CH2M HILL

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SUBJECT: RIO SALADO
Scour downstream of the Energy Dissipater Aprons

BY: H. Allen DATE: Sept. 1994
SHEET NO. 1 OF 3
PROJECT NO.: SWW36963.029

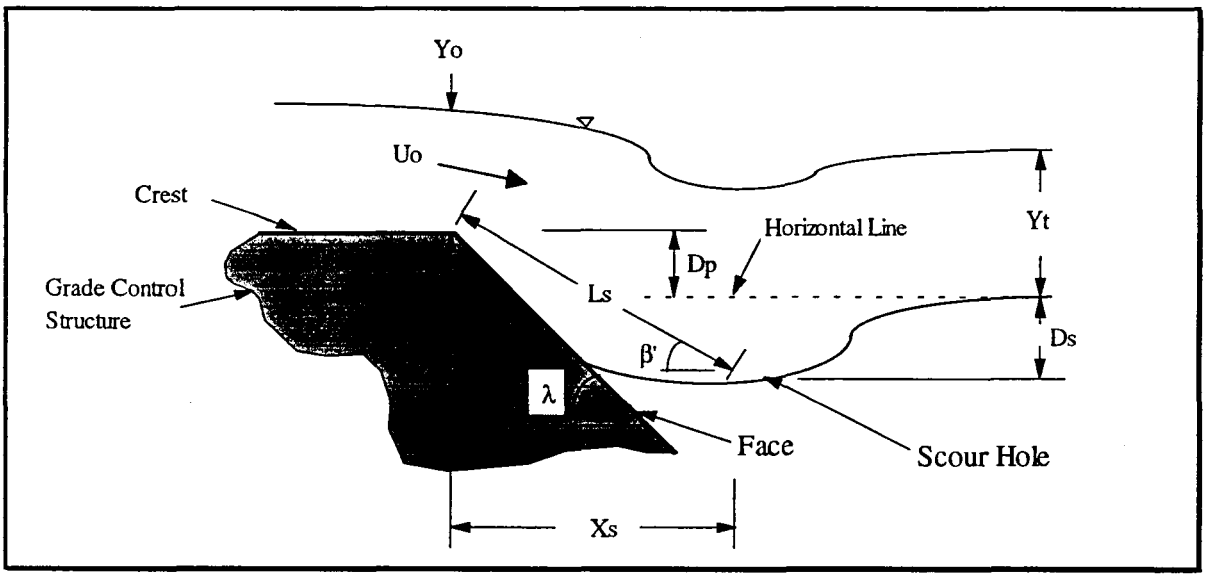
Goal: Estimate the depth of scour downstream of the energy dissipater aprons below the downstream and upstream dams.

Due to channel degradation, a drop forms downstream of the aprons. As the water flows over the brink of the apron and the jet impinges on the channel bed, material is removed.

Procedure:

Procedures and equations for estimating the depth of scour were obtained from the document "*Scour Downstream of Grade Control Structures*", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5.

Some data was obtained from the Technical Data Notebook (TDN) for the *Salt River Channelization Floodplain Delineation Study, SPRR Bridge to McClintock Dr. Bridge*, Nov. 1993.



Depth of scouring is a function of:

- Hydraulic Parameters
  - Upstream jet thickness, Yo, and velocity, Uo
  - Tailwater depth, Yt
- Channel Material
  - Specific gravity, Gs
  - Submerged angle of repose, ϕ
  - Effective grain diameter, ds

- Structure Geometry
  - Drop height, Dp
  - Downstream face angle, λ

- Applied safety factors

Hydraulic Parameters. Copy HEC-2 file RS-PROP.hc2, new file is RS-P-GCS.hc2. RS-PROP.hc2 was composed of the existing channel modified by adding the proposed dams with their aprons, overbank development and sedimentation. The discharges used were Q100 = 215,000 cfs and SPF = 250,000 cfs. Downstream of the downstream dam's apron, the channel bed was lowered by 5.5 feet. Between the downstream dam and the end of the apron at the upstream dam, the channel bed was lowered by 4.3 feet, except where sedimentation filled in the channel upstream of the downstream dam. These depths of degradation were obtained from the TDN. The TDN's degradation depths were slightly more conservative than those estimated using the bed material from the CH2M HILL test pits. The values of the parameters in the HEC-2 output were used in the equations.

Channel Material. Specific gravity was entered as 2.65. The submerged angle of repose of 25 degrees was obtained from calculations found in the 1993 TDN. The effective grain diameter used was D50 of the CH2M HILL grain-size distribution (from test-pit data).

Structure Geometry: Drop heights were set equal to difference in minimum channel bed elevations between cross-sections used for calculations. The cutoff walls at the end of the basins were assumed to be vertical.

Safety Factor: A safety factor of 1.3 was applied.

The values for the above parameters were entered into the equations and scour depths were calculated (see Appendix). Then these depths were multiplied by 1.3 to get the design depths.

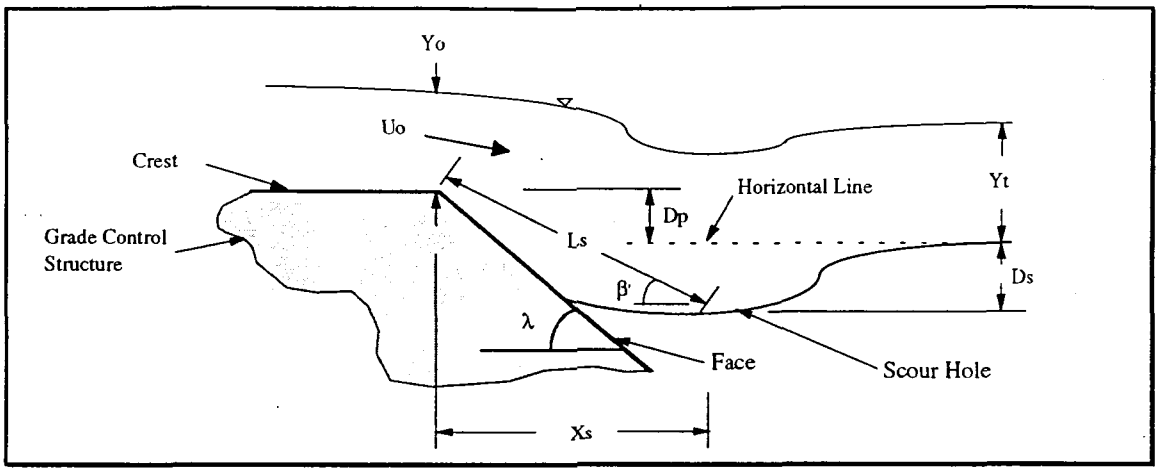
Results:

Table 4-6 Local Scour Below Energy Dissipater Aprons		
Location	**Scour Depth, Ds, ft.**	**Design Scour Depth, ft.**
100-Year Flood		
Downstream	10	13
Upstream	4	5
Standard Project Flood		
Downstream	12	16
Upstream	5	7

CH2M HILL

Scour at Grade Control Structures

Project: RIO SALADO	By: H. Allen
Scour downstream of the apron below the d.s.	Date: Sept, 1994
dam using CH2M Hill D50 + Final HEC-2 (100 yr)	Project #: SWW36963.02



Equations from "Scour Downstream of Grade-Control Structures", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5

Data from HEC-2 output RS-P-GCS.OUT, cross-sections 24600 and 24618
100-year flood

INPUT:

Constants

Gravitational Accel., g =	32.2	ft/s^2
Diffusion Coeff., Cd =	1.8	
Local Friction Equ.:		
Exponent x =	0.5	
Coefficient B =	2.0	

Water/Flow

Jet Thickness, Yo =	14.15	ft.
Jet Velocity, Uo =	17.34	ft./s.
Tailwater Depth, Yt. =	21.03	ft.

Channel Material

Specific Gravity, Gs =	2.65	
Submerged angle of repose, ϕ =	25	degrees
Effective diameter, ds[1] =	95	mm.

Structure

Drop Height, Dp =	5.6	ft.
Face Angle, λ =	90	degrees

CALCULATIONS:

Jet Angle Near Bed, β' =	0.428	radians
(=	24.5	degrees)
Diffused Length of Jet, Ls =	36.4	ft.
Scour Length, Xs =	33.1	ft.
Equilibrium Scour Depth, Ds =	9.5	ft.

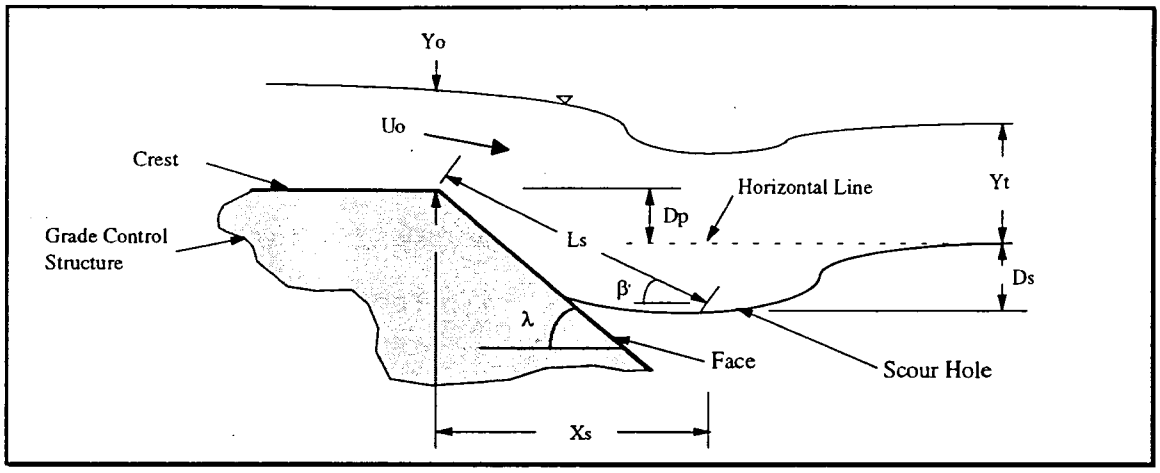
Notes:
(1) N. Bormann recommends using D84 if armoring can occur, otherwise D50 is often used.

CH2M HILL

Scour at Grade Control Structures

Project: RIO SALADO
Scour downstream of the apron below the u.s.
dam using CH2M Hill D50 + Final HEC-2 (100 yr)

By: H. Allen
Date: Sept, 1994
Project #: SWW36963.02



Equations from "Scour Downstream of Grade-Control Structures", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5

Data from HEC-2 output RS-P-GCS.OUT, cross-sections 100 and 103.0
100-year flood

INPUT:

Constants

Gravitational Accel., g =	32.2	ft/s^2
Diffusion Coeff., Cd =	1.8	
Local Friction Equ.:		
Exponent x =	0.5	
Coefficient B =	2.0	

Water/Flow

Jet Thickness, Yo =	19.73	ft.
Jet Velocity, Uo =	11.51	ft./s.
Tailwater Depth, Yt. =	26.68	ft.

Channel Material

Specific Gravity, Gs =	2.65	
Submerged angle of repose, ϕ =	25	degrees
Effective diameter, ds (1) =	95	mm.

Structure

Drop Height, Dp =	6.4	ft.
Face Angle, λ =	90	degrees

CALCULATIONS:

Jet Angle Near Bed, β' =	0.437	radians
(=	25.0	degrees)
Diffused Length of Jet, Ls =	22.9	ft.
Scour Length, Xs =	20.8	ft.
Equilibrium Scour Depth, Ds =	3.3	ft.

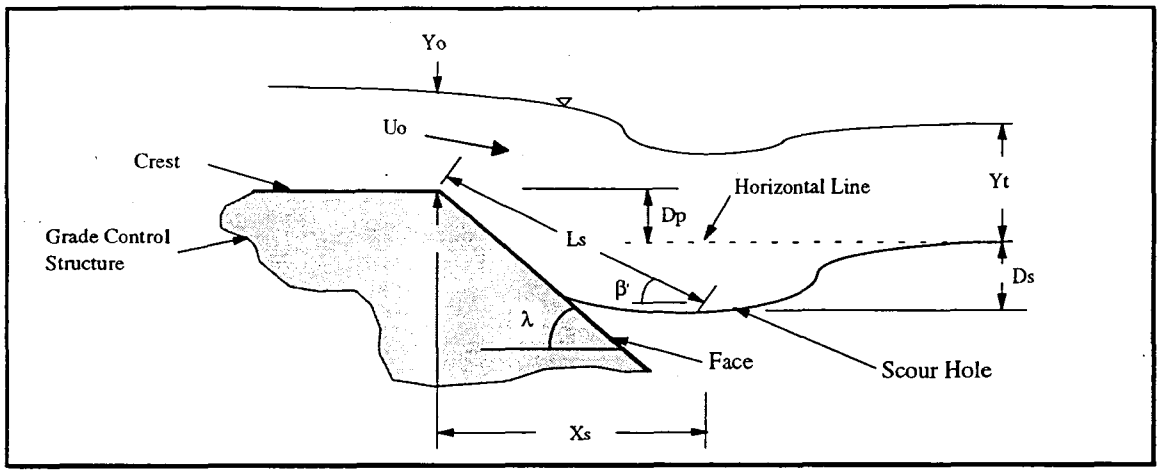
Notes:
(1) N. Bormann recommends using D84 if armoring can occur, otherwise D50 is often used.

CH2M HILL

Scour at Grade Control Structures

Project: RIO SALADO
Scour downstream of the apron below the d.s.
dam using CH2M Hill D50 + Final HEC-2 (SPF)

By: H. Allen
Date: Sept, 1994
Project #: SWW36963.02



Equations from "Scour Downstream of Grade-Control Structures", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5

Data from HEC-2 output RS-P-GCS.OUT, cross-sections 24600 and 24618
Standard Project Flood

INPUT:

Constants

Gravitational Accel., g =	32.2	ft/s^2
Diffusion Coeff., Cd =	1.8	
Local Friction Equ.:		
Exponent x =	0.5	
Coefficient B =	2.0	

Water/Flow

Jet Thickness, Yo =	16.22	ft.
Jet Velocity, Uo =	17.94	ft./s.
Tailwater Depth, Yt. =	23.11	ft.

Channel Material

Specific Gravity, Gs =	2.65	
Submerged angle of repose, ϕ =	25	degrees
Effective diameter, ds (1) =	95	mm.

Structure

Drop Height, Dp =	5.6	ft.
Face Angle, λ =	90	degrees

CALCULATIONS:

Jet Angle Near Bed, β' =	0.419	radians
(=	24.0	degrees)
Diffused Length of Jet, Ls =	42.0	ft.
Scour Length, Xs =	38.3	ft.
Equilibrium Scour Depth, Ds =	11.5	ft.

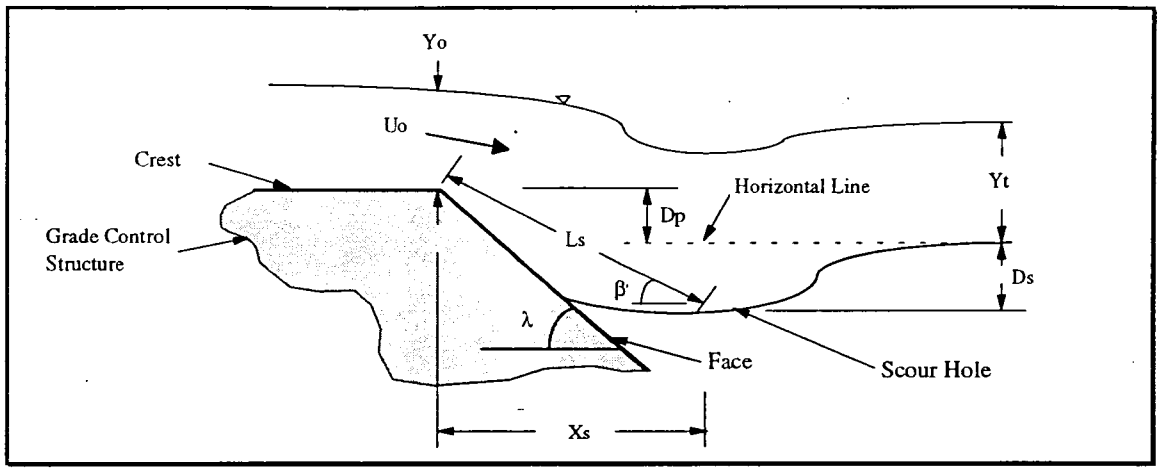
Notes:
(1) N. Bormann recommends using D84 if armoring can occur, otherwise D50 is often used.

CH2M HILL

Scour at Grade Control Structures

Project: RIO SALADO
Scour downstream of the apron below the u.s.
dam using CH2M Hill D50 + Final HEC-2 (SPF)

By: H. Allen
Date: Sept, 1994
Project #: SWW36963.02



Equations from "Scour Downstream of Grade-Control Structures", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5

Data from HEC-2 output RS-P-GCS.OUT, cross-sections 100 and 103.0
Standard Project Flood

INPUT:

Constants

Gravitational Accel., g =	32.2	ft/s^2
Diffusion Coeff., Cd =	1.8	
Local Friction Equ.:		
Exponent x =	0.5	
Coefficient B =	2.0	

Water/Flow

Jet Thickness, Yo =	22.23	ft.
Jet Velocity, Uo =	11.85	ft./s.
Tailwater Depth, Yt. =	29.21	ft.

Channel Material

Specific Gravity, Gs =	2.65	
Submerged angle of repose, ϕ =	25	degrees
Effective diameter, ds (1) =	95	mm.

Structure

Drop Height, Dp =	6.4	ft.
Face Angle, λ =	90	degrees

CALCULATIONS:

Jet Angle Near Bed, β' =	0.430	radians
(=	24.6	degrees)
Diffused Length of Jet, Ls =	25.9	ft.
Scour Length, Xs =	23.5	ft.
Equilibrium Scour Depth, Ds =	4.4	ft.

Notes:
(1) N. Bormann recommends using D84 if armoring can occur, otherwise D50 is often used.

