ANGEL PARK MIDDLE BRANCH DRAINGE STUDY

FINAL REPORT

HEC-RAS INPUT FILES
VOLUME 2

AUGUST 8, 2008

BUREAU VERITAS

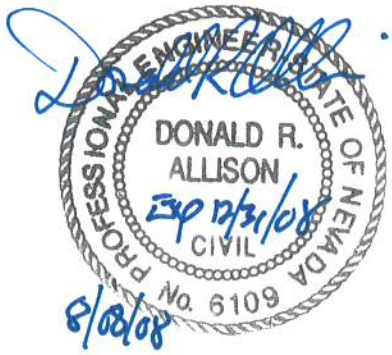
FINAL REPORT
HEC-RAS INPUT DATA
VOLUME 2

FOR

ANGEL PARK MIDDLE BRANCH DRAINAGE STUDY

PREPARED FOR

CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
City Hall, Fourth Floor
400 East Stewart Street
Las Vegas, Nevada 89101



PREPARED
AUGUST 8, 2008

BY

BUREAU VERITAS NORTH AMERICA, INC.
4840 West University Avenue, Suite A-1
Las Vegas, Nevada 89103

ALTERNATIVE I

HEC-RAS Natural Channel Model Output for 4,000, 5,548 and 6,047 cfs

APHS_7_31_08.rep

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Angel Park Middle Branch Drainage Study
Project File : APHS_7_31_08.prj
Run Date and Time: 8/6/2008 1:11:41 PM

Project in English units

Project Description:
This is a steady state HEC-RAS simulation of the Angel Park Middle Branch Channel at Alta and
Hualapai in the City of Las Vegas. The purpose of the model is to simulate various channel modifications for development immediately east of Hualapai adjacent the channel. The model is performed by BVNA for the City of Las Vegas.

PLAN DATA

Plan Title: Angel Park Middle Branch Drainage Study
Plan File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\Natural2\APHS_7_31_08.p01

Geometry Title: Angel Park Hydrology Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\Natural2\APHS_7_31_08.g01

Flow Title : Flow 19
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\Natural2\APHS_7_31_08.f19

Plan Summary Information:

Number of:	Cross Sections	= 32	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.1
Critical depth calculation tolerance	= 0.1
Maximum number of iterations	= 40
Maximum difference tolerance	= 1
Flow tolerance factor	= 0.05

Computation Options
Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow 19
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\Natural2\APHS_7_31_08.f19

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2	PF 3
Angel Park Middl	0132 to 0030	-485	6047	5548	4000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Angel Park Middl	0132 to 0030	PF 1	Normal S = 0.02	Normal S = 0.02

GEOMETRY DATA

Geometry Title: Angel Park Hydrology Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\Natural2\APHS_7_31_08.g01

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -485

INPUT
Description: X-Section -4+85
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-192	2900	-190	2895	-125	2890	-100	2885	-60	2885
-40	2885	-23	2880	-15	2875	-10	2869	0	2869
10	2869	20	2875	30	2880	40	2885	52	2890
70	2895	80	2900						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-192	.035	-10	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	110.01	110.01	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -595

INPUT
Description: Station -5+95 - Upstream of 2-18' x 12
0' RBC, west side of
Hualapai
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-12.3	2879.5	-12.3	2867.5	0	2867.5	12.3	2867.5	12.3	2879.5
30	2885	40	2890	50	2895	60	2900		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-12.3	.025	12.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-12.3	12.3	405	405	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-12.3	2895	F
12.3	60	2895	F

CULVERT

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -900

INPUT
Description: 2, 12' x 10' RCB under Hualapai Way
Distance from Upstream XS = .1
Deck/Roadway Width = 399.8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-135	2895	2895	-120	2895	2895	-100	2895	2885
-65	2895	2881	-40	2895	2881	-12.3	2895	2875.5
-12.3	2895	2867.5	0	2895	2867.5	12.3	2895	2867.5
12.3	2895	2867.5	30	2895	2879.5	40	2895	2885
50	2895	2890	60	2895	2895			

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-12.3	2879.5	-12.3	2867.5	0	2867.5	12.3	2867.5	12.3	2879.5
30	2885	40	2890	50	2895	60	2900		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-12.3	.025	12.3	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
-12.3	12.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-12.3	2895	F

12.3	60	2895	F

Downstream Deck/Roadway Coordinates
num= 7

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-170	2897	2850	-12.3	2897	2850	-12.3	2897	2870
0	2897	2870	12.3	2897	2870	12.3	2897	2850
170	2897	2850						

Downstream Bridge Cross Section Data
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-162	2895	-140	2890	-130	2885	-112	2880	-70	2875
-12.3	2872	-12.3	2860	0	2860	12.3	2860	12.3	2873
70	2875	92	2880	120	2885	140	2890	170	2895

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-162	.013	-12.3	.013	12.3	.013

Bank Sta: Left	Right	Coeff Contr.	Expan.
-12.3	12.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-162	-12.3	2872	T
12.3	170	2872	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-162	-162	2890	170	170	2890

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
2	Box	10	12

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Outlet control

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	0	400	.013	.013	0	.5	.3

Number of Barrels = 2
Upstream Elevation = 2867.5
Centerline Stations

Sta.	Sta.
-6.3	6.3

Downstream Elevation = 2860
Centerline Stations

Sta.	Sta.
-6.3	6.3

CROSS SECTION

RIVER: Angel Park Middl

REACH: 0132 to 0030 RS: -1005

INPUT
Description: X-Section -10+00 - 2-12' x 10' culvert, east side of Hualapai
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-162	2895	-140	2890	-130	2885	-112	2880	-70	2875
-12.3	2872	-12.3	2860	0	2860	12.3	2860	12.3	2873
70	2875	92	2880	120	2885	140	2890	170	2895

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-162	.013	-12.3	.013	12.3	.013

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-12.3	12.3	100	100	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-162	-12.3	2872	T
12.3	170	2872	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-162	-162	2890	170	170	2890

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1100

INPUT
Description: X-Section -11+00
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-140	2890	-120	2885	-110	2880	-90	2875	-60	2870
-36	2865	-18	2860	-12	2855	0	2855	10	2855
20	2860	40	2865	64	2870	80	2875	100	2880
124	2885	140	2890	180	2895				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-140	.035	-12	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-12	10	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1200

INPUT
Description: X-Section -12+00
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-190	2890	-160	2885	-134	2880	-110	2875	-90	2870
-70	2865	-40	2860	-10	2855	0	2853	12	2854
16	2855	40	2860	52	2865	68	2870	84	2875
104	2880	120	2885	144	2890				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

-190	.035	-10	.025	12	.035

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

	-10	12		100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1300

INPUT
Description: X-Section -13+00
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-110	2885	-90	2880	-70	2875	-50	2870	-30	2865
-20	2860	-19	2852	0	2851	22	2852	40	2855
60	2860	70	2865	80	2870	88	2875	100	2880
120	2885								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-110	.035	-19	.025	22	.035

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

	-19	22		100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1400

INPUT
Description: X-Section -14+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-110	2875	-88	2870	-70	2865	-52	2860	-40	2855
-20	2850	0	2850	36	2850	52	2855	70	2860
78	2865	88	2870	100	2875	110	2880	130	2885

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-110	.035	-20	.025	36	.035

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

	-20	36		100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1500

INPUT
Description: X-Section -15+00
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-140	2871	-120	2870	-104	2870	-76	2865	-60	2860
-50	2855	-30	2850	-22	2848	0	2848	26	2848
40	2850	50	2855	72	2860	96	2865	110	2870
128	2875	162	2880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-140	.035	-22	.025	26	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-22	26	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1600

INPUT
Description: X-Section -16+00
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-110	2860	-92	2860	-54	2855	-40	2850	-25	2846
0	2846	30	2846	42	2850	52	2855	81	2860
108	2865	120	2870	130	2875	160	2880		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-110	.035	-25	.025	30	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25	30	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1700

INPUT
Description: X-Section -17+00
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-220	2880	-184	2875	-160	2870	-150	2865	-132	2860
-114	2855	-80	2855	-30	2845	-20	2844	0	2844
20	2844	30	2845	50	2850	80	2855	100	2860
120	2865	130	2870	150	2875	290	2880		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-220	.035	-20	.025	20	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	20	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1800

INPUT
Description: X-Section -18+00
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-132	2875	-124	2870	-116	2865	-108	2860	-92	2855
-80	2850	-14	2845	0	2845	20	2844	30	2845
50	2850	80	2855	100	2860	120	2865	130	2870

150 2875

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-132	.035	-14	.025	20	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-14	20	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1900

INPUT
Description: X-Section -19+00
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-144	2870	-130	2865	-116	2860	-100	2855	-84	2850
-70	2845	-41	2840	0	2840	40	2840	60	2845
80	2850	104	2855	124	2860	140	2865	160	2870
180	2875								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-144	.035	-41	.025	40	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-41	40	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2000

