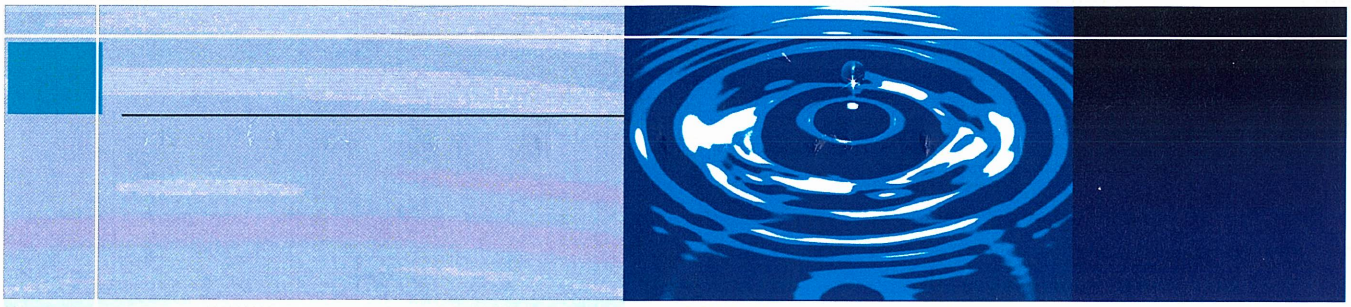

FLOODPLAIN ANALYSIS

Project Identification:

Helen Woodward Animal Center
6461 El Apajo Road
Rancho Santa Fe, CA 92067
Project Number: P04-059
Environmental Log Number: ER# 96-08-023B

Project Owner:

Helen Woodward Animal Center
6461 El Apajo Road
Rancho Santa Fe, CA 92067

Project Contractor: TBD

Prepared by:

RBF CONSULTING
9755 Clairemont Mesa Blvd. Suite 100
San Diego, California 92124-1324
858.614.5000 telephone / 858.614.5001 fax

Contact Person: Kevin G. Vogelsang, RCE 41213

RBF JN 25-102814

Initial Preparation Date: August, 2007
Revision Date(s): December, 2007
March, 2008

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Appendix A Hydrologic Analysis
Appendix B Hydraulic Analyses

- Existing Condition
- Proposed Condition

Appendix C Supporting Documentation

- Solana Fairbanks Elementary Plans
- El Apajo Master Drainage Plan Drainage Basin Map
- 2-6'x12' CBC Plans (Tract 3877-1)
- San Diego HEC-2 Model (Chang, 1980)
- Excerpt from Shoenfelder Report

1 Introduction

This floodplain report presents an analysis of the channel that runs along the southwest boundary of the Helen Woodward Animal Center. The report contains a hydrologic analysis of the floodplain contributing runoff to the channel, and hydraulic analyses of the existing and proposed conditions.

The stretch of channel analyzed is in the County of San Diego, along the north side San Dieguito Road, and west of Camino Del Nido (see Exhibit A).