HEC2 S/N: 1916530021 HMVersion: 6.50 Data File: RS-P-GCS.hc2

```
*********************************************
*  HEC-2 WATER SURFACE PROFILES             *
*                                           *
*  Version   4.6.2;  May 1991               *
*                                           *
*  RUN DATE     2FEB**    TIME   14:31:41   *
*********************************************
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X     X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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:::::::::::::::::::::::::::::::::::::::::::::
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:::                                       :::
:::   FULL MICRO-COMPUTER IMPLEMENTATION   :::
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============================
H A E S T A D   M E T H O D S
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

1C/14PRINT

THIS RUN EXECUTED 2FEB** 14:31:41

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
*************************************
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RIO SALADO - TOWN LAKE FINAL RUN

PROPOSED DEVELOPMENT OF SALT RIVER FOR TOWN LAKE

CHANNEL BED LOWERED TO SIMULATE DEGRADATION TO ARMORING

Downstream dam: at section 24700
3 piers w/0.5H:1V side slopes, 6 ft. topwidth, 16' high
includes concrete apron

Upstream dam: at section 103.00
3 piers w/0.5H:1V side slopes, 6 ft. topwidth, 6' high
includes concrete apron

Sediment deposition at elev. 1132 upstream of downstream dam

Overbank Development:
Placed on top of CSA
Manning's n: walkways = 0.025
landscaped slopes = 0.045
Elevations from landscape plans

Notes:
- this run was created by combining the CRSS runs: RSSRP1.hc2 and RSSRP2.hc2
  The seam is at GC #4
- see note at Priest Ave. Br.
- starting WSEL's on RC card at first cross-section
- these cross-section were set up with the left and right banks defined
  by looking upstream

```
T1   RIO SALADO TOWN LAKE for TEMPE, AZ
T2   CH2M HILL    Walker/Allen   Sept. 1994
T3      RS-P-GCS.HC2

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                4                                                         205000   1119.15

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1                 -1                                                -6.0
```

```
J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        39        66        43         1         8        42        26         5

J5  LPRNT    NUMSEC                  ********REQUESTED SECTION NUMBERS********

    -10       -10

NC   0.050     0.050     0.035       0.1       0.3

QT       4     90000    155000    205000    250000

  Begin ADOT Channelization

              *****  Begin ADOT Channelization  *****

X1   10035        12   10020.0   11105.0       0.0       0.0       0.0       0.0    994.50         0
RC       4     90000   1106.71    155000   1110.92    205000   1113.65    250000   1114.60
GR   125.0     10000.     125.0    10010.    122.00    10020.    105.00    10056.    104.00    10340.
GR  100.00     10356.     97.20    10540.    100.00    10750.    105.00    10770.    105.00    11050.
GR   125.0     11105.     125.0    11150.

X1   10200        11   10025.0   11100.0     165.0     165.0     165.0       0.0    994.50         0
GR  122.00     10000.    123.00    10025.    105.00    10065.    104.00    10355.    100.00    10365.
GR   98.10     10548.    100.00    10758.    105.00    10775.    105.00    11060.    123.00    11100.
GR  123.00     11150.

X1   10400        11   10035.0   11103.0     200.0     200.0     200.0       0.0    994.50         0
GR  122.00     10000.    122.00    10035.    105.00    10070.    105.00    10353.    100.00    10385.
GR   98.10     10548.    100.00    10758.    105.00    10775.    105.00    11060.    123.00    11103.
GR  123.00     11140.

X1   10600        11   10025.0   11100.0     200.0     200.0     200.0       0.0    994.50         0
GR  123.00     10000.    123.00    10025.    105.00    10068.    105.00    10362.    100.00    10392.
GR   98.50     10544.    100.00    10760.    105.00    10775.    106.00    11050.    124.00    11100.
GR  124.00     11130.

X1   10800        11   10030.0   11100.0     200.0     200.0     200.0       0.0    994.50         0
GR  123.00     10000.    123.00    10030.    105.00    10067.    106.00    10380.    100.00    10400.
GR   99.00     10540.    101.00    10780.    106.00    10800.    107.00    11060.    124.00    11100.
GR  124.00     11145.
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X1    11000        11   10022.0   11095.0     200.0     200.0     200.0       0.0    994.50         0
GR   123.00     10000.     123.00    10022.    105.00     10065.    106.00   10392.    101.00     10418.
GR    99.50     10538.     101.00    10810.    106.00     10830.    107.00   11060.    124.00     11095.
GR   125.00     11195.

X1    11200        12   10030.0   11100.0     200.0     200.0     200.0       0.0    994.50         0
GR   123.00     10000.     123.00    10030.    106.00     10064.    106.00   10413.    100.00     10425.
GR   100.00     10538.     100.00    10815.    103.00     10821.    106.00   10875.    107.00     11055.
GR   126.00     11100.     126.00    11160.

X1    11400        11   10030.0   11113.0     200.0     200.0     200.0       0.0    994.50         0
GR   124.00     10000.     124.00    10030.    107.00     10064.    103.40   10405.    100.40     10411.
GR   100.40     10810.     103.40    10816.    108.00     10925.    108.00   11060.    126.00     11113.
GR   128.00     11195.

X1    11600        12   10030.0   11122.0     200.0     200.0     200.0       0.0    994.50         0
GR   124.00     10000.     124.00    10030.    108.00     10065.    103.90   10399.    100.90     10405.
GR   100.90     10805.     103.90    10811.    103.90     11060.    116.50   11080.    116.50     11089.
GR   127.50     11122.     127.50    11133.

X1    11800        12   10035.0   11130,0     200.0     200.0     200.0       0.0    994.50         0
GR   125.50     10000.     125.00    10035.    110.00     10075.    104.40   10386.    101.40     10392.
GR   101.40     10792.     104.40    10798.    104.40     11071.    116.90   11089.    116.90     11097.
GR   127.90     11130.     127.90    11141.

X1    12000        12   10035.0   11130.0     200.0     200.0     200.0       0.0    994.50         0
GR   127.60     10000.     127.00    10035.    110.00     10070.    104.80   10364.    101.80     10370.
GR   101.80     10770.     104.80    10776.    104.80     11070.    117.40   11089.    117.40     11097.
GR   128.40     11130.     128.40    11140.

X1    12100        12   10035.0   11125.0     100.0     100.0     100.0       0.0    994.50         0
GR   127.80     10000.     127.00    10035.    110.50     10070.    105.10   10347.    102.10     10353.
GR   102.10     10753.     105.10    10759.    105.10     11065.    117.60   11084.    117.60     11092.
GR   128.60     11125.     128.60    11136.

X1    12200        12   10032.0   11123.0     100.0     100.0     100.0       0.0    994.50         0
GR   128.00     10000.     126.00    10032.    110.00     10082.    105.30   10334.    102.30     10340.
GR   102.30     10740.     105.30    10746.    105.30     11063.    117.80   11082.    117.80     11090.
GR   128.80     11123.     128.80    11134.
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X1	12400	12	10047.0	11109.0	200.0	200.0	200.0	0.0	994.50	0
GR	129.30	10000.	129.00	10047.	111.00	10085.	105.80	10308.	102.80	10314.
GR	102.80	10714.	105.80	10720.	105.80	11049.	118.20	11068.	118.20	11076.
GR	129.20	11109.	129.20	11119.						
X1	12600	14	10033.0	11097.0	200.0	200.0	200.0	0.0	994.50	0
GR	130.00	10000.	130.00	10033.	118.60	10078.	118.60	10086.	106.20	10105.
GR	106.20	10281.	103.20	10287.	103.20	10687.	106.20	10693.	106.20	11038.
GR	118.60	11056.	118.60	11064.	129.60	11097.	129.60	11108.		
X1	12800	14	10055.0	11130.0	200.0	200.0	200.0	0.0	994.50	0
GR	130.40	10000.	131.00	10055.	119.10	10108.	119.10	10116.	106.70	10135.
GR	106.70	10284.	103.70	10290.	103.70	10690.	106.70	10696.	106.70	11071.
GR	119.10	11089.	119.10	11097.	130.00	11130.	130.00	11141.		
X1	13000	14	10059.0	11115.0	200.0	200.0	200.0	0.0	994.50	0
GR	132.00	10000.	131.00	10059.	119.40	10087.	119.40	10095.	107.20	10113.
GR	107.20	10244.	104.20	10250.	104.20	10650.	107.20	10656.	107.20	11055.
GR	119.50	11074.	119.50	11082.	130.50	11115.	130.50	11126.		
X1	13200	14	10040.0	11092.0	200.0	200.0	200.0	0.0	994.50	0
GR	131.00	10000.	130.00	10040.	119.90	10064.	119.90	10072.	107.70	10090.
GR	107.70	10194.	104.70	10200.	104.70	10600.	107.70	10606.	107.70	11032.
GR	119.90	11051.	119.90	11059.	130.90	11092.	130.90	11102.		
X1	13400	14	10040.0	11092.0	200.0	200.0	200.0	0.0	994.50	0
GR	131.00	10000.	130.00	10040.	120.30	10064.	120.30	10072.	108.10	10090.
GR	108.10	10172.	105.10	10178.	105.10	10578.	108.10	10584.	108.10	11032.
GR	120.30	11051.	120.30	11059.	131.30	11092.	131.30	11102.		
X1	13600	14	10042.0	11087.0	200.0	200.0	200.0	0.0	994.50	0
GR	132.00	10000.	130.00	10042.	120.80	10067.	120.80	10075.	108.60	10093.
GR	108.60	10144.	105.60	10150.	105.60	10550.	108.60	10556.	108.60	11027.
GR	120.80	11046.	120.80	11054.	131.80	11087.	131.80	11097.		
X1	13800	14	10035.0	11081.0	200.0	200.0	200.0	0.0	994.50	0
GR	132.50	10000.	130.00	10035.	121.20	10055.	121.20	10063.	109.10	10081.
GR	109.10	10114.	106.10	10120.	106.10	10520.	109.10	10526.	109.10	11022.
GR	121.20	11040.	121.20	11048.	132.20	11081.	132.20	11092.		

```
X1    14000        14    10033.0    11085.0      200.0      200.0      200.0        0.0     994.50          0
GR   132.00     10000.     130.00     10033.    121.60      10049.    121.60     10057.     109.50      10075.
GR   109.50     10096.     106.50     10102.    106.50      10502.    109.50     10508.     109.50      11026.
GR   121.60     11044.     121.60     11052.    132.60      11085.    132.60     11096.

X1    14200        14    10011.0    11093.0      200.0      200.0      200.0        0.0     994.50          0
GR   133.00     10000.     133.00     10011.    122.00      10044.    122.00     10052.     110.00      10070.
GR   110.00     10091.     107.00     10097.    107.00      10497.    110.00     10503.     110.00      11034.
GR   122.00     11052.     122.00     11060.    133.00      11093.    133.00     11104.

NC      0.0       0.0        0.0        0.3       0.5
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Grade Control Str. No. 2

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                 *****  Grade Control Str. No. 2  *****

X1    14400        13    10027.0    11093.0      200.0      200.0      200.0        0.0     994.50          0
GR   133.50     10000.     133.50     10027.    133.50      10035.    110.50     10070.     110.50      10086.
GR   107.50     10092.     107.50     10492.    110.50      10498.    110.50     11034.     122.50      11052.
GR   122.50     11060.     133.50     11093.    133.50      11104.

NC    0.050     0.050      0.035        0.3       0.5
```

SR 153 Bridge (D/S limit)

```
                 *****  SR 153 Bridge (D/S limit)  *****

X1    14665        10    10036.0    11068.0      265.0      265.0      265.0        0.0     994.50          0
X3        0       0.0        0.0    10036.0      147.0    11068.0      147.0        0.0        0.0
GR   134.10     10000.     134.10     10036.    111.20      10070.    111.20     10092.     108.20      10098.
GR   108.20     10498.     111.20     10504.    111.20      11034.    134.10     11068.     134.10      11103.
```

SR 153 Bridge (U/S limit)

```
                 *****  SR 153 Bridge (U/S limit)  *****

X1    14785        12    10011.0    11068.0      120.0      120.0      120.0        0.0     994.50          0
GR   134.30     10000.     134.30     10011.    123.30      10044.    123.30     10052.     111.40      10070.
GR   111.40     10092.     108.40     10098.    108.40      10498.    111.40     10504.     111.40      11034.
GR   134.30     11068.     134.30     11103.

NC      0.0       0.0        0.0        0.1       0.3

X1    15000        14    10011.0    11091.0      215.0      215.0      215.0        0.0     994.50          0
GR   134.70     10000.     134.70     10011.    123.70      10044.    123.70     10052.     111.90      10070.
GR   111.90     10091.     108.90     10097.    108.90      10497.    111.90     10503.     111.90      11033.
GR   123.70     11050.     123.70     11058.    134.70      11091.    134.70     11102.
```

```
NC    0.050      0.050      0.035       0.1        0.3

X1    15200         14    10011.0    11091.0      200.0      200.0      200.0        0.0     994.50          0
GR   135.20      10000.     135.20     10011.     124.20     10044.     124.20     10052.     112.40      10070.
GR   112.40      10091.     109.40     10097.     109.40     10497.     112.40     10503.     112.40      11033.
GR   124.20      11050.     124.20     11058.     135.20     11091.     135.20     11102.

X1    15400         12    10035.0    11091.0      200.0      200.0      200.0        0.0     994.50          0
GR   135.60      10000.     135.60     10035.     112.80     10069.     112.80     10091.     109.80      10097.
GR   109.80      10497.     112.80     10503.     112.80     11033.     124.60     11051.     124.60      11059.
GR   135.60      11091.     135.60     11102.

NC    0.050      0.050      0.035       0.3        0.5

QT        4      92000     157000     210000     250000

  SR 143 Bridge (D/S limit)

              ***** SR 143 Bridge (D/S limit) *****

X1    15586         12    10035.0    11091.0      186.0      186.0      186.0        0.0     994.50          0
X3        0        0.0        0.0    10035.0      145.4    11091.0      145.4        0.0        0.0
GR   136.00      10000.     136.00     10035.     113.30     10069.     113.30     10091.     110.30      10097.
GR   110.30      10497.     113.30     10503.     113.30     11033.     125.00     11051.     125.00      11059.
GR   136.00      11091.     136.00     11102.

SB     1.05       1.56        2.6      200.0      963.0       48.0    26680.0        1.5    1110.50     1110.30

  SR 143 Bridge (U/S limit)

              ***** SR 143 Bridge (U/S limit) *****

X1    15710         12    10011.0    11066.0      124.0      124.0      124.0        0.0     994.50          0
X2      0.0        0.0          1     1137.0     1145.4        0.0          0       2.00        0.0
GR   136.10      10000.     136.20     10011.     125.20     10044.     125.20     10052.     113.60      10070.
GR   113.60      10091.     110.60     10097.     110.60     10497.     113.60     10503.     113.60      11032.
GR   136.20      11066.     136.20     11102.

NC      0.0        0.0        0.0        0.1        0.3

X1    16000         16    10011.0    11084.0      290.0      290.0      290.0        0.0     994.50          0
GR   136.90      10000.     136.90     10011.     125.90     10044.     125.90     10052.     114.30      10078.
GR   114.30      10089.     111.30     10095.     111.30     10495.     114.30     10501.     114.30      11032.
GR   125.90      11050.     125.90     11058.     122.90     11062.     122.90     11063.     136.90      11084.
GR   136.90      11098.
```

```
NC    0.035      0.035      0.035       0.1        0.3

X1    16200         15    10020.0    11096.0      200.0      200.0      200.0        0.0     994.50          0
GR   137.30      10000.     137.30     10012.     137.30     10020.     114.70      10081.     114.70      10109.
GR   111.70      10115.     111.70     10515.     114.70     10521.     114.70      11043.     126.30      11061.
GR   126.30      11069.     123.30     11073.     123.30     11074.     137.30      11096.     137.30      11109.

X1    16400         16    10011.0    11083.0      200.0      200.0      200.0        0.0     994.50          0
GR   137.70      10000.     137.70     10011.     126.70     10044.     126.70      10052.     115.20      10069.
GR   115.20      10102.     112.20     10108.     112.20     10508.     115.20      10514.     115.20      11031.
GR   126.70      11049.     126.70     11057.     123.70     11061.     123.70      11062.     138.30      11083.
GR   138.30      11098.

X1    16600         16    10011.0    11085.0      200.0      200.0      200.0        0.0     994.50          0
GR   138.10      10000.     138.10     10011.     127.10     10043.     127.10      10051.     115.70      10069.
GR   115.70      10124.     112.70     10130.     112.70     10530.     115.70      10536.     115.70      11033.
GR   127.10      11050.     127.10     11058.     124.10     11063.     124.10      11064.     138.70      11085.
GR   138.70      11099.

X1    16800         16    10010.0    11087.0      200.0      200.0      200.0        0.0     994.50          0
GR   138.60      10000.     138.60     10010.     127.60     10043.     127.60      10051.     116.20      10069.
GR   116.20      10157.     113.20     10163.     113.20     10563.     116.20      10569.     116.20      11035.
GR   127.60      11052.     127.60     11060.     124.60     11065.     124.60      11066.     139.20      11087.
GR   139.20      11101.

X1    17000         16    10011.0    11089.0      200.0      200.0      200.0        0.0     994.50          0
GR   139.00      10000.     139.00     10011.     128.00     10044.     128.00      10052.     116.60      10069.
GR   116.60      10205.     113.60     10211.     113.60     10611.     116.60      10617.     116.60      11037.
GR   128.00      11054.     128.00     11062.     125.00     11067.     125.00      11068.     139.60      11089.
GR   139.60      11103.

X1    17200         16    10011.0    11089.0      200.0      200.0      200.0        0.0     994.50          0
GR   139.40      10000.     139.40     10011.     128.40     10044.     128.40      10052.     117.10      10069.
GR   117.10      10263.     114.10     10269.     114.10     10669.     117.10      10675.     117.10      11037.
GR   128.40      11054.     128.40     11062.     125.40     11067.     125.40      11068.     140.00      11089.
GR   140.00      11103.

X1    17400         12    10010.0    11088.0      200.0      200.0      200.0        0.0     994.50          0
GR   139.80      10000.     139.80     10010.     128.80     10043.     128.80      10051.     117.60      10068.
GR   117.60      10322.     114.60     10328.     114.60     10728.     117.60      10734.     117.60      11036.
GR   140.40      11088.     140.40     11102.
```