INPUT
Description: X-Section -20+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-200	2870	-160	2865	-140	2860	-112	2855	-94	2850
-76	2845	-60	2840	0	2840	40	2840	60	2845
84	2850	110	2855	160	2865				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-200	.035	-60	.025	40	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-60	40	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2100

INPUT
Description: X-Section -21+00
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-190	2865	-160	2860	-132	2855	-110	2850	-94	2845

-80	2840	-30	2837	0	2837	36	2837	50	2840
68	2845	90	2850	112	2855	130	2860	150	2865
170	2870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-190	.035	-30	.025	36	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30	36	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2200

INPUT
Description: X-Section -22+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	2860	-124	2855	-100	2850	-90	2845	-64	2840
-36	2835	0	2835	35	2840	80	2840	110	2845
140	2850	164	2855	200	2860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-150	.035	-36	.025	35	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36	35	110	100	90 .1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2300

INPUT
Description: X-Section -23+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-172	2860	-100	2855	-64	2850	-52	2845	-40	2840
-30	2835	-14	2832	0	2832	24	2832	80	2835
112	2840	130	2845	160	2850	190	2855	220	2860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-172	.035	-14	.025	24	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-14	24	110	100	90 .1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2400

INPUT
Description: X-Section -24+00
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-132	2855	-96	2850	-64	2845	-40	2840	-20	2835
-10	2830	0	2830	10	2830	20	2830	50	2831
70	2831	110	2835	124	2840	150	2845	172	2850
196	2855	230	2860						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-132	.035	-10	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2500

INPUT
Description: X-Section -25+00
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-140	2845	-110	2840	-72	2835	-60	2830	0	2828
30	2830	66	2832	76	2835	108	2840	112	2845
168	2850	190	2855						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-140	.035	-60	.025	30	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-60	30	90	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2600

INPUT
Description: X-Section -26+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-174	2850	-136	2845	-110	2840	-80	2835	-56	2830
0	2825	16	2825	76	2830	90	2835	128	2840
150	2845	180	2850	200	2855				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-174	.035	-56	.025	16	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-56	16	90	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2700

INPUT
Description: X-Section -27+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-214	2855	-184	2850	-154	2845	-130	2840	-94	2835
-66	2830	-30	2825	0	2825	38	2825	70	2825
100	2830	110	2835	120	2840	130	2845	140	2850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-214	.035	-30	.025	38	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30	38	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2800

INPUT
Description: X-Section -28+00
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-222	2855	-190	2850	-170	2845	-146	2840	-120	2835
-90	2830	-70	2825	0	2823	60	2825	70	2830
80	2835	88	2840	100	2845	130	2850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-222	.035	-70	.025	60	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-70	60	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2900

INPUT
Description: X-Section 29+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-170	2850	-150	2845	-130	2840	-110	2835	-90	2830
-70	2825	-20	2820	-14	2820	0	2820	20	2820
40	2825	60	2830	80	2835	110	2840	134	2845

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-170	.035	-14	.025	20	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-14	20	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3000

INPUT
Description: X-Section -30+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-140	2845	-130	2840	-110	2835	-90	2830	-64	2825
-40	2820	-10	2815	0	2815	14	2815	30	2820
70	2825	100	2830	130	2835				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-140	.035	-10	.025	14	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	14	110	100	90	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3100

INPUT
Description: X-Section -30+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-154	2845	-132	2840	-116	2835	-100	2830	-80	2825
-60	2820	-20	2815	0	2813	15	2813	20	2815
40	2820	88	2825	124	2830	160	2835	196	2840

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-154	.035	-20	.025	15	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	15	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3200

INPUT
Description: X-Section -32+00
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-200	2840	-178	2835	-150	2830	-120	2825	-80	2820
-40	2815	-10	2811	0	2810	10	2810	30	2815
60	2820	94	2825	120	2830	144	2835	170	2840

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-200	.035	-10	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3300

INPUT
Description: X-Section -33+00
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-160	2840	-130	2835	-116	2830	-100	2825	-80	2820
-60	2815	-20	2810	0	2808	12	2810	30	2815
90	2820	120	2825	160	2830	176	2835		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-160	.035	-20	.025	12	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	12	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3400

INPUT
Description: X-Section 34+00
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-262	2835	-240	2830	-210	2825	-176	2820	-148	2815
-100	2810	0	2807	38	2807	40	2810	50	2815
60	2820	76	2825	90	2830	100	2835		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-262	.035	-100	.025	38	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-100	38	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3500

INPUT
Description: X-Section 35+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	2835	-230	2830	-200	2825	-170	2820	-140	2815
-105	2810	0	2805	10	2805	15	2810	30	2815
50	2820	80	2825	160	2830				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-240	.035	-105	.025	10	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-105	10	105	100	90	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3600

INPUT
Description: X-Section 36+00
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	2830	-130	2825	-110	2820	-90	2815	-55	2810
-40	2805	0	2802	30	2803	30	2808	64	2810
100	2815	180	2819						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-150	.035	-40	.025	30	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-40	30	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3700

INPUT
Description: X-Section 37+00
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	2825	-90	2820	-70	2815	-60	2810	-50	2805
-40	2802	-15	2800	0	2798	30	2800	30	2809

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.035	-40	.025	30	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-40	30	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3800

INPUT
Description: X-Section 38+00
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	2825	-90	2820	-70	2815	-60	2810	-50	2805
-40	2802	-15	2800	0	2797	30	2800	30	2809

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.035	-40	.025	30	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-40	30	120	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3900

INPUT
Description: X-Section 39+00
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-60	2807	-40	2805	-10	2800	-5	2796	0	2796

60	2796	70	2809

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-60	.035	-5	.025	60	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-5	60	110	100 60	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Angel Park Middl

Reach	River Sta.	n1	n2	n3
0132 to 0030	-485	.035	.025	.035
0132 to 0030	-595	.035	.025	.035
0132 to 0030	-900	Culvert		
0132 to 0030	-1005	.013	.013	.013
0132 to 0030	-1100	.035	.025	.035
0132 to 0030	-1200	.035	.025	.035
0132 to 0030	-1300	.035	.025	.035
0132 to 0030	-1400	.035	.025	.035
0132 to 0030	-1500	.035	.025	.035
0132 to 0030	-1600	.035	.025	.035
0132 to 0030	-1700	.035	.025	.035
0132 to 0030	-1800	.035	.025	.035
0132 to 0030	-1900	.035	.025	.035
0132 to 0030	-2000	.035	.025	.035
0132 to 0030	-2100	.035	.025	.035
0132 to 0030	-2200	.035	.025	.035
0132 to 0030	-2300	.035	.025	.035
0132 to 0030	-2400	.035	.025	.035
0132 to 0030	-2500	.035	.025	.035
0132 to 0030	-2600	.035	.025	.035
0132 to 0030	-2700	.035	.025	.035
0132 to 0030	-2800	.035	.025	.035
0132 to 0030	-2900	.035	.025	.035
0132 to 0030	-3000	.035	.025	.035
0132 to 0030	-3100	.035	.025	.035
0132 to 0030	-3200	.035	.025	.035
0132 to 0030	-3300	.035	.025	.035
0132 to 0030	-3400	.035	.025	.035
0132 to 0030	-3500	.035	.025	.02
0132 to 0030	-3600	.035	.025	.02
0132 to 0030	-3700	.035	.025	.02
0132 to 0030	-3800	.035	.025	.02
0132 to 0030	-3900	.035	.025	.02

SUMMARY OF REACH LENGTHS

River: Angel Park Middl

Reach	River Sta.	Left	Channel	Right
0132 to 0030	-485	110.01	110.01	110.01
0132 to 0030	-595	405	405	405
0132 to 0030	-900	Culvert		

0132 to 0030	-1005	100	100	100
0132 to 0030	-1100	100	100	100
0132 to 0030	-1200	100	100	100
0132 to 0030	-1300	100	100	100
0132 to 0030	-1400	100	100	100
0132 to 0030	-1500	100	100	100
0132 to 0030	-1600	100	100	100
0132 to 0030	-1700	100	100	100
0132 to 0030	-1800	100	100	100
0132 to 0030	-1900	100	100	100
0132 to 0030	-2000	100	100	100
0132 to 0030	-2100	100	100	100
0132 to 0030	-2200	110	100	90
0132 to 0030	-2300	110	100	90
0132 to 0030	-2400	100	100	100
0132 to 0030	-2500	90	100	110
0132 to 0030	-2600	90	100	110
0132 to 0030	-2700	100	100	100
0132 to 0030	-2800	100	100	100
0132 to 0030	-2900	100	100	100
0132 to 0030	-3000	110	100	90
0132 to 0030	-3100	100	100	100
0132 to 0030	-3200	100	100	100
0132 to 0030	-3300	100	100	100
0132 to 0030	-3400	100	100	100
0132 to 0030	-3500	105	100	90
0132 to 0030	-3600	100	100	100
0132 to 0030	-3700	100	100	100
0132 to 0030	-3800	120	100	60
0132 to 0030	-3900	110	100	60