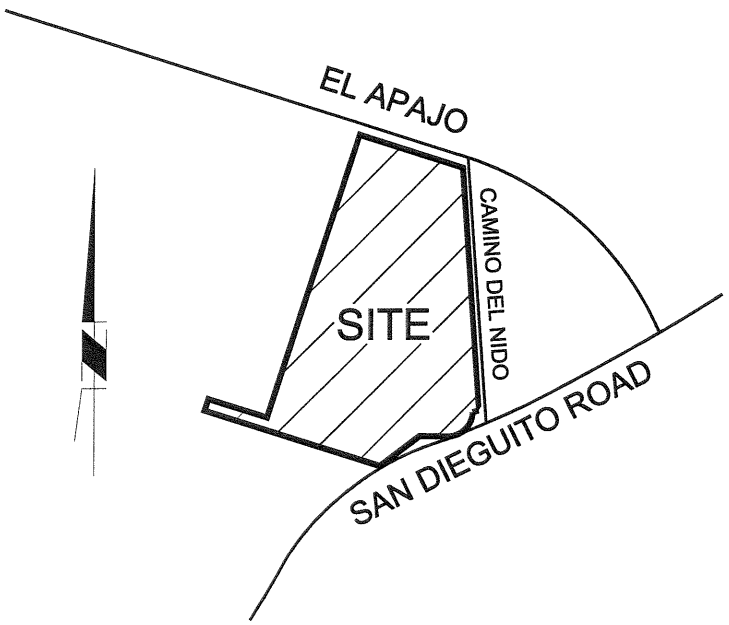


Exhibit A Location Map

2 Background

2.1 LOCATION

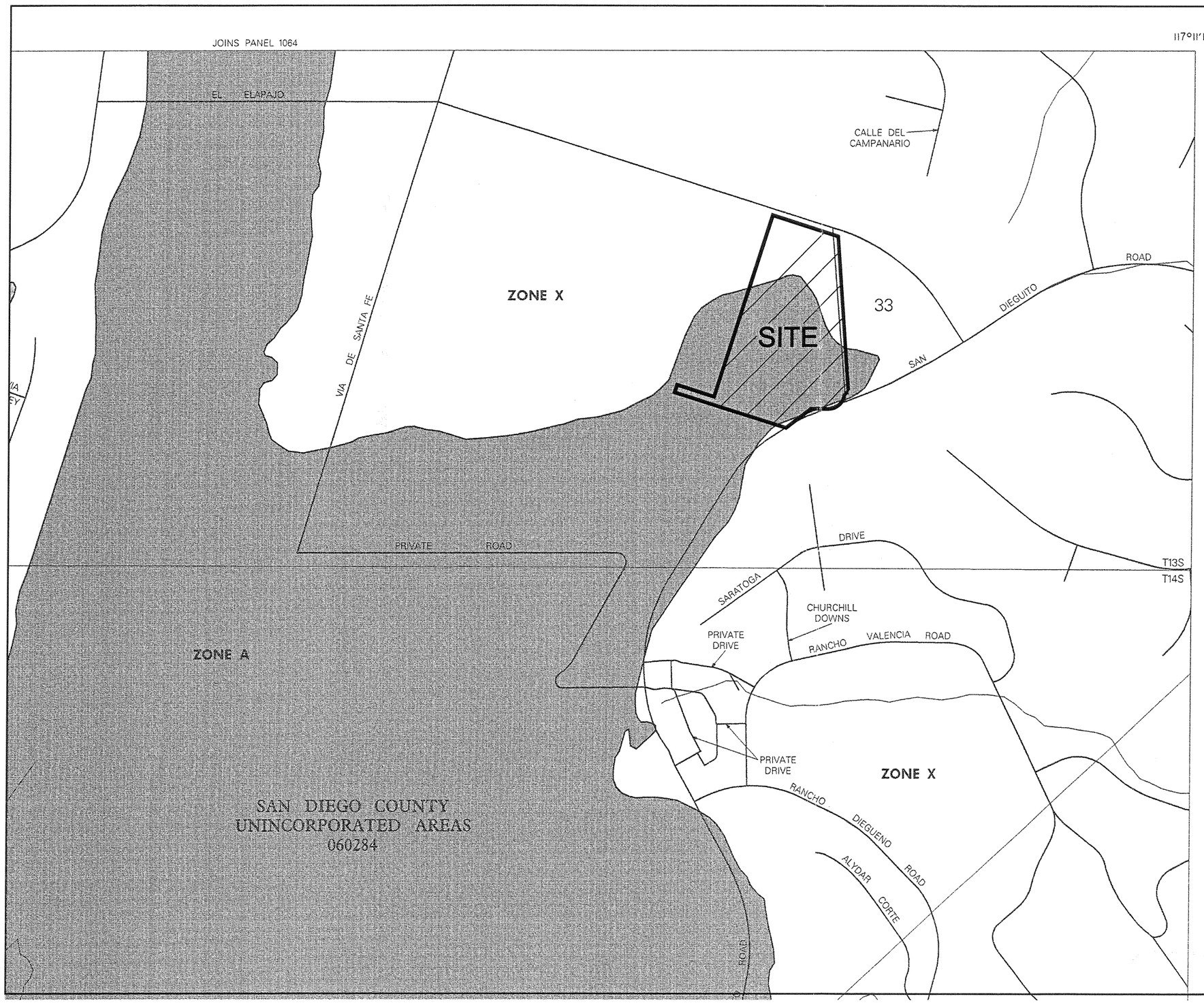
Helen Woodward Animal Center is located in Rancho Santa Fe, CA on El Apajo Road about 1000' northwest of the intersection of San Dieguito Road and El Apajo Road. Exhibit A provides a location map for the project.