X1	17600	12	10011.0	11070.0	200.0	200.0	200.0	0.0	994.50	0
GR	140.30	10000.	140.30	10011.	129.30	10044.	129.30	10052.	118.00	10069.
GR	118.00	10382.	115.00	10388.	115.00	10788.	118.00	10794.	118.00	11035.
GR	140.90	11070.	140.90	11084.						
X1	17800	12	10011.0	11067.0	200.0	200.0	200.0	0.0	994.50	0
GR	140.70	10000.	140.70	10011.	129.70	10044.	129.70	10052.	118.50	10068.
GR	118.50	10431.	115.50	10437.	115.50	10837.	118.50	10843.	118.50	11033.
GR	141.30	11067.	141.30	11081.						
X1	18000	12	10011.0	11065.0	200.0	200.0	200.0	0.0	994.50	0
GR	141.00	10000.	141.00	10011.	130.10	10044.	130.10	10052.	119.00	10069.
GR	119.00	10485.	116.00	10491.	116.00	10891.	119.00	10897.	119.00	11031.
GR	141.70	11065.	141.70	11079.						
X1	18200	12	10011.0	11061.0	200.0	200.0	200.0	0.0	994.50	0
GR	141.50	10000.	141.50	10011.	130.50	10044.	130.50	10052.	119.50	10069.
GR	119.50	10528.	116.50	10534.	116.50	10934.	119.50	10940.	119.50	11027.
GR	142.10	11061.	142.10	11075.						
X1	18400	10	10015.0	11080.0	200.0	200.0	200.0	0.0	994.50	0
GR	142.00	10000.	142.00	10015.	119.90	10077.	119.90	10567.	116.90	10573.
GR	116.90	10973.	119.90	10979.	119.90	11032.	142.60	11080.	142.60	11090.
X1	18600	10	10018.0	11050.0	200.0	200.0	200.0	0.0	994.50	0
GR	142.40	10000.	142.40	10018.	120.40	10067.	120.40	10576.	117.40	10582.
GR	117.40	10982.	120.40	10988.	120.40	11016.	143.00	11050.	143.00	11063.
X1	18800	12	10011.0	11046.0	200.0	200.0	200.0	0.0	994.50	0
GR	142.80	10000.	142.80	10011.	131.80	10044.	131.80	10052.	120.90	10069.
GR	120.90	10587.	117.90	10593.	117.90	10993.	120.90	10999.	120.90	11012.
GR	143.40	11046.	143.40	11060.						
X1	19000	12	10011.0	11039.0	200.0	200.0	200.0	0.0	994.50	0
GR	143.20	10000.	143.20	10011.	132.20	10044.	132.20	10052.	121.30	10069.
GR	121.30	10586.	118.30	10592.	118.30	10992.	121.30	10998.	121.30	11005.
GR	143.80	11039.	143.80	11053.						
X1	19200	12	10011.0	11031.0	200.0	200.0	200.0	0.0	994.50	0
GR	143.70	10000.	143.70	10011.	132.70	10044.	132.70	10052.	121.80	10068.
GR	121.80	10574.	118.80	10580.	118.80	10980.	121.80	10986.	121.80	10998.
GR	144.30	11031.	144.30	11045.						

```
X1    19400        12   10011.0   11023.0     200.0     200.0     200.0       0.0    994.50         0
GR   144.10     10000.    144.10    10011.    133.10    10044.    133.10    10052.    122.30     10068.
GR   122.30     10555.    119.30    10561.    119.30    10961.    122.30    10967.    122.30     10989.
GR   144.70     11023.    144.70    11037.

X1    19600        12   10011.0   11014.0     200.0     200.0     200.0       0.0    994.50         0
GR   144.50     10000.    144.50    10011.    133.50    10044.    133.50    10052.    122.80     10068.
GR   122.80     10516.    119.80    10522.    119.80    10922.    122.80    10928.    122.80     10980.
GR   145.10     11014.    145.10    11028.

X1    19800        12   10011.0   11005.0     200.0     200.0     200.0       0.0    994.50         0
GR   145.00     10000.    145.00    10011.    134.00    10044.    134.00    10052.    123.20     10068.
GR   123.20     10480.    120.20    10486.    120.20    10886.    123.20    10892.    123.20     10972.
GR   145.60     11005.    145.60    11019.

X1    20000        12   10010.0   10994.0     200.0     200.0     200.0       0.0    994.50         0
GR   145.60     10000.    145.60    10010.    134.60    10043.    134.60    10051.    123.70     10068.
GR   123.70     10435.    120.70    10441.    120.70    10841.    123.70    10847.    123.70     10961.
GR   145.60     10994.    145.60    11008.

X1    20200        12   10011.0   10987.0     200.0     200.0     200.0       0.0    994.50         0
GR   146.10     10000.    146.10    10011.    135.10    10044.    135.10    10052.    124.20     10068.
GR   124.20     10382.    121.20    10388.    121.20    10788.    124.20    10794.    124.20     10951.
GR   146.10     10987.    146.10    11000.

X1    20400        10   10020.0   10987.0     200.0     200.0     200.0       0.0    994.50         0
GR   146.60     10000.    146.60    10020.    124.60    10066.    124.60    10325.    121.60     10331.
GR   121.60     10731.    124.60    10737.    124.60    10938.    146.60    10987.    146.60     11000.

X1    20600        12   10010.0   10965.0     200.0     200.0     200.0       0.0    994.50         0
GR   147.10     10000.    147.10    10010.    136.10    10043.    136.10    10051.    125.10     10068.
GR   125.10     10276.    122.10    10282.    122.10    10682.    125.10    10688.    125.10     10932.
GR   147.10     10965.    147.10    10979.

X1    20782        14   10012.0   10988.0     178.0     178.0     178.0       0.0    994.50         0
GR   147.67     10000.    147.67    10012.    136.66    10045.    136.66    10053.    125.56     10069.
GR   125.56     10230.    122.50    10236.    122.50    10636.    125.56    10642.    125.56     10931.
GR   136.66     10947.    136.66    10955.    147.67    10988.    147.67    10999.
```

Grade Control Str. No. 3

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                 *****  Grade Control Str. No. 3  *****

X1    20800        14   10012.0   10988.0      18.0      18.0      18.0       0.0    994.50         0
GR   147.70     10000.    147.70    10012.    136.69    10045.    136.69    10053.    125.59    10069.
GR   125.59     10230.    122.53    10236.    122.53    10636.    125.59    10642.    125.59    10931.
GR   136.69     10947.    136.69    10955.    147.70    10988.    147.70    10999.

X1    21000        10   .10032.0   10964.0     200.0     200.0     200.0       0.0    994.50         0
GR   148.20     10000.    148.20    10032.    125.94    10069.    125.94    10190.    122.86    10196.
GR   122.86     10596.    125.94    10602.    125.94    10931.    148.20    10964.    148.20    10999.

NC    0.050      0.050     0.035       0.3       0.5
  Priest Bridge (D/S)

                 *****  Priest Bridge (D/S)  *****

X1    21050        10   10032.0   10964.0      50.0      50.0      50.0       0.0    994.50         0
X3       10       0.0       0.0       0.0       0.0       0.0       0.0     157.0     157.0
GR    148.3   10000.0     148.3   10032.0     126.2   10069.0     126.2   10190.0     123.2   10196.0
GR    123.2   10596.0     126.2   10602.0     126.2   10931.0     148.3   10964.0     148.8   10999.0

SB     1.05      1.56       2.6    1000.0     861.8      42.0   24080.0       1.5    1117.9    1117.7
  Priest Bridge (U/S)

                 *****  Priest Bridge (U/S)  *****

X1    21150        10   10032.0   10964.0     100.0     100.0     100.0       0.0    994.50         0
X2      0.0       0.0         1    1150.0    1157.0       0.0         0       2.0       0.0
X3       10       0.0       0.0       0.0       0.0       0.0       0.0     157.0     157.0
GR     148.5   10000.0     148.5   10032.0     126.4   10069.0     126.4   10190.0     123.4   10196.0
GR     123.4   10596.0     126.4   10602.0     126.4   10931.0     148.5   10964.0     148.5   10999.0
```

Note: the following change in contraction/expansion coefficients was not in the original file, RSSRP1.hc2, provided to CH2M HILL. When the coefficients are left here as 0.3/0.5, then the CWSEL at GC #4 in RSSRP1 does not match the starting water surface elevation in the file RSSPR2 which begins at GC #4. To make the two runs compatible and since between Priest Ave. and GC #4 there are not any drastic changes in the cross-section, the coefficients were reduced to 0.1/0.3 as shown below. A result of this, though, is that the CWSEL's in this run from Priest to GC #4 will not match those in RSSRP1.

```
NC                                  .1        .3

X1    21200       10   10035.0   10965.0      50.0      50.0      50.0       0.0    994.50         0
GR   148.90    10000.     148.90    10035.    126.20     10069.    126.20    10160.    123.19     10166.
GR   123.19    10566.     126.20    10572.    126.20     10931.    148.90    10965.    148.90     11000.

X1    21400       14   10011.0   10991.0     200.0     200.0     200.0       0.0    994.50         0
GR   149.60    10000.     149.60    10011.    137.86     10045.    137.86    10053.    126.56     10070.
GR   126.56    10133.     123.52    10139.    123.52     10539.    126.56    10545.    126.56     10932.
GR   137.86    10949.     137.86    10957.    149.60     10991.    149.60    11002.

X1    21600       10   10013.0   11006.0     200.0     200.0     200.0       0.0    994.50         0
GR   150.00    10000.     150.00    10013.    126.91     10078.    126.91    10119.    123.85     10125.
GR   123.85    10525.     126.91    10531.    126.91     10940.    150.50    11006.    150.50     11017.

X1    21800       14   10011.0   10991.0     200.0     200.0     200.0       0.0    994.50         0
GR   150.50    10000.     150.50    10011.    138.47     10045.    138.47    10053.    127.17     10070.
GR   127.17    10101.     124.18    10107.    124.18     10507.    127.17    10513.    127.17     10932.
GR   138.47    10949.     138.47    10957.    150.50     10991.    150.50    11002.

X1    22000       14   10011.0   10991.0     200.0     200.0     200.0       0.0    994.50         0
GR   151.00    10000.     151.00    10011.    138.82     10045.    138.82    10053.    127.52     10070.
GR   127.52    10104.     124.51    10110.    124.51     10510.    127.52    10516.    127.52     10932.
GR   138.82    10949.     138.82    10957.    151.00     10991.    151.00    11002.

X1    22200       14   10010.0   10990.0     200.0     200.0     200.0       0.0    994.50         0
GR   151.40    10000.     151.40    10010.    139.08     10044.    139.08    10052.    127.88     10069.
GR   127.88    10123.     124.84    10129.    124.84     10529.    127.88    10535.    127.88     10931.
GR   139.08    10948.     139.08    10956.    151.40     10990.    151.40    11000.

X1    22400       14   10010.0   10990.0     200.0     200.0     200.0       0.0    994.50         0
GR   151.90    10000.     151.90    10010.    139.44     10044.    139.44    10052.    128.24     10069.
GR   128.24    10160.     125.18    10166.    125.18     10566.    128.24    10572.    128.24     10931.
GR   139.44    10948.     139.44    10956.    151.90     10990.    151.90    11000.