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Angel Park Middl

Reach	River Sta.	Contr.	Expan.
0132 to 0030	-485	.1	.3
0132 to 0030	-595	.3	.5
0132 to 0030	-900	Culvert	
0132 to 0030	-1005	.3	.5
0132 to 0030	-1100	.1	.3
0132 to 0030	-1200	.1	.3
0132 to 0030	-1300	.1	.3
0132 to 0030	-1400	.1	.3
0132 to 0030	-1500	.1	.3
0132 to 0030	-1600	.1	.3
0132 to 0030	-1700	.1	.3
0132 to 0030	-1800	.1	.3
0132 to 0030	-1900	.1	.3
0132 to 0030	-2000	.1	.3
0132 to 0030	-2100	.1	.3
0132 to 0030	-2200	.1	.3
0132 to 0030	-2300	.1	.3
0132 to 0030	-2400	.1	.3
0132 to 0030	-2500	.1	.3
0132 to 0030	-2600	.1	.3
0132 to 0030	-2700	.1	.3
0132 to 0030	-2800	.1	.3
0132 to 0030	-2900	.1	.3

0132 to 0030	-3000	.1	.3
0132 to 0030	-3100	.1	.3
0132 to 0030	-3200	.1	.3
0132 to 0030	-3300	.1	.3
0132 to 0030	-3400	.1	.3
0132 to 0030	-3500	.1	.3
0132 to 0030	-3600	.1	.3
0132 to 0030	-3700	.1	.3
0132 to 0030	-3800	.1	.3
0132 to 0030	-3900	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
	(ft)	(ft/s)	(sq ft)	(ft)		
0132 to 0030	-485	PF 1	6047.00	2869.00	2892.12	2881.22
2892.47	0.000174	6.37	1922.98	212.23	0.23	
0132 to 0030	-485	PF 2	5548.00	2869.00	2889.63	2880.59
2890.13	0.000270	7.34	1445.38	174.28	0.28	
0132 to 0030	-485	PF 3	4000.00	2869.00	2883.13	2878.64
2884.37	0.000868	10.24	577.40	69.91	0.48	
0132 to 0030	-595	PF 1	6047.00	2867.50	2890.52	2879.84
2892.29	0.001223	10.68	566.16	148.38	0.39	
0132 to 0030	-595	PF 2	5548.00	2867.50	2888.08	2879.10
2889.95	0.001494	10.96	506.31	140.27	0.43	
0132 to 0030	-595	PF 3	4000.00	2867.50	2882.28	2876.93
2884.16	0.002343	11.00	363.52	97.41	0.50	
0132 to 0030	-900		Culvert			
0132 to 0030	-1005	PF 1	6047.00	2860.00	2875.68	2875.68
2877.83	0.000816	12.82	611.36	148.70	0.57	
0132 to 0030	-1005	PF 2	5548.00	2860.00	2871.52	2871.52
2877.47	0.002724	19.58	283.29	24.60	1.02	
0132 to 0030	-1005	PF 3	4000.00	2860.00	2865.89	2869.34
2877.73	0.009249	27.62	144.84	24.60	2.01	
0132 to 0030	-1100	PF 1	6047.00	2855.00	2862.37	2866.20
2874.58	0.018444	30.56	261.12	55.97	1.98	
0132 to 0030	-1100	PF 2	5548.00	2855.00	2861.75	2865.67
2874.79	0.021721	31.28	228.00	51.28	2.12	
0132 to 0030	-1100	PF 3	4000.00	2855.00	2859.82	2864.00
2875.05	0.038071	33.08	143.10	37.41	2.66	
0132 to 0030	-1200	PF 1	6047.00	2853.00	2859.59	2862.96
2872.31	0.029555	32.99	263.21	75.59	2.40	
0132 to 0030	-1200	PF 2	5548.00	2853.00	2859.27	2862.59
2872.06	0.031461	32.78	239.50	72.12	2.45	
0132 to 0030	-1200	PF 3	4000.00	2853.00	2858.28	2861.38
2870.44	0.036780	31.06	173.05	61.37	2.57	

0132 to 0030	-1300	PF 1	6047.00	2851.00	2855.89	2859.33
2869.09	0.036413	30.37	225.41	63.04	2.56	
0132 to 0030	-1300	PF 2	5548.00	2851.00	2855.61	2858.98
2868.57	0.038818	30.01	207.93	61.88	2.61	
0132 to 0030	-1300	PF 3	4000.00	2851.00	2854.78	2857.65
2866.17	0.045242	27.86	157.88	58.00	2.71	
0132 to 0030	-1400	PF 1	6047.00	2850.00	2853.54	2856.47
2864.60	0.040275	27.72	243.52	81.50	2.60	
0132 to 0030	-1400	PF 2	5548.00	2850.00	2853.36	2856.16
2863.85	0.040920	26.96	228.58	80.17	2.59	
0132 to 0030	-1400	PF 3	4000.00	2850.00	2852.79	2855.04
2861.02	0.040581	23.73	184.28	76.09	2.50	
0132 to 0030	-1500	PF 1	6047.00	2848.00	2852.19	2854.68
2860.62	0.026099	24.96	285.70	83.14	2.15	
0132 to 0030	-1500	PF 2	5548.00	2848.00	2852.01	2854.34
2859.88	0.025743	24.07	270.74	82.05	2.12	
0132 to 0030	-1500	PF 3	4000.00	2848.00	2851.43	2853.20
2857.31	0.023363	20.67	224.33	78.59	1.97	
0132 to 0030	-1600	PF 1	6047.00	2846.00	2850.22	2852.54
2858.00	0.022628	23.36	292.46	83.07	2.00	
0132 to 0030	-1600	PF 2	5548.00	2846.00	2850.01	2852.23
2857.39	0.022935	22.72	274.74	82.04	2.00	
0132 to 0030	-1600	PF 3	4000.00	2846.00	2849.39	2851.09
2854.99	0.021523	19.67	225.13	77.87	1.88	
0132 to 0030	-1700	PF 1	6047.00	2844.00	2848.59	2850.77
2855.66	0.021297	23.96	323.36	92.31	1.97	
0132 to 0030	-1700	PF 2	5548.00	2844.00	2848.39	2850.43
2855.04	0.021135	23.16	305.06	90.50	1.95	
0132 to 0030	-1700	PF 3	4000.00	2844.00	2851.15	2849.34
2852.15	0.001775	9.30	590.89	117.68	0.61	
0132 to 0030	-1800	PF 1	6047.00	2844.00	2851.19	2851.19
2853.37	0.005081	14.73	610.98	140.02	1.02	
0132 to 0030	-1800	PF 2	5548.00	2844.00	2850.72	2850.97
2853.03	0.005858	15.04	545.94	136.06	1.08	
0132 to 0030	-1800	PF 3	4000.00	2844.00	2850.05	2850.05
2851.79	0.004981	12.82	456.99	130.45	0.98	
0132 to 0030	-1900	PF 1	6047.00	2840.00	2842.83	2845.21
2851.63	0.042477	24.51	268.54	108.74	2.57	
0132 to 0030	-1900	PF 2	5548.00	2840.00	2842.65	2844.94
2851.19	0.044708	24.09	249.49	107.01	2.61	
0132 to 0030	-1900	PF 3	4000.00	2840.00	2842.03	2844.00
2849.98	0.058996	23.12	184.23	100.86	2.86	
0132 to 0030	-2000	PF 1	6047.00	2840.00	2843.32	2844.68
2847.79	0.017177	17.32	371.27	123.88	1.68	
0132 to 0030	-2000	PF 2	5548.00	2840.00	2843.17	2844.42
2847.31	0.016856	16.66	353.38	122.84	1.65	
0132 to 0030	-2000	PF 3	4000.00	2840.00	2842.64	2843.58