2.2 EXISTING STUDIES

Hydrologic analyses of a portion of the watershed contributing to the channel have been performed as part of the El Apajo Master Drainage Plan (Snipes-Dye 1997), and the Schoenfelder Property Hydraulic Analysis (Rick Engineering 2000). Hydraulic analyses (which show backwater affects in the area) have been performed for the nearby San Dieguito River by Howard H. Chang in 1980.

2.3 FLOODPLAIN MAPPING

The Federal Emergency Management Agency (FEMA) categorizes the majority of the site as Zone A (no base flood elevations determined). The remainder of the site is Zone X (areas determined to be outside the 500-year floodplain). Exhibit B illustrates the FEMA floodplain mapping in the vicinity of the project site (FIRM Panel 06073C-1327F). Exhibit C illustrates the County of San Diego floodplain mapping in the vicinity of the project site.



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1327 OF 2375

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO COUNTY, UNINCORPORATED AREAS	060284	1327	F
SAN DIEGO, CITY OF	060295	1327	F

MAP NUMBER
06073C1327 F

EFFECTIVE DATE:
JUNE 19, 1997

Federal Emergency Management Agency

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

COUNTY OF SAN DIEGO — FLOODPLAIN MAP

117°12'15" 117°12'00" 117°11'45" 117°11'30" 117°11'15"

306N

304N

302N

33°00'00"

32°59'45"

1707E 1709E 1711E 1713E

-LEGEND-

- Horizontal Control Monument — Third Order; Vertical Control Monument — Second Order or Better
- Horizontal Control Monument — Second Order or Better; Vertical Control Monument — Third Order
- Horizontal Control Monument — Second Order or Better
- Horizontal Control Monument & Bench Mark — Second Order or Better
- Horizontal Control Monument — Third Order
- Horizontal Control Monument & Bench Mark — Third Order
- Bench Mark — Second Order or Better
- Vertical Control Monument — Third Order
- Property Corner Found & Coordinated (California Coordinate System, Zone 6)
- 36 31 T12S R1E / 16 SP BASE T11S R1E — Found Section, Grant or Subdivision Corner
- Photograph, Nadir Point
- Geographic Tick

BOUNDARIES IN ORDER OF PRECEDENCE
(Land Lines Shown are Approximate)

- .025" — National
- Name .025" Name — County
- .015" — City
- Name within Bdry. .015" — Reservation
- Name within Bdry. .015" — National, State or County Park
- Name within Bdry. .015" — Land Grant
- T 2 S / T 3 S .015" — Township, Range or Section

PREPARED UNDER THE DIRECTION
of
DEPARTMENT OF PUBLIC WORKS
County of San Diego

CONTROL DATA FURNISHED
by
SURVEY SECTION
Department of Public Works

HORIZONTAL CONTROL BASED
on
NORTH AMERICAN 1927 DATUM

VERTICAL CONTROL BASED
on
U.S.C. & G.S. 1929 SEA LEVEL DATUM

ORTHOPHOTO IMAGE PREPARED
from
PHOTOGRAPHY DATED: OCT. 23, 1985
by
AMERICAN AERIAL SURVEYS, INC.