X1    22600       14   10010.0   10990.0     200.0     200.0     200.0       0.0    994.50         0
GR   152.30    10000.     152.30    10010.    139.69     10044.    139.69    10052.    128.49     10069.
GR   128.49    10205.     125.51    10211.    125.51     10611.    128.49    10617.    128.49     10931.
GR   139.69    10948.     139.69    10956.    152.30     10990.    152.30    11000.
```

X1	22800	14	10010.0	10990.0	200.0	200.0	200.0	0.0	994.50	0
GR	152.80	10000.	152.80	10010.	140.05	10044.	140.05	10052.	128.85	10069.
GR	128.85	10260.	125.84	10266.	125.84	10666.	128.85	10672.	128.85	10931.
GR	140.05	10948.	140.05	10956.	152.80	10990.	152.80	11000.		
X1	23000	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	153.20	10000.	153.20	10011.	140.30	10045.	140.30	10053.	129.20	10069.
GR	129.20	10325.	126.70	10331.	126.70	10731.	129.20	10737.	129.20	10931.
GR	140.30	10947.	140.30	10955.	153.20	10989.	153.20	11000.		
X1	23200	14	10010.0	10990.0	200.0	200.0	200.0	0.0	994.50	0
GR	153.70	10000.	153.70	10010.	140.66	10044.	140.66	10052.	129.46	10069.
GR	129.46	10390.	126.50	10396.	126.50	10796.	129.46	10802.	129.46	10931.
GR	140.66	10948.	140.66	10956.	153.70	10990.	153.70	11000.		
X1	23400	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	154.10	10000.	154.10	10011.	140.92	10045.	140.92	10053.	129.82	10069.
GR	129.82	10440.	126.83	10446.	126.83	10846.	129.82	10852.	129.82	10931.
GR	140.92	10947.	140.92	10955.	154.10	10989.	154.10	11000.		
X1	23600	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	154.60	10000.	154.60	10011.	141.27	10045.	141.27	10053.	130.17	10069.
GR	130.17	10480.	127.16	10486.	127.16	10886.	130.17	10892.	130.17	10931.
GR	141.27	10947.	141.27	10955.	154.60	10989.	154.60	11000.		
X1	23800	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	155.00	10000.	155.00	10011.	141.53	10045.	141.53	10053.	130.53	10069.
GR	130.53	10500.	127.46	10506.	127.46	10906.	130.53	10912.	130.53	10931.
GR	141.53	10947.	141.53	10955.	155.00	10989.	155.00	11000.		
X1	24000	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	155.50	10000.	155.50	10011.	141.88	10045.	141.88	10053.	130.40	10069.
GR	130.40	10510.	127.82	10516.	127.82	10916.	130.40	10922.	130.40	10931.
GR	141.88	10947.	141.88	10955.	155.50	10989.	155.50	11000.		
X1	24200	14	10011.0	10989.0	200.0	200.0	200.0	0.0	994.50	0
GR	155.90	10000.	155.90	10011.	142.14	10045.	142.14	10053.	130.40	10069.
GR	130.40	10507.	128.15	10513.	128.15	10913.	130.40	10919.	130.40	10931.
GR	142.14	10947.	142.14	10955.	155.90	10989.	155.90	11000.		

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X1    24400        10    10014.0    10981.0      200.0      200.0      200.0        0.0     994.50          0
GR   156.40     10000.     156.40     10014.     130.40     10066.     130.40     10487.     128.48     10493.
GR   128.48     10893.     130.40     10899.     130.40     10928.     156.40     10981.     156.40     10994.

X1    24600        10    10010.0    11004.0      200.0      200.0      200.0        0.0     994.50          0
GR   156.80     10000.     156.80     10010.     130.40     10076.     130.40     10465.     128.81     10471.
GR   128.81     10871.     130.40     10877.     130.40     10938.     156.80     11004.     156.80     11019.

X1    24617                                         17         17         17                   0.03

NC                          .025        .3         .5

  DOWNSTREAM DAM
  d.s. edge of apron

X1    24618         8      10050      10951          1          1          1
GR     1158     10000       1158      10050       1151      10050     1128.9      10083     1128.9      10918
GR     1151     10951       1158      10951       1158      11000

X1    24687                                         69         69         69                   0.1

  d.s. edge of foundation

X1    24688         8      10050      10951          1          1          1
GR     1160     10000       1160      10050       1151      10050       1132    10078.5       1132    10922.5
GR     1151     10951       1160      10951       1160      11000

X1    24700        26      10050      10951         12         12         12
GR     1160     10000       1160      10050       1151      10050       1132    10078.5       1132      10261
GR     1153   10271.5       1163    10271.5       1163    10277.5       1153    10277.5       1132      10288
GR     1132     10487       1153    10497.5       1163    10497.5       1163    10503.5       1153    10503.5
GR     1132     10514       1132      10713       1153    10723.5       1163    10723.5       1163    10729.5
GR     1153   10729.5       1132      10740       1132    10922.5       1151      10951       1160      10951
GR     1160     11000

X1    24733                                         33         33         33

NH        5      .045      10045       .025      10053       .035      10947       .025      10955       .045
NH    11000
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X1    24744        14   10053.0   10947.0        11        11        11                995.61         0
X3               1132               10053      1150     10947      1150
GR   157.30     10000.   157.30   10011.    143.11     10045.    143.11     10053.    130.40     10069.
GR   130.40     10410.   129.14   10416.    129.14     10816.    130.40     10822.    130.40     10931.
GR   143.11     10947.   143.11   10955.    157.30     10989.    157.30     11000.

NC                                    .1        .3

NH        5      .045     10045     .025     10053      .035     10947      .025     10955      .045
NH    11000

X1    24800                                     56        56        56                  .09
X3               1132               10053      1150     10947      1150

  Here is the seam between the two FEMA runs RSSRP1.hc2 and RSSRP2.hc2.

  Grade Control Str. No. 4

NH        5      .045     557.5     .025     581.5      .035      1500      .025      1517      .045
NH     1563

                 *****  Grade Control Str. No. 4  *****

X1      0.0        12     581.5   1500.00     155.0     155.0     155.0       0.0     -4.3         0
X3               1132               581.5      1150   1500.00      1150
GR   1154.7     505.00   1154.60   520.00   1142.10    557.50   1141.86     581.5   1132.40    609.88
GR   1129.4    1022.00   1132.40   1454.7   1147.50   1500.00   1147.65   1515.00   1147.50   1517.00
GR   1157.7    1548.00   1157.85   1563.00

NH        5      .045     574.5     .025     598.5      .035      1500      .025      1568      .045
NH     1609

X1      2.0        13    598.50   1500.00     120.0     200.0     160.0       0.0     -4.3         0
X3               1132               598.50      1150   1500.00      1150
GR   1154.9     522.00   1154.91   573.00   1142.40    574.50   1142.40    598.50   1132.53    626.94
GR   1129.6    1082.00   1132.61   1454.55  1147.83   1500.00   1147.83   1515.00   1145.83   1521.00
GR   1145.8    1568.00   1155.04   1594.00  1155.04   1609.00

NH        5      .045     587.5     .025     611.5      .035      1500      .025      1611      .045
NH     1654

X1      4.0        13    611.50   1500.00     200.0     200.0     200.0       0.0     -4.3         0
X3               1132               611.50      1150   1500.00      1150
GR   1155.4     535.00   1155.41   550.00   1142.90    587.50   1142.90    611.50   1132.74    640.63
GR   1129.8    1141.00   1132.82   1454.34  1148.17   1500.00   1148.32   1515.00   1146.17   1521.00
GR   1146.1    1611.00   1155.44   1639.00  1155.44   1654.00
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NH        5      .045     597.5      .025     621.5      .035      1460      .025      1660      .045
NH     1701

X1      6.0        13    621.50   1460.00     200.0     200.0     200.0       0.0      -4.3         0
X3               1132               621.50      1150   1460.00      1150
GR   1155.9    545.00   1155.91    560.00   1143.40    597.50   1143.40    621.50   1132.96    651.29
GR   1130.0   1190.00   1133.03   1413.59   1148.50   1460.00   1148.50   1515.00   1146.50   1521.00
GR   1146.5   1660.00   1155.83   1686.00   1155.83   1701.00

NH        5      .045     605.5      .025     629.5      .035      1500      .025   1701.83      .045
NH     1745

X1      8.0        13    629.50   1500.00     200.0     200.0     200.0       0.0      -4.3         0
X3               1132               629.50      1150   1500.00    1150.4
GR   1156.4    553.00   1156.41    568.00   1143.90    605.50   1143.66    629.50   1133.50    659.98
GR   1130.2   1225.00   1133.50   1454.01   1148.83   1500.00   1148.83   1515.00   1146.83   1521.00
GR   1147.7   1701.83   1156.22   1730.00   1156.22   1745.00

NH        5      .045     603.5      .025     627.5      .035      1500      .025      1748      .045
NH     1792

X1     10.0        13    627.50   1500.00     200.0     200.0     200.0       0.0      -4.3         0
X3               1132               627.50      1150   1500.00    1150.8
GR   1156.9    551.00   1156.91    566.00   1144.40    603.50   1144.40    627.50   1133.38    658.64
GR   1130.4   1247.00   1133.45   1453.86   1149.17   1500.00   1149.17   1515.00   1147.17   1521.00
GR   1148.3   1748.00   1156.63   1777.00   1156.63   1792.00

NH        5      .045     599.5      .025     623.5      .035      1500      .025      1796      .045
NH     1837

X1     12.0        13    623.50   1500.00     200.0     200.0     200.0       0.0      -4.3         0
X3               1132               623.50      1150   1500.00    1151.2
GR   1157.4    547.00   1157.41    562.00   1144.90    599.50   1144.90    623.50   1133.60    655.15
GR   1130.6   1255.00   1133.66   1453.65   1149.50   1500.00   1149.50   1515.00   1147.50   1521.00
GR   1148.8   1796.00   1157.04   1822.00   1157.04   1837.00

NH        5      .045     587.55     .025     611.43      .035      1500      .025   1830.74      .045
NH   1874.6

X1     14.0        13    611.43   1500.00     115.0     200.0     158.0       0.0      -4.3         0
X3               1132               611.43      1150   1500.00    1151.6
GR   1157.6    535.31   1157.69    550.24   1145.19    587.55   1145.19    611.43   1133.72    643.13
GR   1130.8   1243.75   1133.86   1452.09   1149.83   1500.00   1149.83   1507.43   1147.83   1513.40
GR   1149.4   1830.74   1157.47   1859.66   1157.47    1874.6
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NC                                    0.3       0.5

NH        5      .045    575.61      .025    599.49      .035      1420      .025   1886.52      .045
NH   1926.3

X1     15.4        13    599.49   1420.00      85.0     160.0     122.0       0.0      -4.3         0
X3               1132               599.49      1150   1420.00      1152
GR   1157.9    523.37   1157.90    538.30   1145.40    575.61   1145.40    599.49   1133.81    630.71
GR   1131.0    1233.8   1134.03   1371.79   1150.10   1420.00   1150.10   1515.00   1148.10   1521.00
GR   1149.9   1886.52   1157.79   1911.32   1157.79    1926.3


QT        4     93000    160000    215000    250000

SB     1.48      1.56      2.67    1388.0     816.0      72.0   29800.0      10.7      1132      1132

  SPRR bridge U/S

NH        5      .045    574.61      .025    598.49      .035      1420      .025   1886.52      .045
NH   1926.3

              *****  SPRR bridge U/S  *****

X1     15.6        13    598.49   1420.00      15.0      20.0      18.0       0.0      -4.3         0
X2      0.0       0.0         1    1161.0    1165.0       0.0         0       2.0       0.0
X3               1132               598.49      1150   1420.00      1152
GR   1158.9    522.38   1157.94    537.30   1145.44    574.61   1145.44    598.49   1133.83    629.75
GR   1131.0   1232.81   1134.05   1371.76   1150.13   1420.00   1150.13   1515.00   1148.13   1521.00
GR   1149.9   1886.52   1157.79   1911.40   1157.79    1926.3


NC                                    0.1       0.3

NH        5      .045    578.34      .025    602.29      .035      1500      .025      1790      .045
NH     2050

X1     17.3        13    602.29   1500.00     155.0     150.0     152.0       0.0      -4.3         0
X3               1132               602.29      1150   1500.00      1152
GR   1158.3    525.95   1158.33    540.92   1145.83    578.34   1145.83    602.29   1133.99    634.21
GR   1131.2   1229.54   1134.21   1450.17   1150.38   1500.00   1150.38   1515.00   1148.57   1521.00
GR   1150.0   1790.00   1160.04   1880.00   1160.04   2050.00

  Old Ash Bridge alignment


NH        5      .045    578.42      .025     602.9      .035      1500      .025    1698.3      .045
NH   1741.3
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                 *****  Old Ash Bridge alignment  *****

X1      19.0        13     602.90    1500.00      180.0      165.0      172.0        0.0       -4.3          0
X3                1132                602.90       1150    1500.00       1152
GR    1158.9     526.47    1158.99     541.46    1146.49     578.42    1146.49     602.90    1134.19     636.64
GR    1131.3    1218.78    1134.38    1450.88    1150.66    1500.00    1150.66    1515.00    1148.66    1521.00
GR    1149.5    1698.30    1160.47    1726.27    1160.47     1741.3

NH         5       .045     534.27       .025     557.48       .035       1500       .025    1658.02       .045
NH    1702.6

X1      21.5        13     557.48    1500.00       90.0      275.0      182.0        0.0       -4.3          0
X3                1132                557.48       1150    1500.00       1152
GR    1159.4     483.50    1159.48     498.01    1146.98     534.27    1146.98     557.48    1134.28     590.08
GR    1131.6    1142.03    1134.67    1450.65    1151.12    1500.00    1151.12    1515.00    1149.12    1521.00
GR    1149.8    1658.02    1160.79    1688.10    1160.79    1702.60

NH         5       .045      453.8       .025     522.05       .035       1371       .025    1511.75       .045
NH      1556

X1      24.0        13     522.05    1371.00       50.0      230.0      140.0        0.0       -4.3          0
X3                1132                522.05       1150    1371.00       1152
GR    1159.7     405.82    1159.76     419.53    1147.26     453.80    1147.26     522.05    1134.34     551.50
GR    1131.9    1031.91    1134.91    1327.70    1151.50    1371.00    1151.50    1386.00    1149.50    1392.00
GR    1150.1    1511.75    1160.90    1541.00    1160.90    1556.00

  Mill Avenue bridge
  rating curve not modified for this anaysis.

NH         5       .045     450.15       .025       530       .035       1370       .025    1501.65       .045
NH      1545

                 *****  Mill Avenue bridge  *****

X1      24.6        13     530.00       1370       60.0       60.0       60.0        0.0       -4.3          0
RC         7   40000.0    1141.84    93000.0    1147.51   135000.0    1151.04   160000.0    1152.84   215000.0
RC    1156.1  250000.0    1158.80   296000.0    1162.00
X2       0.0       0.0          0        0.0       0.0        0.0          0        0.0        0.0
X3                1132                530.00       1150       1370       1152
GR    1160.0     402.16    1160.09     415.87    1147.59     450.15    1147.59     530.00    1134.40     560.00
GR    1131.9    1021.85    1134.97    1327.65    1151.62    1370.00    1151.62    1385.00    1149.62    1391.00
GR    1150.1    1501.65    1161.06    1530.00    1161.06    1545.00

NC     0.035     0.035

NH         5       .045     492.66       .025     587.86       .035       1428       .025       1550       .045
NH    1594.6
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X1     26.0        13    587.86   1428.00     230.0     140.0     185.0       0.0     -4.3         0
X3               1132            587.86      1150   1428.00      1152
GR   1160.9    442.68   1160.90    456.96   1148.40    492.66   1148.40    587.86   1134.65    620.48
GR   1132.1   1024.35   1135.12   1382.59   1151.88   1428.00   1151.88   1442.28   1149.88   1447.99
GR   1150.3   1550.00   1161.16   1580.32   1161.16   1594.60

SB     1.11      1.56      2.67    1040.0     760.0      85.0   30000.0       5.2      1132      1132

  Second Mill Avenue bridge

NH        5      .045    492.66      .025    587.86      .035      1428      .025      1550      .045
NH   1594.6

                 *****  Second Mill Avenue bridge  *****

X1    26.45        13    587.86   1428.00      45.0      45.0      45.0       0.0     -4.3         0
X2      0.0       0.0         1   1172.51   1176.14       0.0         0       2.0       0.0
X3               1132            587.86      1150   1428.00      1152
GR   1160.9    442.68   1160.90    456.96   1148.40    492.66   1148.40    587.86   1134.65    620.48
GR   1132.1   1024.35   1135.12   1382.59   1151.88   1428.00   1151.88   1442.28   1149.88   1447.99
GR   1150.3   1550.00   1161.22   1580.32   1161.22   1594.60

NH        5      .045    549.19      .025    648.59      .035      1491      .025   1601.21      .045
NH     1646

X1     27.0        13    648.59   1491.00     255.0      55.0     155.0       0.0     -4.3         0
X3               1132            648.59      1150   1491.00      1153
GR   1161.2    497.00   1161.22    511.91   1148.72    549.19   1148.72    648.59   1134.97    683.18
GR   1132.2   1034.75   1135.22   1443.40   1152.08   1491.00   1152.08   1505.91   1150.08   1511.87
GR   1150.5   1601.21   1161.29   1631.00   1161.29   1646.00

NH        5      .045     554.5      .025     654.5      .035      1500      .025      1598      .045
NH     1643

X1     28.0        13    654.50   1500.00     220.0     100.0     160.0       0.0     -4.3         0
X3               1132            654.50      1150   1500.00      1154
GR   1161.4    502.00   1161.44    517.00   1148.94    554.50   1148.94    654.50   1135.20    689.57
GR   1132.3    999.00   1135.33   1451.97   1152.27   1500.00   1152.27   1515.00   1150.27   1521.00
GR   1150.6   1598.00   1161.57   1628.00   1161.57   1643.00

NH        5      .045     557.5      .025     657.5      .035      1500      .025      1580      .045
NH     1625

X1     30.0        13    657.50    1500.0     200.0     200.0     200.0       0.0     -4.3         0
X3               1132            657.50      1150    1500.0      1153
GR   1161.6    505.00   1161.65    520.00   1149.15    557.50   1149.15    657.50   1135.42    692.39
GR   1132.5    952.00   1135.54   1451.64   1152.65   1500.00   1152.65   1515.00   1150.65   1521.00
GR   1150.9   1580.00   1161.84   1610.00   1161.84   1625.00
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NH        5      .045     566.5      .025     658.06      .035      1500      .025      1580      .045
NH   1634.6

X1     32.0        11    658.06    1500.0      200.0     200.0     200.0       0.0      -4.3         0
X3              1132               658.06       1150    1500.0      1152
GR   1161.8    514.00   1161.86    529.00    1149.37    566.50   1149.37    658.06   1135.63    692.98