2845.82	0.016435	14.55	288.96	119.00	1.58	
0132 to 0030	-2100	PF 1	6047.00	2837.00	2840.59	2842.15
2845.79	0.020595	20.02	372.41	133.80	1.86	
0132 to 0030	-2100	PF 2	5548.00	2837.00	2840.44	2841.91
2845.35	0.020535	19.40	351.62	132.81	1.84	
0132 to 0030	-2100	PF 3	4000.00	2837.00	2839.90	2841.11
2843.88	0.020307	17.24	281.66	127.96	1.78	
0132 to 0030	-2200	PF 1	6047.00	2835.00	2841.13	2841.77
2843.98	0.007209	14.51	507.58	156.67	1.16	
0132 to 0030	-2200	PF 2	5548.00	2835.00	2840.98	2841.52
2843.60	0.006869	13.86	483.28	154.92	1.12	
0132 to 0030	-2200	PF 3	4000.00	2835.00	2840.40	2840.59
2842.31	0.005834	11.71	395.26	148.42	1.01	
0132 to 0030	-2300	PF 1	6047.00	2832.00	2836.16	2838.00
2842.37	0.023812	23.71	354.71	119.71	2.05	
0132 to 0030	-2300	PF 2	5548.00	2832.00	2835.92	2837.74
2842.11	0.025366	23.54	326.80	117.73	2.09	
0132 to 0030	-2300	PF 3	4000.00	2832.00	2835.24	2836.85
2840.92	0.028894	22.11	248.34	111.99	2.17	
0132 to 0030	-2400	PF 1	6047.00	2830.00	2834.14	2835.87
2839.68	0.027633	25.49	363.15	119.73	2.21	
0132 to 0030	-2400	PF 2	5548.00	2830.00	2833.95	2835.60
2839.28	0.028196	24.92	339.68	117.36	2.21	
0132 to 0030	-2400	PF 3	4000.00	2830.00	2833.32	2834.65
2837.77	0.029040	22.53	268.30	109.81	2.18	
0132 to 0030	-2500	PF 1	6047.00	2828.00	2832.48	2833.89
2837.19	0.017378	17.97	373.85	133.54	1.70	
0132 to 0030	-2500	PF 2	5548.00	2828.00	2832.32	2833.64
2836.77	0.017408	17.42	352.25	132.60	1.69	
0132 to 0030	-2500	PF 3	4000.00	2828.00	2831.77	2832.85
2835.31	0.017218	15.38	281.50	126.15	1.63	
0132 to 0030	-2600	PF 1	6047.00	2825.00	2829.91	2831.42
2834.94	0.025836	19.88	358.74	130.01	2.02	
0132 to 0030	-2600	PF 2	5548.00	2825.00	2829.74	2831.16
2834.55	0.025716	19.43	336.59	125.99	2.00	
0132 to 0030	-2600	PF 3	4000.00	2825.00	2829.15	2830.40
2833.17	0.024893	17.71	265.68	112.18	1.93	
0132 to 0030	-2700	PF 1	6047.00	2825.00	2828.36	2829.60
2832.41	0.018459	18.11	410.46	144.35	1.74	
0132 to 0030	-2700	PF 2	5548.00	2825.00	2828.23	2829.36
2831.95	0.017785	17.33	392.27	142.67	1.70	
0132 to 0030	-2700	PF 3	4000.00	2825.00	2827.66	2828.56
2830.65	0.018284	15.43	312.62	135.10	1.67	
0132 to 0030	-2800	PF 1	6047.00	2823.00	2826.99	2828.06
2830.64	0.015598	15.40	400.58	141.94	1.57	
0132 to 0030	-2800	PF 2	5548.00	2823.00	2826.85	2827.83
2830.25	0.015482	14.85	380.44	141.09	1.55	

0132 to 0030	-2800	PF 3	4000.00	2823.00	2826.36	2827.10
2828.96	0.015252	12.99	311.76	138.13	1.49	
0132 to 0030	-2900	PF 1	6047.00	2820.00	2825.82	2826.76
2829.48	0.009146	18.40	468.13	116.58	1.34	
0132 to 0030	-2900	PF 2	5548.00	2820.00	2825.53	2826.47
2829.11	0.009467	18.09	434.90	114.27	1.36	
0132 to 0030	-2900	PF 3	4000.00	2820.00	2824.69	2825.51
2827.69	0.009584	16.30	341.49	105.65	1.33	
0132 to 0030	-3000	PF 1	6047.00	2815.00	2821.65	2823.78
2828.15	0.013362	24.30	368.05	91.14	1.66	
0132 to 0030	-3000	PF 2	5548.00	2815.00	2821.33	2823.42
2827.69	0.013767	23.87	339.51	87.04	1.67	
0132 to 0030	-3000	PF 3	4000.00	2815.00	2820.12	2822.13
2826.20	0.016639	22.76	243.12	71.47	1.77	
0132 to 0030	-3100	PF 1	6047.00	2813.00	2819.26	2821.62
2826.52	0.015911	23.85	334.49	91.15	1.76	
0132 to 0030	-3100	PF 2	5548.00	2813.00	2818.95	2821.26
2826.12	0.016741	23.56	306.48	87.38	1.79	
0132 to 0030	-3100	PF 3	4000.00	2813.00	2817.98	2819.95
2824.41	0.018769	21.85	227.37	75.74	1.83	
0132 to 0030	-3200	PF 1	6047.00	2810.00	2816.64	2819.21
2824.73	0.018808	28.02	338.57	92.95	1.95	
0132 to 0030	-3200	PF 2	5548.00	2810.00	2816.35	2818.85
2824.28	0.019258	27.50	312.64	88.96	1.96	
0132 to 0030	-3200	PF 3	4000.00	2810.00	2815.41	2817.64
2822.45	0.020285	25.22	234.61	75.69	1.96	
0132 to 0030	-3300	PF 1	6047.00	2808.00	2814.79	2817.41
2822.97	0.017828	25.44	318.21	87.54	1.86	
0132 to 0030	-3300	PF 2	5548.00	2808.00	2814.56	2817.06
2822.31	0.017622	24.63	298.61	84.91	1.84	
0132 to 0030	-3300	PF 3	4000.00	2808.00	2813.63	2815.79
2820.44	0.018936	22.59	224.38	74.08	1.85	
0132 to 0030	-3400	PF 1	6047.00	2807.00	2809.83	2812.00
2819.53	0.080055	25.05	242.98	134.04	3.27	
0132 to 0030	-3400	PF 2	5548.00	2807.00	2809.72	2811.77
2818.92	0.079134	24.38	229.03	130.45	3.24	
0132 to 0030	-3400	PF 3	4000.00	2807.00	2809.33	2811.06
2816.97	0.077884	22.21	181.21	117.33	3.14	
0132 to 0030	-3500	PF 1	6047.00	2805.00	2810.32	2811.64
2814.62	0.017924	16.69	364.43	123.24	1.69	
0132 to 0030	-3500	PF 2	5548.00	2805.00	2810.20	2811.37
2814.13	0.017345	15.97	349.05	121.99	1.65	
0132 to 0030	-3500	PF 3	4000.00	2805.00	2809.71	2810.53
2812.64	0.015219	13.76	291.45	113.68	1.51	
0132 to 0030	-3600	PF 1	6047.00	2802.00	2807.69	2809.43
2812.96	0.013791	18.51	334.04	78.07	1.52	
0132 to 0030	-3600	PF 2	5548.00	2802.00	2807.40	2809.02

2812.47	0.014354	18.14	311.78	77.21	1.54	
0132 to 0030	-3600	PF 3	4000.00	2802.00	2806.47	2807.73
2810.82	0.016683	16.77	240.88	74.40	1.60	
0132 to 0030	-3700	PF 1	6047.00	2798.00	2803.67	2805.87
2810.97	0.022941	21.72	281.86	75.58	1.92	
0132 to 0030	-3700	PF 2	5548.00	2798.00	2803.43	2805.52
2810.43	0.023820	21.26	263.52	74.77	1.94	
0132 to 0030	-3700	PF 3	4000.00	2798.00	2802.62	2804.41
2808.62	0.027900	19.67	203.91	72.06	2.03	
0132 to 0030	-3800	PF 1	6047.00	2797.00	2804.76	2805.53
2808.67	0.008452	15.95	388.07	79.19	1.21	
0132 to 0030	-3800	PF 2	5548.00	2797.00	2804.53	2805.20
2808.14	0.008210	15.30	370.16	78.43	1.19	
0132 to 0030	-3800	PF 3	4000.00	2797.00	2803.77	2804.05
2806.39	0.007254	13.01	311.33	75.89	1.10	
0132 to 0030	-3900	PF 1	6047.00	2796.00	2800.22	2802.40
2807.21	0.019126	21.45	292.12	74.54	1.84	
0132 to 0030	-3900	PF 2	5548.00	2796.00	2799.96	2802.04
2806.65	0.019888	20.98	273.16	72.99	1.86	
0132 to 0030	-3900	PF 3	4000.00	2796.00	2799.11	2800.85
2804.83	0.023336	19.35	212.04	71.28	1.93	

ALTERNATIVE II

HEC-RAS Model Output for 6,047 cfs, 1.5:1 rip rap side slopes

APHS_06_28_08_15_1ss.rep

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Angel Park Middle Branch Drainage Study
Project File : APHS_06_28_08_15_1ss.prj
Run Date and Time: 8/6/2008 3:27:17 PM

Project in English units

Project Description:
This is a steady state HEC-RAS simulation of the Angel Park Middle Branch Channel east of Hualapai Way in the City of Las Vegas. The purpose of the model is to simulate various channel modifications for development immediately east of Hualapai adjacent to the channel. The model is performed by BVNA for the City of Las Vegas.

