 1

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

```
  1          35046                      100 nat   6550.00     932.80     946.54
946.76     0.001676      5.60     2833.06     617.60          0.30
  1          34164                      100 nat   6550.00     930.06     944.60
945.02     0.002361      6.13     1838.96     281.09          0.35
  1          33522                      100 nat   6700.00     927.77     943.66     938.99
943.86     0.001169      4.77     2533.01     375.16          0.25
  1          32995                      100 nat   6700.00     925.95     942.69     938.66
943.10     0.001987      6.42     2166.33     342.06          0.32
  1          32570                      100 nat   6680.00     925.57     942.20     936.13
942.46     0.001026      4.90     2414.56     640.30          0.24
  1          31948                      100 nat   6680.00     924.24     941.02
941.63     0.001673      7.49     1872.22     533.80          0.37
  1          31847                      100 nat   6680.00     924.22     940.97     935.30
941.41     0.001088      6.47     2311.78     527.84          0.31
  1          31798    Franklin Rd                      Bridge

  1          31749                      100 nat   6680.00     924.22     941.00     935.31
941.33     0.000889      5.85     2749.72     625.72          0.28
```

# EFFECTIVE MODEL

- AMEC model extracted sections from below Franklin Road upstream through the project
- Added one section in area of proposed streambank stabilization
- Used GIS contours to approximate conditions prior to severe erosion

HEC-RAS Plan: effective River: Rottenwood Reach: 1 Profile: 100 nat

| 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) | |
| 1 | 35046 | 100 nat | 6550.00 | 932.80 | 946.59 | | 946.80 | 0.001633 | 5.54 | 2862.15 | 618.68 | 0.29 |
| 1 | 34164 | 100 nat | 6550.00 | 930.06 | 944.72 | | 945.12 | 0.002251 | 6.02 | 1872.73 | 281.68 | 0.35 |
| 1 | 33618 | 100 nat | 6550.00 | 927.90 | 943.73 | | 944.02 | 0.001532 | 5.62 | 2280.85 | 280.01 | 0.29 |
| 1 | 33522 | 100 nat | 6700.00 | 927.77 | 943.66 | 938.99 | 943.86 | 0.001169 | 4.77 | 2533.01 | 375.16 | 0.25 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 Franklin Rd | | Bridge | | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

# EXISTING MODEL

- AMEC model extracted sections from below Franklin Road upstream through the project
- Adjusted cross sections through site (including added section) for field run conditions including scour in area of project

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X     X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X      X    X       X
X     X  X        X    X       X   X     X    X       X
X     X  XXXXXX    XXXX        X    X    X    X   XXXXX
```

PROJECT DATA
Project Title: Rottenwood Creek 1
Project File : RottenwoodCreek1.prj
Run Date and Time: 1/3/2013 4:11:02 PM

Project in English units

Project Description:
Cobb County Priority Area 3 Flood Study
Rottenwood Creek
Rottenwood Creek
Watershed

Model extends from just downstream of Cumberland Blvd to 370 feet
upstream of Fairground Street

Plans
Existing Conditions Floodplain (ex
fp)
Existing Conditions Floodway  (ex fw)
Future Conditions Floodplain  (fc
fp)

AMEC Earth and Environmental
EWW - Project Engineer
October
2004

Originally run in HEC-RAS 3.1.1

PLAN DATA

Plan Title: effective
Plan File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.p08

Geometry Title: effective
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.g04

Flow Title    : ex 100
Flow File     : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.f02

Plan Description:
existing floodway model

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 9 | Multiple Openings | = | 0 |
| | Culverts | = 0 | Inline Structures | = | 0 |
| | Bridges | = 1 | 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 = 0.3
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

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

FLOW DATA

Flow Title: ex 100
Flow File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.f02

Flow Data (cfs)

| River | Reach | RS | 100 nat |
|---|---|---|---|
| Rottenwood | 1 | 35046 | 6550 |
| Rottenwood | 1 | 33522 | 6700 |
| Rottenwood | 1 | 32570 | 6680 |
| Rottenwood | 1 | 31749 | 6680 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Rottenwood | 1 | 100 nat | | Known WS = 941 |

GEOMETRY DATA

Geometry Title: effective
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.g04

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 35046

INPUT
Description:
Station Elevation Data num= 168

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 991.78 | .03 | 991.78 | 9.39 | 991.49 | 29.93 | 991.12 | 44.65 | 990.75 |
| 59.84 | 990.47 | 75.49 | 990.42 | 83.38 | 990.27 | 97.77 | 989.64 | 114.55 | 989.13 |
| 120.23 | 988.92 | 134.75 | 987.69 | 139.44 | 987.53 | 163.36 | 986.23 | 166.83 | 986.11 |
| 189.96 | 985.12 | 192.22 | 984.94 | 194.45 | 984.81 | 217.92 | 983.15 | 222.29 | 983.01 |
| 239.38 | 981.33 | 244.5 | 981.21 | 256.64 | 980.18 | 261.97 | 979.83 | 267.85 | 979.15 |
| 276.7 | 978.2 | 285.7 | 977.17 | 287.37 | 976.9 | 290.95 | 976.65 | 296.13 | 976.36 |
| 298.2 | 976.25 | 302.15 | 975.82 | 307.95 | 975.28 | 337.43 | 973.5 | 345.9 | 973.16 |
| 364.77 | 972.2 | 382.41 | 971.04 | 396.5 | 970.39 | 412.58 | 969.69 | 418.35 | 969.67 |
| 432.83 | 969.01 | 441.13 | 969.05 | 457.13 | 968.79 | 464.58 | 968.46 | 486.74 | 968.35 |
| 487.83 | 968.33 | 488.83 | 968.32 | 496.21 | 968.18 | 512.49 | 967.96 | 538.92 | 967.25 |
| 540.99 | 967.24 | 566.14 | 966.72 | 567.4 | 966.7 | 568.37 | 966.69 | 596.96 | 966.83 |
| 598.44 | 966.78 | 600.08 | 966.8 | 602.29 | 966.82 | 618.42 | 966.91 | 629.85 | 965.36 |
| 635.64 | 965.29 | 646.38 | 965.13 | 677.54 | 964.67 | 687.5 | 964.66 | 697.23 | 964.8 |
| 706.48 | 964.78 | 715.49 | 964.63 | 720.98 | 964.7 | 733.99 | 964.42 | 745.44 | 964.49 |
| 762.05 | 964.37 | 765.93 | 964.52 | 770.1 | 964.71 | 785.74 | 965.38 | 802.16 | 965.95 |
| 802.43 | 965.95 | 802.75 | 965.95 | 826.92 | 965.66 | 835.31 | 965.66 | 842.94 | 965.61 |
| 872.76 | 965.59 | 881.37 | 965.59 | 912.66 | 965.08 | 913.28 | 965.51 | 1034.43 | 953.97 |
| 1135.05 | 940.49 | 1260.06 | 940.37 | 1343.48 | 940.92 | 1383.31 | 941.88 | 1390.44 | 932.8 |
| 1399.87 | 933.12 | 1410.89 | 933.52 | 1423.5 | 942.99 | 1565.92 | 943.52 | 1575.31 | 943.34 |
| 1597.39 | 943.48 | 1612.13 | 944.09 | 1639.62 | 944.01 | 1649.93 | 944.31 | 1665.08 | 944.64 |
| 1666.73 | 944.73 | 1678.62 | 943.81 | 1679.62 | 943.71 | 1683.91 | 944.65 | 1690.86 | 945.71 |
| 1695.49 | 945.85 | 1702.82 | 946.24 | 1752.25 | 949.44 | 1766.03 | 949.67 | 1775.24 | 949.83 |
| 1777.99 | 949.61 | 1783.28 | 950.18 | 1785.22 | 950.2 | 1793.44 | 951.51 | 1797.04 | 951.87 |
| 1804.59 | 952.76 | 1812.96 | 954.64 | 1821.82 | 955.9 | 1823.76 | 955.97 | 1832.57 | 957.77 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1841.37 | 958.88 | 1844.84 | 958.93 | 1856.88 | 960.2 | 1859.96 | 960.31 | 1875.29 | 962.97 |
| 1888 | 964.62 | 1893.27 | 964.89 | 1910.66 | 966.12 | 1917.41 | 966.58 | 1928.91 | 967.69 |
| 1943.12 | 969.01 | 1947.84 | 969.14 | 1960.22 | 969.65 | 1967.72 | 970.37 | 1978.03 | 970.48 |
| 2000.47 | 971.9 | 2015.96 | 972.88 | 2021.66 | 972.92 | 2035.5 | 973.56 | 2046.4 | 973.64 |
| 2058.5 | 973.86 | 2067.21 | 974.65 | 2075.91 | 975.94 | 2078.92 | 977.59 | 2088.7 | 976.76 |
| 2100.52 | 976.07 | 2113.09 | 973.68 | 2122.34 | 971.74 | 2137.23 | 976.28 | 2145.86 | 979.3 |
| 2149.36 | 979.33 | 2156.02 | 979.5 | 2162.51 | 979.38 | 2174.53 | 979.18 | 2180.35 | 978.87 |
| 2185.32 | 978.58 | 2194.16 | 976.35 | 2216.83 | 970.38 | 2224.21 | 971.26 | 2225.76 | 971.47 |
| 2232.42 | 971.57 | 2263.81 | 971.99 | 2277.33 | 970.66 | 2279.51 | 970.43 | 2281.24 | 970.61 |
| 2297.8 | 972.28 | 2309.94 | 972.05 | 2328.3 | 971.67 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1383.31 | .048 | 1423.5 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1383.31 | 1423.5 | 838.32 | 881.91 | 920.22 | .1 | .3 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 946.80 | Element | | | |
| Vel Head (ft) | 0.21 | Wt. n-Val. | 0.100 | 0.048 | 0.090 |
| W.S. Elev (ft) | 946.59 | Reach Len. (ft) | 838.32 | 881.91 | 920.22 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1611.22 | 445.77 | 805.15 |
| E.G. Slope (ft/ft) | 0.001633 | Area (sq ft) | 1611.22 | 445.77 | 805.15 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 3005.50 | 2471.09 | 1073.42 |
| Top Width (ft) | 618.68 | Top Width (ft) | 293.78 | 40.19 | 284.71 |
| Vel Total (ft/s) | 2.29 | Avg. Vel. (ft/s) | 1.87 | 5.54 | 1.33 |
| Max Chl Dpth (ft) | 13.79 | Hydr. Depth (ft) | 5.48 | 11.09 | 2.83 |
| Conv. Total (cfs) | 162111.3 | Conv. (cfs) | 74385.4 | 61159.0 | 26566.8 |
| Length Wtd. (ft) | 868.14 | Wetted Per. (ft) | 294.20 | 47.78 | 284.98 |
| Min Ch El (ft) | 932.80 | Shear (lb/sq ft) | 0.56 | 0.95 | 0.29 |
| Alpha | 2.57 | Stream Power (lb/ft s) | 2328.30 | 0.00 | 0.00 |
| Frctn Loss (ft) | 1.65 | Cum Volume (acre-ft) | 99.21 | 51.87 | 24.05 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 21.13 | 4.57 | 7.52 |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 34164

INPUT
Description:
Station Elevation Data num= 204

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.23 | 19.66 | 962.16 | 34.39 | 962.08 | 39.67 | 962.05 | 52.24 | 961.83 |
| 71.86 | 962.63 | 82.1 | 962.48 | 84.07 | 962.49 | 96.98 | 962.82 | 98 | 962.87 |
| 98.84 | 962.99 | 117.45 | 962.02 | 123.83 | 961.8 | 144.55 | 961.34 | 149.46 | 961.17 |
| 152.04 | 961.09 | 153.56 | 961.06 | 155.34 | 961.01 | 194.7 | 960.43 | 210.53 | 960.25 |
| 241.92 | 960.09 | 243.89 | 960.36 | 249.78 | 961.05 | 255.13 | 961.7 | 261.65 | 962.54 |
| 273.02 | 962.31 | 279.28 | 962.11 | 289.07 | 961.87 | 293.68 | 961.84 | 300.36 | 961.52 |
| 330.41 | 960.96 | 342.03 | 960.59 | 370.12 | 960.28 | 387.02 | 960.8 | 421.49 | 961.79 |
| 430.38 | 961.84 | 440.81 | 960.08 | 475.02 | 958.56 | 487.07 | 960.03 | 490.12 | 960.12 |
| 492.64 | 960.68 | 496.58 | 960.82 | 508.71 | 961.19 | 523.44 | 958.41 | 538.81 | 955.65 |
| 545.31 | 955.55 | 548.9 | 955.4 | 566.72 | 954.76 | 569.85 | 954.64 | 570.48 | 954.63 |
| 572.69 | 954.49 | 586.08 | 953.47 | 590.68 | 953.29 | 607.23 | 952.94 | 620.82 | 952.54 |
| 622.94 | 952.41 | 632.84 | 952.29 | 678.85 | 952.2 | 729.6 | 952.04 | 735.32 | 952.1 |
| 738.49 | 952.19 | 745.21 | 952.32 | 772.28 | 952.92 | 788.62 | 953.64 | 788.79 | 953.64 |
| 797.11 | 952.12 | 803.51 | 950.74 | 805.01 | 950.8 | 820.66 | 952.09 | 824.43 | 953.16 |
| 832.34 | 952.91 | 833.29 | 952.89 | 851.95 | 952.59 | 860.94 | 949.38 | 870.16 | 944.88 |
| 881.32 | 939.88 | 893.83 | 939.29 | 923.32 | 938.57 | 923.34 | 938.57 | 923.36 | 938.56 |
| 931.95 | 938 | 939.7 | 938 | 957.84 | 938 | 958.35 | 938.15 | 961.1 | 939.06 |
| 964.62 | 939.05 | 971.78 | 939.13 | 985.13 | 939.23 | 996.04 | 939.24 | 1025.68 | 938.22 |
| 1027.36 | 938.2 | 1032.6 | 938.3 | 1067.48 | 939.09 | 1070.38 | 939.16 | 1073.32 | 939.22 |
| 1075.83 | 936.87 | 1081.12 | 931.84 | 1081.41 | 931.67 | 1081.61 | 931.67 | 1087 | 930.06 |
| 1094.8 | 931.7 | 1101.41 | 932.37 | 1106.72 | 932.89 | 1124.4 | 934.63 | 1151.66 | 944.53 |
| 1162.42 | 948.46 | 1177.21 | 948.68 | 1194.35 | 949.06 | 1211.15 | 949.35 | 1214.18 | 949.44 |
| 1238.04 | 949.86 | 1251.65 | 949.99 | 1254.58 | 950.08 | 1277.47 | 950.18 | 1311.4 | 949.87 |
| 1315.62 | 949.88 | 1326.18 | 949.8 | 1326.82 | 949.8 | 1336.48 | 949.73 | 1341.06 | 949.78 |
| 1363.09 | 949.46 | 1368.93 | 949.55 | 1416.74 | 951.07 | 1427.63 | 952.28 | 1430.87 | 952.59 |
| 1436.55 | 952.98 | 1450.24 | 952.89 | 1455.11 | 952.71 | 1460.45 | 952.71 | 1465.95 | 952.8 |
| 1469.77 | 952.86 | 1471.77 | 952.89 | 1503.64 | 953.18 | 1515.18 | 953.39 | 1523.21 | 953.53 |
| 1529.35 | 952.35 | 1533.05 | 951.82 | 1543.79 | 951.99 | 1546.29 | 952 | 1560.25 | 951.95 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1582.06 | 952.16 | 1583.13 | 952.19 | 1589.04 | 952.35 | 1589.68 | 952.35 | 1610.45 | 952.68 |
| 1614.34 | 952.79 | 1659.7 | 954.37 | 1664.35 | 954.53 | 1667.66 | 954.53 | 1682.25 | 954.65 |
| 1698.3 | 954.78 | 1704.59 | 954.35 | 1718.74 | 953.7 | 1733.73 | 955.03 | 1734.62 | 955.09 |
| 1736.45 | 955.25 | 1753.14 | 956.8 | 1763.55 | 957.04 | 1771.42 | 957.29 | 1776.31 | 957.34 |
| 1814.34 | 957.72 | 1823.48 | 957.65 | 1865.5 | 957.17 | 1880.42 | 957.5 | 1883.08 | 957.84 |
| 1893.43 | 958.99 | 1900.07 | 958.36 | 1905.31 | 957.8 | 1936.39 | 958.36 | 1959.7 | 958.66 |
| 1964.35 | 958.76 | 1968.17 | 958.72 | 2010.45 | 959.78 | 2015.2 | 959.9 | 2015.94 | 959.84 |
| 2027.94 | 958.84 | 2039.91 | 961.79 | 2055.59 | 965.29 | 2059.05 | 965.19 | 2099.21 | 964.39 |
| 2114.44 | 964.06 | 2117.77 | 964 | 2123.79 | 964.03 | 2126.43 | 964.05 | 2143.88 | 964.27 |
| 2150.98 | 965.23 | 2168.87 | 967.16 | 2201.12 | 970.66 | 2215.55 | 972.48 | 2224.46 | 974.36 |
| 2231.27 | 975.87 | 2266.05 | 975.23 | 2270.45 | 975.15 | 2271.4 | 975.12 | 2271.9 | 975.11 |
| 2272.3 | 975.1 | 2274.47 | 975.02 | 2277.7 | 974.89 | 2313.1 | 973.36 | 2315.8 | 972.94 |
| 2324.24 | 971.78 | 2325.93 | 972.19 | 2337.67 | 974.93 | 2359.19 | 975.19 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1073.32 | .05 | 1162.42 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1073.32 | 1162.42 | 643.6 | 546.53 | 445.42 | .1 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 900 | 961.1 | 939.06 | T |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 945.12 | Element | Left OB | Channel | Right OB | |
| Vel Head (ft) | 0.40 | Wt. n-Val. | 0.120 | 0.050 | | |
| W.S. Elev (ft) | 944.72 | Reach Len. (ft) | 643.60 | 546.53 | 445.42 | |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1129.87 | 742.86 | | |
| E.G. Slope (ft/ft) | 0.002251 | Area (sq ft) | 1170.70 | 742.86 | | |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 2077.27 | 4472.73 | | |
| Top Width (ft) | 281.68 | Top Width (ft) | 202.81 | 78.87 | | |
| Vel Total (ft/s) | 3.50 | Avg. Vel. (ft/s) | 1.84 | 6.02 | | |
| Max Chl Dpth (ft) | 14.66 | Hydr. Depth (ft) | 5.57 | 9.42 | | |
| Conv. Total (cfs) | 138058.4 | Conv. (cfs) | 43783.9 | 94274.5 | | |
| Length Wtd. (ft) | 584.09 | Wetted Per. (ft) | 204.09 | 84.18 | | |
| Min Ch El (ft) | 930.06 | Shear (lb/sq ft) | 0.78 | 1.24 | | |
| Alpha | 2.11 | Stream Power (lb/ft s) | 2359.19 | 0.00 | 0.00 | |