TOPOGRAPHY COMPILED
by
PHOTOGRAMMETRIC METHODS
from
PHOTOGRAPHY DATED: OCT. 25, 1985
by
SAN-LO AERIAL SURVEYS

FINAL MAP PREPARED
by
MAPPING SECTION
Department of Public Works

This Map Complies with
NATIONAL MAP ACCURACY STANDARDS

200 0 200 400 600 800 1000 (Feet)
100 0 100 200 300 (Meters)

SCALE 1: 2400 (1"= 200')
INDEX CONTOUR INTERVAL: 25 FEET
CONTOUR INTERVAL: 5 FEET
TWO THOUSAND FOOT CALIFORNIA RECTANGULAR GRID (ZONE VI)
THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED
THE RECTANGULAR COORDINATE VALUES ARE SHOWN ON THE SOUTH AND WEST MARGINS
THE GEOGRAPHIC VALUES ARE SHOWN ON THE NORTH AND EAST MARGINS

FLOOD PLAIN DATA

PREPARED UNDER DIRECTION OF THE DIRECTOR OF PUBLIC WORKS, COUNTY OF SAN DIEGO, CALIFORNIA

EFFECTIVE DATE: _____

BASED ON FLOOD PLAIN DATA COMPILED FROM PHOTOGRAPHY OF OCTOBER 12, 1983

FLOOD PLAIN LEGEND

- POINT OF MINIMUM ELEVATION
- CROSS SECTION END OR ANGLE POINTS
- FLOODWAY ANGLE POINTS
- 234.5 FLOODWAY ELEVATION SEA (MEAN SEA LEVEL)
- FLOODWAY LINE
- 100 YEAR FLOOD PLAIN
- EROSION/SEDIMENTATION HAZARD AREA

IN ACCORDANCE WITH THE RESOURCE PROTECTION ORDINANCE, THE INCREASE OF THE FLOODWAY WATER SURFACE ELEVATION OVER THAT OF THE 100-YEAR FLOOD IS NO MORE THAN 0.2 OF ONE FOOT.

INDEX TO ADJOINING SHEETS

306-1701	306-1707	306-1713
302-1701	302-1707	302-1713
298-1701	298-1707	298-1713

SAN DIEGUITO RIVER
SHEET 4 OF 13
PROJECT 3152
NOTE UPDATED JUNE 1997

SAN DIEGO COUNTY
CALIFORNIA

SHEET NO.
302-1707

3 Hydrologic Analysis

3.1 OBJECTIVE

The objective of this analysis is to determine the peak 100-year flows contributing runoff to the channel.

3.2 METHOD

The analysis was performed by producing a HEC-HMS hydrologic model including five subbasins (see Offsite Drainage Map Appendix A) as follows:

- Soils data used was obtained from the NRCS Soil Survey, San Diego County Area, California (see Soil Type Map Appendix A).
- Land use was established using aerial photographs (see Land Use Map Appendix A).
- Soils and land use were then combined to produce compound curve numbers (see calculations (Appendix A).
- Subbasins were delineated and flow path data were gathered based upon San Diego County topographic data, and in the area to the north and northeast of the site, grading of the El Apajo subdivision (excerpt contained in Appendix C)
- All calculations were performed utilizing the methodology outlined in the San Diego County Hydrology Manual (SDCHM, June 2003).
- The watershed was broken into five subbasins – East 1, East 2, North, West and South. The East 1 subbasin concentrates flow at the inlet of 2-12x6 concrete box culverts at the northeast corner of the intersection of El Apajo, and San Dieguito Roads. The culverts then discharge into the channel at the western corner of Camino Del Nido and San Dieguito Road where the are combined with runoff from the East 2 subbasin. The North subbasin concentrates flow at the inlet of 2-2x5 concrete box culverts north of the intersection of El Apajo, and Camino Del Nido. The culverts then discharge into the channel at the western corner of Camino Del Nido and San Dieguito Road. The West subbasin collects runoff from the areas west and northwest of the site (including the site area) and conveys it to the channel downstream of the culvert outlets. Runoff from the South subbasin is added to the channel flow at the downstream limit of the hydraulic model.
- Previous analysis of the area showed that before the 1990's there were significant breakout flows to the southeast from the left bank of the San Dieguito River just

downstream of the Via Del Sante Fe Bridge. Between the 1990's and the present, development in the area has contained the San Dieguito's flows within its banks at this location. This is outlined in the Schoenfelder Property Hydraulic Analysis (Rick Engineering 2000). An excerpt from this report is contained in Appendix C.