PLAN DATA

Plan Title: Angel Park Hydrology Study
Plan File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\15to1\APHS_06_28_08_15_1ss.p01

Geometry Title: Angel Park Hydrology Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\15to1\APHS_06_28_08_15_1ss.g01

Flow Title : Flow 15
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\15to1\APHS_06_28_08_15_1ss.f15

Plan Summary Information:

Number of:	Cross Sections	= 32	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.1
Critical depth calculation tolerance	= 0.1
Maximum number of iterations	= 40
Maximum difference tolerance	= 1
Flow tolerance factor	= 0.05

Computation Options
Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow 15
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\15to1\APHS_06_28_08_15_1ss.f15

Flow Data (cfs)

River	Reach	RS	PF 1
Angel Park Middl	0132 to 0030	-485	6047

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Angel Park Middl	0132 to 0030	PF 1	Normal S = 0.02	Normal S = 0.02

GEOMETRY DATA

Geometry Title: Angel Park Hydrology Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\15to1\APHS_06_28_08_15_1ss.g01

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -485

INPUT
Description: X-Section -4+85
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-192	2900	-190	2895	-125	2890	-100	2885	-60	2885
-40	2885	-23	2880	-15	2875	-10	2869	0	2869
10	2869	20	2875	30	2880	40	2885	52	2890
70	2895	80	2900						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-192	.035	-10	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	110	110	.1	.3

CROSS SECTION

RIVER: Angel Park Middl

REACH: 0132 to 0030 RS: -595

INPUT
Description: Station -5+95 - Upstream of 2-18' x 10' RBC, west side of Hualapai
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-18.3	2878	-18.3	2863.5	0	2863.5	18.3	2863.5	18.3	2878
30	2885	40	2890	50	2895	100	2898		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-18.3	.013	18.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-18.3	18.3	410	410	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-18.3	2878.5	T
18.3	100	2878.5	T

CULVERT

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -900

INPUT
Description: 2, 12' x 10' RCB under Hualapai Way
Distance from Upstream XS = .1
Deck/Roadway Width = 399.8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 14

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-135	2895	2895	-120	2895	2895	-100	2895	2885
-65	2895	2881	-40	2895	2881	-12.3	2895	2875.5
-12.3	2895	2867.5	0	2895	2867.5	12.3	2895	2867.5
12.3	2895	2867.5	30	2895	2879.5	40	2895	2885
50	2895	2890	60	2895	2895			

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-18.3	2878	-18.3	2863.5	0	2863.5	18.3	2863.5	18.3	2878
30	2885	40	2890	50	2895	100	2898		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-18.3	.013	18.3	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
-18.3	18.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-18.3	2878.5	T
18.3	100	2878.5	T

Downstream Deck/Roadway Coordinates
num= 7

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-170	2897	2850	-12	2897	2850	-12	2897	2870

```
      0    2897    2870      12    2897    2870      12    2897    2850
    170    2897    2850

Downstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
     -80     2880     -65     2870     -50     2860       0     2860      50     2860
      65     2870      80     2880

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
     -80     .013     -50     .013      50     .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
           -50      50             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     -80   -12.5    2907        T
    12.5      80    2907        T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev    Sta L   Sta R    Elev
     -80    -162    2927      170      80    2927

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

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
2                  Box        10      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Outlet control
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                0     350      .013      .013         0                    .5
    .3
Number of Barrels =  2
Upstream   Elevation =  2863.5
Centerline Stations
    Sta.     Sta.
    -6.3      6.3
Downstream Elevation =  2860
Centerline Stations
    Sta.     Sta.
    -6.3      6.3

CROSS SECTION


RIVER: Angel Park Middl
REACH: 0132 to 0030       RS: -1005

INPUT
Description: X-Section -10+00 - 2-12' x 10' culvert, east side of Hualapai
Station Elevation Data    num=       7
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
     -80     2880     -65     2870     -50     2860       0     2860      50     2860
```

65	2870	80	2880

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.013	-50	.013	50	.013

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-80	-12.5	2907	T
12.5	80	2907	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-80	-162	2927	170	80	2927

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1100

INPUT
Description: X-Section -11+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2865	-50	2855	0	2855	50	2855	65	2865

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1200

INPUT
Description: X-Section -12+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2863	-50	2853	0	2853	50	2853	65	2863

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1300

INPUT
Description: X-Section -13+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2861	-50	2851	0	2851	50	2851	65	2861

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1400

INPUT
Description: X-Section -14+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2860	-50	2850	0	2850	50	2850	65	2860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1500

INPUT
Description: X-Section -15+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2855	-50	2848	0	2848	50	2848	65	2855

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1600

INPUT
Description: X-Section -16+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2856	-50	2846	0	2846	50	2846	65	2856

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2000

INPUT
Description: X-Section -20+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2850	-50	2840	0	2840	50	2840	65	2850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2100

INPUT
Description: X-Section -21+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2847	-50	2837	0	2837	50	2837	65	2847

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2200

INPUT
Description: X-Section -22+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2845	-50	2835	0	2835	50	2835	65	2845

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2300

INPUT
Description: X-Section -23+00

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2843	-50	2833	0	2833	50	2833	65	2843

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	90	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2400

INPUT
Description: X-Section -24+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2840	-50	2830	0	2830	50	2830	65	2840

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2500

INPUT
Description: X-Section -25+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2838	-50	2828	0	2828	50	2828	65	2838

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	90	100	110	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2600

INPUT
Description: X-Section -26+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2835	-50	2825	0	2825	50	2825	65	2835

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

-65	.035	-50	.025	50	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50	90	100	110	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2700

INPUT
Description: X-Section -27+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2835	-50	2825	0	2825	50	2825	65	2835

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2800

INPUT
Description: X-Section -28+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2833	-50	2823	0	2823	50	2823	65	2833

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2900

INPUT
Description: X-Section 29+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2848	-50	2820	0	2820	50	2820	65	2848

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3000

INPUT
Description: X-Section -30+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2843	-50	2815	0	2815	50	2815	65	2843

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	90	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3100

INPUT
Description: X-Section -30+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2841	-50	2813	0	2813	50	2813	65	2841

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3200

INPUT
Description: X-Section -32+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2838	-50	2810	0	2810	50	2810	65	2838

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3300

INPUT

Description: X-Section -33+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2836	-50	2808	0	2808	50	2808	65	2836

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3400

INPUT
Description: X-Section 34+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2833	-50	2805	0	2805	50	2805	65	2833

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3500

INPUT
Description: X-Section 35+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2833	-50	2805	0	2805	50	2805	65	2833

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	105	100	90	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3600

INPUT
Description: X-Section 36+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2830	-50	2802	0	2802	50	2802	65	2830

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3700

INPUT
Description: X-Section 37+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2812	-50	2798	0	2798	50	2798	65	2812

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	120	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3800

INPUT
Description: X-Section 38+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2810	-50	2796	0	2796	50	2796	65	2810

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	120	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3900

INPUT
Description: X-Section 39+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	2810	-50	2796	0	2796	50	2796	65	2810

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.035	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Angel Park Middl

Reach	River Sta.	n1	n2	n3
0132 to 0030	-485	.035	.025	.035
0132 to 0030	-595	.035	.013	.035
0132 to 0030	-900	Culvert		
0132 to 0030	-1005	.013	.013	.013
0132 to 0030	-1100	.035	.025	.035
0132 to 0030	-1200	.035	.025	.035
0132 to 0030	-1300	.035	.025	.035
0132 to 0030	-1400	.035	.025	.035
0132 to 0030	-1500	.035	.025	.035
0132 to 0030	-1600	.035	.025	.035
0132 to 0030	-1700	.035	.025	.035
0132 to 0030	-1800	.035	.025	.035
0132 to 0030	-1900	.035	.025	.035
0132 to 0030	-2000	.035	.025	.035
0132 to 0030	-2100	.035	.025	.035
0132 to 0030	-2200	.035	.025	.035
0132 to 0030	-2300	.035	.025	.035
0132 to 0030	-2400	.035	.025	.035
0132 to 0030	-2500	.035	.025	.035
0132 to 0030	-2600	.035	.025	.035
0132 to 0030	-2700	.035	.025	.035
0132 to 0030	-2800	.035	.025	.035
0132 to 0030	-2900	.035	.025	.035
0132 to 0030	-3000	.035	.025	.035
0132 to 0030	-3100	.035	.025	.035
0132 to 0030	-3200	.035	.025	.035
0132 to 0030	-3300	.035	.025	.035
0132 to 0030	-3400	.035	.025	.035
0132 to 0030	-3500	.035	.025	.02
0132 to 0030	-3600	.035	.025	.02
0132 to 0030	-3700	.035	.025	.02
0132 to 0030	-3800	.035	.025	.02
0132 to 0030	-3900	.035	.025	.02