| Frctn Loss (ft) | 1.07 | Cum Volume (acre-ft) | 72.44 | 39.83 | 15.55 | |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 16.35 | 3.37 | 4.51 | |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 33618

INPUT
Description:
Station Elevation Data num= 22

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| -25 | 946 | 28 | 944 | 34.6 | 942 | 39.4 | 940 | 49.1 | 938 |
| 72.9 | 936 | 137.3 | 934 | 149.4 | 936 | 225.2 | 936 | 236 | 938 |
| 252 | 938 | 257.7 | 936 | 259.1 | 934 | 260.3 | 932 | 262.2 | 930 |
| 274.1 | 928 | 275.7 | 927.9 | 277.7 | 928 | 290.6 | 930 | 304.5 | 940 |
| 311.6 | 946 | 323.5 | 948 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| -25 | .12 | 252 | .05 | 304.5 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 252 | 304.5 | 96 | 96 | .1 | .3 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 944.02 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.29 | Wt. n-Val. | 0.120 | 0.050 | 0.090 |
| W.S. Elev (ft) | 943.73 | Reach Len. (ft) | 96.00 | 96.00 | 96.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1641.66 | 630.97 | 8.22 |
| E.G. Slope (ft/ft) | 0.001532 | Area (sq ft) | 1641.66 | 630.97 | 8.22 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 2997.97 | 3545.31 | 6.72 |
| Top Width (ft) | 280.01 | Top Width (ft) | 223.10 | 52.50 | 4.41 |

| | | | | | |
|---|---|---|---|---|---|
| Vel Total (ft/s) | 2.87 | Avg. Vel. (ft/s) | 1.83 | 5.62 | 0.82 |
| Max Chl Dpth (ft) | 15.83 | Hydr. Depth (ft) | 7.36 | 12.02 | 1.86 |
| Conv. Total (cfs) | 167361.8 | Conv. (cfs) | 76602.4 | 90587.7 | 171.7 |
| Length Wtd. (ft) | 96.00 | Wetted Per. (ft) | 224.42 | 59.42 | 5.77 |
| Min Ch El (ft) | 927.90 | Shear (lb/sq ft) | 0.70 | 1.02 | 0.14 |
| Alpha | 2.26 | Stream Power (lb/ft s) | 323.50 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.13 | Cum Volume (acre-ft) | 51.66 | 31.22 | 15.50 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 13.20 | 2.54 | 4.49 |

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 33522

INPUT
Description:
Station Elevation Data num= 201

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 958.96 | 16.13 | 957.63 | 35.95 | 956.65 | 43.68 | 956.4 | 59.88 | 956.14 |
| 66.27 | 956.14 | 77.21 | 955.71 | 101.3 | 955.08 | 108.4 | 954.82 | 117.12 | 954.63 |
| 123.77 | 954.31 | 156.55 | 952.85 | 161.48 | 952.8 | 165.51 | 952.66 | 171.09 | 952.44 |
| 192.05 | 952.13 | 210.32 | 951.73 | 219.09 | 952.56 | 257.78 | 951.86 | 260.55 | 951.85 |
| 272.14 | 951.53 | 274.37 | 951.26 | 287.54 | 950.89 | 293.44 | 950.3 | 308.93 | 950.43 |
| 330.36 | 950.67 | 337.04 | 950.69 | 367.92 | 951.08 | 368.68 | 951.09 | 368.8 | 951.09 |
| 379.84 | 951.15 | 382.58 | 951.13 | 423.49 | 950.34 | 441.53 | 949.99 | 447.15 | 949.88 |
| 459.97 | 949.86 | 478.91 | 949.79 | 484.95 | 949.77 | 494.96 | 949.26 | 513.2 | 947.79 |
| 514.15 | 947.75 | 514.75 | 947.73 | 515.71 | 947.74 | 536.34 | 948.01 | 549.33 | 947.96 |
| 572.91 | 946.44 | 589.37 | 945.95 | 601.98 | 945.68 | 621.25 | 944.84 | 630.36 | 944.38 |
| 644.54 | 944.15 | 659.43 | 943.82 | 676.02 | 943.42 | 695.41 | 943.68 | 707.64 | 943.57 |
| 717.54 | 943.93 | 722.13 | 944.41 | 734.97 | 944.42 | 755.82 | 944.65 | 771.02 | 944.66 |
| 777 | 944.8 | 791.42 | 944.94 | 803.62 | 945.3 | 817.93 | 945.47 | 823.65 | 945.73 |
| 832.77 | 945.89 | 863.64 | 946.15 | 864.99 | 946.15 | 871.96 | 944.08 | 898.6 | 936.21 |
| 909.65 | 935.95 | 911.84 | 935.91 | 912.5 | 935.76 | 919.45 | 934.8 | 922.68 | 934.8 |
| 928.73 | 934.8 | 930.5 | 934.8 | 934.51 | 934.8 | 948.74 | 934.8 | 956.7 | 934.8 |
| 969.88 | 934.8 | 973.56 | 934.8 | 982.01 | 934.8 | 984.97 | 936.39 | 985.87 | 936.85 |
| 1019.32 | 935.53 | 1034.08 | 935.09 | 1038.29 | 935.05 | 1057.09 | 934.59 | 1065.18 | 934.48 |
| 1077.13 | 936.13 | 1086.31 | 937.42 | 1105.45 | 935.57 | 1111.82 | 935.25 | 1121.69 | 935.32 |
| 1123.9 | 935.34 | 1142.77 | 935.48 | 1150.43 | 932.96 | 1152.19 | 932.38 | 1160.46 | 929.38 |
| 1171.46 | 927.77 | 1180.88 | 929.38 | 1190.64 | 933.59 | 1192.67 | 934.47 | 1212.5 | 945.97 |
| 1241.53 | 945.51 | 1251.15 | 945.29 | 1259.29 | 945.35 | 1286.69 | 946.74 | 1300.15 | 946.89 |
| 1309.18 | 946.98 | 1338.19 | 947.71 | 1369.1 | 947.97 | 1393.23 | 948.24 | 1409.19 | 948.34 |
| 1422.45 | 948.49 | 1431.13 | 947.68 | 1438.5 | 946.94 | 1445.49 | 947.07 | 1455.51 | 947.38 |
| 1457.29 | 947.42 | 1474.06 | 947.41 | 1489.4 | 947.85 | 1495.56 | 948.17 | 1507.74 | 950.32 |
| 1512.31 | 950.73 | 1514.28 | 950.68 | 1519.05 | 951.53 | 1522.38 | 951.68 | 1524.19 | 951.72 |
| 1541.31 | 951.86 | 1550.76 | 952.07 | 1564 | 952.1 | 1571.49 | 952.07 | 1576.79 | 952.13 |
| 1582.21 | 952.07 | 1582.58 | 952.03 | 1583.43 | 951.98 | 1589.72 | 951.55 | 1595.83 | 951.69 |
| 1611.73 | 952.04 | 1614.35 | 952.06 | 1625.49 | 952.2 | 1634.29 | 952.29 | 1650.1 | 954.06 |
| 1652.89 | 954.09 | 1665.23 | 954.18 | 1666.51 | 954.19 | 1694.7 | 954.08 | 1699.3 | 954.11 |
| 1701.37 | 954.13 | 1713.07 | 953.5 | 1719.06 | 953.38 | 1731.29 | 953.07 | 1753.71 | 953.06 |
| 1776.04 | 953.5 | 1789.97 | 953.78 | 1808.9 | 954.06 | 1831.02 | 954.24 | 1841.52 | 954.41 |
| 1849.37 | 954.51 | 1859.76 | 955.12 | 1872.16 | 954.82 | 1888.39 | 955.1 | 1908.88 | 955.24 |
| 1938.43 | 955.18 | 1947.29 | 955.27 | 1953 | 955.27 | 1984.14 | 956.17 | 1992.38 | 956.49 |
| 1999.94 | 956.65 | 2009.21 | 957.03 | 2019.73 | 957.03 | 2034.17 | 956.98 | 2042.07 | 957.23 |
| 2063.12 | 957.49 | 2066.53 | 957.54 | 2074.54 | 957.53 | 2079.23 | 957.55 | 2091.45 | 957.44 |
| 2092.85 | 957.38 | 2102.18 | 957.17 | 2122.66 | 956.58 | 2125.2 | 956.52 | 2145.73 | 959.03 |
| 2149.45 | 959.56 | 2158.49 | 960.15 | 2178.72 | 961.63 | 2186.99 | 961.79 | 2208.52 | 961.79 |
| 2225.94 | 960.54 | 2228.7 | 960.43 | 2229.94 | 960.41 | 2249.58 | 961.81 | 2279.8 | 963.33 |
| 2290 | 964.05 | 2301.82 | 965.96 | 2309.26 | 967.17 | 2316.32 | 969.03 | 2341.46 | 969.39 |
| 2353.14 | 969.61 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1142.77 | .05 | 1212.5 | .09 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1142.77 1212.5 440.95 526.75 614.99 .1 .3

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 530 | 863.64 | 946.15 | F |
| 863.64 | 1085.57 | 937.32 | F |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 895 | 1084 | 936.85 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.86 | Element | Left OB | Channel | Right OB |

| | | | | | |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.20 | Wt. n-Val. | 0.100 | 0.050 | |
| W.S. Elev (ft) | 943.66 | Reach Len. (ft) | 440.95 | 526.75 | 614.99 |
| Crit W.S. (ft) | 938.99 | Flow Area (sq ft) | 1816.52 | 716.49 | |
| E.G. Slope (ft/ft) | 0.001169 | Area (sq ft) | 1820.37 | 716.49 | |
| Q Total (cfs) | 6700.00 | Flow (cfs) | 3285.26 | 3414.74 | |
| Top Width (ft) | 375.16 | Top Width (ft) | 309.42 | 65.74 | |
| Vel Total (ft/s) | 2.65 | Avg. Vel. (ft/s) | 1.81 | 4.77 | |
| Max Chl Dpth (ft) | 15.89 | Hydr. Depth (ft) | 6.74 | 10.90 | |
| Conv. Total (cfs) | 195935.8 | Conv. (cfs) | 96074.7 | 99861.2 | |
| Length Wtd. (ft) | 497.63 | Wetted Per. (ft) | 270.51 | 70.55 | |
| Min Ch El (ft) | 927.77 | Shear (lb/sq ft) | 0.49 | 0.74 | |
| Alpha | 1.88 | Stream Power (lb/ft s) | 2353.14 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.75 | Cum Volume (acre-ft) | 47.84 | 29.73 | 15.50 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 12.61 | 2.41 | 4.48 |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32995

INPUT
Description:
Station Elevation Data num= 192

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 957.44 | 16.27 | 957.03 | 38.57 | 956.3 | 50.98 | 955.82 | 89.48 | 954.64 |
| 128.18 | 953.14 | 141.01 | 952.58 | 153.57 | 952.44 | 182.78 | 953.43 | 195.8 | 954.31 |
| 206.11 | 955.26 | 224.25 | 956.8 | 229.93 | 956.45 | 239.02 | 955.81 | 249.59 | 955.26 |
| 258.29 | 953.69 | 260.4 | 953.35 | 268.66 | 952.75 | 274.39 | 952.49 | 275.07 | 952.45 |
| 287.81 | 951.79 | 292.29 | 951.65 | 298.59 | 951.45 | 311.21 | 951.01 | 335.23 | 950.47 |
| 347.75 | 950.15 | 348.58 | 950.14 | 351.31 | 950.08 | 391.41 | 949.38 | 404.49 | 949.18 |
| 428.68 | 948.86 | 444.69 | 948.72 | 454.87 | 948.44 | 471.79 | 948.4 | 473.65 | 948.35 |
| 492.85 | 949.63 | 496.42 | 949.45 | 498.27 | 949.61 | 513.65 | 948.53 | 516 | 948.37 |
| 518.1 | 948.22 | 521.74 | 947.72 | 526.8 | 946.23 | 530.52 | 946.08 | 553.18 | 944.92 |
| 594.16 | 944.26 | 602.37 | 944.26 | 604.71 | 944.12 | 643.87 | 942.89 | 656.23 | 942.76 |
| 685.14 | 942.96 | 707.77 | 942.88 | 717.7 | 943.51 | 730.99 | 943.91 | 749.65 | 944.14 |
| 750.68 | 944.14 | 754.27 | 944.42 | 765 | 945.77 | 791.52 | 944.49 | 813.78 | 944.22 |
| 832.78 | 943.41 | 833.03 | 943.4 | 833.28 | 943.45 | 834.12 | 943.67 | 852.9 | 948.45 |
| 856.97 | 949.86 | 873.76 | 942.21 | 885.06 | 937.15 | 912.59 | 935.12 | 921.52 | 934.45 |
| 921.92 | 934.42 | 923.29 | 934.39 | 960.17 | 935.74 | 975.88 | 936.04 | 996.39 | 936.45 |
| 1026.3 | 937.52 | 1031.76 | 937.72 | 1034.98 | 937.76 | 1038.03 | 928.76 | 1038.4 | 927.56 |
| 1039.11 | 927.56 | 1045 | 925.95 | 1053.41 | 927.56 | 1055.24 | 927.98 | 1062.05 | 929.55 |
| 1065.92 | 930.17 | 1069.19 | 930.69 | 1071.47 | 930.95 | 1084.85 | 936.46 | 1085.35 | 936.64 |
| 1085.42 | 936.65 | 1094.81 | 936.76 | 1101.03 | 936.79 | 1105.86 | 936.84 | 1112.37 | 936.96 |
| 1118.36 | 936.73 | 1132.33 | 936.8 | 1147.16 | 936.75 | 1150.47 | 936.86 | 1169 | 939.74 |
| 1180.02 | 941.79 | 1185.92 | 942.1 | 1188.36 | 942.22 | 1191.28 | 942.39 | 1196.05 | 942.48 |
| 1230.86 | 942.87 | 1248.83 | 943.33 | 1268.07 | 944.03 | 1269.27 | 944.07 | 1272.21 | 944.08 |
| 1300.9 | 944.14 | 1306.27 | 944.57 | 1313.51 | 945.19 | 1322.43 | 945.84 | 1330.36 | 945.21 |
| 1354.47 | 944.62 | 1363.48 | 944.25 | 1372.88 | 943.94 | 1392.91 | 943.77 | 1406.33 | 943.43 |
| 1415.8 | 943.18 | 1421.96 | 943.71 | 1428.71 | 944.37 | 1435.47 | 944.99 | 1438.4 | 945.51 |
| 1447.59 | 946.34 | 1449.85 | 946.37 | 1458.45 | 946.53 | 1465.91 | 946.76 | 1492.86 | 947.21 |
| 1509.28 | 947.37 | 1517.52 | 947.64 | 1559.33 | 947.96 | 1583.81 | 947.53 | 1613.18 | 947.59 |
| 1621.14 | 947.88 | 1659.34 | 948.64 | 1669.52 | 948.87 | 1674.35 | 948.98 | 1679.6 | 949 |
| 1685.66 | 948.9 | 1717.17 | 948.39 | 1721.02 | 948.23 | 1728.91 | 947.44 | 1758.48 | 947.89 |
| 1771.17 | 948.32 | 1781.68 | 948.64 | 1813.42 | 948.82 | 1822.66 | 948.84 | 1825.5 | 948.84 |
| 1829.88 | 948.82 | 1876.81 | 948.7 | 1898.52 | 948.84 | 1907.04 | 948.83 | 1927.9 | 949.34 |
| 1941.75 | 949.43 | 1959.12 | 949.24 | 1975.93 | 948.87 | 2007.91 | 948.61 | 2009.49 | 948.62 |
| 2011.08 | 948.57 | 2038.29 | 951.62 | 2043.25 | 952.46 | 2050.54 | 953.47 | 2069.42 | 956.04 |
| 2079.22 | 957 | 2087.5 | 958.11 | 2099.52 | 959.95 | 2100.46 | 960.07 | 2101.72 | 960.24 |
| 2103.58 | 960.49 | 2105.91 | 960.81 | 2117.17 | 961.98 | 2131.28 | 964.25 | 2132.16 | 964.23 |
| 2132.57 | 964.24 | 2147.65 | 964.09 | 2148.76 | 964.2 | 2155.66 | 964.29 | 2169.19 | 964.46 |
| 2179.4 | 964.32 | 2182 | 964.33 | 2186.18 | 962.68 | 2195.4 | 959.3 | 2210.74 | 958.59 |
| 2230.49 | 957.4 | 2240.21 | 957.01 | 2244.79 | 956.54 | 2253.93 | 959.03 | 2277.66 | 965.52 |
| 2288.23 | 965.63 | 2297.78 | 965.91 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1034.98 | .05 | 1085.42 | .12 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1034.98 | 1085.42 | 424.42 | 425.55 | 426.3 | .1 .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 856.97 | 949.86 | F |

1322.43 2297.78 945.84 F

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.10 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.41 | Wt. n-Val. | 0.120 | 0.050 | 0.120 |
| W.S. Elev (ft) | 942.69 | Reach Len. (ft) | 424.42 | 425.55 | 426.30 |
| Crit W.S. (ft) | 938.66 | Flow Area (sq ft) | 1034.39 | 635.38 | 496.55 |
| E.G. Slope (ft/ft) | 0.001987 | Area (sq ft) | 1034.39 | 635.38 | 496.55 |
| Q Total (cfs) | 6700.00 | Flow (cfs) | 1952.22 | 4077.27 | 670.51 |
| Top Width (ft) | 342.06 | Top Width (ft) | 162.27 | 50.44 | 129.34 |
| Vel Total (ft/s) | 3.09 | Avg. Vel. (ft/s) | 1.89 | 6.42 | 1.35 |
| Max Chl Dpth (ft) | 16.74 | Hydr. Depth (ft) | 6.37 | 12.60 | 3.84 |
| Conv. Total (cfs) | 150298.4 | Conv. (cfs) | 43793.4 | 91463.8 | 15041.3 |
| Length Wtd. (ft) | 425.25 | Wetted Per. (ft) | 163.61 | 59.60 | 129.78 |
| Min Ch El (ft) | 925.95 | Shear (lb/sq ft) | 0.78 | 1.32 | 0.47 |
| Alpha | 2.75 | Stream Power (lb/ft s) | 2297.78 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.59 | Cum Volume (acre-ft) | 33.40 | 21.56 | 11.99 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 10.23 | 1.71 | 3.57 |

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32570

INPUT
Description:
Station Elevation Data num= 169

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.79 | 14.12 | 962.14 | 18.61 | 961.95 | 18.96 | 961.93 | 21.12 | 962.04 |
| 53.28 | 962.16 | 53.96 | 962.19 | 58.73 | 961.95 | 73.19 | 962.27 | 98.31 | 962.34 |
| 103.58 | 962.38 | 105.92 | 962.39 | 107.8 | 962.33 | 117.36 | 962.3 | 130.46 | 962.26 |
| 134.36 | 961.3 | 137.7 | 960.58 | 140.02 | 960.59 | 148.33 | 960.68 | 190.79 | 960.77 |
| 205.55 | 960.92 | 240.56 | 961 | 246.46 | 960.93 | 268.35 | 960.74 | 282.99 | 960.32 |
| 293.42 | 959.3 | 311.25 | 956.86 | 312.78 | 956.86 | 325.88 | 956.34 | 363.82 | 954.44 |
| 371.51 | 953.95 | 412.04 | 952.43 | 420.7 | 951.99 | 421.43 | 951.93 | 421.58 | 951.91 |
| 423.13 | 951.82 | 431.64 | 951.16 | 432.89 | 951.06 | 444.74 | 949.52 | 459.72 | 948.54 |
| 468.97 | 947.93 | 474.55 | 947.63 | 504.5 | 946.45 | 516.4 | 946.12 | 528.5 | 944.3 |
| 530.14 | 943.99 | 537.46 | 943.34 | 575.69 | 942.13 | 581.07 | 941.87 | 583.63 | 941.86 |
| 625.63 | 941.41 | 636.18 | 940.97 | 649.42 | 940.83 | 688.78 | 940.49 | 690.51 | 940.5 |
| 691.24 | 940.49 | 691.9 | 940.48 | 727.42 | 940.68 | 747.28 | 940.62 | 799.31 | 940.43 |
| 800.44 | 940.43 | 802.71 | 940.41 | 804.15 | 940.41 | 805.34 | 940.39 | 852.84 | 940.03 |
| 864.2 | 940.46 | 878.48 | 941.18 | 903.62 | 942.32 | 910.74 | 941.62 | 929.54 | 940.03 |
| 930.2 | 939.72 | 935.16 | 937.26 | 943.64 | 933.07 | 944.42 | 932.73 | 973.57 | 933.74 |
| 976.36 | 933.92 | 982.61 | 934.1 | 998.97 | 934.74 | 1020.72 | 934.95 | 1046.66 | 935.84 |
| 1061.88 | 935.71 | 1067.19 | 935.71 | 1076.23 | 935.6 | 1098.34 | 934.83 | 1104.36 | 934.95 |
| 1112.92 | 934.71 | 1123.42 | 934.1 | 1128.35 | 932.39 | 1134.79 | 929.65 | 1136.91 | 928.77 |
| 1138.22 | 928.23 | 1139.07 | 927.18 | 1156 | 925.57 | 1176.39 | 927.18 | 1178.79 | 928.5 |