3.3 RESULTS

Table 1 outlines the results of the hydrologic analysis. All exhibits, data, and results for the hydrologic analysis are contained in Appendix A.

Table 1 – Hydrology Results

SUBBASIN/CONFLUENCE*	AREA (sqmi)	Q_{100} (cfs)
EAST 1	1.998	1,548
CULVERT UPSTREAM*	1.998	1,548
EAST 2	0.060	150
CULVERT DOWNSTREAM*	2.058	1,564
NORTH	0.084	106
CHANNEL UPSTREAM*	2.142	1,587
WEST	0.045	76
END SITE*	2.187	1,600
SOUTH	0.112	106
DOWNSTREAM*	2.299	1,629
*COMBINING HYDROGRAPHS IN HEC-HMS		

4 HYDRAULIC ANALYSES

4.1 OBJECTIVE

The objective of this analysis is to determine the water surface elevations and limits of inundation for the stretch of the channel that is on the site due to the peak 100-year flows contributing runoff to the channel.

4.2 METHOD

The analyses were performed by producing two HEC-RAS hydraulic models as follows:

- Cross sections downstream of the culvert outlets were cut based upon survey points (obtained as part of this analysis) and proposed site grading (for the proposed condition). For both the proposed and existing condition models, cross sections 0 through 5 were extended based upon San Diego County topo data.
- Cross sections upstream of the culvert were cut based upon the approved plans for the Solana Fairbanks Elementary School contained in Appendix C.
- Culvert data was obtained from survey points (obtained as part of this analysis) as well as plans for the improvement of County of San Diego Tract 3877-1 contained in Appendix C.
- Mannings "n" values used were 0.035 for the entire channel downstream of the culvert, 0.013 for the culvert, 0.013 for the concrete channel upstream of the culvert, 0.035 for the vegetated left bank of the concrete channel, and 0.015 for the asphalt (school parking lot) right bank of the concrete channel.
- The downstream boundary condition for the models is from the Howard Chang HEC-2 model (in Appendix C) which is the basis for the County floodplain mapping (Exhibit C). The model begins near the southern tip of the site and extends up the San Dieguito River. The boundary condition is the known water surface elevation of 31.2. In order to take into account the possible backwater effects of the swelling San Dieguito River at this location, this water surface elevation was used as the boundary condition for both of the models created for this report. The use of this water surface elevation is conservative because the location of the downstream cross section in the Chang model is upstream of our downstream cross sections.

- The upstream boundary condition for the models is assumed normal depth using the slope of the concrete channel.
- The existing condition model shows a significant berm between the outlets of the two sets of culverts that discharge into the channel. The height of the berm declines in the downstream direction. As the conveyance at each side of the berm contains the flow just downstream of the culvert, a separate reach (Trib) and junction (J1) were used to model the flows separately at the culvert outlets, then combine them downstream as the berm diminishes. Flows used within the existing and proposed condition model were 1,548 cfs (East 1 subbasin) for the concrete channel upstream, 1,564 cfs for the channel portion before the junction downstream of the 2-6'x12' culverts, 91 cfs (North subbasin) for the flow exiting the 2-2'x5' culverts (Trib reach) for a total of 1,587 at the confluence, 1,600 cfs at the downstream end of the site, and 1,629 at the downstream end of the model.

4.3 RESULTS

The Proposed Project has no adverse effects on upstream or downstream water surface elevations. The project does not significantly alter existing flows in the channel which would lead to increased erosion of the channel on the property or downstream.

The backwater effects from the San Dieguito River are minimized on the northern portion of the site due to the proposed grading of the site.

All exhibits, data, and results for the hydraulic analysis are contained in Appendix B.

5 References

5.1 GENERAL REFERENCES

FEMA, 1997. FEMA. (June 17, 1997). Flood Insurance Study, San Diego County.