GR   1132.7    920.00   1135.75   1462.92    1148.11   1500.00   1148.91   1580.00   1162.11   1619.60
GR   1162.1   1634.60

NH        5      .045     581.5      .025     656.17      .035      1500      .025      1580      .045
NH   1634.6

X1     34.0        11    656.17   1500.00      200.0     200.0     200.0       0.0      -4.3         0
X3              1132               656.17       1150   1500.00      1152
GR   1162.0    529.00   1162.07    544.00    1149.57    581.50   1149.57    656.17   1135.85    691.45
GR   1132.9    902.00   1135.96   1466.01    1148.32   1500.00   1149.12   1580.00   1162.32   1619.60
GR   1162.3   1634.60

NH        5      .045     609.5      .025     658.78      .035      1500      .025      1580      .045
NH   1634.6

X1     36.0        11    658.78   1500.00      230.0     200.0     215.0       0.0      -4.3         0
X3              1132               658.78       1150   1500.00      1152
GR   1162.3    557.00   1162.31    572.00    1149.81    609.50   1149.81    658.78   1136.09    699.94
GR   1133.1    894.00   1136.17   1462.89    1148.54   1500.00   1149.34   1580.00   1162.53   1619.57
GR   1162.5    1634.6

NH        5      .045    619.27      .025     661.39      .035      1500      .025      1580      .045
NH   1634.6

X1     38.0        11    661.39   1500.00      260.0     200.0     230.0       0.0      -4.3         0
X3              1132               661.39       1150   1500.00      1152
GR   1162.5    568.00   1162.58    583.00    1150.49    619.27   1150.08    661.39   1136.37    697.57
GR   1133.3    892.00   1136.37   1462.86    1148.75   1500.00   1149.55   1580.00   1162.74   1619.57
GR   1162.7    1634.6

NH        5      .045    647.78      .025     671.78      .035      1500      .025      1580      .045
NH   1654.6

X1     40.0        11    671.78   1500.00      260.0     200.0     230.0       0.0      -4.3         0
X3              1132               671.78       1151   1500.00      1152
GR   1162.8    596.00   1162.85    611.00    1150.59    647.78   1150.35    671.78   1136.65    712.88
GR   1133.5    895.00   1136.58   1462.86    1148.96   1500.00   1149.76   1580.00   1162.95   1639.57
GR   1162.9    1654.6
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NH        5      .045    649.78      .025    673.78      .035      1500      .025      1580      .045
NH   1636.8

X1     42.0       11    673.78   1500.00     260.0     200.0     230.0       0.0      -4.3         0
X3             1132               673.78    1151.3   1500.00      1152
GR   1163.1    598.00   1163.12    613.00   1150.86    649.78   1150.62    673.78   1136.93    714.85
GR   1133.7    900.00   1136.79   1462.83   1149.18   1500.00   1149.24   1580.00   1163.16   1621.76
GR   1163.1    1636.8

NH        5      .045    666.78      .025    690.78      .035      1500      .025      1580      .045
NH   1634.5

X1     44.0       11    690.78   1500.00     260.0     200.0     230.0       0.0      -4.3         0
X3             1132               690.78    1151.6   1500.00    1151.6
GR   1163.3    615.00   1163.39    630.00   1151.13    666.78   1150.89    690.78   1137.20    731.85
GR   1134.0    908.00   1137.00   1462.83   1149.39   1500.00   1150.19   1580.00   1163.37   1619.54
GR   1163.3    1634.5

NH        5      .045    665.78      .025    689.78      .035      1500      .025      1580      .045
NH   1634.5

X1     46.0       11    689.78   1500.00     260.0     200.0     230.0       0.0      -4.3         0
X3             1132               689.78     1152   1500.00    1151.2
GR   1163.6    614.00   1163.66    629.00   1151.40    665.78   1151.16    689.78   1137.48    730.82
GR   1134.2    919.00   1137.21   1462.83   1149.60   1500.00   1150.40   1580.00   1163.58   1619.54
GR   1163.5    1634.5

NH        5      .045    658.78      .025    682.78      .035      1500      .025      1580      .045
NH   1634.5

X1     48.0       11    682.78   1500.00     260.0     200.0     230.0       0.0      -4.3         0
X3             1132               682.78     1152   1500.00    1150.8
GR   1163.9    607.00   1163.93    622.00   1151.67    658.78   1151.43    682.78   1137.76    723.79
GR   1134.4    931.00   1137.42   1462.80   1149.82   1500.00   1150.62   1580.00   1163.79   1619.51
GR   1163.7    1634.5

NH        5      .045    646.78      .025    670.78      .035      1500      .025      1580      .045
NH   1634.5

X1     50.0       11    670.78   1500.00     210.0     200.0     205.0       0.0      -4.3         0
X3             1132               670.78    1151.8   1500.00    1150.4
GR   1164.1    595.00   1164.15    610.00   1151.89    646.78   1151.65    670.78   1137.99    711.76
GR   1134.6    951.00   1137.63   1462.80   1150.03   1500.00   1150.83   1580.00   1164.00   1619.51
GR   1164.0    1634.5
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NH        5      .045    637.78      .025    661.78      .035      1500      .025      1580      .045
NH   1634.5

X1     52.0        11    661.78   1500.00     175.0     200.0     188.0       0.0      -4.3         0
X3               1132               661.78    1151.6   1500.00    1150.0
GR   1164.3    586.00   1164.33    601.00   1152.07    637.78   1151.83    661.78   1138.17    702.76
GR   1134.8    981.00   1137.84   1462.80   1150.24   1500.00   1151.04   1580.00   1164.21   1619.51
GR   1164.2    1634.5


NH        5      .045    630.78      .025    654.78      .035      1500      .025      1580      .045
NH   1634.5

X1     54.0        11    654.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3               1132               654.78    1151.4   1500.00      1150
GR   1164.5    579.00   1164.50    594.00   1152.24    630.78   1152.00    654.78   1138.34    695.76
GR   1135.0   1020.00   1138.05   1467.87   1150.46   1500.00   1151.26   1580.00   1164.42   1619.48
GR   1164.4    1634.5


NH        5      .045    621.78      .025    645.78      .035      1500      .025      1580      .045
NH   1634.5

X1     56.0        11    645.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3               1132               645.78    1151.2   1500.00      1150
GR   1164.6    570.00   1164.67    585.00   1152.41    621.78   1152.17    645.78   1138.52    686.73
GR   1135.2   1065.00   1138.26   1462.77   1150.67   1500.00   1151.47   1580.00   1164.63   1619.48
GR   1164.6    1634.5


NH        5      .045    614.78      .025    638.78      .035      1500      .025      1580      .045
NH   1634.5

X1     58.0        11    638.78   1500.00     165.0     200.0     182.0       0.0      -4.3         0
X3               1132               638.78    1151.0   1500.00    1150.3
GR   1164.8    563.00   1164.84    578.00   1152.58    614.78   1152.34    638.78   1138.69    679.73
GR   1135.4   1121.00   1138.47   1462.77   1150.88   1500.00   1151.68   1580.00   1164.84   1619.48
GR   1164.8    1634.5


NH        5      .045    605.78      .025    629.78      .035      1500      .025      1580      .045
NH   1634.5

X1     60.0        11    629.78   1500.00     170.0     200.0     185.0       0.0      -4.3         0
X3               1132               629.78    1151.0   1500.00    1150.6
GR   1165.0    554.00   1165.01    569.00   1152.75    605.78   1152.51    629.78   1138.87    670.70
GR   1135.6   1180.00   1138.68   1462.77   1151.09   1500.00   1151.89   1580.00   1165.05   1619.48
GR   1165.0    1634.5
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NH        5      .045    596.78      .025    620.78      .035      1500      .025      1580      .045
NH   1634.5

X1     62.0        11    620.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3               1132            620.78    1151.5   1500.00      1151
GR   1165.1    545.00   1165.18    560.00   1152.92    596.78   1152.68    620.78   1139.04    661.70
GR   1135.8   1230.00   1138.89   1462.74   1151.31   1500.00   1152.11   1580.00   1165.26   1619.45
GR   1165.2    1634.5

NH        5      .045    588.78      .025    612.78      .035      1500      .025      1580      .045
NH   1634.5

X1     64.0        11    612.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3               1132            612.78      1152   1500.00    1151.3
GR   1165.3    537.00   1165.34    552.00   1153.08    588.78   1152.84    612.78   1139.22    647.88
GR   1136.0   1270.00   1139.09   1462.71   1151.52   1500.00   1152.32   1580.00   1165.47   1619.45
GR   1165.4    1634.5

NH        5      .045    580.78      .025    604.78      .035      1500      .025      1580      .045
NH   1633.9

X1     66.0        11    604.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3               1132            604.78    1152.5   1500.00    1151.6
GR   1165.5    529.00   1165.51    544.00   1153.25    580.78   1153.01    604.78   1139.39    645.64
GR   1136.3   1300.00   1139.30   1462.71   1151.73   1500.00   1152.53   1580.00   1165.51   1618.94
GR   1165.5    1633.9

NH        5      .045    573.78      .025    597.78      .035      1500      .025      1580      .045
NH   1634.4

X1     68.0        11    597.78   1500.00     170.0     200.0     185.0       0.0      -4.3         0
X3               1132            597.78      1153   1500.00      1152
GR   1165.6    522.00   1165.69    537.00   1153.43    573.78   1153.19    597.78   1139.57    638.64
GR   1136.5   1318.00   1139.51   1462.68   1151.95   1500.00   1152.75   1580.00   1165.89   1619.42
GR   1165.8    1634.4

NH        5      .045    566.78      .025    590.78      .035      1500      .025      1580      .045
NH   1634.4

X1     69.3        11    590.78   1500.00      85.0     130.0     108.0       0.0      -4.3         0
X3       10      1132            590.78    1153.2   1500.00      1152                            0.0
GR   1165.7    515.00   1165.78    530.00   1153.52    566.78   1153.28    590.78   1139.66    631.64
GR   1136.6   1322.00   1139.65   1462.68   1152.09   1500.00   1152.89   1580.00   1166.03   1619.42
GR   1166.0    1634.4
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SB      1.05      1.56      2.63       0.0     831.0      54.0   34820.0       5.0   1132.45   1132.35

  Rural Road bridge

NH         5      .045    565.78      .025    589.78      .035      1500      .025      1580      .045
NH    1634.4

                 *****  Rural Road bridge  *****

X1      70.3        21    589.78   1500.00      85.0     100.0      92.0       0.0      -4.3         0
X2       0.0       0.0         1   1172.28   1176.98       0.0         0       2.0       0.0
X3                                 589.78    1153.4   1500.00      1152
BT       -12    514.00   1176.98   1165.86    524.00   1177.02   1169.35    645.00   1178.49   1170.82
BT              766.00   1179.49   1171.79    887.00   1179.95   1172.28   1008.00   1179.95   1172.28
BT             1129.00   1179.46   1171.79   1250.00   1178.49   1170.82   1371.00   1177.02   1169.35
BT             1492.00   1175.07   1167.40   1612.00   1172.65   1164.98   1619.42   1172.50   1166.13
GR    1165.8    514.00   1165.78    524.00   1165.86    529.00   1153.60    565.78   1153.36    589.78
GR    1139.7    630.61   1139.69    645.00   1139.17    766.00   1138.64    887.00   1138.12   1008.00
GR    1137.6   1129.00   1137.07   1250.00   1136.75   1325.00   1137.76   1371.00   1139.75   1462.68
GR    1149.5   1492.00   1152.19   1500.00   1152.99   1580.00   1163.66   1612.00   1166.13   1619.42
GR    1166.1    1634.4

NH         5      .045    557.78      .025    581.78      .035      1500      .025      1549      .045
NH    1604.4

X1      72.0        11    581.78   1500.00     150.0     170.0     160.0       0.0      -4.3         0
X3                                 581.78    1153.6   1500.00      1152
GR    1166.0    506.00   1166.03    521.00   1153.77    557.78   1153.53    581.78   1139.91    622.64
GR    1136.9   1321.00   1139.93   1462.68   1152.37   1500.00   1152.86   1549.00   1166.31   1589.35
GR    1166.3    1604.4

NH         5      .045    547.78      .025    571.78      .035      1500      .025      1524      .045
NH    1580.1

X1      74.0        11    571.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3                                 571.78    1153.8   1500.00    1152.5
GR    1166.2    496.00   1166.26    511.00   1154.00    547.78   1153.76    571.78   1140.12    612.70
GR    1137.1   1315.00   1140.14   1462.65   1152.59   1500.00   1152.83   1524.00   1166.52   1565.07
GR    1166.5    1580.1

NH         5      .045    532.78      .025    556.78      .035      1500      .025      1524      .045
NH    1580.1

X1      76.0        11    556.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3                                 556.78      1154   1500.00      1153
GR    1166.4    481.00   1166.49    496.00   1154.23    532.78   1153.99    556.78   1140.33    597.76
GR    1137.3   1279.00   1140.35   1462.65   1152.80   1500.00   1153.04   1524.00   1166.73   1565.07
GR    1166.7    1580.1
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```
NH        5      .045    508.75      .025    532.75      .035      1500      .025      1524      .045
NH   1580.1

X1     78.0        11    532.75   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3                          532.75    1154.2   1500.00    1153.5
GR   1166.7    457.00   1166.71    472.00   1154.46    508.75   1154.22    532.75   1140.54    573.79
GR   1137.5   1241.00   1140.56   1462.65   1153.01   1500.00   1153.25   1524.00   1166.94   1565.07
GR   1166.9    1580.1

NH        5      .045    482.78      .025    506.78      .035      1500      .025      1524      .045
NH   1580.0

X1     80.0        11    506.78   1500.00     165.0     200.0     182.0       0.0      -4.3         0
X3                          506.78    1154.4   1500.00      1154
GR   1166.9    431.00   1166.95    446.00   1154.69    482.78   1154.45    506.78   1140.76    547.85
GR   1137.7   1194.00   1140.77   1462.62   1153.23   1500.00   1153.47   1524.00   1167.15   1565.04
GR   1167.1    1580.0

NH        5      .045    447.78      .025    471.78      .035      1500      .025      1524      .045
NH   1580.0

X1     82.0        11    471.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3                          471.78    1154.6   1500.00    1154.5
GR   1167.1    396.00   1167.18    411.00   1154.92    447.78   1154.68    471.78   1140.97    512.91
GR   1137.9   1136.00   1140.98   1462.62   1153.44   1500.00   1153.68   1524.00   1167.36   1565.04
GR   1167.3    1580.0

NH        5      .045    411.78      .025    435.78      .035      1500      .025      1524      .045
NH   1580.0

X1     84.0        11    435.78   1500.00     160.0     200.0     180.0       0.0      -4.3         0
X3                          435.78    1154.8   1500.00      1155
GR   1167.4    360.00   1167.41    375.00   1155.15    411.78   1154.91    435.78   1141.19    476.94
GR   1138.1   1088.00   1141.19   1462.62   1153.65   1500.00   1153.89   1524.00   1167.57   1565.04
GR   1167.5    1580.0

NH        5      .045    364.78      .025    388.78      .035      1500      .025      1524      .045
NH   1580.0

X1     86.0        11    388.78   1500.00     165.0     200.0     182.0       0.0      -4.3         0
X3                          388.78     1155   1500.00    1154.5
GR   1167.6    313.00   1167.64    328.00   1155.38    364.78   1155.14    388.78   1141.39    430.03
GR   1138.4   1040.00   1141.40   1462.59   1153.87   1500.00   1154.11   1524.00   1167.78   1565.01
GR   1167.7    1580.0
```

```
NH        5      .045     298.78      .025     322.78      .035      1500      .025      1524      .045
NH   1580.0

X1     88.0        11     322.78   1500.00      160.0     200.0     180.0       0.0      -4.3         0
X3                            322.78      1155   1500.00      1154
GR   1167.8    247.00    1167.87    262.00    1155.61    298.78   1155.37    322.78   1141.60    364.09
GR   1138.6   1008.00    1141.60   1462.56    1154.08   1500.00   1154.32   1524.00   1167.99   1565.01
GR   1167.9    1580.0

NH        5      .045        241      .025     265.78      .035      1500      .025      1524      .045
NH   1576.0

X1     90.0        12     265.78   1500.00      155.0     200.0     178.0       0.0      -4.3         0
X3                            265.78      1155   1500.00      1154
GR   1168.0    190.00    1168.07    205.00    1155.81    241.00   1155.57    265.78   1149.50    284.00
GR   1141.8    307.09    1138.81    980.00    1141.81   1462.56   1154.29   1500.00   1154.53   1524.00
GR   1168.2   1561.01    1168.20    1576.0

NH        5      .045     191.78      .025     215.78      .035      1500      .025      1524      .045
NH   1577.0

X1     92.0        11     215.78   1500.00      155.0     200.0     178.0       0.0      -4.3         0
X3                            215.78      1155   1500.00      1154
GR   1168.2    140.00    1168.24    155.00    1155.98    191.78   1157.74    215.78   1142.01    262.97
GR   1139.0    960.00    1142.02   1459.53    1155.51   1500.00   1155.75   1524.00   1168.41   1561.98
GR   1168.4    1577.0

NH        5      .045     144.75      .025     168.75      .035      1500      .025      1524      .045
NH   1576.1

X1     94.0        12     168.75   1500.00      155.0     200.0     178.0       0.0      -4.3         0
X3                            168.75      1155   1500.00      1154
GR   1168.4     93.00    1168.41    108.00    1156.16    144.75   1155.92    168.75   1142.21    185.88
GR   1141.9    282.00    1139.23    948.00    1142.23   1471.62   1154.72   1500.00   1154.96   1524.00
GR   1168.6   1561.05    1168.62    1576.1

NH        5      .045      84.75      .025       150      .035      1500      .025      1524      .045
NH   1580.0

X1     96.0        12     150.00   1500.00      225.0     200.0     212.0       0.0      -4.3         0
X3                            150.00      1155   1500.00     1154.5
GR   1168.6     33.00    1168.66     48.00    1156.41     84.75   1156.17    150.00   1142.51    190.98
GR   1142.1    319.00    1139.44    939.00    1142.44   1462.53   1154.93   1500.00   1155.17   1524.00
GR   1168.8   1564.98    1168.83    1580.0
```

```
NH       3      .035      1500      .025      1524      .045    1580.0

X1    98.0         9     20.00   1500.00     290.0     200.0     245.0       0.0      -4.3         0
X3                                                    1500.00      1155
GR   1156.4     20.00   1142.89     60.80   1141.79    353.00   1139.65    920.00   1142.65   1462.50
GR   1155.1   1500.00   1155.39   1524.00   1169.04   1564.95   1169.04    1580.0

NH       3      .035      1500      .025      1524      .045    1580.0

X1   100.0         7    350.00   1500.00     310.0     200.0     255.0       0.0      -4.3         0
X3                                                    1500.00    1155.5
GR   1142.5    350.00   1139.86    885.00   1142.86   1462.50   1155.36   1500.00   1155.60   1524.00
GR   1169.2   1564.95   1169.25    1580.0
```