| 1199.2 | 940.99 | 1208.97 | 941.03 | 1210.22 | 941.05 | 1210.68 | 941.16 | 1219.08 | 943.16 |
| 1232.58 | 942.41 | 1232.87 | 942.39 | 1233.14 | 942.39 | 1239.36 | 942.43 | 1259.73 | 942.46 |
| 1266.88 | 942.56 | 1288.79 | 942.86 | 1312.58 | 943.59 | 1338.78 | 944.72 | 1364.1 | 944.75 |
| 1391.31 | 943.29 | 1396.06 | 942.85 | 1406.25 | 942.05 | 1407.59 | 942.24 | 1437.11 | 946.65 |
| 1459.44 | 947.11 | 1482.2 | 947.61 | 1482.72 | 947.78 | 1520.49 | 961.93 | 1523.55 | 962.06 |
| 1552.09 | 962.38 | 1563.93 | 962.37 | 1584.33 | 962 | 1608.83 | 962.1 | 1644.11 | 962.12 |
| 1668.54 | 962.23 | 1705.29 | 962.22 | 1730.2 | 962.44 | 1761.32 | 962.44 | 1785.98 | 962.62 |
| 1811.96 | 962.63 | 1835.49 | 962.81 | 1861.29 | 962.92 | 1861.54 | 962.92 | 1861.96 | 962.97 |
| 1875.22 | 964.1 | 1927.13 | 964.52 | 1938.87 | 964.65 | 1968.88 | 964.97 | 1993.71 | 965.15 |
| 2041.5 | 965.67 | 2048.13 | 965.74 | 2097.24 | 965.74 | 2107.13 | 965.74 | 2133.73 | 965.74 |
| 2143.25 | 965.74 | 2147.29 | 965.76 | 2161.5 | 965.79 | 2171.19 | 964.87 | 2172 | 964.78 |
| 2172.39 | 964.78 | 2188.91 | 964.87 | 2199.43 | 964.94 | 2228.5 | 965.1 | 2233.02 | 964.78 |
| 2240.31 | 964.71 | 2247.6 | 964.18 | 2258.44 | 963.65 | 2273.73 | 961.57 | 2286.64 | 959.44 |
| 2291.27 | 959.7 | 2293.87 | 959.98 | 2307.56 | 964.16 | 2319.85 | 967.45 | 2362.04 | 967.71 |
| 2368.01 | 967.75 | 2369 | 967.62 | 2382.24 | 966.04 | 2382.57 | 966.1 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1123.42 | .05 | 1199.2 | .11 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1123.42 1199.2 614.58 621.16 617.04 .1 .3

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1338.78 | 1425 | 944.72 | F |
| 1217.9 | 1338.78 | 942.88 | F |

550 903.62 942.32 F

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 942.46 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.27 | Wt. n-Val. | 0.120 | 0.050 | 0.110 |
| W.S. Elev (ft) | 942.20 | Reach Len. (ft) | 614.58 | 621.16 | 617.04 |
| Crit W.S. (ft) | 936.13 | Flow Area (sq ft) | 1447.93 | 950.84 | 15.78 |
| E.G. Slope (ft/ft) | 0.001026 | Area (sq ft) | 1900.25 | 950.84 | 16.00 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 2014.16 | 4659.06 | 6.78 |
| Top Width (ft) | 640.30 | Top Width (ft) | 545.81 | 75.78 | 18.72 |
| Vel Total (ft/s) | 2.77 | Avg. Vel. (ft/s) | 1.39 | 4.90 | 0.43 |
| Max Chl Dpth (ft) | 16.63 | Hydr. Depth (ft) | 6.63 | 12.55 | 1.00 |
| Conv. Total (cfs) | 208566.0 | Conv. (cfs) | 62886.9 | 145467.5 | 211.6 |
| Length Wtd. (ft) | 619.38 | Wetted Per. (ft) | 220.42 | 81.41 | 15.97 |
| Min Ch El (ft) | 925.57 | Shear (lb/sq ft) | 0.42 | 0.75 | 0.06 |
| Alpha | 2.26 | Stream Power (lb/ft s) | 2382.57 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.80 | Cum Volume (acre-ft) | 19.10 | 13.81 | 9.48 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 6.78 | 1.09 | 2.84 |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31948

INPUT
Description:
Station Elevation Data num= 172

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 965.57 | 11.54 | 965.68 | 13.15 | 965.83 | 16.76 | 965.83 | 20.7 | 965.8 |
| 57.77 | 967.52 | 69.14 | 967.55 | 77.67 | 967.31 | 96.2 | 965.92 | 98.12 | 965.49 |
| 102.83 | 965.52 | 151.12 | 962.43 | 152.79 | 962.48 | 156.49 | 962.61 | 159.32 | 962.68 |
| 174.82 | 963.37 | 189.1 | 960.93 | 189.88 | 960.8 | 192.5 | 960.83 | 236.97 | 961.17 |
| 264.78 | 960.96 | 286.81 | 959.86 | 337.02 | 957.83 | 339.99 | 957.67 | 353.6 | 957.31 |
| 386.03 | 956.44 | 400.02 | 955.71 | 441.17 | 954.47 | 457 | 953.76 | 464.47 | 953.77 |
| 468.41 | 953.72 | 476.03 | 950.86 | 486.37 | 947.41 | 486.78 | 947.27 | 487.1 | 947.17 |
| 507.64 | 946.29 | 515.7 | 946.06 | 522.04 | 944.99 | 534.14 | 941.98 | 544.09 | 941.96 |
| 569.89 | 941.27 | 605.14 | 940.85 | 605.29 | 940.84 | 605.45 | 940.84 | 607.05 | 940.83 |
| 655.65 | 940.67 | 672.39 | 940.67 | 677.7 | 940.69 | 681.62 | 940.75 | 703.21 | 940.93 |
| 708.06 | 940.95 | 728.16 | 941.3 | 752.86 | 941.63 | 760.3 | 941.46 | 779.56 | 940.57 |
| 793.46 | 939.8 | 815.24 | 938.67 | 818.96 | 938.71 | 826.47 | 938.54 | 839.68 | 938.27 |
| 853.81 | 937.92 | 884.86 | 937.1 | 897.77 | 936.72 | 905.99 | 936.05 | 910.45 | 935.69 |
| 913.32 | 935.5 | 915.48 | 935.6 | 918.2 | 935.77 | 924.03 | 936.03 | 929.43 | 932.47 |
| 936.37 | 927.89 | 939.14 | 925.84 | 948.17 | 924.24 | 958.19 | 925.84 | 968.24 | 930.86 |
| 969.46 | 931.43 | 970.61 | 931.97 | 973.09 | 932.14 | 982.84 | 932.73 | 991.38 | 934.12 |
| 1009.97 | 937.51 | 1014.71 | 937.65 | 1023.85 | 937.78 | 1034.04 | 937.77 | 1035.03 | 937.76 |
| 1049.71 | 937.7 | 1067.26 | 937.78 | 1103.79 | 937.88 | 1116.39 | 937.91 | 1125.82 | 938.6 |
| 1130.51 | 938.55 | 1136.37 | 938.35 | 1138.28 | 937.89 | 1146.81 | 935.69 | 1154 | 934.54 |
| 1156.12 | 934.09 | 1158.11 | 934.69 | 1162.93 | 935.85 | 1171.66 | 937.99 | 1194.18 | 944.84 |
| 1194.33 | 944.88 | 1194.35 | 944.88 | 1233.85 | 945.23 | 1266.05 | 944.9 | 1276.21 | 945.09 |
| 1281.78 | 945.23 | 1319.45 | 945.59 | 1333.46 | 946.69 | 1341.87 | 947.63 | 1344.88 | 947.74 |
| 1362.48 | 947.57 | 1370.59 | 947.49 | 1373.79 | 947.61 | 1380.49 | 948.09 | 1384.83 | 948.78 |
| 1385.38 | 948.85 | 1388.66 | 949.28 | 1388.99 | 950.12 | 1389.48 | 951.25 | 1398.54 | 951.54 |
| 1417.47 | 952.17 | 1437.22 | 952.86 | 1461.58 | 953.73 | 1495.38 | 953.64 | 1500.3 | 953.66 |
| 1536.96 | 954 | 1550.2 | 954.37 | 1570.79 | 955.15 | 1579.58 | 955.33 | 1582.35 | 955.6 |
| 1587.85 | 956.58 | 1604.44 | 960.26 | 1636.01 | 961.38 | 1638.1 | 961.46 | 1638.58 | 961.46 |
| 1639.11 | 961.47 | 1639.49 | 961.47 | 1640.02 | 961.47 | 1642.63 | 961.46 | 1683.85 | 960.87 |
| 1702.07 | 960.35 | 1706.75 | 960.35 | 1731.35 | 960 | 1732.75 | 959.95 | 1734.21 | 960.02 |
| 1735.7 | 960.1 | 1736.48 | 963.29 | 1736.65 | 963.95 | 1736.77 | 964.47 | 1746.81 | 964.75 |
| 1768.92 | 964.84 | 1783.87 | 965.33 | 1794.66 | 965.39 | 1833.91 | 965.1 | 1875.26 | 965.26 |
| 1883.92 | 965.28 | 1926.65 | 965.76 | 1933.94 | 965.74 | 1940.86 | 965.76 | 1983.95 | 965.5 |
| 1989.59 | 965.51 | 2033.99 | 966.04 | 2043.05 | 966.08 | 2051.16 | 966.17 | 2080.08 | 966.48 |
| 2088.19 | 971.92 | 2088.98 | 972.46 | 2093.27 | 972.64 | 2112.76 | 973.38 | 2119.5 | 973.59 |
| 2125.63 | 973.49 | 2144.07 | 973.08 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 924.03 | .042 | 970.61 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 924.03 | 970.61 | 83.8 | 101.77 | 116.75 | .3 | .5 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|

1138 1172 938

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.63 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.61 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.02 | Reach Len. (ft) | 83.80 | 101.77 | 116.75 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 479.32 | 605.74 | 787.15 |
| E.G. Slope (ft/ft) | 0.001673 | Area (sq ft) | 479.32 | 605.74 | 787.15 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 707.58 | 4538.87 | 1433.56 |
| Top Width (ft) | 533.80 | Top Width (ft) | 276.20 | 46.58 | 211.03 |
| Vel Total (ft/s) | 3.57 | Avg. Vel. (ft/s) | 1.48 | 7.49 | 1.82 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 1.74 | 13.00 | 3.73 |
| Conv. Total (cfs) | 163337.8 | Conv. (cfs) | 17301.5 | 110983.3 | 35053.0 |
| Length Wtd. (ft) | 101.78 | Wetted Per. (ft) | 276.35 | 51.40 | 212.04 |
| Min Ch El (ft) | 924.24 | Shear (lb/sq ft) | 0.18 | 1.23 | 0.39 |
| Alpha | 3.07 | Stream Power (lb/ft s) | 2144.07 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.14 | Cum Volume (acre-ft) | 2.31 | 2.71 | 3.79 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 0.98 | 0.22 | 1.22 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31847

INPUT
Description:
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 954.14 | 1003.14 | 97.38 | 97.38 | 100.28 | .3 .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.41 | Element | Left OB | Channel | Right OB | |
| Vel Head (ft) | 0.44 | Wt. n-Val. | 0.080 | 0.042 | 0.080 | |
| W.S. Elev (ft) | 940.97 | Reach Len. (ft) | 19.00 | 19.00 | 19.00 | |
| Crit W.S. (ft) | 935.30 | Flow Area (sq ft) | 872.09 | 681.99 | 757.70 | |
| E.G. Slope (ft/ft) | 0.001088 | Area (sq ft) | 872.09 | 681.99 | 757.70 | |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 1295.58 | 4409.23 | 975.19 | |
| Top Width (ft) | 527.84 | Top Width (ft) | 230.67 | 49.00 | 248.16 | |
| Vel Total (ft/s) | 2.89 | Avg. Vel. (ft/s) | 1.49 | 6.47 | 1.29 | |
| Max Chl Dpth (ft) | 16.75 | Hydr. Depth (ft) | 3.78 | 13.92 | 3.05 | |
| Conv. Total (cfs) | 202492.9 | Conv. (cfs) | 39273.4 | 133658.2 | 29561.3 | |
| Length Wtd. (ft) | 19.00 | Wetted Per. (ft) | 231.00 | 52.31 | 248.89 | |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.26 | 0.89 | 0.21 | |
| Alpha | 3.38 | Stream Power (lb/ft s) | 2200.56 | 0.00 | 0.00 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 1.01 | 1.21 | 1.72 | |
| C & E Loss (ft) | | Cum SA (acres) | 0.49 | 0.11 | 0.60 | |

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

BRIDGE

RIVER: Rottenwood
REACH: 1 RS: 31798

INPUT
Description: B170716100, Franklin Road, L 63' & W 50.1'

Distance from Upstream XS = 19
Deck/Roadway Width = 50.1
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |
| 567.59 | 945.23 | | 603.22 | 944.32 | | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | | 1115.63 | 937.59 | |

| | | | | | |
|---|---|---|---|---|---|
| 1134.19 | 937.66 | 1145.77 | 937.76 | 1161.82 | 938.1 |
| 1168.82 | 938.26 | 1178.47 | 938.42 | 1193.35 | 938.75 |
| 1206.69 | 938.97 | 1225.72 | 939.43 | 1233.28 | 939.64 |
| 1250.81 | 940.2 | 1262.2 | 940.55 | 1265.14 | 940.65 |
| 1279.57 | 941.13 | 1293.32 | 941.6 | 1308.26 | 942.13 |
| 1315.37 | 942.44 | 1317.28 | 942.5 | 1326.64 | 942.81 |
| 1335.16 | 943.04 | 1347.23 | 943.25 | 1356.21 | 943.56 |
| 1369.09 | 944.02 | 1381.94 | 944.65 | 1392.51 | 945.02 |
| 1398.97 | 945.2 | 1407.33 | 945.44 | 1409.58 | 945.53 |
| 1411.68 | 945.61 | 1421.64 | 946.11 | 1423.87 | 946.21 |
| 1425.78 | 946.3 | 1440.45 | 946.5 | 1460.22 | 947.14 |
| 1462.14 | 947.22 | 1464.35 | 947.31 | 1466.73 | 947.4 |
| 1482.53 | 947.88 | 1488.72 | 948.15 | 1499.91 | 948.87 |
| 1510.85 | 949.13 | 1529.63 | 949.72 | 1538.53 | 950.12 |
| 1545.34 | 950.33 | 1551.59 | 950.48 | 1575.81 | 951.16 |
| 1580.59 | 951.28 | 1581.27 | 951.3 | 1600.88 | 951.74 |
| 1606.65 | 951.99 | 1612.04 | 952.15 | 1633.56 | 953.03 |
| 1641.79 | 953.25 | 1648.55 | 953.33 | 1657.81 | 953.78 |
| 1660.85 | 953.89 | 1663.66 | 954 | 1666.07 | 954.1 |
| 1675.44 | 954.46 | 1677.98 | 954.59 | 1698.47 | 955.2 |
| 1701.05 | 955.22 | 1709.01 | 955.45 | 1711.54 | 955.46 |
| 1714.44 | 955.47 | 1727.16 | 955.84 | 1729.98 | 956.03 |
| 1743.08 | 956.72 | 1750.55 | 956.87 | 1758.09 | 957.12 |
| 1775.12 | 957.6 | 1788.49 | 957.95 | 1804.39 | 958.38 |
| 1811.13 | 958.76 | 1826.91 | 959.33 | 1835.75 | 959.66 |
| 1846.37 | 960.1 | 1856.96 | 960.52 | 1883.46 | 961.62 |
| 1890.39 | 961.98 | 1899.57 | 962.42 | 1915.61 | 963.02 |
| 1926.29 | 963.32 | 1941.17 | 963.85 | 1958.27 | 964.4 |
| 1967.8 | 964.69 | 1981.81 | 965.16 | 1990.04 | 965.52 |
| 2002.08 | 965.92 | 2008.23 | 966.11 | 2023.45 | 966.59 |
| 2029.35 | 966.78 | 2048.73 | 967.11 | 2059.59 | 967.54 |
| 2068.73 | 968.47 | 2088.73 | 969.34 | 2103.12 | 969.83 |
| 2120.8 | 970.45 | 2132.88 | 970.97 | 2146.72 | 971.66 |
| 2156.56 | 972.02 | 2168.27 | 972.39 | 2181.5 | 972.76 |
| 2190.49 | 973.18 | 2196.76 | 973.4 | 2207.46 | 973.85 |
| 2209.45 | 973.96 | 2213.33 | 974.19 | 2216.57 | 974.39 |
| 2227.79 | 974.61 | | | | |

Upstream Bridge Cross Section Data
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

| Bank Sta: Left | Right | Coeff Contr. | Expan. |
|---|---|---|---|
| 954.14 | 1003.14 | .3 | .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

Downstream Deck/Roadway Coordinates num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |
| 567.59 | 945.23 | | 603.22 | 944.32 | | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | | 1115.63 | 937.59 | |
| 1134.19 | 937.66 | | 1145.77 | 937.76 | | 1161.82 | 938.1 | |
| 1168.82 | 938.26 | | 1178.47 | 938.42 | | 1193.35 | 938.75 | |
| 1206.69 | 938.97 | | 1225.72 | 939.43 | | 1233.28 | 939.64 | |
| 1250.81 | 940.2 | | 1262.2 | 940.55 | | 1265.14 | 940.65 | |
| 1279.57 | 941.13 | | 1293.32 | 941.6 | | 1308.26 | 942.13 | |
| 1315.37 | 942.44 | | 1317.28 | 942.5 | | 1326.64 | 942.81 | |
| 1335.16 | 943.04 | | 1347.23 | 943.25 | | 1356.21 | 943.56 | |
| 1369.09 | 944.02 | | 1381.94 | 944.65 | | 1392.51 | 945.02 | |
| 1398.97 | 945.2 | | 1407.33 | 945.44 | | 1409.58 | 945.53 | |
| 1411.68 | 945.61 | | 1421.64 | 946.11 | | 1423.87 | 946.21 | |
| 1425.78 | 946.3 | | 1440.45 | 946.5 | | 1460.22 | 947.14 | |
| 1462.14 | 947.22 | | 1464.35 | 947.31 | | 1466.73 | 947.4 | |
| 1482.53 | 947.88 | | 1488.72 | 948.15 | | 1499.91 | 948.87 | |
| 1510.85 | 949.13 | | 1529.63 | 949.72 | | 1538.53 | 950.12 | |
| 1545.34 | 950.33 | | 1551.59 | 950.48 | | 1575.81 | 951.16 | |
| 1580.59 | 951.28 | | 1581.27 | 951.3 | | 1600.88 | 951.74 | |
| 1606.65 | 951.99 | | 1612.04 | 952.15 | | 1633.56 | 953.03 | |
| 1641.79 | 953.25 | | 1648.55 | 953.33 | | 1657.81 | 953.78 | |
| 1660.85 | 953.89 | | 1663.66 | 954 | | 1666.07 | 954.1 | |
| 1675.44 | 954.46 | | 1677.98 | 954.59 | | 1698.47 | 955.2 | |
| 1701.05 | 955.22 | | 1709.01 | 955.45 | | 1711.54 | 955.46 | |
| 1714.44 | 955.47 | | 1727.16 | 955.84 | | 1729.98 | 956.03 | |
| 1743.08 | 956.72 | | 1750.55 | 956.87 | | 1758.09 | 957.12 | |
| 1775.12 | 957.6 | | 1788.49 | 957.95 | | 1804.39 | 958.38 | |
| 1811.13 | 958.76 | | 1826.91 | 959.33 | | 1835.75 | 959.66 | |
| 1846.37 | 960.1 | | 1856.96 | 960.52 | | 1883.46 | 961.62 | |

| | | | | | |
|---|---|---|---|---|---|
| 1890.39 | 961.98 | 1899.57 | 962.42 | 1915.61 | 963.02 |
| 1926.29 | 963.32 | 1941.17 | 963.85 | 1958.27 | 964.4 |
| 1967.8 | 964.69 | 1981.81 | 965.16 | 1990.04 | 965.52 |
| 2002.08 | 965.92 | 2008.23 | 966.11 | 2023.45 | 966.59 |
| 2029.35 | 966.78 | 2048.73 | 967.11 | 2059.59 | 967.54 |
| 2068.73 | 968.47 | 2088.73 | 969.34 | 2103.12 | 969.83 |
| 2120.8 | 970.45 | 2132.88 | 970.97 | 2146.72 | 971.66 |
| 2156.56 | 972.02 | 2168.27 | 972.39 | 2181.5 | 972.76 |
| 2190.49 | 973.18 | 2196.76 | 973.4 | 2207.46 | 973.85 |
| 2209.45 | 973.96 | 2213.33 | 974.19 | 2216.57 | 974.39 |
| 2227.79 | 974.61 | | | | |

Downstream Bridge Cross Section Data

Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Coeff Contr. Expan.