SUMMARY OF REACH LENGTHS

River: Angel Park Middl

Reach	River Sta.	Left	Channel	Right
0132 to 0030	-485	110	110	110
0132 to 0030	-595	410	410	410
0132 to 0030	-900	Culvert		
0132 to 0030	-1005	100	100	100
0132 to 0030	-1100	100	100	100
0132 to 0030	-1200	100	100	100
0132 to 0030	-1300	100	100	100
0132 to 0030	-1400	100	100	100
0132 to 0030	-1500	100	100	100
0132 to 0030	-1600	100	100	100
0132 to 0030	-1700	100	100	100
0132 to 0030	-1800	100	100	100

0132 to 0030	-1900	100	100	100
0132 to 0030	-2000	100	100	100
0132 to 0030	-2100	100	100	100
0132 to 0030	-2200	110	100	90
0132 to 0030	-2300	110	100	90
0132 to 0030	-2400	100	100	100
0132 to 0030	-2500	90	100	110
0132 to 0030	-2600	90	100	110
0132 to 0030	-2700	100	100	100
0132 to 0030	-2800	100	100	100
0132 to 0030	-2900	100	100	100
0132 to 0030	-3000	110	100	90
0132 to 0030	-3100	100	100	100
0132 to 0030	-3200	100	100	100
0132 to 0030	-3300	100	100	100
0132 to 0030	-3400	100	100	100
0132 to 0030	-3500	105	100	90
0132 to 0030	-3600	100	100	100
0132 to 0030	-3700	120	100	60
0132 to 0030	-3800	120	100	60
0132 to 0030	-3900	110	100	60

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Angel Park Middl

Reach	River Sta.	Contr.	Expan.
0132 to 0030	-485	.1	.3
0132 to 0030	-595	.3	.5
0132 to 0030	-900	Culvert	
0132 to 0030	-1005	.3	.5
0132 to 0030	-1100	.1	.3
0132 to 0030	-1200	.1	.3
0132 to 0030	-1300	.1	.3
0132 to 0030	-1400	.1	.3
0132 to 0030	-1500	.1	.3
0132 to 0030	-1600	.1	.3
0132 to 0030	-1700	.1	.3
0132 to 0030	-1800	.1	.3
0132 to 0030	-1900	.1	.3
0132 to 0030	-2000	.1	.3
0132 to 0030	-2100	.1	.3
0132 to 0030	-2200	.1	.3
0132 to 0030	-2300	.1	.3
0132 to 0030	-2400	.1	.3
0132 to 0030	-2500	.1	.3
0132 to 0030	-2600	.1	.3
0132 to 0030	-2700	.1	.3
0132 to 0030	-2800	.1	.3
0132 to 0030	-2900	.1	.3
0132 to 0030	-3000	.1	.3
0132 to 0030	-3100	.1	.3
0132 to 0030	-3200	.1	.3
0132 to 0030	-3300	.1	.3
0132 to 0030	-3400	.1	.3
0132 to 0030	-3500	.1	.3
0132 to 0030	-3600	.1	.3
0132 to 0030	-3700	.1	.3
0132 to 0030	-3800	.1	.3

0132 to 0030 -3900 .1 .3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (cfs) (sq ft)	Top Width (ft) (ft)	Froude # Chl (ft)	(ft)
0132 to 0030	-485	PF 1	6047.00	2869.00	2888.60	2881.22
2889.38	0.000430	8.96	1268.66	166.60	0.36	
0132 to 0030	-595	PF 1	6047.00	2863.50	2888.83	2872.93
2889.24	0.000070	5.57	1638.10	142.76	0.20	
0132 to 0030	-900		Culvert			
0132 to 0030	-1005	PF 1	6047.00	2860.00	2872.16	2872.16
2878.30	0.001083	19.89	304.00	136.48	1.01	
0132 to 0030	-1100	PF 1	6047.00	2855.00	2856.76	2859.78
2874.47	0.152783	33.92	181.08	105.29	4.50	
0132 to 0030	-1200	PF 1	6047.00	2853.00	2855.53	2857.78
2864.06	0.045846	23.60	262.03	107.57	2.62	
0132 to 0030	-1300	PF 1	6047.00	2851.00	2853.99	2855.78
2860.02	0.025851	19.85	312.75	108.98	2.02	
0132 to 0030	-1400	PF 1	6047.00	2850.00	2853.62	2854.78
2857.70	0.013589	16.34	381.89	110.87	1.51	
0132 to 0030	-1500	PF 1	6047.00	2848.00	2851.34	2852.75
2856.03	0.017550	17.59	357.66	114.31	1.70	
0132 to 0030	-1600	PF 1	6047.00	2846.00	2849.32	2850.78
2854.20	0.018320	17.89	348.00	109.95	1.73	
0132 to 0030	-1700	PF 1	6047.00	2844.00	2847.25	2848.78
2852.35	0.019683	18.28	340.33	109.74	1.79	
0132 to 0030	-1800	PF 1	6047.00	2844.00	2848.78	2848.78
2851.07	0.005314	12.30	512.39	114.34	0.99	
0132 to 0030	-1900	PF 1	6047.00	2840.00	2842.86	2844.78
2849.49	0.030286	20.82	297.80	108.57	2.17	
0132 to 0030	-2000	PF 1	6047.00	2840.00	2844.48	2844.78
2847.10	0.006602	13.13	478.60	113.45	1.09	
0132 to 0030	-2100	PF 1	6047.00	2837.00	2840.11	2841.78
2845.68	0.022666	19.07	325.76	109.34	1.91	
0132 to 0030	-2200	PF 1	6047.00	2835.00	2838.23	2839.78
2843.38	0.019985	18.36	338.73	109.69	1.80	
0132 to 0030	-2300	PF 1	6047.00	2833.00	2836.23	2837.78
2841.38	0.019985	18.36	338.73	109.69	1.80	
0132 to 0030	-2400	PF 1	6047.00	2830.00	2833.00	2834.78
2839.02	0.025809	19.84	312.91	108.98	2.02	
0132 to 0030	-2500	PF 1	6047.00	2828.00	2831.22	2832.78
2836.41	0.020190	18.42	337.66	109.66	1.81	
0132 to 0030	-2600	PF 1	6047.00	2825.00	2827.99	2829.78
2834.04	0.026030	19.89	312.09	108.96	2.03	
0132 to 0030	-2700	PF 1	6047.00	2825.00	2829.61	2829.78
2832.08	0.006014	12.77	492.83	113.83	1.05	
0132 to 0030	-2800	PF 1	6047.00	2823.00	2826.46	2827.78
2830.94	0.015894	17.13	363.71	110.37	1.62	
0132 to 0030	-2900	PF 1	6047.00	2820.00	2823.13	2824.83
2828.86	0.022983	19.26	317.76	103.35	1.92	
0132 to 0030	-3000	PF 1	6047.00	2815.00	2817.64	2819.83
2825.69	0.040346	22.81	267.82	102.83	2.47	
0132 to 0030	-3100	PF 1	6047.00	2813.00	2816.07	2817.83
2822.03	0.024522	19.64	311.55	103.28	1.98	
0132 to 0030	-3200	PF 1	6047.00	2810.00	2812.96	2814.83

2819.37	0.027620	20.35	300.49	103.17	2.09	
0132 to 0030	-3300	PF 1	6047.00	2808.00	2811.23	2812.83
2816.59	0.020554	18.63	328.74	103.46	1.83	
0132 to 0030	-3400	PF 1	6047.00	2805.00	2808.02	2809.83
2814.16	0.025673	19.91	307.24	103.24	2.02	
0132 to 0030	-3500	PF 1	6047.00	2805.00	2809.65	2809.83
2812.21	0.006070	12.89	476.19	104.98	1.05	
0132 to 0030	-3600	PF 1	6047.00	2802.00	2805.13	2806.83
2810.82	0.022732	19.18	318.49	103.36	1.91	
0132 to 0030	-3700	PF 1	6047.00	2798.00	2800.75	2802.79
2807.95	0.034342	21.64	283.49	105.90	2.30	
0132 to 0030	-3800	PF 1	6047.00	2796.00	2799.10	2800.79
2804.74	0.022990	19.17	320.57	106.65	1.92	
0132 to 0030	-3900	PF 1	6047.00	2796.00	2800.47	2800.79
2803.14	0.006705	13.21	468.49	109.58	1.10	

ALTERNATIVE III

HEC-RAS Model Output for 6,047 cfs, 3:1 rip rap side slopes

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Angel Park Middle Branch Drainage Study
Project File : APHS_06_28_08.prj
Run Date and Time: 8/6/2008 3:12:51 PM

Project in English units

Project Description:
This is a steady state HEC-RAS simulation of the Angel Park Middle Branch Channel east of Hualapai Way in the City of Las Vegas. The purpose of the model is to simulate various channel modifications for development immediately east of Hualapai adjacent the channel. The model is performed by BVNA for the City of Las Vegas.