Section 102 was used as the downstream edge of the apron. This is the first cross-section upstream of the confluence with the Indian Bend Wash and is very close to the location of the apron which is also right next to the confluence.

```
NH       5      .045    460.41      .025    484.41      .035      1500      .025      1524      .045
NH   1580.0

X1   102.0        11    484.41   1500.00     370.0     200.0     285.0       0.0      -4.3         0
X3                                 484.41      1155   1500.00      1156
GR   1169.4    407.91   1169.42    422.91   1156.92    460.41   1156.68    484.41   1143.15    525.00
GR   1140.0    853.00   1143.07   1462.50   1155.57   1500.00   1155.81   1524.00   1169.46   1564.95
GR   1169.4    1580.0
```

UPSTREAM DAM
d.s.edge of apron

```
NC    .045      .045      .025        .3        .5

X1   103.00        8       510      1474         1         1         1
GR    1165      500      1165       510      1157       510      1142     532.5      1142    1451.5
GR    1157     1474      1165      1474      1165      1484
```

d.s. edge of piers

```
X1   103.22                                    22        22        22

X1   103.28       26       510      1474         6         6         6
GR    1165      500      1165       510      1157       510      1142     532.5      1142     741.5
GR    1154    747.5      1166     747.5      1166     753.5      1154     753.5      1142     759.5
GR    1142      983      1154       989      1166       989      1166       995      1154       995
GR    1142     1001      1142    1224.5      1154    1230.5      1166    1230.5      1166    1236.5
GR    1154   1236.5      1142    1242.5      1142    1451.5      1157      1474      1165      1474
GR    1165     1484
```

```
X1   103.46                                    18        18        18

X1   103.52        8       510      1474        6         6         6
GR     1165      500      1165       510     1157       510      1142     532.5      1142    1451.5
GR     1157     1474      1165      1474     1165      1484

  u.s. edge of apron

X1   103.80                                    28        28        28

NC     .035      .035      .035        .1       .3

X1   103.81       11    484.41   1500.00        1         1         1                 .07
GR   1169.4   407.91   1169.42    422.91  1156.92    460.41   1156.68    484.41   1143.15   525.00
GR   1140.0   853.00   1143.07   1462.50  1155.57   1500.00   1155.81   1524.00   1169.46  1564.95
GR   1169.4  1579.95

X1    104.0       11    535.50   1500.00      178       118       148
GR   1169.6   459.00   1169.62    474.00  1157.12    511.50   1156.88    535.50   1143.15   576.69
GR   1140.2   828.00   1143.28   1462.47  1155.79   1500.00   1156.03   1524.00   1169.67  1564.92
GR   1169.6  1579.92

X1    106.0       11    531.50   1500.00    250.0     200.0     225.0       0.0       0.0        0
GR   1169.8   455.00   1169.87    470.00  1157.37    507.50   1157.13    531.50   1143.40   572.69
GR   1140.4   810.00   1143.49   1462.47  1156.00   1500.00   1156.14   1514.40   1169.88  1555.62
GR   1169.8  1570.62

X1    108.0       10    473.50   1500.00    250.0     200.0     225.0       0.0       0.0        0
GR   1170.1   397.00   1170.12    412.00  1157.62    449.50   1157.38    473.50   1143.65   514.69
GR   1140.7   795.00   1143.70   1462.02  1156.36   1500.00   1170.09   1541.19   1170.09  1556.19

X1    110.0        9    590.50   1500.00    255.0     200.0     228.0       0.0       0.0        0
GR   1170.3   514.00   1170.37    529.00  1157.87    566.50   1157.63    590.50   1143.91   631.66
GR   1140.9   790.00   1143.91   1420.83  1170.30   1500.00   1170.30   1515.00

X1    112.0        9    606.50   1500.00    225.0     200.0     212.0       0.0       0.0        0
GR   1170.6   530.00   1170.60    545.00  1158.10    582.50   1157.86    606.50   1144.13   647.69
GR   1141.1   790.00   1144.12   1420.83  1170.51   1500.00   1170.51   1515.00
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X1    114.0        9    584.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
GR   1170.8   508.00   1170.80    523.00   1158.30    560.50   1158.06    584.50   1144.33    625.69
GR   1141.3   800.00   1144.32   1420.77   1170.73   1500.00   1170.73   1515.00

X1    116.0        9    529.50   1500.00     205.0     200.0     202.0       0.0       0.0         0
GR   1171.0   453.00   1171.00    468.00   1158.50    505.50   1158.26    529.50   1144.54    570.66
GR   1141.5   820.00   1144.53   1420.77   1170.94   1500.00   1170.94   1515.00

X1    118.0        9    474.50   1500.00     210.0     200.0     205.0       0.0       0.0         0
GR   1171.2   398.00   1171.21    413.00   1158.71    450.50   1158.47    474.50   1144.75    515.66
GR   1141.7   854.00   1144.74   1420.77   1171.15   1500.00   1171.15   1515.00

X1    119.8        9    446.50   1500.00     180.0     200.0     190.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.3   370.00   1171.39    385.00   1158.89    422.50   1158.65    446.50   1144.95    487.60
GR   1141.9   525.00   1144.95   1420.74   1171.37   1500.00   1171.37   1515.00

X1   120.42        9    446.22   1485.00      57.0      42.0      50.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.4   370.00   1171.45    385.00   1158.95    422.50   1158.71    446.22   1144.98    487.69
GR   1142.0   926.50   1145.00   1405.77   1171.41   1485.00   1171.41   1500.00
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Grade Control Str. No. 5

***** Grade Control Str. No. 5 *****

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X1    120.5        9    443.50   1485.00       8.0       8.0       8.0       0.0       0.0         0
GR   1171.4   367.00   1171.46    382.00   1158.96    419.50   1158.72    443.50   1150.00    469.66
GR   1147.0   926.50   1150.00   1420.74   1171.42   1485.00   1171.42   1500.00

X1    122.0        9    441.50   1460.00     155.0     150.0     152.0       0.0       0.0         0
GR   1171.6   365.00   1171.61    380.00   1159.11    417.50   1158.87    441.50   1150.16    467.63
GR   1147.1   941.00   1150.15   1395.71   1171.58   1460.00   1171.58   1475.00

X1   122.65        9    441.50   1460.00      65.0      65.0      65.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.6   365.00   1171.68    380.00   1159.18    417.50   1158.94    441.50   1150.22    490.27
GR   1147.2   952.00   1150.22   1395.71   1171.65   1460.00   1171.65   1475.00

SB    1.05     1.56      2.63       0.0     798.0      66.0   24246.0       6.3   1147.31   1147.22
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McClintock Drive Bridge

***** McClintock Drive Bridge *****

X1	123.55	20	441.5	1460.00	90.0	90.0	90.0	0.0	0.0	0
X2	0.0	0.0	1	1180.61	1181.8	0.0	0	2.0	0.0	
X3	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BT	-11	316.00	1181.80	1174.13	436.00	1184.23	1176.56	554.00	1185.93	1178.26
BT		672.00	1187.37	1179.70	790.00	1188.15	1180.48	908.00	1188.28	1180.61
BT		1026.00	1188.15	1180.48	1144.00	1187.37	1179.70	1262.00	1185.93	1178.26
BT		1380.00	1184.23	1176.56	1500.00	1181.80	1174.13			
GR	1174.1	316.00	1171.77	371.00	1171.77	386.00	1159.27	423.50	1159.10	436.00
GR	1159.0	441.50	1150.31	500.09	1149.97	554.00	1149.22	672.00	1148.48	790.00
GR	1147.7	908.00	1147.31	975.00	1147.64	1026.00	1148.42	1144.00	1149.19	1262.00
GR	1149.9	1380.00	1150.31	1433.31	1171.75	1460.00	1171.75	1475.00	1174.13	1500.00
X1	124.0	9	436.50	1465.00	45.0	45.0	45.0	0.0	0.0	0
GR	1171.8	360.00	1171.81	375.00	1159.31	412.50	1159.07	436.50	1150.36	464.22
GR	1147.3	983.00	1150.35	1400.68	1171.79	1465.00	1171.79	1480.00		
X1	126.0	10	415.00	1500.00	200.0	200.0	200.0	0.0	0.0	0
X3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	1170.0	240.00	1168.00	272.00	1166.00	317.00	1164.00	348.00	1162.00	388.00
GR	1159.2	415.00	1150.56	441.13	1147.55	985.00	1150.55	1435.62	1172.01	1500.00
X1	128.0	8	402.00	1500.00	200.0	200.0	200.0	0.0	0.0	0
X3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	1172.0	242.00	1166.00	280.00	1164.00	377.00	1159.47	402.00	1150.76	428.13
GR	1147.7	1017.00	1150.75	1359.75	1170.00	1500.00				

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T1   RIO SALADO TOWN LAKE for TEMPE, AZ
T2   CH2M HILL    Walker/Allen   Sept. 1994
T3      RS-P-GCS.HC2

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
                 5                                                  250000   1120.10
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
      2                 -1                                           -6.0
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K/L 4PRINT

THIS RUN EXECUTED 2FEB** 14:31:52

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

RS-P-GCS.HC2

SUMMARY PRINTOUT

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
10035.000	0.00	0.00	205000.00	1113.65	21.95	1091.70	11.84	18.99
10035.000	0.00	0.00	250000.00	1114.60	22.90	1091.70	13.64	23.52
10200.000	165.00	165.00	205000.00	1113.99	21.39	1092.60	11.75	18.46
10200.000	165.00	165.00	250000.00	1115.07	22.47	1092.60	13.45	22.39
10400.000	200.00	365.00	205000.00	1114.39	21.79	1092.60	11.66	17.91
10400.000	200.00	365.00	250000.00	1115.59	22.99	1092.60	13.27	21.29
10600.000	200.00	565.00	205000.00	1114.77	21.77	1093.00	11.62	17.75
10600.000	200.00	565.00	250000.00	1116.06	23.06	1093.00	13.14	20.71
10800.000	200.00	765.00	205000.00	1115.10	21.60	1093.50	11.75	18.40
10800.000	200.00	765.00	250000.00	1116.46	22.96	1093.50	13.24	21.18
11000.000	200.00	965.00	205000.00	1115.57	21.57	1094.00	11.44	16.92
11000.000	200.00	965.00	250000.00	1117.04	23.04	1094.00	12.83	19.20
11200.000	200.00	1165.00	205000.00	1115.97	21.47	1094.50	11.26	15.95
11200.000	200.00	1165.00	250000.00	1117.51	23.01	1094.50	12.60	17.98
11400.000	200.00	1365.00	205000.00	1116.38	21.48	1094.90	11.00	14.94
11400.000	200.00	1365.00	250000.00	1118.00	23.10	1094.90	12.27	16.69
11600.000	200.00	1565.00	205000.00	1116.82	21.42	1095.40	10.55	13.12
11600.000	200.00	1565.00	250000.00	1118.52	23.12	1095.40	11.76	14.63
11800.000	200.00	1765.00	205000.00	1117.03	21.13	1095.90	10.83	14.33
11800.000	200.00	1765.00	250000.00	1118.75	22.85	1095.90	12.03	15.80
12000.000	200.00	1965.00	205000.00	1117.32	21.02	1096.30	10.82	14.23
12000.000	200.00	1965.00	250000.00	1119.08	22.78	1096.30	11.99	15.57

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
12100.000	100.00	2065.00	205000.00	1117.43	20.83	1096.60	10.97	14.81
12100.000	100.00	2065.00	250000.00	1119.20	22.60	1096.60	12.15	16.16
12200.000	100.00	2165.00	205000.00	1117.57	20.77	1096.80	11.00	14.93
12200.000	100.00	2165.00	250000.00	1119.36	22.56	1096.80	12.17	16.27
12400.000	200.00	2365.00	205000.00	1117.78	20.48	1097.30	11.43	16.26
12400.000	200.00	2365.00	250000.00	1119.57	22.27	1097.30	12.63	17.63
12600.000	200.00	2565.00	205000.00	1118.13	20.43	1097.70	11.35	15.71
12600.000	200.00	2565.00	250000.00	1119.96	22.26	1097.70	12.54	17.08
12800.000	200.00	2765.00	205000.00	1118.42	20.22	1098.20	11.44	16.24
12800.000	200.00	2765.00	250000.00	1120.29	22.09	1098.20	12.60	17.48
13000.000	200.00	2965.00	205000.00	1118.74	20.04	1098.70	11.51	16.45
13000.000	200.00	2965.00	250000.00	1120.62	21.92	1098.70	12.66	17.60
13200.000	200.00	3165.00	205000.00	1119.04	19.84	1099.20	11.64	17.08
13200.000	200.00	3165.00	250000.00	1120.94	21.74	1099.20	12.78	18.14
13400.000	200.00	3365.00	205000.00	1119.37	19.77	1099.60	11.69	17.29
13400.000	200.00	3365.00	250000.00	1121.30	21.70	1099.60	12.81	18.27
13600.000	200.00	3565.00	205000.00	1119.67	19.57	1100.10	11.92	18.27
13600.000	200.00	3565.00	250000.00	1121.61	21.51	1100.10	13.03	19.18
13800.000	200.00	3765.00	205000.00	1120.03	19.43	1100.60	11.94	18.50
13800.000	200.00	3765.00	250000.00	1121.99	21.39	1100.60	13.04	19.31
14000.000	200.00	3965.00	205000.00	1120.44	19.44	1101.00	11.82	18.06
14000.000	200.00	3965.00	250000.00	1122.45	21.45	1101.00	12.88	18.73
14200.000	200.00	4165.00	205000.00	1120.84	19.34	1101.50	11.74	18.05
14200.000	200.00	4165.00	250000.00	1122.87	21.37	1101.50	12.76	18.57
14400.000	200.00	4365.00	205000.00	1121.18	19.18	1102.00	11.88	18.46
14400.000	200.00	4365.00	250000.00	1123.22	21.22	1102.00	12.91	18.94