San Diego County, 2005. San Diego County Flood Control District (July 2005). Drainage Design Manual.

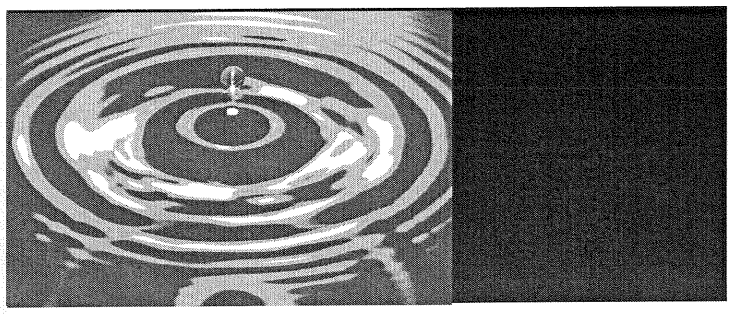
San Diego County, 2003. San Diego County Flood Control District. (June 2003). Hydrology Manual.

San Diego County, 1993. San Diego County Flood Control District. (April 1993). Hydrology Manual and Design and Procedure Manual. Ref. SFC P3055.

SCS, 1973. Soil Conservation Service. (December, 1973). Soil Survey, San Diego Area, California.

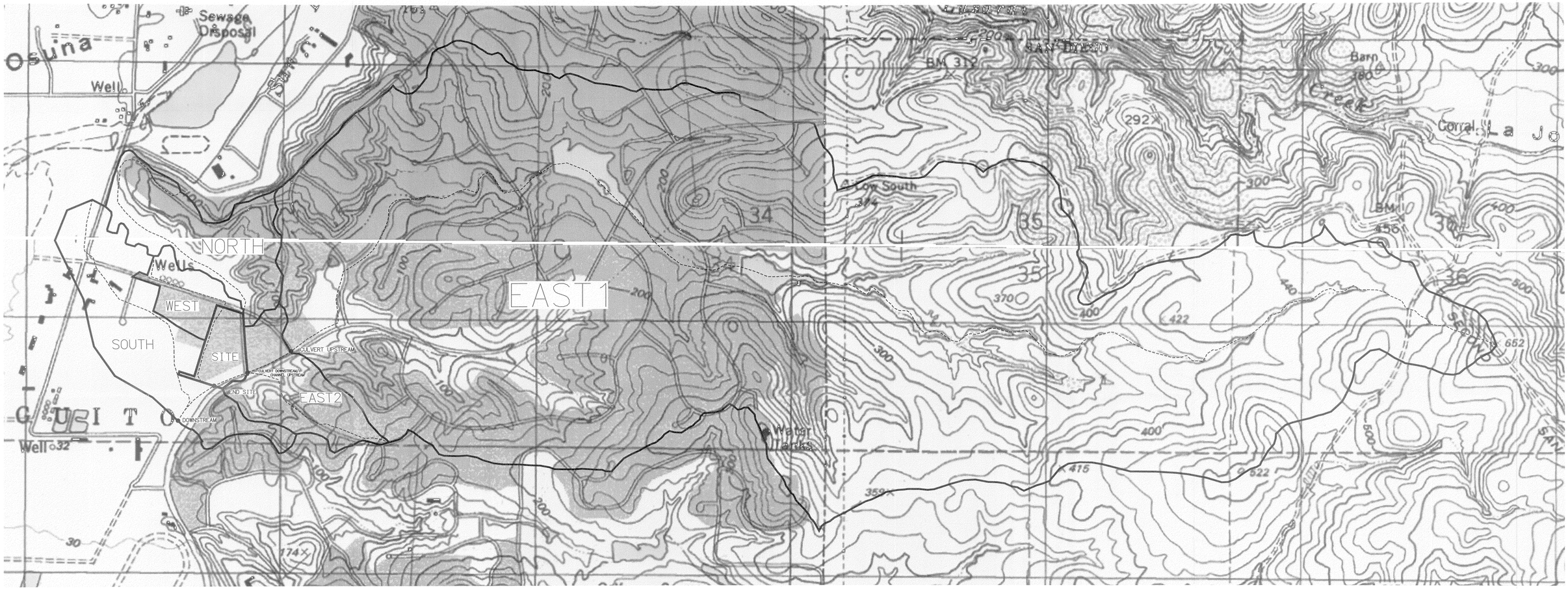
Rick Engineering, 2000. Rick Engineering Company. (February 2000). Shoenfelder Property Hydraulic Analysis TPM 20277