954.14 1003.14 .3 .5

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

Upstream Embankment side slope = 0 horiz. to 1.0 vertical

Downstream Embankment side slope = 0 horiz. to 1.0 vertical

Maximum allowable submergence for weir flow = .95

Elevation at which weir flow begins =

Energy head used in spillway design =

Spillway height used in design =

Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

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

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

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31749

INPUT
Description:
Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 954.14 | 1003.14 | 31660.84 | 31769.51 | 31788.64 | .3 .5 |

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.33 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.33 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.00 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 935.31 | Flow Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| E.G. Slope (ft/ft) | 0.000889 | Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 994.10 | 3998.03 | 1687.86 |
| Top Width (ft) | 625.72 | Top Width (ft) | 250.39 | 49.00 | 326.33 |
| Vel Total (ft/s) | 2.43 | Avg. Vel. (ft/s) | 1.22 | 5.85 | 1.35 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 3.26 | 13.95 | 3.83 |
| Conv. Total (cfs) | 224039.2 | Conv. (cfs) | 33341.1 | 134089.3 | 56608.9 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 250.77 | 52.31 | 328.02 |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.18 | 0.73 | 0.21 |
| Alpha | 3.59 | Stream Power (lb/ft s) | 2255.66 | 0.00 | 0.00 |
| 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:Rottenwood

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| 1 | 35046 | .1 | .048 | .09 |
| 1 | 34164 | .12 | .05 | .09 |
| 1 | 33618 | .12 | .05 | .09 |
| 1 | 33522 | .1 | .05 | .09 |
| 1 | 32995 | .12 | .05 | .12 |
| 1 | 32570 | .12 | .05 | .11 |
| 1 | 31948 | .08 | .042 | .08 |
| 1 | 31847 | .08 | .042 | .08 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | .08 | .042 | .08 |

SUMMARY OF REACH LENGTHS

River: Rottenwood

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| 1 | 35046 | 838.32 | 881.91 | 920.22 |
| 1 | 34164 | 643.6 | 546.53 | 445.42 |
| 1 | 33618 | 96 | 96 | 96 |
| 1 | 33522 | 440.95 | 526.75 | 614.99 |
| 1 | 32995 | 424.42 | 425.55 | 426.3 |
| 1 | 32570 | 614.58 | 621.16 | 617.04 |
| 1 | 31948 | 83.8 | 101.77 | 116.75 |
| 1 | 31847 | 97.38 | 97.38 | 100.28 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | 31660.84 | 31769.51 | 31788.64 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Rottenwood

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| 1 | 35046 | .1 | .3 |
| 1 | 34164 | .1 | .3 |
| 1 | 33618 | .1 | .3 |
| 1 | 33522 | .1 | .3 |
| 1 | 32995 | .1 | .3 |

| | | | |
|---|---|---|---|
| 1 | 32570 | .1 | .3 |
| 1 | 31948 | .3 | .5 |
| 1 | 31847 | .3 | .5 |
| 1 | 31798 | Bridge | |
| 1 | 31749 | .3 | .5 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| 1 | 35046 | 100 nat | 6550.00 | 932.80 | 946.59 | | 946.80 | 0.001633 | 5.54 | 2862.15 | 618.68 | 0.29 |
| 1 | 34164 | 100 nat | 6550.00 | 930.06 | 944.72 | | 945.12 | 0.002251 | 6.02 | 1872.73 | 281.68 | 0.35 |
| 1 | 33618 | 100 nat | 6550.00 | 927.90 | 943.73 | | 944.02 | 0.001532 | 5.62 | 2280.85 | 280.01 | 0.29 |
| 1 | 33522 | 100 nat | 6700.00 | 927.77 | 943.66 | 938.99 | 943.86 | 0.001169 | 4.77 | 2533.01 | 375.16 | 0.25 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 | Franklin Rd | | Bridge | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

Profile Output Table - Standard Table 2

| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| 1 | 35046 | 100 nat | 946.80 | 946.59 | 0.21 | 1.65 | 0.02 | 3005.50 | 2471.09 | 1073.42 | 618.68 |
| 1 | 34164 | 100 nat | 945.12 | 944.72 | 0.40 | 1.07 | 0.03 | 2077.27 | 4472.73 | | 281.68 |
| 1 | 33618 | 100 nat | 944.02 | 943.73 | 0.29 | 0.13 | 0.03 | 2997.97 | 3545.31 | 6.72 | 280.01 |
| 1 | 33522 | 100 nat | 943.86 | 943.66 | 0.20 | 0.75 | 0.02 | 3285.26 | 3414.74 | | 375.16 |
| 1 | 32995 | 100 nat | 943.10 | 942.69 | 0.41 | 0.59 | 0.04 | 1952.22 | 4077.27 | 670.51 | 342.06 |
| 1 | 32570 | 100 nat | 942.46 | 942.20 | 0.27 | 0.80 | 0.03 | 2014.16 | 4659.06 | 6.78 | 640.30 |
| 1 | 31948 | 100 nat | 941.63 | 941.02 | 0.61 | 0.14 | 0.08 | 707.58 | 4538.87 | 1433.56 | 533.80 |
| 1 | 31847 | 100 nat | 941.41 | 940.97 | 0.44 | | | 1295.58 | 4409.23 | 975.19 | 527.84 |
| 1 | 31798 | Franklin Rd | | Bridge | | | | | | | |
| 1 | 31749 | 100 nat | 941.33 | 941.00 | 0.33 | | | 994.10 | 3998.03 | 1687.86 | 625.72 |

HEC-RAS Plan: exist River: Rottenwood Reach: 1 Profile: 100 nat

| 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) | |
| 1 | 35046 | 100 nat | 6550.00 | 931.20 | 946.04 | | 946.27 | 0.001420 | 4.94 | 2674.68 | 605.40 | 0.28 |
| 1 | 34164 | 100 nat | 6550.00 | 930.00 | 944.59 | | 944.93 | 0.001647 | 5.14 | 1881.82 | 272.87 | 0.30 |
| 1 | 33618 | 100 nat | 6550.00 | 927.90 | 943.68 | | 943.98 | 0.001603 | 5.75 | 2258.72 | 279.02 | 0.29 |
| 1 | 33522 | 100 nat | 6700.00 | 928.10 | 943.64 | 938.72 | 943.82 | 0.001024 | 4.06 | 2463.93 | 364.19 | 0.23 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 Franklin Rd | | Bridge | | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

# PROPOSED MODEL

- AMEC model extracted sections from below Franklin Road upstream through the project
- Adjusted added cross section through scour for live crib walls used for streambank stabilization

HEC-RAS Plan: proposed River: Rottenwood Reach: 1 Profile: 100 nat

| 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) | |
| 1 | 35046 | 100 nat | 6550.00 | 931.20 | 946.10 | | 946.32 | 0.001377 | 4.88 | 2709.08 | 606.90 | 0.28 |
| 1 | 34164 | 100 nat | 6550.00 | 930.00 | 944.70 | | 945.03 | 0.001581 | 5.07 | 1911.47 | 273.55 | 0.29 |
| 1 | 33618 | 100 nat | 6550.00 | 927.90 | 943.69 | | 943.99 | 0.001993 | 5.91 | 2167.65 | 263.68 | 0.29 |
| 1 | 33522 | 100 nat | 6700.00 | 928.10 | 943.64 | 938.72 | 943.82 | 0.001024 | 4.06 | 2463.93 | 364.19 | 0.23 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 Franklin Rd | | Bridge | | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rottenwood Creek 1
Project File : RottenwoodCreek1.prj
Run Date and Time: 1/3/2013 4:18:12 PM

Project in English units

Project Description:
Cobb County Priority Area 3 Flood Study
Rottenwood Creek
Rottenwood Creek
Watershed

Model extends from just downstream of Cumberland Blvd to 370 feet
upstream of Fairground Street

Plans
Existing Conditions Floodplain (ex
fp)
Existing Conditions Floodway  (ex fw)
Future Conditions Floodplain  (fc
fp)

AMEC Earth and Environmental
EWW - Project Engineer
October
2004

Originally run in HEC-RAS 3.1.1

PLAN DATA

Plan Title: proposed
Plan File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.p06

Geometry Title: proposed
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.g03

Flow Title    : ex 100
Flow File     : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras
Model\RottenwoodCreek1.f02

Plan Description:
existing floodway model

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 9 | Multiple Openings | = | 0 |
| | Culverts | = 0 | Inline Structures | = | 0 |
| | Bridges | = 1 | 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 = 0.3
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

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

FLOW DATA

Flow Title: ex 100
Flow File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.f02

Flow Data (cfs)

| River | Reach | RS | 100 nat |
|---|---|---|---|
| Rottenwood | 1 | 35046 | 6550 |
| Rottenwood | 1 | 33522 | 6700 |
| Rottenwood | 1 | 32570 | 6680 |
| Rottenwood | 1 | 31749 | 6680 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Rottenwood | 1 | 100 nat | | Known WS = 941 |

GEOMETRY DATA

Geometry Title: proposed
Geometry File : C:\Users\Joanie\Documents\projects\mark lee\rottenwood\Hec-Ras Model\RottenwoodCreek1.g03

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 35046

INPUT
Description:
Station Elevation Data num= 176

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 991.78 | .03 | 991.78 | 9.39 | 991.49 | 29.93 | 991.12 | 44.65 | 990.75 |
| 59.84 | 990.47 | 75.49 | 990.42 | 83.38 | 990.27 | 97.77 | 989.64 | 114.55 | 989.13 |
| 120.23 | 988.92 | 134.75 | 987.69 | 139.44 | 987.53 | 163.36 | 986.23 | 166.83 | 986.11 |
| 189.96 | 985.12 | 192.22 | 984.94 | 194.45 | 984.81 | 217.92 | 983.15 | 222.29 | 983.01 |
| 239.38 | 981.33 | 244.5 | 981.21 | 256.64 | 980.18 | 261.97 | 979.83 | 267.85 | 979.15 |
| 276.7 | 978.2 | 285.7 | 977.17 | 287.37 | 976.9 | 290.95 | 976.65 | 296.13 | 976.36 |
| 298.2 | 976.25 | 302.15 | 975.82 | 307.95 | 975.28 | 337.43 | 973.5 | 345.9 | 973.16 |
| 364.77 | 972.2 | 382.41 | 971.04 | 396.5 | 970.39 | 412.58 | 969.69 | 418.35 | 969.67 |
| 432.83 | 969.01 | 441.13 | 969.05 | 457.13 | 968.79 | 464.58 | 968.46 | 486.74 | 968.35 |
| 487.83 | 968.33 | 488.83 | 968.32 | 496.21 | 968.18 | 512.49 | 967.96 | 538.92 | 967.25 |
| 540.99 | 967.24 | 566.14 | 966.72 | 567.4 | 966.7 | 568.37 | 966.69 | 596.96 | 966.83 |
| 598.44 | 966.78 | 600.08 | 966.8 | 602.29 | 966.82 | 618.42 | 966.91 | 629.85 | 965.36 |
| 635.64 | 965.29 | 646.38 | 965.13 | 677.54 | 964.67 | 687.5 | 964.66 | 697.23 | 964.8 |
| 706.48 | 964.78 | 715.49 | 964.63 | 720.98 | 964.7 | 733.99 | 964.42 | 745.44 | 964.49 |
| 762.05 | 964.37 | 765.93 | 964.52 | 770.1 | 964.71 | 785.74 | 965.38 | 802.16 | 965.95 |
| 802.43 | 965.95 | 802.75 | 965.95 | 826.92 | 965.66 | 835.31 | 965.66 | 842.94 | 965.61 |
| 872.76 | 965.59 | 881.37 | 965.59 | 912.66 | 965.08 | 913.28 | 965.51 | 1034.43 | 953.97 |
| 1135.05 | 940.49 | 1260.06 | 940.37 | 1343.48 | 940.92 | 1374 | 940 | 1375 | 938 |
| 1376 | 936 | 1379 | 934 | 1384 | 932 | 1395 | 931.2 | 1406 | 932 |
| 1409 | 934 | 1413 | 936 | 1416 | 938 | 1420 | 940 | 1423 | 942 |
| 1423.5 | 942.99 | 1565.92 | 943.52 | 1575.31 | 943.34 | 1597.39 | 943.48 | 1612.13 | 944.09 |
| 1639.62 | 944.01 | 1649.93 | 944.31 | 1665.08 | 944.64 | 1666.73 | 944.73 | 1678.62 | 943.81 |
| 1679.62 | 943.71 | 1683.91 | 944.65 | 1690.86 | 945.71 | 1695.49 | 945.85 | 1702.82 | 946.24 |
| 1752.25 | 949.44 | 1766.03 | 949.67 | 1775.24 | 949.83 | 1777.99 | 949.61 | 1783.28 | 950.18 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1785.22 | 950.2 | 1793.44 | 951.51 | 1797.04 | 951.87 | 1804.59 | 952.76 | 1812.96 | 954.64 |
| 1821.82 | 955.9 | 1823.76 | 955.97 | 1832.57 | 957.77 | 1841.37 | 958.88 | 1844.84 | 958.93 |
| 1856.88 | 960.2 | 1859.96 | 960.31 | 1875.29 | 962.97 | 1888 | 964.62 | 1893.27 | 964.89 |
| 1910.66 | 966.12 | 1917.41 | 966.58 | 1928.91 | 967.69 | 1943.12 | 969.01 | 1947.84 | 969.14 |
| 1960.22 | 969.65 | 1967.72 | 970.37 | 1978.03 | 970.48 | 2000.47 | 971.9 | 2015.96 | 972.88 |
| 2021.66 | 972.92 | 2035.5 | 973.56 | 2046.4 | 973.64 | 2058.5 | 973.86 | 2067.21 | 974.65 |
| 2075.91 | 975.94 | 2078.92 | 977.59 | 2088.7 | 976.76 | 2100.52 | 976.07 | 2113.09 | 973.68 |
| 2122.34 | 971.74 | 2137.23 | 976.28 | 2145.86 | 979.3 | 2149.36 | 979.33 | 2156.02 | 979.5 |
| 2162.51 | 979.38 | 2174.53 | 979.18 | 2180.35 | 978.87 | 2185.32 | 978.58 | 2194.16 | 976.35 |
| 2216.83 | 970.38 | 2224.21 | 971.26 | 2225.76 | 971.47 | 2232.42 | 971.57 | 2263.81 | 971.99 |
| 2277.33 | 970.66 | 2279.51 | 970.43 | 2281.24 | 970.61 | 2297.8 | 972.28 | 2309.94 | 972.05 |
| 2328.3 | 971.67 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1343.48 | .048 | 1423.5 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1343.48 | 1423.5 | 838.32 | 881.91 | 920.22 | .1 | .3 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 946.32 | Element | | | |
| Vel Head (ft) | 0.23 | Wt. n-Val. | 0.100 | 0.048 | 0.090 |
| W.S. Elev (ft) | 946.10 | Reach Len. (ft) | 838.32 | 881.91 | 920.22 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1280.19 | 762.27 | 666.62 |