14665.000	265.00	4630.00	205000.00	1121.63	18.93	1102.70	12.09	19.17
14665.000	265.00	4630.00	250000.00	1123.68	20.98	1102.70	13.13	19.58
14785.000	120.00	4750.00	205000.00	1121.91	19.01	1102.90	12.00	19.07
14785.000	120.00	4750.00	250000.00	1123.98	21.08	1102.90	13.01	19.38
15000.000	215.00	4965.00	205000.00	1122.31	18.91	1103.40	12.05	19.61
15000.000	215.00	4965.00	250000.00	1124.40	21.00	1103.40	13.03	19.84
15200.000	200.00	5165.00	205000.00	1122.68	18.78	1103.90	12.14	20.10
15200.000	200.00	5165.00	250000.00	1124.78	20.88	1103.90	13.11	20.25

	SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
	15400.000	200.00	5365.00	205000.00	1123.08	18.78	1104.30	12.17	19.92
	15400.000	200.00	5365.00	250000.00	1125.17	20.87	1104.30	13.15	20.07
	15586.000	186.00	5551.00	210000.00	1123.38	18.58	1104.80	12.62	21.75
	15586.000	186.00	5551.00	250000.00	1125.53	20.73	1104.80	13.25	20.58
*	15710.000	124.00	5675.00	210000.00	1125.00	19.90	1105.10	11.68	16.95
*	15710.000	124.00	5675.00	250000.00	1126.76	21.66	1105.10	12.63	17.61
	16000.000	290.00	5965.00	210000.00	1125.47	19.67	1105.80	11.79	17.88
	16000.000	290.00	5965.00	250000.00	1127.26	21.46	1105.80	12.70	18.34
	16200.000	200.00	6165.00	210000.00	1125.86	19.67	1106.20	11.70	17.51
	16200.000	200.00	6165.00	250000.00	1127.67	21.47	1106.20	12.59	17.92
	16400.000	200.00	6365.00	210000.00	1126.17	19.47	1106.70	11.91	18.45
	16400.000	200.00	6365.00	250000.00	1127.98	21.28	1106.70	12.80	18.80
	16600.000	200.00	6565.00	210000.00	1126.53	19.33	1107.20	11.98	18.86
	16600.000	200.00	6565.00	250000.00	1128.34	21.15	1107.20	12.86	19.14
	16800.000	200.00	6765.00	210000.00	1126.89	19.19	1107.70	12.05	19.30
	16800.000	200.00	6765.00	250000.00	1128.71	21.01	1107.70	12.92	19.52
	17000.000	200.00	6965.00	210000.00	1127.27	19.17	1108.10	12.06	19.34
	17000.000	200.00	6965.00	250000.00	1129.10	21.00	1108.10	12.92	19.53
	17200.000	200.00	7165.00	210000.00	1127.64	19.04	1108.60	12.14	19.77
	17200.000	200.00	7165.00	250000.00	1129.48	20.88	1108.60	13.00	19.91
	17400.000	200.00	7365.00	210000.00	1128.02	18.92	1109.10	12.23	20.04
	17400.000	200.00	7365.00	250000.00	1129.85	20.75	1109.10	13.10	20.24
	17600.000	200.00	7565.00	210000.00	1128.39	18.89	1109.50	12.35	20.38
	17600.000	200.00	7565.00	250000.00	1130.22	20.72	1109.50	13.23	20.55
	17800.000	200.00	7765.00	210000.00	1128.77	18.77	1110.00	12.46	20.91
	17800.000	200.00	7765.00	250000.00	1130.61	20.61	1110.00	13.34	21.04
	18000.000	200.00	7965.00	210000.00	1129.17	18.67	1110.50	12.56	21.39
	18000.000	200.00	7965.00	250000.00	1131.00	20.50	1110.50	13.43	21.48
	18200.000	200.00	8165.00	210000.00	1129.57	18.57	1111.00	12.69	22.02
	18200.000	200.00	8165.00	250000.00	1131.40	20.40	1111.00	13.57	22.07
	18400.000	200.00	8365.00	210000.00	1130.08	18.68	1111.40	12.50	21.23
	18400.000	200.00	8365.00	250000.00	1131.93	20.53	1111.40	13.36	21.26
	18600.000	200.00	8565.00	210000.00	1130.43	18.53	1111.90	12.80	22.27
	18600.000	200.00	8565.00	250000.00	1132.27	20.37	1111.90	13.69	22.32

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
18800.000	200.00	8765.00	210000.00	1130.84	18.44	1112.40	12.97	23.21
18800.000	200.00	8765.00	250000.00	1132.67	20.27	1112.40	13.86	23.22
19000.000	200.00	8965.00	210000.00	1131.29	18.49	1112.80	13.01	23.27
19000.000	200.00	8965.00	250000.00	1133.12	20.32	1112.80	13.91	23.30
19200.000	200.00	9165.00	210000.00	1131.72	18.42	1113.30	13.16	23.90
19200.000	200.00	9165.00	250000.00	1133.55	20.25	1113.30	14.07	23.95
19400.000	200.00	9365.00	210000.00	1132.16	18.36	1113.80	13.31	24.59
19400.000	200.00	9365.00	250000.00	1133.98	20.18	1113.80	14.23	24.64
19600.000	200.00	9565.00	210000.00	1132.62	18.32	1114.30	13.47	25.25
19600.000	200.00	9565.00	250000.00	1134.43	20.13	1114.30	14.40	25.30
19800.000	200.00	9765.00	210000.00	1133.11	18.41	1114.70	13.50	25.15
19800.000	200.00	9765.00	250000.00	1134.92	20.22	1114.70	14.44	25.26
20000.000	200.00	9965.00	210000.00	1133.57	18.37	1115.20	13.68	25.91
20000.000	200.00	9965.00	250000.00	1135.37	20.17	1115.20	14.63	26.05
20200.000	200.00	10165.00	210000.00	1134.05	18.35	1115.70	13.83	26.53
20200.000	200.00	10165.00	250000.00	1135.85	20.15	1115.70	14.80	26.69
20400.000	200.00	10365.00	210000.00	1134.60	18.50	1116.10	13.77	25.86
20400.000	200.00	10365.00	250000.00	1136.40	20.30	1116.10	14.75	26.10
20600.000	200.00	10565.00	210000.00	1135.05	18.45	1116.60	14.02	26.99
20600.000	200.00	10565.00	250000.00	1136.85	20.25	1116.60	15.01	27.26
20782.000	178.00	10743.00	210000.00	1135.57	18.57	1117.00	13.95	26.97
20782.000	178.00	10743.00	250000.00	1137.38	20.38	1117.00	14.91	27.12
20800.000	18.00	10761.00	210000.00	1135.62	18.59	1117.03	13.93	26.87
20800.000	18.00	10761.00	250000.00	1137.44	20.41	1117.03	14.89	27.03
21000.000	200.00	10961.00	210000.00	1136.21	18.85	1117.36	13.78	25.04
21000.000	200.00	10961.00	250000.00	1138.01	20.65	1117.36	14.81	25.47
21050.000	50.00	11011.00	210000.00	1136.30	18.60	1117.70	13.95	26.06
21050.000	50.00	11011.00	250000.00	1138.10	20.40	1117.70	14.97	26.41
21150.000	100.00	11111.00	210000.00	1136.93	19.03	1117.90	13.60	24.01
21150.000	100.00	11111.00	250000.00	1138.84	20.94	1117.90	14.54	24.01
21200.000	50.00	11161.00	210000.00	1137.20	19.51	1117.69	13.24	21.94
21200.000	50.00	11161.00	250000.00	1139.13	21.44	1117.69	14.19	22.12
21400.000	200.00	11361.00	210000.00	1137.75	19.73	1118.02	12.99	21.47
21400.000	200.00	11361.00	250000.00	1139.72	21.70	1118.02	13.86	21.48

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
21600.000	200.00	11561.00	210000.00	1138.32	19.97	1118.35	12.63	19.88
21600.000	200.00	11561.00	250000.00	1140.31	21.96	1118.35	13.49	19.91
21800.000	200.00	11761.00	210000.00	1138.69	20.01	1118.68	12.76	20.30
21800.000	200.00	11761.00	250000.00	1140.67	21.99	1118.68	13.63	20.37
22000.000	200.00	11961.00	210000.00	1139.12	20.11	1119.01	12.70	19.96
22000.000	200.00	11961.00	250000.00	1141.10	22.09	1119.01	13.57	20.05
22200.000	200.00	12161.00	210000.00	1139.54	20.20	1119.34	12.65	19.72
22200.000	200.00	12161.00	250000.00	1141.53	22.19	1119.34	13.52	19.82
22400.000	200.00	12361.00	210000.00	1139.95	20.27	1119.68	12.61	19.50
22400.000	200.00	12361.00	250000.00	1141.94	22.26	1119.68	13.48	19.61
22600.000	200.00	12561.00	210000.00	1140.38	20.37	1120.01	12.50	18.96
22600.000	200.00	12561.00	250000.00	1142.38	22.37	1120.01	13.37	19.09
22800.000	200.00	12761.00	210000.00	1140.77	20.43	1120.34	12.47	18.83
22800.000	200.00	12761.00	250000.00	1142.77	22.43	1120.34	13.34	18.97
23000.000	200.00	12961.00	210000.00	1141.10	19.90	1121.20	12.65	19.67
23000.000	200.00	12961.00	250000.00	1143.11	21.91	1121.20	13.51	19.73
23200.000	200.00	13161.00	210000.00	1141.62	20.62	1121.00	12.32	18.07
23200.000	200.00	13161.00	250000.00	1143.64	22.64	1121.00	13.18	18.23
23400.000	200.00	13361.00	210000.00	1141.98	20.65	1121.33	12.32	18.02
23400.000	200.00	13361.00	250000.00	1144.00	22.67	1121.33	13.18	18.19
23600.000	200.00	13561.00	210000.00	1142.35	20.69	1121.66	12.31	17.98
23600.000	200.00	13561.00	250000.00	1144.37	22.71	1121.66	13.17	18.14
23800.000	200.00	13761.00	210000.00	1142.71	20.75	1121.96	12.29	17.88
23800.000	200.00	13761.00	250000.00	1144.74	22.78	1121.96	13.15	18.03
24000.000	200.00	13961.00	210000.00	1143.15	20.83	1122.32	12.07	16.84
24000.000	200.00	13961.00	250000.00	1145.19	22.87	1122.32	12.93	17.05
24200.000	200.00	14161.00	210000.00	1143.54	20.89	1122.65	11.92	16.17
24200.000	200.00	14161.00	250000.00	1145.59	22.94	1122.65	12.78	16.41
24400.000	200.00	14361.00	210000.00	1143.94	20.96	1122.98	11.72	15.13
24400.000	200.00	14361.00	250000.00	1145.99	23.01	1122.98	12.59	15.43
24600.000	200.00	14561.00	210000.00	1144.34	21.03	1123.31	11.45	14.36
24600.000	200.00	14561.00	250000.00	1146.42	23.11	1123.31	12.28	14.62
24617.000	17.00	14578.00	210000.00	1144.36	21.02	1123.34	11.45	14.38
24617.000	17.00	14578.00	250000.00	1146.45	23.11	1123.34	12.28	14.63

	SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
	24618.000	1.00	14579.00	210000.00	1143.05	14.15	1128.90	17.34	26.00
	24618.000	1.00	14579.00	250000.00	1145.12	16.22	1128.90	17.94	23.35
	24687.000	69.00	14648.00	210000.00	1143.57	14.57	1129.00	16.82	23.59
	24687.000	69.00	14648.00	250000.00	1145.52	16.52	1129.00	17.60	21.96
*	24688.000	1.00	14649.00	210000.00	1144.33	12.33	1132.00	19.74	40.28
*	24688.000	1.00	14649.00	250000.00	1145.85	13.85	1132.00	20.87	38.74
*	24700.000	12.00	14661.00	210000.00	1145.02	13.02	1132.00	20.11	43.38
*	24700.000	12.00	14661.00	250000.00	1146.59	14.59	1132.00	21.23	42.22
*	24733.000	33.00	14694.00	210000.00	1147.98	15.98	1132.00	16.21	22.10
	24733.000	33.00	14694.00	250000.00	1149.85	17.85	1132.00	17.16	21.78
	24744.000	11.00	14705.00	210000.00	1149.74	17.74	1132.00	13.29	21.76
	24744.000	11.00	14705.00	250000.00	1151.75	19.75	1132.00	14.19	21.53
	24800.000	56.00	14761.00	210000.00	1149.92	17.92	1132.00	13.15	21.05
	24800.000	56.00	14761.00	250000.00	1151.93	19.93	1132.00	14.06	20.87
	0.000	155.00	14916.00	210000.00	1150.50	18.50	1132.00	12.53	18.37
	0.000	155.00	14916.00	250000.00	1152.58	20.58	1132.00	13.35	18.06
	2.000	160.00	15076.00	210000.00	1150.78	18.78	1132.00	12.58	18.19
	2.000	160.00	15076.00	250000.00	1152.86	20.86	1132.00	13.37	17.83
	4.000	200.00	15276.00	210000.00	1151.18	19.18	1132.00	12.50	17.47
	4.000	200.00	15276.00	250000.00	1153.28	21.28	1132.00	13.26	17.08
	6.000	200.00	15476.00	210000.00	1151.38	19.38	1132.00	13.10	19.00
	6.000	200.00	15476.00	250000.00	1153.48	21.48	1132.00	13.82	18.39
	8.000	200.00	15676.00	210000.00	1152.15	20.15	1132.00	12.10	15.39
	8.000	200.00	15676.00	250000.00	1154.27	22.27	1132.00	12.80	15.03
	10.000	200.00	15876.00	210000.00	1152.56	20.56	1132.00	11.82	14.32
	10.000	200.00	15876.00	250000.00	1154.70	22.70	1132.00	12.49	13.97
	12.000	200.00	16076.00	210000.00	1152.95	20.95	1132.00	11.55	13.34
	12.000	200.00	16076.00	250000.00	1155.11	23.11	1132.00	12.18	13.00
	14.000	158.00	16234.00	210000.00	1153.28	21.28	1132.00	11.22	12.34
	14.000	158.00	16234.00	250000.00	1155.45	23.45	1132.00	11.83	12.04
	15.400	122.00	16356.00	210000.00	1153.27	21.27	1132.00	12.19	14.65
	15.400	122.00	16356.00	250000.00	1155.45	23.45	1132.00	12.75	14.05
	15.600	18.00	16374.00	215000.00	1154.19	22.19	1132.00	11.81	12.98
	15.600	18.00	16374.00	250000.00	1156.39	24.39	1132.00	12.06	11.90

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
17.300	152.00	16526.00	215000.00	1154.84	22.84	1132.00	10.50	9.85
17.300	152.00	16526.00	250000.00	1156.96	24.96	1132.00	10.91	9.42
19.000	172.00	16698.00	215000.00	1155.01	23.01	1132.00	10.49	9.75
19.000	172.00	16698.00	250000.00	1157.09	25.09	1132.00	11.00	9.53
21.500	182.00	16880.00	215000.00	1155.40	23.40	1132.00	9.82	8.34
21.500	182.00	16880.00	250000.00	1157.48	25.48	1132.00	10.35	8.24
24.000	140.00	17020.00	215000.00	1155.30	23.30	1132.00	10.89	10.35
24.000	140.00	17020.00	250000.00	1157.36	25.36	1132.00	11.44	10.17
24.600	60.00	17080.00	215000.00	1156.10	24.10	1132.00	10.57	9.31
24.600	60.00	17080.00	250000.00	1158.80	26.80	1132.00	10.80	8.41
26.000	185.00	17265.00	215000.00	1156.31	24.31	1132.00	10.47	9.06
26.000	185.00	17265.00	250000.00	1158.99	26.99	1132.00	10.71	8.22
26.450	45.00	17310.00	215000.00	1156.74	24.74	1132.00	10.25	8.48
26.450	45.00	17310.00	250000.00	1159.41	27.41	1132.00	10.50	7.74
27.000	155.00	17465.00	215000.00	1156.87	24.87	1132.00	10.22	8.40
27.000	155.00	17465.00	250000.00	1159.53	27.53	1132.00	10.50	7.71
28.000	160.00	17625.00	215000.00	1157.02	25.02	1132.00	10.16	8.26
28.000	160.00	17625.00	250000.00	1159.65	27.65	1132.00	10.47	7.65
30.000	200.00	17825.00	215000.00	1157.21	25.21	1132.00	10.10	8.07
30.000	200.00	17825.00	250000.00	1159.82	27.82	1132.00	10.43	7.53
32.000	200.00	18025.00	215000.00	1157.43	25.43	1132.00	9.91	7.64
32.000	200.00	18025.00	250000.00	1160.02	28.02	1132.00	10.26	7.17
34.000	200.00	18225.00	215000.00	1157.60	25.60	1132.00	9.86	7.49
34.000	200.00	18225.00	250000.00	1160.17	28.17	1132.00	10.23	7.07
36.000	215.00	18440.00	215000.00	1157.75	25.75	1132.00	9.90	7.52
36.000	215.00	18440.00	250000.00	1160.30	28.30	1132.00	10.32	7.17
38.000	230.00	18670.00	215000.00	1157.93	25.93	1132.00	9.87	7.40
38.000	230.00	18670.00	250000.00	1160.47	28.47	1132.00	10.30	7.09
40.000	230.00	18900.00	215000.00	1158.07	26.07	1132.00	10.02	7.59