PLAN DATA

Plan Title: Angel Park Middle Branch Drainage Study
Plan File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\3to1\APHS_06_28_08.p01

Geometry Title: Angel Park Middle Branch Drainage Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\3to1\APHS_06_28_08.g01

Flow Title : Flow 06
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\3to1\APHS_06_28_08.f06

Plan Summary Information:

Number of:	Cross Sections	= 32	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.1
Critical depth calculation tolerance	= 0.1
Maximum number of iterations	= 40
Maximum difference tolerance	= 1
Flow tolerance factor	= 0.05

Computation Options
Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow 06
Flow File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\3to1\APHS_06_28_08.f06

Flow Data (cfs)

River	Reach	RS	PF 1
Angel Park Middl	0132 to 0030	-485	6047

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Angel Park Middl	0132 to 0030	PF 1	Normal S = 0.02	Normal S = 0.02

GEOMETRY DATA

Geometry Title: Angel Park Middle Branch Drainage Study
Geometry File : C:\Program Files\HEC\HEC-RAS\4.0\AP5\3to1\APHS_06_28_08.g01

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -485

INPUT
Description: X-Section -4+85
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-192	2900	-190	2895	-125	2890	-100	2885	-60	2885
-40	2885	-23	2880	-15	2875	-10	2869	0	2869
10	2869	20	2875	30	2880	40	2885	52	2890
70	2895	80	2900						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-192	.035	-10	.025	10	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	110	110	.1	.3

CROSS SECTION

RIVER: Angel Park Middl

REACH: 0132 to 0030 RS: -595

INPUT
Description: Station -5+95 - Upstream of 2-18' x 10' RBC, west side of Hualapai
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-18.3	2878	-18.3	2863.5	0	2863.5	18.3	2863.5	18.3	2878
30	2885	40	2890	50	2895	100	2898		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-18.3	.013	18.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-18.3	18.3	405	405	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-18.3	2878.5	T
18.3	100	2878.5	T

CULVERT

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -900

INPUT
Description: 2, 12' x 10' RCB under Hualapai Way
Distance from Upstream XS = .1
Deck/Roadway Width = 399.8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 12

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-135	2895	2850	-120	2895	2850	-100	2895	2850
-65	2895	2850	-40	2895	2850	-12.3	2895	2873.5
-12.3	2895	2873.5	0	2895	2873.5	12.3	2895	2873.5
12.3	2895	2850	30	2895	2850	40	2895	2850

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-135	2905	-120	2900	-100	2885	-65	2881	-40	2881
-18.3	2878	-18.3	2863.5	0	2863.5	18.3	2863.5	18.3	2878
30	2885	40	2890	50	2895	100	2898		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-135	.035	-18.3	.013	18.3	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
-18.3	18.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-135	-18.3	2878.5	T
18.3	100	2878.5	T

Downstream Deck/Roadway Coordinates
num= 7

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-170	2897	2850	-12.3	2897	2850	-12.3	2897	2870
0	2897	2870	12.3	2897	2870	12.3	2897	2850

170 2897 2850

Downstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2880	-65	2870	-50	2860	0	2860	50	2860
65	2870	80	2880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.013	-50	.013	50	.013

Bank Sta: Left Right Coeff Contr. Expan.
-50 50 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-80	-12.3	2907	T
12.3	80	2907	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-80	-162	2927	170	80	2927

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
2	Box	10	12

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Outlet control

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	0	350	.013	.013	0	.5	.3

Number of Barrels = 2
Upstream Elevation = 2863.5
Centerline Stations

Sta.	Sta.
-6.3	6.3

Downstream Elevation = 2860
Centerline Stations

Sta.	Sta.
-6.3	6.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1005

INPUT
Description: X-Section -10+00 - 2-12' x 10' culvert, east side of Hualapai
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2880	-65	2870	-50	2860	0	2860	50	2860
65	2870	80	2880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.013	-50	.013	50	.013

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-80	-12.3	2907	T
12.3	80	2907	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-80	-162	2927	170	80	2927

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1100

INPUT
Description: X-Section -11+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2865	-50	2855	0	2855	50	2855	80	2865

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1200

INPUT
Description: X-Section -12+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2863	-50	2853	0	2853	50	2853	80	2863

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1300

INPUT
Description: X-Section -13+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-80	2861	-50	2851	0	2851	50	2851	80	2861

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1400

INPUT
Description: X-Section -14+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2860	-50	2850	0	2850	50	2850	80	2860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1500

INPUT
Description: X-Section -15+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2855	-50	2848	0	2848	50	2848	80	2855

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1600

INPUT
Description: X-Section -16+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2856	-50	2846	0	2846	50	2846	80	2856

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1700

INPUT
Description: X-Section -17+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2854	-50	2844	0	2844	50	2844	80	2854

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1800

INPUT
Description: X-Section -18+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2854	-50	2844	0	2844	50	2844	80	2854

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -1900

INPUT
Description: X-Section -19+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2850	-50	2840	0	2840	50	2840	80	2850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2000

INPUT
Description: X-Section -20+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2850	-50	2840	0	2840	50	2840	80	2850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2100

INPUT
Description: X-Section -21+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2847	-50	2837	0	2837	50	2837	80	2847

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2200

INPUT
Description: X-Section -22+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2845	-50	2835	0	2835	50	2835	80	2845

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	90	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2300

INPUT
Description: X-Section -23+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2843	-50	2833	0	2833	50	2833	80	2843

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	90	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2400

INPUT
Description: X-Section -24+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2840	-50	2830	0	2830	50	2830	80	2840

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2500

INPUT
Description: X-Section -25+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2838	-50	2828	0	2828	50	2828	80	2838

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	90	100	110	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2600

INPUT
Description: X-Section -26+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2835	-50	2825	0	2825	50	2825	80	2835

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	90	100	110	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2700

INPUT
Description: X-Section -27+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2835	-50	2825	0	2825	50	2825	80	2835

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2800

INPUT
Description: X-Section -28+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2833	-50	2823	0	2823	50	2823	80	2833

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -2900

INPUT
Description: X-Section 29+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2830	-50	2820	0	2820	50	2820	80	2830

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3000

INPUT
Description: X-Section -30+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2825	-50	2815	0	2815	50	2815	80	2825

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	110	100	90	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3100

INPUT
Description: X-Section -30+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2823	-50	2813	0	2813	50	2813	80	2823

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3200

INPUT
Description: X-Section -32+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2820	-50	2810	0	2810	50	2810	80	2820

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3300

INPUT
Description: X-Section -33+00

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2818	-50	2808	0	2808	50	2808	80	2818

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3400

INPUT
Description: X-Section 34+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2815	-50	2805	0	2805	50	2805	80	2815

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	100	100	100	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3500

INPUT
Description: X-Section 35+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2815	-50	2805	0	2805	50	2805	80	2815

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-50	50	105	100	90	.1 .3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3600

INPUT
Description: X-Section 36+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2812	-50	2802	0	2802	50	2802	80	2812

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

-80	.025	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50		100	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3700

INPUT
Description: X-Section 37+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2808	-50	2798	0	2798	50	2798	80	2808

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50		120	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3800

INPUT
Description: X-Section 38+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2806	-50	2796	0	2796	50	2796	80	2806

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50		120	100	.1	.3

CROSS SECTION

RIVER: Angel Park Middl
REACH: 0132 to 0030 RS: -3900

INPUT
Description: X-Section 39+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	2806	-50	2796	0	2796	50	2796	80	2806

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-80	.025	-50	.025	50	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right		Coeff Contr.	Expan.
-50	50		110	100	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Angel Park Middl

Reach	River Sta.	n1	n2	n3
0132 to 0030	-485	.035	.025	.035
0132 to 0030	-595	.035	.013	.035
0132 to 0030	-900	Culvert		
0132 to 0030	-1005	.013	.013	.013
0132 to 0030	-1100	.025	.025	.025
0132 to 0030	-1200	.025	.025	.025
0132 to 0030	-1300	.025	.025	.025
0132 to 0030	-1400	.025	.025	.025
0132 to 0030	-1500	.025	.025	.025
0132 to 0030	-1600	.025	.025	.025
0132 to 0030	-1700	.025	.025	.025
0132 to 0030	-1800	.025	.025	.025
0132 to 0030	-1900	.025	.025	.025
0132 to 0030	-2000	.025	.025	.025
0132 to 0030	-2100	.025	.025	.025
0132 to 0030	-2200	.025	.025	.025
0132 to 0030	-2300	.025	.025	.025
0132 to 0030	-2400	.025	.025	.025
0132 to 0030	-2500	.025	.025	.025
0132 to 0030	-2600	.025	.025	.025
0132 to 0030	-2700	.025	.025	.025
0132 to 0030	-2800	.025	.025	.025
0132 to 0030	-2900	.025	.025	.025
0132 to 0030	-3000	.025	.025	.025
0132 to 0030	-3100	.025	.025	.025
0132 to 0030	-3200	.025	.025	.025
0132 to 0030	-3300	.025	.025	.025
0132 to 0030	-3400	.025	.025	.025
0132 to 0030	-3500	.025	.025	.02
0132 to 0030	-3600	.025	.025	.02
0132 to 0030	-3700	.025	.025	.02
0132 to 0030	-3800	.025	.025	.02
0132 to 0030	-3900	.025	.025	.02