| E.G. Slope (ft/ft) | 0.001377 | Area (sq ft) | 1280.19 | 762.27 | 666.62 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 2093.23 | 3723.18 | 733.59 |
| Top Width (ft) | 606.90 | Top Width (ft) | 250.27 | 80.02 | 276.60 |
| Vel Total (ft/s) | 2.42 | Avg. Vel. (ft/s) | 1.64 | 4.88 | 1.10 |
| Max Chl Dpth (ft) | 14.90 | Hydr. Depth (ft) | 5.12 | 9.53 | 2.41 |
| Conv. Total (cfs) | 176536.6 | Conv. (cfs) | 56417.0 | 100347.8 | 19771.8 |
| Length Wtd. (ft) | 872.63 | Wetted Per. (ft) | 250.65 | 86.92 | 276.86 |
| Min Ch El (ft) | 931.20 | Shear (lb/sq ft) | 0.44 | 0.75 | 0.21 |
| Alpha | 2.49 | Stream Power (lb/ft s) | 2328.30 | 0.00 | 0.00 |
| Frctn Loss (ft) | 1.29 | Cum Volume (acre-ft) | 88.97 | 61.76 | 22.54 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 19.63 | 5.79 | 7.40 |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 34164

INPUT
Description:
Station Elevation Data num= 178

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.23 | 19.66 | 962.16 | 34.39 | 962.08 | 39.67 | 962.05 | 52.24 | 961.83 |
| 71.86 | 962.63 | 82.1 | 962.48 | 84.07 | 962.49 | 96.98 | 962.82 | 98 | 962.87 |
| 98.84 | 962.99 | 117.45 | 962.02 | 123.83 | 961.8 | 144.55 | 961.34 | 149.46 | 961.17 |
| 152.04 | 961.09 | 153.56 | 961.06 | 155.34 | 961.01 | 194.7 | 960.43 | 210.53 | 960.25 |
| 241.92 | 960.09 | 243.89 | 960.36 | 249.78 | 961.05 | 255.13 | 961.7 | 261.65 | 962.54 |
| 273.02 | 962.31 | 279.28 | 962.11 | 289.07 | 961.87 | 293.68 | 961.84 | 300.36 | 961.52 |
| 330.41 | 960.96 | 342.03 | 960.59 | 370.12 | 960.28 | 387.02 | 960.8 | 421.49 | 961.79 |
| 430.38 | 961.84 | 440.81 | 960.08 | 475.02 | 958.56 | 487.07 | 960.03 | 490.12 | 960.12 |
| 492.64 | 960.68 | 496.58 | 960.82 | 508.71 | 961.19 | 523.44 | 958.41 | 538.81 | 955.65 |
| 545.31 | 955.55 | 548.9 | 955.4 | 566.72 | 954.76 | 569.85 | 954.64 | 570.48 | 954.63 |
| 572.69 | 954.49 | 586.08 | 953.47 | 590.68 | 953.29 | 607.23 | 952.94 | 620.82 | 952.54 |
| 622.94 | 952.41 | 632.84 | 952.29 | 678.85 | 952.2 | 729.6 | 952.04 | 735.32 | 952.1 |
| 738.49 | 952.19 | 745.21 | 952.32 | 772.28 | 952.92 | 788.62 | 953.64 | 788.79 | 953.64 |
| 797.11 | 952.12 | 803.51 | 950.74 | 805.01 | 950.8 | 820.66 | 952.09 | 824.43 | 953.16 |
| 832.34 | 952.91 | 833.29 | 952.89 | 851.95 | 952.59 | 860.94 | 949.38 | 870.16 | 944.88 |
| 881.32 | 939.88 | 893.83 | 939.29 | 923.32 | 938.57 | 923.34 | 938.57 | 923.36 | 938.56 |
| 931.95 | 938 | 939.7 | 938 | 957.84 | 938 | 958.35 | 938.15 | 961.1 | 939.06 |
| 964.62 | 939.05 | 971.78 | 939.13 | 985.13 | 939.23 | 996.04 | 939.24 | 1025.68 | 938.22 |
| 1027.36 | 938.2 | 1032.6 | 938.3 | 1054.9 | 938 | 1061.3 | 936 | 1062.8 | 934 |
| 1066.3 | 932 | 1087 | 930 | 1107.3 | 932 | 1113.5 | 934 | 1117.8 | 936 |
| 1121.3 | 938 | 1127.9 | 940 | 1134.3 | 942 | 1141.3 | 944 | 1149.3 | 946 |
| 1160.3 | 948 | 1162.42 | 948.46 | 1177.21 | 948.68 | 1194.35 | 949.06 | 1211.15 | 949.35 |
| 1214.18 | 949.44 | 1238.04 | 949.86 | 1251.65 | 949.99 | 1254.58 | 950.08 | 1277.47 | 950.18 |
| 1311.4 | 949.87 | 1315.62 | 949.88 | 1326.18 | 949.8 | 1326.82 | 949.8 | 1336.48 | 949.73 |
| 1341.06 | 949.78 | 1363.09 | 949.46 | 1368.93 | 949.55 | 1416.74 | 951.07 | 1427.63 | 952.28 |
| 1430.87 | 952.59 | 1436.55 | 952.98 | 1450.24 | 952.89 | 1455.11 | 952.71 | 1460.45 | 952.71 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1465.95 | 952.8 | 1469.77 | 952.86 | 1471.77 | 952.89 | 1503.64 | 953.18 | 1515.18 | 953.39 | | |
| 1523.21 | 953.53 | 1529.35 | 952.35 | 1533.05 | 951.82 | 1543.79 | 951.99 | 1546.29 | 952 | | |
| 1560.25 | 951.95 | 1582.06 | 952.16 | 1583.13 | 952.19 | 1589.04 | 952.35 | 1589.68 | 952.35 | | |
| 1610.45 | 952.68 | 1614.34 | 952.79 | 1659.7 | 954.37 | 1664.35 | 954.53 | 1667.66 | 954.53 | | |
| 1682.25 | 954.65 | 1698.3 | 954.78 | 1704.59 | 954.35 | 1718.74 | 953.7 | 1733.73 | 955.03 | | |
| 1734.62 | 955.09 | 1736.45 | 955.25 | 1753.14 | 956.8 | 1763.55 | 957.04 | 1771.42 | 957.29 | | |
| 1776.31 | 957.34 | 1814.34 | 957.72 | 1823.48 | 957.65 | 1865.5 | 957.17 | 1880.42 | 957.5 | | |
| 1883.08 | 957.84 | 1893.43 | 958.99 | 1900.07 | 958.36 | 1905.31 | 957.8 | 1936.39 | 958.36 | | |
| 1959.7 | 958.66 | 1964.35 | 958.76 | 1968.17 | 958.72 | 2010.45 | 959.78 | 2015.2 | 959.9 | | |
| 2015.94 | 959.84 | 2027.94 | 958.84 | 2039.91 | 961.79 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1032.6 | .05 | 1162.42 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1032.6 | 1162.42 | 643.6 | 546.53 | 445.42 | .1 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 900 | 961.1 | 939.06 | T |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 945.03 | Element | | | |
| Vel Head (ft) | 0.32 | Wt. n-Val. | 0.120 | 0.050 | |
| W.S. Elev (ft) | 944.70 | Reach Len. (ft) | 643.60 | 546.53 | 445.42 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 883.42 | 1028.05 | |
| E.G. Slope (ft/ft) | 0.001581 | Area (sq ft) | 924.26 | 1028.05 | |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 1340.59 | 5209.41 | |
| Top Width (ft) | 273.55 | Top Width (ft) | 162.04 | 111.50 | |
| Vel Total (ft/s) | 3.43 | Avg. Vel. (ft/s) | 1.52 | 5.07 | |
| Max Chl Dpth (ft) | 14.70 | Hydr. Depth (ft) | 5.45 | 9.22 | |
| Conv. Total (cfs) | 164706.7 | Conv. (cfs) | 33710.5 | 130996.2 | |
| Length Wtd. (ft) | 581.60 | Wetted Per. (ft) | 163.30 | 115.79 | |
| Min Ch El (ft) | 930.00 | Shear (lb/sq ft) | 0.53 | 0.88 | |
| Alpha | 1.78 | Stream Power (lb/ft s) | 2039.91 | 0.00 | 0.00 |
| Frctn Loss (ft) | 1.03 | Cum Volume (acre-ft) | 67.76 | 43.64 | 15.50 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 15.66 | 3.85 | 4.48 |

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.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 33618

INPUT
Description:
Station Elevation Data num= 25

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| -25 | 946 | 28 | 944 | 34.6 | 942 | 39.4 | 940 | 49.1 | 938 |
| 72.9 | 936 | 137.3 | 934 | 149.4 | 936 | 225.2 | 936 | 236 | 938 |
| 252 | 938 | 257.7 | 936 | 259.1 | 934 | 260.3 | 932 | 262.2 | 930 |
| 274.1 | 928 | 275.7 | 927.9 | 277.7 | 928 | 290.6 | 930 | 292.6 | 932 |
| 292.7 | 943.83 | 297.7 | 943.83 | 297.8 | 948.33 | 307.8 | 948.33 | 331.5 | 948.85 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| -25 | .12 | 252 | .05 | 292.7 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 252 | 292.7 | 96 | 96 | .1 | .3 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.99 | Element | | | |
| Vel Head (ft) | 0.30 | Wt. n-Val. | 0.120 | 0.050 | |
| W.S. Elev (ft) | 943.69 | Reach Len. (ft) | 96.00 | 96.00 | 96.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1633.46 | 534.20 | |
| E.G. Slope (ft/ft) | 0.001993 | Area (sq ft) | 1633.46 | 534.20 | |
| Q Total (cfs) | 6550.00 | Flow (cfs) | 3392.74 | 3157.26 | |
| Top Width (ft) | 263.68 | Top Width (ft) | 222.98 | 40.70 | |
| Vel Total (ft/s) | 3.02 | Avg. Vel. (ft/s) | 2.08 | 5.91 | |
| Max Chl Dpth (ft) | 15.79 | Hydr. Depth (ft) | 7.33 | 13.13 | |
| Conv. Total (cfs) | 146713.0 | Conv. (cfs) | 75993.8 | 70719.3 | |

| | | | | | |
|---|---|---|---|---|---|
| Length Wtd. (ft) | 96.00 | Wetted Per. (ft) | 224.30 | 56.82 | |
| Min Ch El (ft) | 927.90 | Shear (lb/sq ft) | 0.91 | 1.17 | |
| Alpha | 2.09 | Stream Power (lb/ft s) | 331.50 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.13 | Cum Volume (acre-ft) | 48.86 | 33.84 | 15.50 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 12.82 | 2.90 | 4.48 |

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 33522

INPUT
Description:
Station Elevation Data num= 172

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 958.96 | 16.13 | 957.63 | 35.95 | 956.65 | 43.68 | 956.4 | 59.88 | 956.14 |
| 66.27 | 956.14 | 77.21 | 955.71 | 101.3 | 955.08 | 108.4 | 954.82 | 117.12 | 954.63 |
| 123.77 | 954.31 | 156.55 | 952.85 | 161.48 | 952.8 | 165.51 | 952.66 | 171.09 | 952.44 |
| 192.05 | 952.13 | 210.32 | 951.73 | 219.09 | 952.56 | 257.78 | 951.86 | 260.55 | 951.85 |
| 272.14 | 951.53 | 274.37 | 951.26 | 287.54 | 950.89 | 293.44 | 950.3 | 308.93 | 950.43 |
| 330.36 | 950.67 | 337.04 | 950.69 | 367.92 | 951.08 | 368.68 | 951.09 | 368.8 | 951.09 |
| 379.84 | 951.15 | 382.58 | 951.13 | 423.49 | 950.34 | 441.53 | 949.99 | 447.15 | 949.88 |
| 459.97 | 949.86 | 478.91 | 949.79 | 484.95 | 949.77 | 494.96 | 949.26 | 513.2 | 947.79 |
| 514.15 | 947.75 | 514.75 | 947.73 | 515.71 | 947.74 | 536.34 | 948.01 | 549.33 | 947.96 |
| 572.91 | 946.44 | 589.37 | 945.95 | 601.98 | 945.68 | 621.25 | 944.84 | 630.36 | 944.38 |
| 644.54 | 944.15 | 659.43 | 943.82 | 676.02 | 943.42 | 695.41 | 943.68 | 707.64 | 943.57 |
| 717.54 | 943.93 | 722.13 | 944.41 | 734.97 | 944.42 | 755.82 | 944.65 | 771.02 | 944.66 |
| 777 | 944.8 | 791.42 | 944.94 | 803.62 | 945.3 | 817.93 | 945.47 | 823.65 | 945.73 |
| 832.77 | 945.89 | 863.64 | 946.15 | 864.99 | 946.15 | 871.96 | 944.08 | 898.6 | 936.21 |
| 909.65 | 935.95 | 911.84 | 935.91 | 912.5 | 935.76 | 919.45 | 934.8 | 922.68 | 934.8 |
| 928.73 | 934.8 | 930.5 | 934.8 | 934.51 | 934.8 | 948.74 | 934.8 | 956.7 | 934.8 |
| 969.88 | 934.8 | 973.56 | 934.8 | 982.01 | 934.8 | 984.97 | 936.39 | 985.87 | 936.85 |
| 1019.32 | 935.53 | 1034.08 | 935.09 | 1038.29 | 935.05 | 1057.09 | 934.59 | 1065.18 | 934.48 |
| 1077.13 | 936.13 | 1086.31 | 937.42 | 1144.86 | 936 | 1149.16 | 934 | 1150.06 | 932 |
| 1155.66 | 930 | 1171.46 | 928.1 | 1185.96 | 930 | 1189.56 | 932 | 1192.46 | 934 |
| 1194.86 | 936 | 1197.76 | 938 | 1200.16 | 940 | 1202.16 | 942 | 1203.86 | 944 |
| 1298.56 | 946 | 1323.56 | 948 | 1393.23 | 948.24 | 1409.19 | 948.34 | 1422.45 | 948.49 |
| 1431.13 | 947.68 | 1438.5 | 946.94 | 1445.49 | 947.07 | 1455.51 | 947.38 | 1457.29 | 947.42 |
| 1474.06 | 947.41 | 1489.4 | 947.85 | 1495.56 | 948.17 | 1507.74 | 950.32 | 1512.31 | 950.73 |
| 1514.28 | 950.68 | 1519.05 | 951.53 | 1522.38 | 951.68 | 1524.19 | 951.72 | 1541.31 | 951.86 |
| 1550.76 | 952.07 | 1564 | 952.1 | 1571.49 | 952.07 | 1576.79 | 952.13 | 1582.21 | 952.07 |
| 1582.58 | 952.03 | 1583.43 | 951.98 | 1589.72 | 951.55 | 1595.83 | 951.69 | 1611.73 | 952.04 |
| 1614.35 | 952.06 | 1625.49 | 952.2 | 1634.29 | 952.29 | 1650.1 | 954.06 | 1652.89 | 954.09 |
| 1665.23 | 954.18 | 1666.51 | 954.19 | 1694.7 | 954.08 | 1699.3 | 954.11 | 1701.37 | 954.13 |
| 1713.07 | 953.5 | 1719.06 | 953.38 | 1731.29 | 953.07 | 1753.71 | 953.06 | 1776.04 | 953.5 |
| 1789.97 | 953.78 | 1808.9 | 954.06 | 1831.02 | 954.24 | 1841.52 | 954.41 | 1849.37 | 954.51 |
| 1859.76 | 955.12 | 1872.16 | 954.82 | 1888.39 | 955.1 | 1908.88 | 955.24 | 1938.43 | 955.18 |
| 1947.29 | 955.27 | 1953 | 955.27 | 1984.14 | 956.17 | 1992.38 | 956.49 | 1999.94 | 956.65 |
| 2009.21 | 957.03 | 2019.73 | 957.03 | 2034.17 | 956.98 | 2042.07 | 957.23 | 2063.12 | 957.49 |
| 2066.53 | 957.54 | 2074.54 | 957.53 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .1 | 1086.31 | .05 | 1203.86 | .09 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1086.31 | 1203.86 | 440.95 | 526.75 614.99 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 530 | 863.64 | 946.15 | F |
| 863.64 | 1085.57 | 937.32 | F |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 895 | 1084 | 936.85 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.82 | Element | | | |
| Vel Head (ft) | 0.18 | Wt. n-Val. | 0.100 | 0.050 | |
| W.S. Elev (ft) | 943.64 | Reach Len. (ft) | 440.95 | 526.75 | 614.99 |
| Crit W.S. (ft) | 938.72 | Flow Area (sq ft) | 1365.20 | 1098.73 | |
| E.G. Slope (ft/ft) | 0.001024 | Area (sq ft) | 1368.19 | 1098.73 | |
| Q Total (cfs) | 6700.00 | Flow (cfs) | 2234.12 | 4465.88 | |
| Top Width (ft) | 364.19 | Top Width (ft) | 246.95 | 117.24 | |
| Vel Total (ft/s) | 2.72 | Avg. Vel. (ft/s) | 1.64 | 4.06 | |
| Max Chl Dpth (ft) | 15.54 | Hydr. Depth (ft) | 6.41 | 9.37 | |
| Conv. Total (cfs) | 209343.4 | Conv. (cfs) | 69805.7 | 139537.7 | |

| | | | | | |
|---|---|---|---|---|---|
| Length Wtd. (ft) | 504.36 | Wetted Per. (ft) | 213.87 | 124.37 | |
| Min Ch El (ft) | 928.10 | Shear (lb/sq ft) | 0.41 | 0.56 | |