40.000	230.00	18900.00	250000.00	1160.60	28.60	1132.00	10.47	7.30
42.000	230.00	19130.00	215000.00	1158.25	26.25	1132.00	9.99	7.51
42.000	230.00	19130.00	250000.00	1160.77	28.77	1132.00	10.46	7.24
44.000	230.00	19360.00	215000.00	1158.39	26.39	1132.00	10.16	7.72
44.000	230.00	19360.00	250000.00	1160.90	28.90	1132.00	10.63	7.47

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
46.000	230.00	19590.00	215000.00	1158.59	26.59	1132.00	10.07	7.54
46.000	230.00	19590.00	250000.00	1161.10	29.10	1132.00	10.55	7.31
48.000	230.00	19820.00	215000.00	1158.82	26.82	1132.00	9.91	7.24
48.000	230.00	19820.00	250000.00	1161.32	29.32	1132.00	10.39	7.03
50.000	205.00	20025.00	215000.00	1159.04	27.04	1132.00	9.70	6.88
50.000	205.00	20025.00	250000.00	1161.54	29.54	1132.00	10.17	6.69
52.000	188.00	20213.00	215000.00	1159.21	27.21	1132.00	9.54	6.62
52.000	188.00	20213.00	250000.00	1161.71	29.71	1132.00	10.01	6.45
54.000	180.00	20393.00	215000.00	1159.37	27.37	1132.00	9.42	6.44
54.000	180.00	20393.00	250000.00	1161.87	29.87	1132.00	9.89	6.28
56.000	180.00	20573.00	215000.00	1159.52	27.52	1132.00	9.33	6.31
56.000	180.00	20573.00	250000.00	1162.01	30.01	1132.00	9.79	6.15
58.000	182.00	20755.00	215000.00	1159.65	27.65	1132.00	9.26	6.22
58.000	182.00	20755.00	250000.00	1162.15	30.15	1132.00	9.72	6.06
60.000	185.00	20940.00	215000.00	1159.79	27.79	1132.00	9.17	6.10
60.000	185.00	20940.00	250000.00	1162.29	30.29	1132.00	9.63	5.96
62.000	180.00	21120.00	215000.00	1159.92	27.92	1132.00	9.11	6.03
62.000	180.00	21120.00	250000.00	1162.41	30.41	1132.00	9.57	5.89
64.000	180.00	21300.00	215000.00	1160.05	28.05	1132.00	9.03	5.92
64.000	180.00	21300.00	250000.00	1162.54	30.54	1132.00	9.49	5.79
66.000	180.00	21480.00	215000.00	1160.16	28.16	1132.00	9.02	5.96
66.000	180.00	21480.00	250000.00	1162.65	30.65	1132.00	9.47	5.81
68.000	185.00	21665.00	215000.00	1160.28	28.08	1132.20	8.99	5.94
68.000	185.00	21665.00	250000.00	1162.77	30.57	1132.20	9.44	5.80
69.300	108.00	21773.00	215000.00	1160.36	28.06	1132.30	8.92	5.85
69.300	108.00	21773.00	250000.00	1162.85	30.55	1132.30	9.37	5.71
70.300	92.00	21865.00	215000.00	1160.49	28.04	1132.45	8.90	5.82
70.300	92.00	21865.00	250000.00	1162.99	30.54	1132.45	9.34	5.67
72.000	160.00	22025.00	215000.00	1160.57	27.97	1132.60	8.91	5.85
72.000	160.00	22025.00	250000.00	1163.07	30.47	1132.60	9.38	5.73
74.000	180.00	22205.00	215000.00	1160.68	27.88	1132.80	8.91	5.88
74.000	180.00	22205.00	250000.00	1163.17	30.37	1132.80	9.39	5.78
76.000	180.00	22385.00	215000.00	1160.82	27.82	1133.00	8.80	5.75
76.000	180.00	22385.00	250000.00	1163.31	30.31	1133.00	9.27	5.65

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
78.000	180.00	22565.00	215000.00	1160.98	27.78	1133.20	8.60	5.50
78.000	180.00	22565.00	250000.00	1163.47	30.27	1133.20	9.06	5.40
80.000	182.00	22747.00	215000.00	1161.13	27.73	1133.40	8.39	5.25
80.000	182.00	22747.00	250000.00	1163.63	30.23	1133.40	8.84	5.15
82.000	180.00	22927.00	215000.00	1161.30	27.70	1133.60	8.11	4.91
82.000	180.00	22927.00	250000.00	1163.80	30.20	1133.60	8.55	4.82
84.000	180.00	23107.00	215000.00	1161.45	27.65	1133.80	7.86	4.61
84.000	180.00	23107.00	250000.00	1163.97	30.17	1133.80	8.28	4.52
86.000	182.00	23289.00	215000.00	1161.62	27.52	1134.10	7.54	4.26
86.000	182.00	23289.00	250000.00	1164.14	30.04	1134.10	7.94	4.16
88.000	180.00	23469.00	215000.00	1161.80	27.50	1134.30	7.11	3.78
88.000	180.00	23469.00	250000.00	1164.33	30.03	1134.30	7.49	3.70
90.000	178.00	23647.00	215000.00	1161.94	27.43	1134.51	6.80	3.46
90.000	178.00	23647.00	250000.00	1164.47	29.96	1134.51	7.16	3.38
92.000	178.00	23825.00	215000.00	1162.04	27.34	1134.70	6.58	3.27
92.000	178.00	23825.00	250000.00	1164.58	29.88	1134.70	6.92	3.18
94.000	178.00	24003.00	215000.00	1162.16	27.23	1134.93	6.29	2.97
94.000	178.00	24003.00	250000.00	1164.71	29.78	1134.93	6.63	2.90
96.000	212.00	24215.00	215000.00	1162.23	27.09	1135.14	6.27	2.99
96.000	212.00	24215.00	250000.00	1164.78	29.64	1135.14	6.58	2.90
98.000	245.00	24460.00	215000.00	1162.40	27.05	1135.35	5.78	2.59
98.000	245.00	24460.00	250000.00	1164.95	29.60	1135.35	6.09	2.54
100.000	255.00	24715.00	215000.00	1162.24	26.68	1135.56	7.44	4.47
100.000	255.00	24715.00	250000.00	1164.77	29.21	1135.56	7.84	4.39
102.000	285.00	25000.00	215000.00	1162.19	26.49	1135.70	8.63	5.93
102.000	285.00	25000.00	250000.00	1164.69	28.99	1135.70	9.05	5.72
103.000	1.00	25001.00	215000.00	1161.73	19.73	1142.00	11.51	7.38
103.000	1.00	25001.00	250000.00	1164.23	22.23	1142.00	11.85	6.71
103.220	22.00	25023.00	215000.00	1161.75	19.75	1142.00	11.50	7.36
103.220	22.00	25023.00	250000.00	1164.25	22.25	1142.00	11.84	6.69
103.280	6.00	25029.00	215000.00	1161.69	19.69	1142.00	11.90	9.08
103.280	6.00	25029.00	250000.00	1164.18	22.18	1142.00	12.24	8.36
103.460	18.00	25047.00	215000.00	1161.71	19.71	1142.00	11.89	9.05
103.460	18.00	25047.00	250000.00	1164.20	22.20	1142.00	12.23	8.34

	SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
	103.520	6.00	25053.00	215000.00	1161.95	19.95	1142.00	11.38	7.11
	103.520	6.00	25053.00	250000.00	1164.44	22.44	1142.00	11.74	6.50
	103.800	28.00	25081.00	215000.00	1161.98	19.98	1142.00	11.37	7.09
	103.800	28.00	25081.00	250000.00	1164.46	22.46	1142.00	11.73	6.48
	103.810	1.00	25082.00	215000.00	1162.33	22.26	1140.07	10.46	11.17
	103.810	1.00	25082.00	250000.00	1164.86	24.79	1140.07	10.75	10.07
	104.000	148.00	25230.00	215000.00	1162.36	22.16	1140.20	11.07	12.60
	104.000	148.00	25230.00	250000.00	1164.87	24.67	1140.20	11.38	11.38
	106.000	225.00	25455.00	215000.00	1162.67	22.27	1140.40	10.98	12.32
	106.000	225.00	25455.00	250000.00	1165.14	24.74	1140.40	11.33	11.23
	108.000	225.00	25680.00	215000.00	1163.19	22.49	1140.70	10.23	10.49
	108.000	225.00	25680.00	250000.00	1165.64	24.94	1140.70	10.59	9.66
	110.000	228.00	25908.00	215000.00	1162.96	22.06	1140.90	12.41	16.45
	110.000	228.00	25908.00	250000.00	1165.35	24.45	1140.90	12.81	15.18
	112.000	212.00	26120.00	215000.00	1163.26	22.16	1141.10	12.59	16.88
	112.000	212.00	26120.00	250000.00	1165.62	24.52	1141.10	13.02	15.66
	114.000	200.00	26320.00	215000.00	1163.81	22.51	1141.30	12.04	15.05
	114.000	200.00	26320.00	250000.00	1166.15	24.85	1141.30	12.49	14.12
	116.000	202.00	26522.00	215000.00	1164.47	22.97	1141.50	11.05	12.27
	116.000	202.00	26522.00	250000.00	1166.81	25.31	1141.50	11.50	11.60
	118.000	205.00	26727.00	215000.00	1164.99	23.29	1141.70	10.26	10.33
	118.000	205.00	26727.00	250000.00	1167.33	25.63	1141.70	10.69	9.82
	119.800	190.00	26917.00	215000.00	1165.30	23.40	1141.90	9.92	9.58
	119.800	190.00	26917.00	250000.00	1167.64	25.74	1141.90	10.35	9.12
	120.420	50.00	26967.00	215000.00	1165.31	23.31	1142.00	10.10	9.98
	120.420	50.00	26967.00	250000.00	1167.64	25.64	1142.00	10.53	9.50
*	120.500	8.00	26975.00	215000.00	1164.42	17.42	1147.00	13.61	26.96
*	120.500	8.00	26975.00	250000.00	1166.85	19.85	1147.00	13.62	22.39
	122.000	152.00	27127.00	215000.00	1164.80	17.70	1147.10	13.71	26.81
	122.000	152.00	27127.00	250000.00	1167.13	20.03	1147.10	13.82	22.86
	122.650	65.00	27192.00	215000.00	1164.96	17.76	1147.20	13.74	27.01
	122.650	65.00	27192.00	250000.00	1167.27	20.07	1147.20	13.88	23.15
	123.550	90.00	27282.00	215000.00	1165.90	18.59	1147.31	12.75	21.51
	123.550	90.00	27282.00	250000.00	1168.13	20.82	1147.31	13.04	19.09

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
124.000	45.00	27327.00	215000.00	1166.01	18.71	1147.30	12.73	21.37
124.000	45.00	27327.00	250000.00	1168.23	20.93	1147.30	13.02	19.07
126.000	200.00	27527.00	215000.00	1166.87	19.32	1147.55	11.56	16.73
126.000	200.00	27527.00	250000.00	1169.08	21.53	1147.55	11.84	15.07
128.000	200.00	27727.00	215000.00	1167.14	19.44	1147.70	11.88	18.40
128.000	200.00	27727.00	250000.00	1169.32	21.62	1147.70	12.13	16.60

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=  15710.000  PROFILE=  1  HYDRAULIC JUMP D.S.
CAUTION SECNO=  15710.000  PROFILE=  2  HYDRAULIC JUMP D.S.

CAUTION SECNO=  24688.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  24688.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  24688.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=  24688.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  24688.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  24688.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  24700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  24700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  24700.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  24700.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=  24733.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    120.500  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    120.500  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

CH2M HILL

Grain-Size Distribution

Project: RIO SALADO

By: H. Allen

CH2M Hill Grain-Size Distribution from test pits

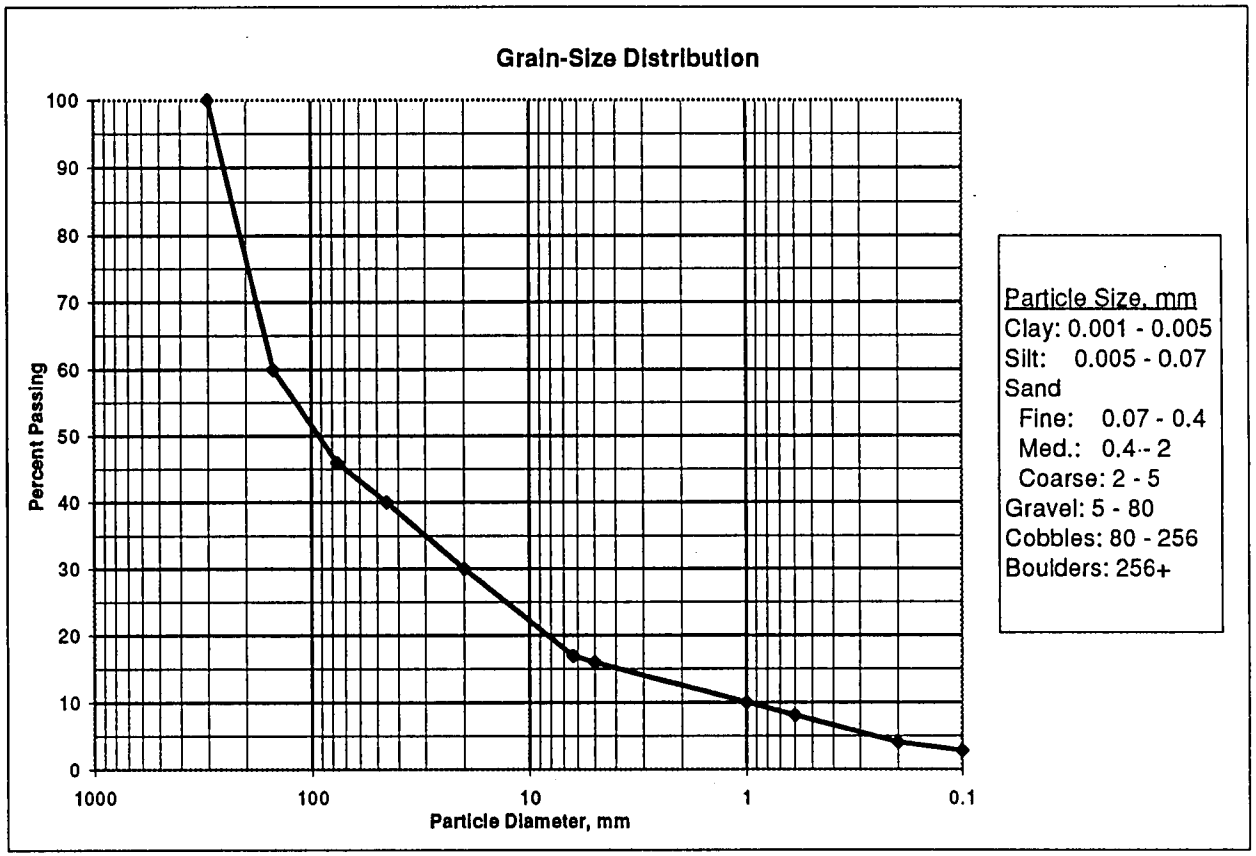
Date: Aug, 1994

- plot of finer-limit envelope

Project #: SWW36963.02

INPUT:

	Grain/Sieve Size, mm.	Percent Passing
1)	0.1	2.8
2)	0.2	4
3)	0.6	8
4)	1	10
5)	5	16
6)	6.3	17
7)	20	30
8)	45	40
9)	76	46
10)	150	60
11)	300	100
12)		
13)		
14)		
15)		



Notes:

CHGSDST.XLS

Post-it® Fax Note 7671	Date	# of pages ▶ 3
To Tim Graves/AHX	From Dale Smith	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

Gradation Curves
Rio Salado Town Lake
Test Pit Exploration Along Slurry Wall Alignment

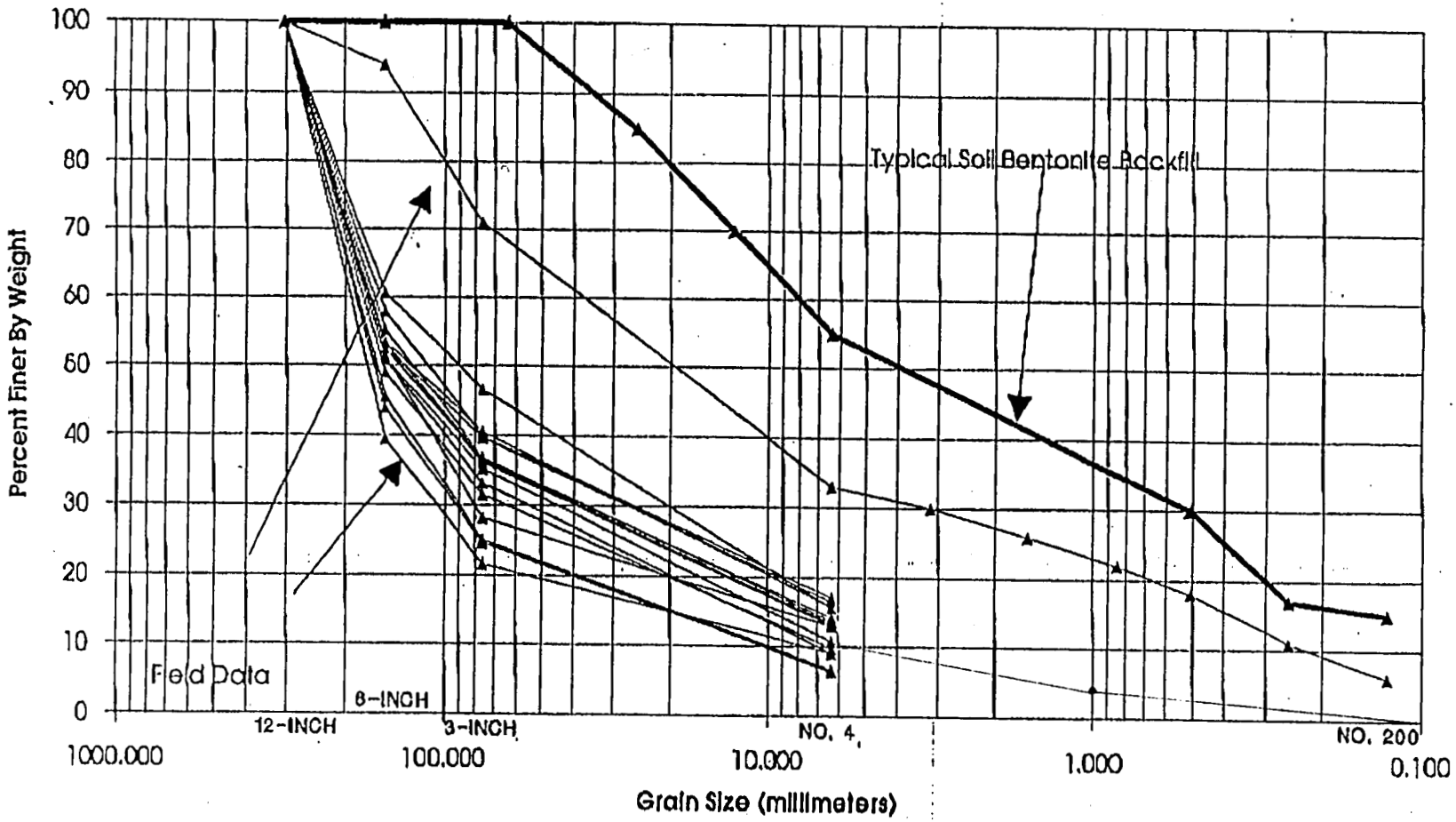


FIGURE 1
GRAIN SIZE DISTRIBUTION
RIO SALADO TOWN LAKE
TEMPE, ARIZONA

CH2M HILL

8WW/30063.02.04 JULY 1994

CH2M HILL

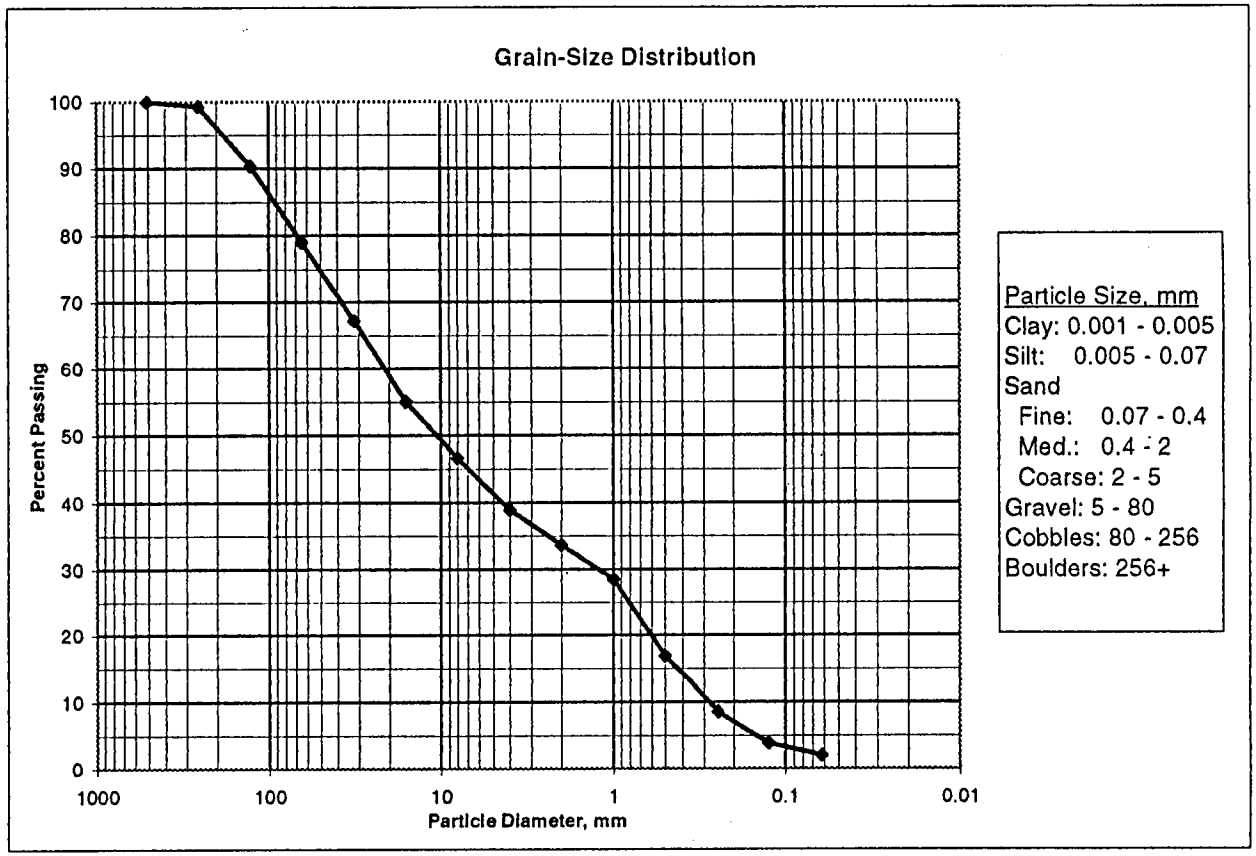
Grain-Size Distribution

Project: RIO SALADO
1993 TDN Grain-Size Distribution

By: H. Allen
Date: July, 1994
Project #: SWW36963.02

INPUT:

	Grain/Sieve Size, mm.	Percent Passing
1)	0.0625	2
2)	0.125	3.9
3)	0.25	8.6
4)	0.5	17
5)	1	28.5
6)	2	33.6
7)	4	38.9
8)	8	46.6
9)	16	55.1
10)	32	67.2
11)	64	79
12)	128	90.4
13)	256	99.3
14)	512	100
15)		



Notes:

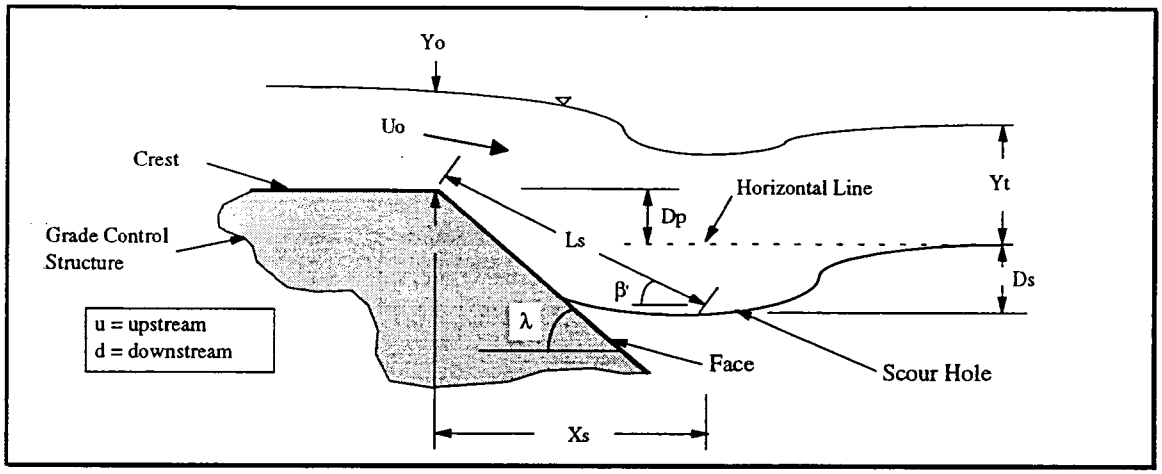
TDNGSDST.XLS

CH2M HILL

Scour at Grade Control Structures

Project: RIO SALADO
Scour downstream GC #4 using 1993 TDN input to verify equations in this spreadsheet

By: H. Allen
Date: July, 1994
Project #: SWW36963.02



Equations from "Scour Downstream of Grade-Control Structures", N. E. Bormann and P. Y. Julien, J. of Hydraulic Engineering, Vol. 117, No. 5

INPUT:

Constants

Gravitational Accel., g =	32.2	ft/s^2
Diffusion Coeff., Cd =	1.8	
Local Friction Equ.:		
Exponent x =	0.5	
Coefficient B =	2.0	

Water/Flow

Jet Thickness, Yo =	22.7	ft.
Jet Velocity, Uo =	13.8	ft./s.
Tailwater Depth, Yt. =	28.4	ft.

Channel Material

Specific Gravity, Gs =	2.65	
Angle of repose, ϕ =	25	degrees
Effective diameter, ds (1) =	10	mm.

Structure

Drop Height, Dp =	5	ft.
Face Angle, λ =	45	degrees

CALCULATIONS:

Jet Angle Near Bed, β' =	0.316	radians
(=	18.1	degrees)
Diffused Length of Jet, Ls =	89.9	ft.
Equilibrium Scour Depth, Ds =	22.9	ft.
Scour Length, Xs =	85.4	ft.

Notes:
(1) N. Bormann recommends using D84 if armoring can occur, otherwise D50 is often used.

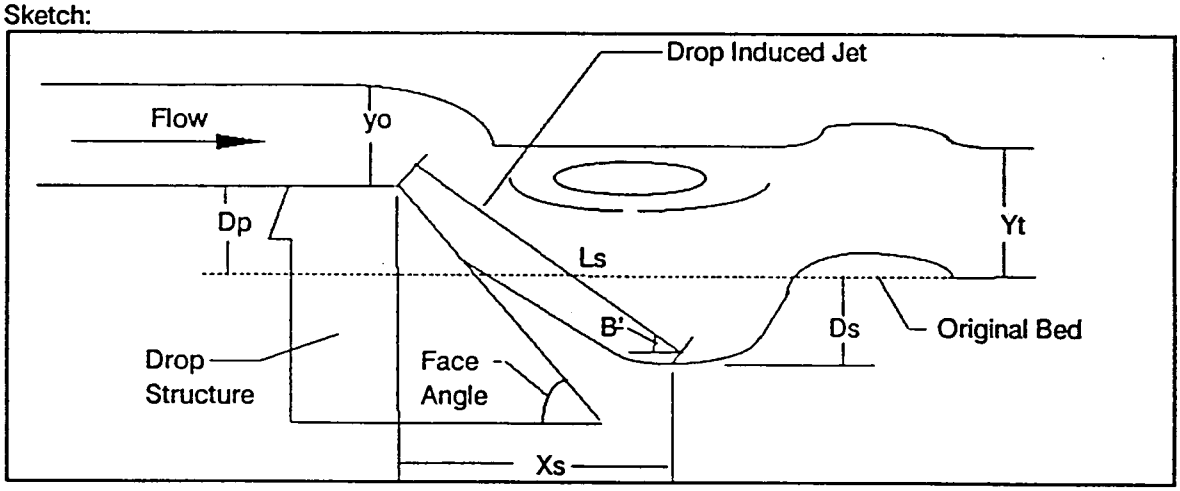
Job:	Date
Calc by: GKC	7/25/91
Checked by: JF-M	8/2/91
Dwg Chk:	

CRSS

Excel Template by: George K. Cotton, PE
Last Revised: August 1, 1991
Description: Solution of scour downstream of a grade control structure. Method is based on equations by Borman and Julien, 1991, "Scour Downstream of Grade-Control Structures", Journal of Hydraulic Engineering, Vol. 115, No. 5.

Constants:		
Diffusion Coef.,	Cd =	1.8
Local Friction Eq.:		
Exponent,	x =	0.5
Coefficient,	B =	2.0

Definition Sketch:



Input:				Computation:			
Drop Height,	Dp =	5.0	ft	Jet angle / bed, B' =		0.316	radians
Unit discharge,	q =	313.2	cfs/ft	Diffusion Eq.:			
Jet thickness,	Yo =	22.7	ft	Coefficient,	K =	0.849	
Jet velocity,	Uo =	13.8	fps	q exponent,	a =	0.600	
Jet Froude No.,	Fr =	0.5		Uo exponent,	b =	1.000	
Tailwater Depth,	Yt =	28.4	ft	g exponent,	f =	0.800	
Face Angle,	Af =	0.785	radians	ds exponent,	i =	0.400	
Angle of repose,	Ar =	0.436	radians	Diffused length,	Ls =	90.0	ft
Sed. density,	rhos =	2.65		Scour Depth,	Ds =	23.0	ft
Sed. Size,	ds =	10.000	mm	Scour Length,	Xs =	85.5	ft

Note:
Grade Control Structure No. 4 Scour Analysis
Check calculation for Rio Salado Map Revision

Q = 296,000 cfs