SUMMARY OF REACH LENGTHS

River: Angel Park Middl

Reach	River Sta.	Left	Channel	Right
0132 to 0030	-485	110	110	110
0132 to 0030	-595	405	405	405
0132 to 0030	-900	Culvert		
0132 to 0030	-1005	100	100	100
0132 to 0030	-1100	100	100	100
0132 to 0030	-1200	100	100	100
0132 to 0030	-1300	100	100	100
0132 to 0030	-1400	100	100	100
0132 to 0030	-1500	100	100	100
0132 to 0030	-1600	100	100	100
0132 to 0030	-1700	100	100	100
0132 to 0030	-1800	100	100	100
0132 to 0030	-1900	100	100	100

0132 to 0030	-2000	100	100	100
0132 to 0030	-2100	100	100	100
0132 to 0030	-2200	110	100	90
0132 to 0030	-2300	110	100	90
0132 to 0030	-2400	100	100	100
0132 to 0030	-2500	90	100	110
0132 to 0030	-2600	90	100	110
0132 to 0030	-2700	100	100	100
0132 to 0030	-2800	100	100	100
0132 to 0030	-2900	100	100	100
0132 to 0030	-3000	110	100	90
0132 to 0030	-3100	100	100	100
0132 to 0030	-3200	100	100	100
0132 to 0030	-3300	100	100	100
0132 to 0030	-3400	100	100	100
0132 to 0030	-3500	105	100	90
0132 to 0030	-3600	100	100	100
0132 to 0030	-3700	120	100	60
0132 to 0030	-3800	120	100	60
0132 to 0030	-3900	110	100	60

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Angel Park Middl

Reach	River Sta.	Contr.	Expan.
0132 to 0030	-485	.1	.3
0132 to 0030	-595	.3	.5
0132 to 0030	-900	Culvert	
0132 to 0030	-1005	.3	.5
0132 to 0030	-1100	.1	.3
0132 to 0030	-1200	.1	.3
0132 to 0030	-1300	.1	.3
0132 to 0030	-1400	.1	.3
0132 to 0030	-1500	.1	.3
0132 to 0030	-1600	.1	.3
0132 to 0030	-1700	.1	.3
0132 to 0030	-1800	.1	.3
0132 to 0030	-1900	.1	.3
0132 to 0030	-2000	.1	.3
0132 to 0030	-2100	.1	.3
0132 to 0030	-2200	.1	.3
0132 to 0030	-2300	.1	.3
0132 to 0030	-2400	.1	.3
0132 to 0030	-2500	.1	.3
0132 to 0030	-2600	.1	.3
0132 to 0030	-2700	.1	.3
0132 to 0030	-2800	.1	.3
0132 to 0030	-2900	.1	.3
0132 to 0030	-3000	.1	.3
0132 to 0030	-3100	.1	.3
0132 to 0030	-3200	.1	.3
0132 to 0030	-3300	.1	.3
0132 to 0030	-3400	.1	.3
0132 to 0030	-3500	.1	.3
0132 to 0030	-3600	.1	.3
0132 to 0030	-3700	.1	.3
0132 to 0030	-3800	.1	.3
0132 to 0030	-3900	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
(ft)	(ft/ft)	(ft/s)	(cfs) (sq ft)	(ft) (ft)	(ft)	(ft)
0132 to 0030	-485	PF 1	6047.00	2869.00	2888.60	2881.22
2889.38	0.000430	8.96	1268.66	166.60	0.36	
0132 to 0030	-595	PF 1	6047.00	2863.50	2888.83	2872.93
2889.24	0.000070	5.57	1638.10	142.76	0.20	
0132 to 0030	-900		Culvert			
0132 to 0030	-1005	PF 1	6047.00	2860.00	2872.29	2872.29
2878.50	0.001079	20.00	302.41	136.88	1.01	
0132 to 0030	-1100	PF 1	6047.00	2855.00	2856.71	2859.66
2874.62	0.162803	34.29	179.77	110.26	4.62	
0132 to 0030	-1200	PF 1	6047.00	2853.00	2855.47	2857.66
2863.79	0.046843	23.47	264.74	114.79	2.63	
0132 to 0030	-1300	PF 1	6047.00	2851.00	2853.93	2855.66
2859.70	0.025937	19.60	318.66	117.58	2.02	
0132 to 0030	-1400	PF 1	6047.00	2850.00	2853.54	2854.66
2857.39	0.013527	16.05	391.42	121.23	1.50	
0132 to 0030	-1500	PF 1	6047.00	2848.00	2851.20	2852.58
2855.68	0.018160	17.40	364.22	127.45	1.71	
0132 to 0030	-1600	PF 1	6047.00	2846.00	2849.27	2850.66
2853.83	0.017729	17.44	359.29	119.63	1.70	
0132 to 0030	-1700	PF 1	6047.00	2844.00	2847.21	2848.66
2851.97	0.019037	17.83	351.30	119.23	1.75	
0132 to 0030	-1800	PF 1	6047.00	2844.00	2848.66	2848.66
2850.77	0.005202	11.96	531.14	127.96	0.98	
0132 to 0030	-1900	PF 1	6047.00	2840.00	2842.79	2844.66
2849.20	0.030754	20.64	302.04	116.72	2.18	
0132 to 0030	-2000	PF 1	6047.00	2840.00	2844.33	2844.66
2846.81	0.006734	12.95	488.89	125.96	1.10	
0132 to 0030	-2100	PF 1	6047.00	2837.00	2840.04	2841.66
2845.38	0.022867	18.86	331.56	118.23	1.91	
0132 to 0030	-2200	PF 1	6047.00	2835.00	2838.13	2839.66
2843.15	0.020775	18.31	341.74	118.75	1.83	
0132 to 0030	-2300	PF 1	6047.00	2833.00	2836.13	2837.66
2841.15	0.020775	18.31	341.74	118.75	1.83	
0132 to 0030	-2400	PF 1	6047.00	2830.00	2832.91	2834.66
2838.75	0.026395	19.70	316.91	117.49	2.03	
0132 to 0030	-2500	PF 1	6047.00	2828.00	2831.15	2832.66
2836.10	0.020263	18.17	344.44	118.88	1.80	
0132 to 0030	-2600	PF 1	6047.00	2825.00	2827.92	2829.66
2833.73	0.026168	19.65	317.77	117.53	2.03	
0132 to 0030	-2700	PF 1	6047.00	2825.00	2829.51	2829.66
2831.78	0.005824	12.38	512.21	127.07	1.03	
0132 to 0030	-2800	PF 1	6047.00	2823.00	2826.37	2827.66
2830.65	0.016043	16.92	370.82	120.21	1.62	
0132 to 0030	-2900	PF 1	6047.00	2820.00	2823.00	2824.66
2828.50	0.024000	19.14	326.54	117.98	1.95	
0132 to 0030	-3000	PF 1	6047.00	2815.00	2817.56	2819.66
2825.23	0.040960	22.53	276.09	115.38	2.48	
0132 to 0030	-3100	PF 1	6047.00	2813.00	2815.98	2817.66
2821.55	0.024470	19.25	324.55	117.88	1.97	
0132 to 0030	-3200	PF 1	6047.00	2810.00	2812.88	2814.66
2818.88	0.027663	19.99	312.27	117.25	2.08	

0132 to 0030	-3300	PF 1	6047.00	2808.00	2811.14	2812.66
2816.13	0.020514	18.24	343.10	118.82	1.82	
0132 to 0030	-3400	PF 1	6047.00	2805.00	2807.92	2809.66
2813.74	0.026304	19.68	317.25	117.50	2.03	
0132 to 0030	-3500	PF 1	6047.00	2805.00	2809.54	2809.65
2811.74	0.005600	12.19	515.53	127.23	1.01	
0132 to 0030	-3600	PF 1	6047.00	2802.00	2805.01	2806.65
2810.40	0.023245	18.90	328.50	118.08	1.92	
0132 to 0030	-3700	PF 1	6047.00	2798.00	2800.70	2802.65
2807.52	0.034085	21.25	291.38	116.17	2.28	
0132 to 0030	-3800	PF 1	6047.00	2796.00	2799.03	2800.65
2804.36	0.022917	18.82	329.97	118.15	1.91	
0132 to 0030	-3900	PF 1	6047.00	2796.00	2800.36	2800.65
2802.77	0.006467	12.75	492.36	126.13	1.08	