| Alpha | 1.61 | Stream Power (lb/ft s) | 2074.54 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.70 | Cum Volume (acre-ft) | 45.56 | 32.04 | 15.50 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 12.30 | 2.72 | 4.48 |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32995

INPUT
Description:
Station Elevation Data num= 192

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 957.44 | 16.27 | 957.03 | 38.57 | 956.3 | 50.98 | 955.82 | 89.48 | 954.64 |
| 128.18 | 953.14 | 141.01 | 952.58 | 153.57 | 952.44 | 182.78 | 953.43 | 195.8 | 954.31 |
| 206.11 | 955.26 | 224.25 | 956.8 | 229.93 | 956.45 | 239.02 | 955.81 | 249.59 | 955.26 |
| 258.29 | 953.69 | 260.4 | 953.35 | 268.66 | 952.75 | 274.39 | 952.49 | 275.07 | 952.45 |
| 287.81 | 951.79 | 292.29 | 951.65 | 298.59 | 951.45 | 311.21 | 951.01 | 335.23 | 950.47 |
| 347.75 | 950.15 | 348.58 | 950.14 | 351.31 | 950.08 | 391.41 | 949.38 | 404.49 | 949.18 |
| 428.68 | 948.86 | 444.69 | 948.72 | 454.87 | 948.44 | 471.79 | 948.4 | 473.65 | 948.35 |
| 492.85 | 949.63 | 496.42 | 949.45 | 498.27 | 949.61 | 513.65 | 948.53 | 516 | 948.37 |
| 518.1 | 948.22 | 521.74 | 947.72 | 526.8 | 946.23 | 530.52 | 946.08 | 553.18 | 944.92 |
| 594.16 | 944.26 | 602.37 | 944.26 | 604.71 | 944.12 | 643.87 | 942.89 | 656.23 | 942.76 |
| 685.14 | 942.96 | 707.77 | 942.88 | 717.7 | 943.51 | 730.99 | 943.91 | 749.65 | 944.14 |
| 750.68 | 944.14 | 754.27 | 944.42 | 765 | 945.77 | 791.52 | 944.49 | 813.78 | 944.22 |
| 832.78 | 943.41 | 833.03 | 943.4 | 833.28 | 943.45 | 834.12 | 943.67 | 852.9 | 948.45 |
| 856.97 | 949.86 | 873.76 | 942.21 | 885.06 | 937.15 | 912.59 | 935.12 | 921.52 | 934.45 |
| 921.92 | 934.42 | 923.29 | 934.39 | 960.17 | 935.74 | 975.88 | 936.04 | 996.39 | 936.45 |
| 1026.3 | 937.52 | 1031.76 | 937.72 | 1034.98 | 937.76 | 1038.03 | 928.76 | 1038.4 | 927.56 |
| 1039.11 | 927.56 | 1045 | 925.95 | 1053.41 | 927.56 | 1055.24 | 927.98 | 1062.05 | 929.55 |
| 1065.92 | 930.17 | 1069.19 | 930.69 | 1071.47 | 930.95 | 1084.85 | 936.46 | 1085.35 | 936.64 |
| 1085.42 | 936.65 | 1094.81 | 936.76 | 1101.03 | 936.79 | 1105.86 | 936.84 | 1112.37 | 936.96 |
| 1118.36 | 936.73 | 1132.33 | 936.8 | 1147.16 | 936.75 | 1150.47 | 936.86 | 1169 | 939.74 |
| 1180.02 | 941.79 | 1185.92 | 942.1 | 1188.36 | 942.22 | 1191.28 | 942.39 | 1196.05 | 942.48 |
| 1230.86 | 942.87 | 1248.83 | 943.33 | 1268.07 | 944.03 | 1269.27 | 944.07 | 1272.21 | 944.08 |
| 1300.9 | 944.14 | 1306.27 | 944.57 | 1313.51 | 945.19 | 1322.43 | 945.84 | 1330.36 | 945.21 |
| 1354.47 | 944.62 | 1363.48 | 944.25 | 1372.88 | 943.94 | 1392.91 | 943.77 | 1406.33 | 943.43 |
| 1415.8 | 943.18 | 1421.96 | 943.71 | 1428.71 | 944.37 | 1435.47 | 944.99 | 1438.4 | 945.51 |
| 1447.59 | 946.34 | 1449.85 | 946.37 | 1458.45 | 946.53 | 1465.91 | 946.76 | 1492.86 | 947.21 |
| 1509.28 | 947.37 | 1517.52 | 947.64 | 1559.33 | 947.96 | 1583.81 | 947.53 | 1613.18 | 947.59 |
| 1621.14 | 947.88 | 1659.34 | 948.64 | 1669.52 | 948.87 | 1674.35 | 948.98 | 1679.6 | 949 |
| 1685.66 | 948.9 | 1717.17 | 948.39 | 1721.02 | 948.23 | 1728.91 | 947.44 | 1758.48 | 947.89 |
| 1771.17 | 948.32 | 1781.68 | 948.64 | 1813.42 | 948.82 | 1822.66 | 948.84 | 1825.5 | 948.84 |
| 1829.88 | 948.82 | 1876.81 | 948.7 | 1898.52 | 948.84 | 1907.04 | 948.83 | 1927.9 | 949.34 |
| 1941.75 | 949.43 | 1959.12 | 949.24 | 1975.93 | 948.87 | 2007.91 | 948.61 | 2009.49 | 948.62 |
| 2011.08 | 948.57 | 2038.29 | 951.62 | 2043.25 | 952.46 | 2050.54 | 953.47 | 2069.42 | 956.04 |
| 2079.22 | 957 | 2087.5 | 958.11 | 2099.52 | 959.95 | 2100.46 | 960.07 | 2101.72 | 960.24 |
| 2103.58 | 960.49 | 2105.91 | 960.81 | 2117.17 | 961.98 | 2131.28 | 964.25 | 2132.16 | 964.23 |
| 2132.57 | 964.24 | 2147.65 | 964.09 | 2148.76 | 964.2 | 2155.66 | 964.29 | 2169.19 | 964.46 |
| 2179.4 | 964.32 | 2182 | 964.33 | 2186.18 | 962.68 | 2195.4 | 959.3 | 2210.74 | 958.59 |
| 2230.49 | 957.4 | 2240.21 | 957.01 | 2244.79 | 956.54 | 2253.93 | 959.03 | 2277.66 | 965.52 |
| 2288.23 | 965.63 | 2297.78 | 965.91 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1034.98 | .05 | 1085.42 | .12 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1034.98 | 1085.42 | 424.42 | 425.55 | 426.3 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 856.97 | 949.86 | F |
| 1322.43 | 2297.78 | 945.84 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 943.10 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.41 | Wt. n-Val. | 0.120 | 0.050 | 0.120 |
| W.S. Elev (ft) | 942.69 | Reach Len. (ft) | 424.42 | 425.55 | 426.30 |
| Crit W.S. (ft) | 938.66 | Flow Area (sq ft) | 1034.39 | 635.38 | 496.55 |
| E.G. Slope (ft/ft) | 0.001987 | Area (sq ft) | 1034.39 | 635.38 | 496.55 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 6700.00 | Flow (cfs) | 1952.22 | 4077.27 | 670.51 |
| Top Width (ft) | 342.06 | Top Width (ft) | 162.27 | 50.44 | 129.34 |
| Vel Total (ft/s) | 3.09 | Avg. Vel. (ft/s) | 1.89 | 6.42 | 1.35 |
| Max Chl Dpth (ft) | 16.74 | Hydr. Depth (ft) | 6.37 | 12.60 | 3.84 |
| Conv. Total (cfs) | 150298.4 | Conv. (cfs) | 43793.4 | 91463.8 | 15041.3 |
| Length Wtd. (ft) | 425.25 | Wetted Per. (ft) | 163.61 | 59.60 | 129.78 |
| Min Ch El (ft) | 925.95 | Shear (lb/sq ft) | 0.78 | 1.32 | 0.47 |
| Alpha | 2.75 | Stream Power (lb/ft s) | 2297.78 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.59 | Cum Volume (acre-ft) | 33.40 | 21.56 | 11.99 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 10.23 | 1.71 | 3.57 |

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 32570

INPUT
Description:
Station Elevation Data num= 169

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 962.79 | 14.12 | 962.14 | 18.61 | 961.95 | 18.96 | 961.93 | 21.12 | 962.04 |
| 53.28 | 962.16 | 53.96 | 962.19 | 58.73 | 961.95 | 73.19 | 962.27 | 98.31 | 962.34 |
| 103.58 | 962.38 | 105.92 | 962.39 | 107.8 | 962.33 | 117.36 | 962.3 | 130.46 | 962.26 |
| 134.36 | 961.3 | 137.7 | 960.58 | 140.02 | 960.59 | 148.33 | 960.68 | 190.79 | 960.77 |
| 205.55 | 960.92 | 240.56 | 961 | 246.46 | 960.93 | 268.35 | 960.74 | 282.99 | 960.32 |
| 293.42 | 959.3 | 311.25 | 956.86 | 312.78 | 956.86 | 325.88 | 956.34 | 363.82 | 954.44 |
| 371.51 | 953.95 | 412.04 | 952.43 | 420.7 | 951.99 | 421.43 | 951.93 | 421.58 | 951.91 |
| 423.13 | 951.82 | 431.64 | 951.16 | 432.89 | 951.06 | 444.74 | 949.52 | 459.72 | 948.54 |
| 468.97 | 947.93 | 474.55 | 947.63 | 504.5 | 946.45 | 516.4 | 946.12 | 528.5 | 944.3 |
| 530.14 | 943.99 | 537.46 | 943.34 | 575.69 | 942.13 | 581.07 | 941.87 | 583.63 | 941.86 |
| 625.63 | 941.41 | 636.18 | 940.97 | 649.42 | 940.83 | 688.78 | 940.49 | 690.51 | 940.5 |
| 691.24 | 940.49 | 691.9 | 940.48 | 727.42 | 940.68 | 747.28 | 940.62 | 799.31 | 940.43 |
| 800.44 | 940.43 | 802.71 | 940.41 | 804.15 | 940.41 | 805.34 | 940.39 | 852.84 | 940.03 |
| 864.2 | 940.46 | 878.48 | 941.18 | 903.62 | 942.32 | 910.74 | 941.62 | 929.54 | 940.03 |
| 930.2 | 939.72 | 935.16 | 937.26 | 943.64 | 933.07 | 944.42 | 932.73 | 973.57 | 933.74 |
| 976.36 | 933.92 | 982.61 | 934.1 | 998.97 | 934.74 | 1020.72 | 934.95 | 1046.66 | 935.84 |
| 1061.88 | 935.71 | 1067.19 | 935.71 | 1076.23 | 935.6 | 1098.34 | 934.83 | 1104.36 | 934.95 |
| 1112.92 | 934.71 | 1123.42 | 934.1 | 1128.35 | 932.39 | 1134.79 | 929.65 | 1136.91 | 928.77 |
| 1138.22 | 928.23 | 1139.07 | 927.18 | 1156 | 925.57 | 1176.39 | 927.18 | 1178.79 | 928.5 |
| 1199.2 | 940.99 | 1208.97 | 941.03 | 1210.22 | 941.05 | 1210.68 | 941.16 | 1219.08 | 943.16 |
| 1232.58 | 942.41 | 1232.87 | 942.39 | 1233.14 | 942.39 | 1239.36 | 942.43 | 1259.73 | 942.46 |
| 1266.88 | 942.56 | 1288.79 | 942.86 | 1312.58 | 943.59 | 1338.78 | 944.72 | 1364.1 | 944.75 |
| 1391.31 | 943.29 | 1396.06 | 942.85 | 1406.25 | 942.05 | 1407.59 | 942.24 | 1437.11 | 946.65 |
| 1459.44 | 947.11 | 1482.2 | 947.61 | 1482.72 | 947.78 | 1520.49 | 961.93 | 1523.55 | 962.06 |
| 1552.09 | 962.38 | 1563.93 | 962.37 | 1584.33 | 962 | 1608.83 | 962.1 | 1644.11 | 962.12 |
| 1668.54 | 962.23 | 1705.29 | 962.22 | 1730.2 | 962.44 | 1761.32 | 962.44 | 1785.98 | 962.62 |
| 1811.96 | 962.63 | 1835.49 | 962.81 | 1861.29 | 962.92 | 1861.54 | 962.92 | 1861.96 | 962.97 |
| 1875.22 | 964.1 | 1927.13 | 964.52 | 1938.87 | 964.65 | 1968.88 | 964.97 | 1993.71 | 965.15 |
| 2041.5 | 965.67 | 2048.13 | 965.74 | 2097.24 | 965.74 | 2107.13 | 965.74 | 2133.73 | 965.74 |
| 2143.25 | 965.74 | 2147.29 | 965.76 | 2161.5 | 965.79 | 2171.19 | 964.87 | 2172 | 964.78 |
| 2172.39 | 964.78 | 2188.91 | 964.87 | 2199.43 | 964.94 | 2228.5 | 965.1 | 2233.02 | 964.78 |
| 2240.31 | 964.71 | 2247.6 | 964.18 | 2258.44 | 963.65 | 2273.73 | 961.57 | 2286.64 | 959.44 |
| 2291.27 | 959.7 | 2293.87 | 959.98 | 2307.56 | 964.16 | 2319.85 | 967.45 | 2362.04 | 967.71 |
| 2368.01 | 967.75 | 2369 | 967.62 | 2382.24 | 966.04 | 2382.57 | 966.1 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .12 | 1123.42 | .05 | 1199.2 | .11 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 1123.42 | 1199.2 | 614.58 | 621.16 617.04 | .1 | .3 |

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1338.78 | 1425 | 944.72 | F |
| 1217.9 | 1338.78 | 942.88 | F |
| 550 | 903.62 | 942.32 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 942.46 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.27 | Wt. n-Val. | 0.120 | 0.050 | 0.110 |
| W.S. Elev (ft) | 942.20 | Reach Len. (ft) | 614.58 | 621.16 | 617.04 |
| Crit W.S. (ft) | 936.13 | Flow Area (sq ft) | 1447.93 | 950.84 | 15.78 |
| E.G. Slope (ft/ft) | 0.001026 | Area (sq ft) | 1900.25 | 950.84 | 16.00 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 6680.00 | Flow (cfs) | 2014.16 | 4659.06 | 6.78 |
| Top Width (ft) | 640.30 | Top Width (ft) | 545.81 | 75.78 | 18.72 |
| Vel Total (ft/s) | 2.77 | Avg. Vel. (ft/s) | 1.39 | 4.90 | 0.43 |
| Max Chl Dpth (ft) | 16.63 | Hydr. Depth (ft) | 6.63 | 12.55 | 1.00 |
| Conv. Total (cfs) | 208566.0 | Conv. (cfs) | 62886.9 | 145467.5 | 211.6 |
| Length Wtd. (ft) | 619.38 | Wetted Per. (ft) | 220.42 | 81.41 | 15.97 |
| Min Ch El (ft) | 925.57 | Shear (lb/sq ft) | 0.42 | 0.75 | 0.06 |
| Alpha | 2.26 | Stream Power (lb/ft s) | 2382.57 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.80 | Cum Volume (acre-ft) | 19.10 | 13.81 | 9.48 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 6.78 | 1.09 | 2.84 |

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31948

INPUT
Description:
Station Elevation Data num= 172

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 965.57 | 11.54 | 965.68 | 13.15 | 965.83 | 16.76 | 965.83 | 20.7 | 965.8 |
| 57.77 | 967.52 | 69.14 | 967.55 | 77.67 | 967.31 | 96.2 | 965.92 | 98.12 | 965.49 |
| 102.83 | 965.52 | 151.12 | 962.43 | 152.79 | 962.48 | 156.49 | 962.61 | 159.32 | 962.68 |
| 174.82 | 963.37 | 189.1 | 960.93 | 189.88 | 960.8 | 192.5 | 960.83 | 236.97 | 961.17 |
| 264.78 | 960.96 | 286.81 | 959.86 | 337.02 | 957.83 | 339.99 | 957.67 | 353.6 | 957.31 |
| 386.03 | 956.44 | 400.02 | 955.71 | 441.17 | 954.47 | 457 | 953.76 | 464.47 | 953.77 |
| 468.41 | 953.72 | 476.03 | 950.86 | 486.37 | 947.41 | 486.78 | 947.27 | 487.1 | 947.17 |
| 507.64 | 946.29 | 515.7 | 946.06 | 522.04 | 944.99 | 534.14 | 941.98 | 544.09 | 941.96 |
| 569.89 | 941.27 | 605.14 | 940.85 | 605.29 | 940.84 | 605.45 | 940.84 | 607.05 | 940.83 |
| 655.65 | 940.67 | 672.39 | 940.67 | 677.7 | 940.69 | 681.62 | 940.75 | 703.21 | 940.93 |
| 708.06 | 940.95 | 728.16 | 941.3 | 752.86 | 941.63 | 760.3 | 941.46 | 779.56 | 940.57 |
| 793.46 | 939.8 | 815.24 | 938.67 | 818.96 | 938.71 | 826.47 | 938.54 | 839.68 | 938.27 |
| 853.81 | 937.92 | 884.86 | 937.1 | 897.77 | 936.72 | 905.99 | 936.05 | 910.45 | 935.69 |
| 913.32 | 935.5 | 915.48 | 935.6 | 918.2 | 935.77 | 924.03 | 936.03 | 929.43 | 932.47 |
| 936.37 | 927.89 | 939.14 | 925.84 | 948.17 | 924.24 | 958.19 | 925.84 | 968.24 | 930.86 |
| 969.46 | 931.43 | 970.61 | 931.97 | 973.09 | 932.14 | 982.84 | 932.73 | 991.38 | 934.12 |
| 1009.97 | 937.51 | 1014.71 | 937.65 | 1023.85 | 937.78 | 1034.04 | 937.77 | 1035.03 | 937.76 |
| 1049.71 | 937.7 | 1067.26 | 937.78 | 1103.79 | 937.88 | 1116.39 | 937.91 | 1125.82 | 938.6 |
| 1130.51 | 938.55 | 1136.37 | 938.35 | 1138.28 | 937.89 | 1146.81 | 935.69 | 1154 | 934.54 |
| 1156.12 | 934.09 | 1158.11 | 934.69 | 1162.93 | 935.85 | 1171.66 | 937.99 | 1194.18 | 944.84 |
| 1194.33 | 944.88 | 1194.35 | 944.88 | 1233.85 | 945.23 | 1266.05 | 944.9 | 1276.21 | 945.09 |
| 1281.78 | 945.23 | 1319.45 | 945.59 | 1333.46 | 946.69 | 1341.87 | 947.63 | 1344.88 | 947.74 |
| 1362.48 | 947.57 | 1370.59 | 947.49 | 1373.79 | 947.61 | 1380.49 | 948.09 | 1384.83 | 948.78 |
| 1385.38 | 948.85 | 1388.66 | 949.28 | 1388.99 | 950.12 | 1389.48 | 951.25 | 1398.54 | 951.54 |
| 1417.47 | 952.17 | 1437.22 | 952.86 | 1461.58 | 953.73 | 1495.38 | 953.64 | 1500.3 | 953.66 |
| 1536.96 | 954 | 1550.2 | 954.37 | 1570.79 | 955.15 | 1579.58 | 955.33 | 1582.35 | 955.6 |
| 1587.85 | 956.58 | 1604.44 | 960.26 | 1636.01 | 961.38 | 1638.1 | 961.46 | 1638.58 | 961.46 |
| 1639.11 | 961.47 | 1639.49 | 961.47 | 1640.02 | 961.47 | 1642.63 | 961.46 | 1683.85 | 960.87 |
| 1702.07 | 960.35 | 1706.75 | 960.35 | 1731.35 | 960 | 1732.75 | 959.95 | 1734.21 | 960.02 |
| 1735.7 | 960.1 | 1736.48 | 963.29 | 1736.65 | 963.95 | 1736.77 | 964.47 | 1746.81 | 964.75 |
| 1768.92 | 964.84 | 1783.87 | 965.33 | 1794.66 | 965.39 | 1833.91 | 965.1 | 1875.26 | 965.26 |
| 1883.92 | 965.28 | 1926.65 | 965.76 | 1933.94 | 965.74 | 1940.86 | 965.76 | 1983.95 | 965.5 |
| 1989.59 | 965.51 | 2033.99 | 966.04 | 2043.05 | 966.08 | 2051.16 | 966.17 | 2080.08 | 966.48 |
| 2088.19 | 971.92 | 2088.98 | 972.46 | 2093.27 | 972.64 | 2112.76 | 973.38 | 2119.5 | 973.59 |
| 2125.63 | 973.49 | 2144.07 | 973.08 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 924.03 | .042 | 970.61 | .08 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
924.03 970.61 83.8 101.77 116.75 .3 .5

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 1138 | 1172 | 938 |

CROSS SECTION OUTPUT Profile #100 nat

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.63 | Element | | | |
| Vel Head (ft) | 0.61 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.02 | Reach Len. (ft) | 83.80 | 101.77 | 116.75 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 479.32 | 605.74 | 787.15 |
| E.G. Slope (ft/ft) | 0.001673 | Area (sq ft) | 479.32 | 605.74 | 787.15 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 6680.00 | Flow (cfs) | 707.58 | 4538.87 | 1433.56 |
| Top Width (ft) | 533.80 | Top Width (ft) | 276.20 | 46.58 | 211.03 |
| Vel Total (ft/s) | 3.57 | Avg. Vel. (ft/s) | 1.48 | 7.49 | 1.82 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 1.74 | 13.00 | 3.73 |
| Conv. Total (cfs) | 163337.8 | Conv. (cfs) | 17301.5 | 110983.3 | 35053.0 |
| Length Wtd. (ft) | 101.78 | Wetted Per. (ft) | 276.35 | 51.40 | 212.04 |
| Min Ch El (ft) | 924.24 | Shear (lb/sq ft) | 0.18 | 1.23 | 0.39 |
| Alpha | 3.07 | Stream Power (lb/ft s) | 2144.07 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.14 | Cum Volume (acre-ft) | 2.31 | 2.71 | 3.79 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 0.98 | 0.22 | 1.22 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31847

INPUT
Description:
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
954.14 1003.14 97.38 97.38 100.28 .3 .5

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.41 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 940.97 | Reach Len. (ft) | 19.00 | 19.00 | 19.00 |
| Crit W.S. (ft) | 935.30 | Flow Area (sq ft) | 872.09 | 681.99 | 757.70 |
| E.G. Slope (ft/ft) | 0.001088 | Area (sq ft) | 872.09 | 681.99 | 757.70 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 1295.58 | 4409.23 | 975.19 |
| Top Width (ft) | 527.84 | Top Width (ft) | 230.67 | 49.00 | 248.16 |
| Vel Total (ft/s) | 2.89 | Avg. Vel. (ft/s) | 1.49 | 6.47 | 1.29 |
| Max Chl Dpth (ft) | 16.75 | Hydr. Depth (ft) | 3.78 | 13.92 | 3.05 |
| Conv. Total (cfs) | 202492.9 | Conv. (cfs) | 39273.4 | 133658.2 | 29561.3 |
| Length Wtd. (ft) | 19.00 | Wetted Per. (ft) | 231.00 | 52.31 | 248.89 |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.26 | 0.89 | 0.21 |
| Alpha | 3.38 | Stream Power (lb/ft s) | 2200.56 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 1.01 | 1.21 | 1.72 |
| C & E Loss (ft) | | Cum SA (acres) | 0.49 | 0.11 | 0.60 |

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

BRIDGE

RIVER: Rottenwood
REACH: 1 RS: 31798

INPUT
Description: B170716100, Franklin Road, L 63' & W 50.1'

Distance from Upstream XS = 19
Deck/Roadway Width = 50.1
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |
| 567.59 | 945.23 | | 603.22 | 944.32 | | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | | 1115.63 | 937.59 | |
| 1134.19 | 937.66 | | 1145.77 | 937.76 | | 1161.82 | 938.1 | |
| 1168.82 | 938.26 | | 1178.47 | 938.42 | | 1193.35 | 938.75 | |
| 1206.69 | 938.97 | | 1225.72 | 939.43 | | 1233.28 | 939.64 | |
| 1250.81 | 940.2 | | 1262.2 | 940.55 | | 1265.14 | 940.65 | |
| 1279.57 | 941.13 | | 1293.32 | 941.6 | | 1308.26 | 942.13 | |
| 1315.37 | 942.44 | | 1317.28 | 942.5 | | 1326.64 | 942.81 | |
| 1335.16 | 943.04 | | 1347.23 | 943.25 | | 1356.21 | 943.56 | |
| 1369.09 | 944.02 | | 1381.94 | 944.65 | | 1392.51 | 945.02 | |
| 1398.97 | 945.2 | | 1407.33 | 945.44 | | 1409.58 | 945.53 | |

| | | | | | |
|---|---|---|---|---|---|
| 1411.68 | 945.61 | 1421.64 | 946.11 | 1423.87 | 946.21 |
| 1425.78 | 946.3 | 1440.45 | 946.5 | 1460.22 | 947.14 |
| 1462.14 | 947.22 | 1464.35 | 947.31 | 1466.73 | 947.4 |
| 1482.53 | 947.88 | 1488.72 | 948.15 | 1499.91 | 948.87 |
| 1510.85 | 949.13 | 1529.63 | 949.72 | 1538.53 | 950.12 |
| 1545.34 | 950.33 | 1551.59 | 950.48 | 1575.81 | 951.16 |
| 1580.59 | 951.28 | 1581.27 | 951.3 | 1600.88 | 951.74 |
| 1606.65 | 951.99 | 1612.04 | 952.15 | 1633.56 | 953.03 |
| 1641.79 | 953.25 | 1648.55 | 953.33 | 1657.81 | 953.78 |
| 1660.85 | 953.89 | 1663.66 | 954 | 1666.07 | 954.1 |
| 1675.44 | 954.46 | 1677.98 | 954.59 | 1698.47 | 955.2 |
| 1701.05 | 955.22 | 1709.01 | 955.45 | 1711.54 | 955.46 |
| 1714.44 | 955.47 | 1727.16 | 955.84 | 1729.98 | 956.03 |
| 1743.08 | 956.72 | 1750.55 | 956.87 | 1758.09 | 957.12 |
| 1775.12 | 957.6 | 1788.49 | 957.95 | 1804.39 | 958.38 |
| 1811.13 | 958.76 | 1826.91 | 959.33 | 1835.75 | 959.66 |
| 1846.37 | 960.1 | 1856.96 | 960.52 | 1883.46 | 961.62 |
| 1890.39 | 961.98 | 1899.57 | 962.42 | 1915.61 | 963.02 |
| 1926.29 | 963.32 | 1941.17 | 963.85 | 1958.27 | 964.4 |
| 1967.8 | 964.69 | 1981.81 | 965.16 | 1990.04 | 965.52 |
| 2002.08 | 965.92 | 2008.23 | 966.11 | 2023.45 | 966.59 |
| 2029.35 | 966.78 | 2048.73 | 967.11 | 2059.59 | 967.54 |
| 2068.73 | 968.47 | 2088.73 | 969.34 | 2103.12 | 969.83 |
| 2120.8 | 970.45 | 2132.88 | 970.97 | 2146.72 | 971.66 |
| 2156.56 | 972.02 | 2168.27 | 972.39 | 2181.5 | 972.76 |
| 2190.49 | 973.18 | 2196.76 | 973.4 | 2207.46 | 973.85 |
| 2209.45 | 973.96 | 2213.33 | 974.19 | 2216.57 | 974.39 |
| 2227.79 | 974.61 | | | | |

Upstream Bridge Cross Section Data
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 972.73 | 3.93 | 972.39 | 5.19 | 972.32 | 10.22 | 971.78 | 27.1 | 970.49 |
| 30.47 | 970.07 | 44.32 | 969.4 | 53.2 | 968.92 | 58.84 | 968.56 | 66.73 | 968.22 |
| 70.39 | 968.36 | 89.6 | 967.58 | 105.57 | 966.93 | 112.28 | 966.73 | 122.34 | 966.38 |
| 136.98 | 965.85 | 151.6 | 964.82 | 162.32 | 964.56 | 170.91 | 964.05 | 179.86 | 963.83 |
| 184.86 | 963.14 | 199.73 | 962.92 | 212.67 | 962.25 | 225.29 | 961.52 | 234.59 | 961.03 |
| 244.53 | 960.49 | 254.4 | 960.25 | 260.61 | 959.98 | 268.47 | 959.54 | 275.99 | 959.12 |
| 301.22 | 958.11 | 313.72 | 957.67 | 319.98 | 957.35 | 334.78 | 956.24 | 350.58 | 955.61 |
| 355.74 | 955.55 | 368.44 | 954.95 | 373.39 | 954.72 | 377.56 | 954.4 | 390.24 | 953.79 |
| 401.97 | 953.48 | 416.11 | 952.72 | 424.74 | 953.35 | 426.58 | 953.32 | 434.86 | 952.05 |
| 436.23 | 952.06 | 445.66 | 950.55 | 446.45 | 950.54 | 458.7 | 950.28 | 459.72 | 950.24 |
| 466.99 | 949.99 | 469.29 | 949.88 | 474.38 | 949.91 | 478.04 | 949.82 | 491.2 | 949.92 |
| 494.91 | 949.61 | 498.47 | 948.9 | 508.06 | 948.59 | 524.54 | 947.29 | 524.98 | 947.22 |
| 525.76 | 947.05 | 528.47 | 946.86 | 542.61 | 945.42 | 549.23 | 945.15 | 555.41 | 944.91 |
| 599.25 | 943.74 | 610.55 | 943.33 | 619.27 | 943.07 | 658.76 | 942.07 | 669.83 | 941.86 |
| 685.38 | 941.57 | 697.17 | 941.45 | 702.59 | 941.39 | 709.84 | 941.26 | 735.01 | 940.73 |
| 747.53 | 940.5 | 754.93 | 940.39 | 756.86 | 940.36 | 801.89 | 939.73 | 808.02 | 939.64 |
| 818.95 | 939.48 | 825.48 | 939.36 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1010.31 | 935.5 | 1013.67 | 936.45 | 1020.19 | 937.54 |
| 1030.12 | 937.52 | 1042.32 | 937.45 | 1048.46 | 937.44 | 1067.05 | 937.39 | 1075.82 | 937.43 |
| 1082.85 | 937.47 | 1109.16 | 937.68 | 1131.94 | 937.61 | 1157.19 | 937.8 | 1177.8 | 938.24 |
| 1187.02 | 938.4 | 1199.14 | 938.91 | 1206.85 | 939.23 | 1208.3 | 939.02 | 1215.07 | 939.15 |
| 1215.49 | 939.17 | 1219.57 | 939.45 | 1222.64 | 939.33 | 1227.18 | 939.21 | 1228.81 | 938.99 |
| 1231.06 | 939.12 | 1234.72 | 939.14 | 1238.36 | 939.07 | 1243.52 | 939.41 | 1244.92 | 939.45 |
| 1247.72 | 940.08 | 1248.93 | 940.35 | 1251.75 | 941.09 | 1253.25 | 941.11 | 1257.78 | 941.14 |
| 1265.07 | 941.28 | 1270.09 | 941.24 | 1272.02 | 941.12 | 1272.54 | 941.15 | 1280.58 | 941.48 |
| 1280.73 | 941.53 | 1286.91 | 942.37 | 1288.37 | 942.75 | 1293.96 | 943.29 | 1299.86 | 943.49 |
| 1310.97 | 944.04 | 1327.26 | 944.42 | 1328.92 | 944.47 | 1331.25 | 944.5 | 1339.18 | 944.54 |
| 1343.4 | 944.5 | 1350.21 | 944.54 | 1354.42 | 944.64 | 1365.65 | 944.87 | 1371.91 | 945.18 |
| 1381.16 | 945.99 | 1388.32 | 946.5 | 1396.74 | 946.74 | 1400.89 | 946.9 | 1411.77 | 947.01 |
| 1429.34 | 947.34 | 1437.05 | 947.76 | 1438.11 | 947.76 | 1453.34 | 949.95 | 1455.18 | 950.26 |
| 1456.46 | 950.29 | 1460.73 | 949.58 | 1463.54 | 948.97 | 1465.21 | 948.91 | 1468.41 | 948.89 |
| 1469.93 | 949 | 1478.06 | 949.37 | 1481.19 | 949.61 | 1489.69 | 950.36 | 1496.08 | 950.69 |
| 1505.47 | 951.18 | 1507.82 | 951.35 | 1515.85 | 951.87 | 1517.17 | 951.89 | 1517.45 | 951.89 |
| 1525.06 | 952 | 1526.88 | 952.04 | 1531.11 | 952.14 | 1533.54 | 952.17 | 1537.5 | 952.3 |
| 1540.53 | 952.34 | 1546.03 | 952.41 | 1549.58 | 952.4 | 1556.78 | 952.55 | 1569.5 | 953.47 |
| 1572.2 | 953.62 | 1573.53 | 953.75 | 1577.2 | 954.12 | 1592.36 | 954.58 | 1608 | 953.45 |
| 1621.34 | 954.1 | 1637.19 | 954.86 | 1652.53 | 955.05 | 1658.36 | 955.28 | 1661.98 | 955.35 |
| 1673.57 | 955.92 | 1681.05 | 956.26 | 1687.05 | 956.43 | 1695.38 | 956.89 | 1704.73 | 957.17 |
| 1708.74 | 957.26 | 1715.27 | 957.22 | 1720.76 | 957.4 | 1726.66 | 957.86 | 1746.63 | 958.18 |
| 1749.39 | 958.19 | 1758.3 | 958.33 | 1776.18 | 958.51 | 1795.86 | 959.09 | 1800.49 | 959.32 |
| 1809.5 | 960.51 | 1811.61 | 960.71 | 1813.01 | 960.84 | 1840.29 | 963.17 | 1844.63 | 963.22 |
| 1850.76 | 963.63 | 1857.45 | 963.65 | 1858.91 | 962.09 | 1861.94 | 960.24 | 1865 | 961.03 |
| 1868.46 | 961.41 | 1874.2 | 961.25 | 1877.36 | 961.36 | 1882.8 | 961.03 | 1888.87 | 960.97 |
| 1895.52 | 959.99 | 1899.83 | 959.29 | 1905.19 | 959.92 | 1914.72 | 959.37 | 1919.29 | 959.11 |
| 1920.33 | 959.12 | 1924.63 | 959.09 | 1930.09 | 959.84 | 1940.17 | 960.32 | 1941.08 | 960.31 |
| 1951.25 | 960.86 | 1953.35 | 960.85 | 1958.9 | 961.13 | 1965.22 | 961.29 | 1966.31 | 961.27 |
| 1976.99 | 964.63 | 1983.86 | 964.9 | 1990.15 | 965.03 | 1999.22 | 965.6 | 2003.68 | 965.6 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2009.01 | 965.57 | 2022.58 | 966.09 | 2027.12 | 966.37 | 2035.86 | 966.63 | 2038.46 | 966.66 |
| 2039.81 | 966.65 | 2046.72 | 967.97 | 2047.36 | 968.28 | 2056.36 | 968.79 | 2079.36 | 969.55 |
| 2082.49 | 969.91 | 2091.59 | 970.56 | 2093.07 | 970.63 | 2094.6 | 970.69 | 2104.15 | 970.36 |
| 2115.3 | 970.11 | 2120.66 | 970.19 | 2130.04 | 970.67 | 2133.49 | 970.72 | 2142.41 | 971.42 |
| 2150.26 | 972.56 | 2150.68 | 972.59 | 2152.06 | 972.95 | 2157.58 | 973.33 | 2164.91 | 973.66 |
| 2173.08 | 974.13 | 2188.11 | 974.69 | 2200.56 | 975.09 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Coeff Contr. Expan.

954.14 1003.14 .3 .5

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 0 | 917 | 938.7 | F |
| 1026 | 2200.56 | 937.4 | F |

Downstream Deck/Roadway Coordinates

num= 178

| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
|---|---|---|---|---|---|---|---|---|
| 0 | 971.12 | | 6.63 | 970.95 | | 21.82 | 970.28 | |
| 44.54 | 969.6 | | 54.14 | 969.27 | | 70.99 | 968.59 | |
| 84.78 | 968.21 | | 94.11 | 967.89 | | 101.43 | 967.66 | |
| 136.01 | 966.16 | | 143.22 | 965.94 | | 147.42 | 965.81 | |
| 182.08 | 964.32 | | 189.19 | 963.93 | | 196.35 | 963.54 | |
| 231.44 | 962.15 | | 236.34 | 961.88 | | 244.1 | 961.47 | |
| 269.27 | 960.16 | | 276.97 | 959.75 | | 281.5 | 959.51 | |
| 298.72 | 958.36 | | 303.22 | 958.17 | | 309.06 | 957.87 | |
| 355.18 | 955.46 | | 367.78 | 954.83 | | 375.44 | 954.43 | |
| 392.91 | 953.61 | | 400.7 | 953.21 | | 407.36 | 952.87 | |
| 449.98 | 950.87 | | 458.84 | 950.41 | | 467.8 | 949.95 | |
| 478.99 | 949.36 | | 483.78 | 949.11 | | 491.97 | 948.81 | |
| 537.4 | 946.45 | | 544.21 | 946.14 | | 556.18 | 945.67 | |
| 567.59 | 945.23 | | 603.22 | 944.32 | | 612.71 | 943.97 | |
| 639.41 | 942.98 | | 646.68 | 942.76 | | 656.34 | 942.59 | |
| 681.59 | 942.07 | | 696.05 | 941.79 | | 702.54 | 941.67 | |
| 723.4 | 941.28 | | 739.69 | 941.01 | | 739.77 | 941.01 | |
| 759.43 | 940.8 | | 770.61 | 940.65 | | 773.61 | 940.61 | |
| 791.5 | 940.4 | | 798.91 | 940.29 | | 805.33 | 940.19 | |
| 812.3 | 940.09 | | 830.23 | 939.88 | | 840.14 | 939.78 | |
| 890.14 | 939.1 | | 940.14 | 938.56 | | 940.14 | 938.56 | 934.59 |
| 1003.14 | 937.83 | 934.04 | 1003.14 | 937.83 | | 1053.14 | 937.6 | |
| 1103.14 | 938 | | 1107.56 | 937.54 | | 1115.63 | 937.59 | |
| 1134.19 | 937.66 | | 1145.77 | 937.76 | | 1161.82 | 938.1 | |
| 1168.82 | 938.26 | | 1178.47 | 938.42 | | 1193.35 | 938.75 | |
| 1206.69 | 938.97 | | 1225.72 | 939.43 | | 1233.28 | 939.64 | |
| 1250.81 | 940.2 | | 1262.2 | 940.55 | | 1265.14 | 940.65 | |
| 1279.57 | 941.13 | | 1293.32 | 941.6 | | 1308.26 | 942.13 | |
| 1315.37 | 942.44 | | 1317.28 | 942.5 | | 1326.64 | 942.81 | |
| 1335.16 | 943.04 | | 1347.23 | 943.25 | | 1356.21 | 943.56 | |
| 1369.09 | 944.02 | | 1381.94 | 944.65 | | 1392.51 | 945.02 | |
| 1398.97 | 945.2 | | 1407.33 | 945.44 | | 1409.58 | 945.53 | |
| 1411.68 | 945.61 | | 1421.64 | 946.11 | | 1423.87 | 946.21 | |
| 1425.78 | 946.3 | | 1440.45 | 946.5 | | 1460.22 | 947.14 | |
| 1462.14 | 947.22 | | 1464.35 | 947.31 | | 1466.73 | 947.4 | |
| 1482.53 | 947.88 | | 1488.72 | 948.15 | | 1499.91 | 948.87 | |
| 1510.85 | 949.13 | | 1529.63 | 949.72 | | 1538.53 | 950.12 | |
| 1545.34 | 950.33 | | 1551.59 | 950.48 | | 1575.81 | 951.16 | |
| 1580.59 | 951.28 | | 1581.27 | 951.3 | | 1600.88 | 951.74 | |
| 1606.65 | 951.99 | | 1612.04 | 952.15 | | 1633.56 | 953.03 | |
| 1641.79 | 953.25 | | 1648.55 | 953.33 | | 1657.81 | 953.78 | |
| 1660.85 | 953.89 | | 1663.66 | 954 | | 1666.07 | 954.1 | |
| 1675.44 | 954.46 | | 1677.98 | 954.59 | | 1698.47 | 955.2 | |
| 1701.05 | 955.22 | | 1709.01 | 955.45 | | 1711.54 | 955.46 | |
| 1714.44 | 955.47 | | 1727.16 | 955.84 | | 1729.98 | 956.03 | |
| 1743.08 | 956.72 | | 1750.55 | 956.87 | | 1758.09 | 957.12 | |
| 1775.12 | 957.6 | | 1788.49 | 957.95 | | 1804.39 | 958.38 | |
| 1811.13 | 958.76 | | 1826.91 | 959.33 | | 1835.75 | 959.66 | |
| 1846.37 | 960.1 | | 1856.96 | 960.52 | | 1883.46 | 961.62 | |
| 1890.39 | 961.98 | | 1899.57 | 962.42 | | 1915.61 | 963.02 | |
| 1926.29 | 963.32 | | 1941.17 | 963.85 | | 1958.27 | 964.4 | |
| 1967.8 | 964.69 | | 1981.81 | 965.16 | | 1990.04 | 965.52 | |
| 2002.08 | 965.92 | | 2008.23 | 966.11 | | 2023.45 | 966.59 | |
| 2029.35 | 966.78 | | 2048.73 | 967.11 | | 2059.59 | 967.54 | |
| 2068.73 | 968.47 | | 2088.73 | 969.34 | | 2103.12 | 969.83 | |
| 2120.8 | 970.45 | | 2132.88 | 970.97 | | 2146.72 | 971.66 | |
| 2156.56 | 972.02 | | 2168.27 | 972.39 | | 2181.5 | 972.76 | |
| 2190.49 | 973.18 | | 2196.76 | 973.4 | | 2207.46 | 973.85 | |

2209.45 973.96 2213.33 974.19 2216.57 974.39
2227.79 974.61

Downstream Bridge Cross Section Data
Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Coeff Contr. Expan.
954.14 1003.14 .3 .5

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

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

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8

Max Low Cord =

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

CROSS SECTION

RIVER: Rottenwood
REACH: 1 RS: 31749

INPUT
Description:
Station Elevation Data num= 209

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 976.58 | .29 | 976.56 | 4.86 | 972.5 | 6.12 | 970.54 | 12.22 | 967.75 |
| 19.41 | 964.64 | 26.26 | 964.61 | 27 | 964.47 | 29.09 | 964.47 | 57.44 | 964.71 |
| 64.22 | 964.95 | 83.22 | 965.13 | 90.97 | 965.67 | 97.48 | 965.76 | 103.21 | 965.84 |
| 111.91 | 967.17 | 112.34 | 967.16 | 116.2 | 967.02 | 116.93 | 966.96 | 118.16 | 966.86 |
| 121.21 | 967.33 | 127.81 | 968.18 | 143.01 | 969.71 | 147.06 | 969.89 | 156.54 | 970.38 |
| 158.22 | 970.36 | 167.46 | 968.93 | 168.62 | 968.84 | 189.78 | 967.2 | 192.01 | 966.89 |
| 200.5 | 964.82 | 206.95 | 962.81 | 209.02 | 961.92 | 210.4 | 961.48 | 221 | 961.58 |
| 236.9 | 961.68 | 242.69 | 961.63 | 265.22 | 961.38 | 269.55 | 960.36 | 276.62 | 958.92 |
| 298.34 | 957.01 | 309.38 | 956.16 | 360.35 | 954.15 | 361.28 | 954.12 | 362.24 | 954.07 |
| 399.2 | 952.39 | 430.1 | 951.21 | 433.95 | 951.12 | 467.29 | 950.08 | 499.86 | 948.19 |
| 505.67 | 947.95 | 547.15 | 946.28 | 569.62 | 945.1 | 577.36 | 944.72 | 610.4 | 943.85 |
| 639.41 | 942.5 | 644.17 | 942.35 | 649.07 | 942.27 | 686.82 | 941.78 | 708.09 | 940.8 |
| 709.17 | 940.75 | 714.87 | 940.58 | 781.28 | 940.1 | 784.18 | 940.08 | 789.78 | 940.07 |
| 811.88 | 940.22 | 828.4 | 940.03 | 954.14 | 930.37 | 960.14 | 927.62 | 981.14 | 924.22 |
| 991.14 | 925.86 | 1003.14 | 933.64 | 1027.7 | 935.96 | 1039.05 | 936.22 | 1058.88 | 936.58 |
| 1065.78 | 936.56 | 1072.99 | 936.54 | 1077.95 | 936.56 | 1077.98 | 936.56 | 1106.03 | 937.6 |
| 1108.67 | 937.6 | 1167.34 | 938.49 | 1171.87 | 938.5 | 1175.79 | 938.66 | 1180.7 | 934.88 |
| 1181.13 | 934.75 | 1181.58 | 934.78 | 1197.72 | 935.63 | 1198.78 | 935.61 | 1214.01 | 936.37 |
| 1216.68 | 936.36 | 1232.08 | 936.57 | 1237.92 | 936.69 | 1251.57 | 936.89 | 1260.63 | 937.09 |
| 1271.86 | 937.24 | 1283.14 | 937.78 | 1283.59 | 937.8 | 1294.23 | 938.16 | 1303.33 | 939.56 |
| 1306.52 | 940.08 | 1308.17 | 940.17 | 1311.69 | 940.37 | 1322.1 | 940.72 | 1328.31 | 940.96 |
| 1335.28 | 941.2 | 1367.85 | 942.25 | 1370.48 | 942.33 | 1373.64 | 942.39 | 1407.63 | 943.81 |
| 1426.36 | 944.64 | 1427.67 | 944.68 | 1429.58 | 944.78 | 1434.26 | 946.43 | 1441.22 | 945.78 |
| 1445.81 | 945.41 | 1451.56 | 945.61 | 1458.67 | 946.08 | 1469.73 | 946.29 | 1474.1 | 946.47 |
| 1488.83 | 946.9 | 1490.22 | 946.97 | 1491.7 | 947.05 | 1516.1 | 947.67 | 1518.4 | 947.75 |
| 1520.87 | 947.84 | 1543.6 | 948.68 | 1548.76 | 949.06 | 1560.14 | 949.77 | 1568.88 | 950.31 |
| 1578.73 | 950.46 | 1597.74 | 949.84 | 1598.53 | 949.83 | 1598.59 | 949.84 | 1604.13 | 951.02 |
| 1606.45 | 951.64 | 1606.52 | 951.65 | 1608.47 | 951.75 | 1617.56 | 952.1 | 1618.83 | 952.23 |
| 1619.06 | 952.24 | 1636.28 | 952.9 | 1636.72 | 952.9 | 1639.54 | 952.89 | 1659.4 | 953.24 |
| 1661.61 | 953.27 | 1684.18 | 953.84 | 1689.44 | 953.88 | 1696.26 | 954 | 1703.25 | 954.17 |
| 1710.28 | 954.52 | 1711.07 | 954.52 | 1716.24 | 954.64 | 1718.55 | 954.7 | 1739.16 | 955.29 |
| 1744.35 | 955.44 | 1747.4 | 955.56 | 1752.52 | 956.48 | 1761.94 | 958.32 | 1763.59 | 958.59 |
| 1766.36 | 959 | 1777.02 | 960.78 | 1791 | 961.18 | 1809.35 | 961.55 | 1811.37 | 961.62 |
| 1813.52 | 961.67 | 1828 | 962.58 | 1846.74 | 962.78 | 1868.27 | 963.62 | 1877.17 | 963.89 |
| 1895.19 | 964.44 | 1907.36 | 964.87 | 1920.12 | 964.97 | 1933.51 | 965.67 | 1945.21 | 965.97 |
| 1952.53 | 966.32 | 1954.28 | 966.37 | 1963.03 | 965.01 | 1967.48 | 964.27 | 1970.28 | 963.9 |
| 1973.56 | 964.62 | 1983.11 | 966.18 | 1988.72 | 966.75 | 2028.31 | 967.21 | 2029.3 | 967.22 |
| 2029.85 | 967.21 | 2041.74 | 967.26 | 2052.3 | 967.49 | 2074.26 | 968.14 | 2081 | 968.34 |
| 2088.08 | 968.66 | 2096.03 | 968.88 | 2101.9 | 969.09 | 2125.32 | 969.56 | 2132.46 | 969.86 |
| 2139.47 | 969.41 | 2148.77 | 969.97 | 2173.6 | 970.81 | 2181.69 | 971.27 | 2187.52 | 971.72 |
| 2194.44 | 971.97 | 2219.63 | 972.59 | 2225.95 | 972.82 | 2233.57 | 973.4 | 2242.05 | 974.02 |
| 2243.3 | 974.07 | 2245.81 | 974.19 | 2254.41 | 974.65 | 2255.66 | 974.67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 954.14 | .042 | 1003.14 | .08 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
954.14 1003.14 31660.8431769.5131788.64 .3 .5

Ineffective Flow num= 3

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 1171.87 | 1310 | 938.5 | F |
| 800 | 932 | 938 | F |
| 1011 | 1171.87 | 937.6 | F |

CROSS SECTION OUTPUT Profile #100 nat

| | | | | | | |
|---|---|---|---|---|---|---|
| E.G. Elev (ft) | 941.33 | Element | | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.33 | Wt. n-Val. | | 0.080 | 0.042 | 0.080 |
| W.S. Elev (ft) | 941.00 | Reach Len. (ft) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Crit W.S. (ft) | 935.31 | Flow Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| E.G. Slope (ft/ft) | 0.000889 | Area (sq ft) | 816.88 | 683.31 | 1249.53 |
| Q Total (cfs) | 6680.00 | Flow (cfs) | 994.10 | 3998.03 | 1687.86 |
| Top Width (ft) | 625.72 | Top Width (ft) | 250.39 | 49.00 | 326.33 |
| Vel Total (ft/s) | 2.43 | Avg. Vel. (ft/s) | 1.22 | 5.85 | 1.35 |
| Max Chl Dpth (ft) | 16.78 | Hydr. Depth (ft) | 3.26 | 13.95 | 3.83 |
| Conv. Total (cfs) | 224039.2 | Conv. (cfs) | 33341.1 | 134089.3 | 56608.9 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 250.77 | 52.31 | 328.02 |
| Min Ch El (ft) | 924.22 | Shear (lb/sq ft) | 0.18 | 0.73 | 0.21 |
| Alpha | 3.59 | Stream Power (lb/ft s) | 2255.66 | 0.00 | 0.00 |
| 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:Rottenwood

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| 1 | 35046 | .1 | .048 | .09 |
| 1 | 34164 | .12 | .05 | .09 |
| 1 | 33618 | .12 | .05 | .09 |
| 1 | 33522 | .1 | .05 | .09 |
| 1 | 32995 | .12 | .05 | .12 |
| 1 | 32570 | .12 | .05 | .11 |
| 1 | 31948 | .08 | .042 | .08 |
| 1 | 31847 | .08 | .042 | .08 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | .08 | .042 | .08 |

SUMMARY OF REACH LENGTHS

River: Rottenwood

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| 1 | 35046 | 838.32 | 881.91 | 920.22 |
| 1 | 34164 | 643.6 | 546.53 | 445.42 |
| 1 | 33618 | 96 | 96 | 96 |
| 1 | 33522 | 440.95 | 526.75 | 614.99 |
| 1 | 32995 | 424.42 | 425.55 | 426.3 |
| 1 | 32570 | 614.58 | 621.16 | 617.04 |
| 1 | 31948 | 83.8 | 101.77 | 116.75 |
| 1 | 31847 | 97.38 | 97.38 | 100.28 |
| 1 | 31798 | Bridge | | |
| 1 | 31749 | 31660.84 | 31769.51 | 31788.64 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Rottenwood

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| 1 | 35046 | .1 | .3 |
| 1 | 34164 | .1 | .3 |
| 1 | 33618 | .1 | .3 |
| 1 | 33522 | .1 | .3 |
| 1 | 32995 | .1 | .3 |
| 1 | 32570 | .1 | .3 |
| 1 | 31948 | .3 | .5 |
| 1 | 31847 | .3 | .5 |
| 1 | 31798 | Bridge | |
| 1 | 31749 | .3 | .5 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| 1 | 35046 | 100 nat | 6550.00 | 931.20 | 946.10 | | 946.32 | 0.001377 | 4.88 | 2709.08 | 606.90 | 0.28 |
| 1 | 34164 | 100 nat | 6550.00 | 930.00 | 944.70 | | 945.03 | 0.001581 | 5.07 | 1911.47 | 273.55 | 0.29 |
| 1 | 33618 | 100 nat | 6550.00 | 927.90 | 943.69 | | 943.99 | 0.001993 | 5.91 | 2167.65 | 263.68 | 0.29 |
| 1 | 33522 | 100 nat | 6700.00 | 928.10 | 943.64 | 938.72 | 943.82 | 0.001024 | 4.06 | 2463.93 | 364.19 | 0.23 |
| 1 | 32995 | 100 nat | 6700.00 | 925.95 | 942.69 | 938.66 | 943.10 | 0.001987 | 6.42 | 2166.33 | 342.06 | 0.32 |
| 1 | 32570 | 100 nat | 6680.00 | 925.57 | 942.20 | 936.13 | 942.46 | 0.001026 | 4.90 | 2414.56 | 640.30 | 0.24 |
| 1 | 31948 | 100 nat | 6680.00 | 924.24 | 941.02 | | 941.63 | 0.001673 | 7.49 | 1872.22 | 533.80 | 0.37 |
| 1 | 31847 | 100 nat | 6680.00 | 924.22 | 940.97 | 935.30 | 941.41 | 0.001088 | 6.47 | 2311.78 | 527.84 | 0.31 |
| 1 | 31798 | Franklin Rd | | Bridge | | | | | | | | |
| 1 | 31749 | 100 nat | 6680.00 | 924.22 | 941.00 | 935.31 | 941.33 | 0.000889 | 5.85 | 2749.72 | 625.72 | 0.28 |

Profile Output Table - Standard Table 2

| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| 1 | 35046 | 100 nat | 946.32 | 946.10 | 0.23 | 1.29 | 0.01 | 2093.23 | 3723.18 | 733.59 | 606.90 |
| 1 | 34164 | 100 nat | 945.03 | 944.70 | 0.32 | 1.03 | 0.01 | 1340.59 | 5209.41 | | 273.55 |
| 1 | 33618 | 100 nat | 943.99 | 943.69 | 0.30 | 0.13 | 0.03 | 3392.74 | 3157.26 | | 263.68 |
| 1 | 33522 | 100 nat | 943.82 | 943.64 | 0.18 | 0.70 | 0.02 | 2234.12 | 4465.88 | | 364.19 |
| 1 | 32995 | 100 nat | 943.10 | 942.69 | 0.41 | 0.59 | 0.04 | 1952.22 | 4077.27 | 670.51 | 342.06 |
| 1 | 32570 | 100 nat | 942.46 | 942.20 | 0.27 | 0.80 | 0.03 | 2014.16 | 4659.06 | 6.78 | 640.30 |
| 1 | 31948 | 100 nat | 941.63 | 941.02 | 0.61 | 0.14 | 0.08 | 707.58 | 4538.87 | 1433.56 | 533.80 |
| 1 | 31847 | 100 nat | 941.41 | 940.97 | 0.44 | | | 1295.58 | 4409.23 | 975.19 | 527.84 |
| 1 | 31798 | Franklin Rd | | Bridge | | | | | | | |
| 1 | 31749 | 100 nat | 941.33 | 941.00 | 0.33 | | | 994.10 | 3998.03 | 1687.86 | 625.72 |