Snipes-Dye, 1997. Snipes-Dye Associates. (May 1997). El Apajo Master Drainage Plan



APPENDIX A
HYDROLOGIC ANALYSIS

RBF CONSULTING



LEGEND

- SITE BOUNDARY
- SUBBASIN BOUNDARY
- FLOW PATH
- CONFLUENCE

0 1200 2400 3600

NOTE: DELINEATIONS BASED UPON SAN DIEGO COUNTY TOPOGRAPHIC DATA.

WOODWARD CENTER

OFFSITE DRAINAGE MAP

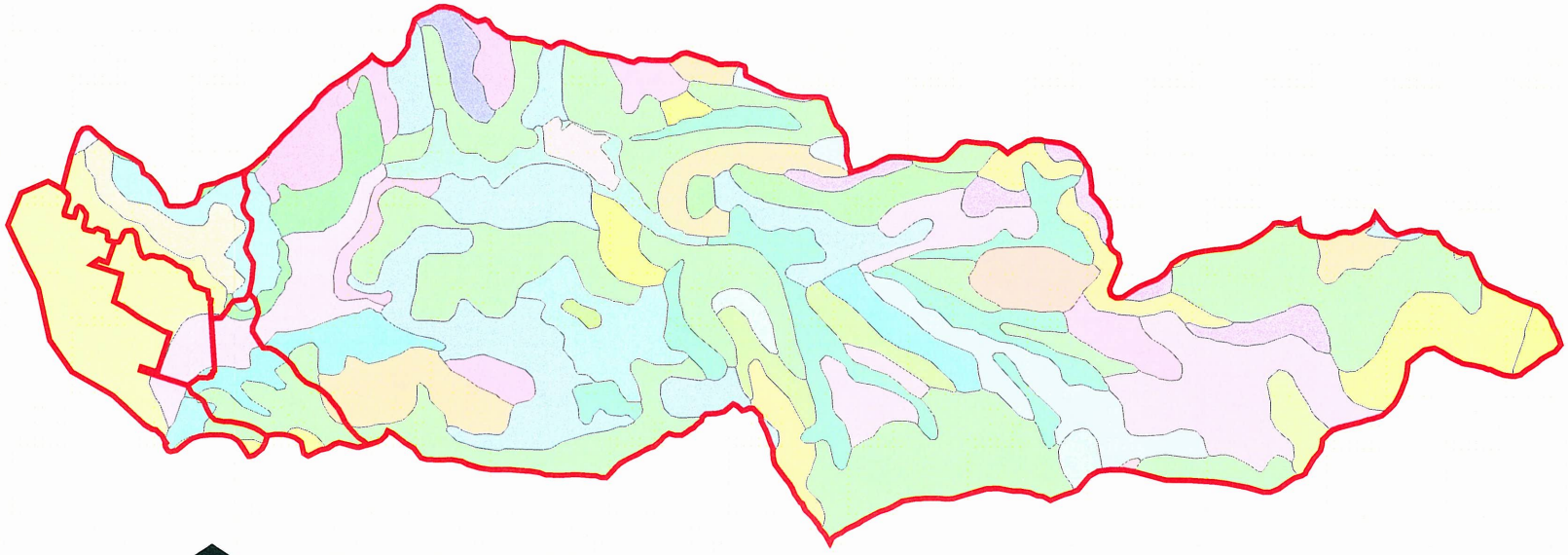
RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324
858.614.5000 ▪ FAX 858.614.5001 ▪ www.RBF.com

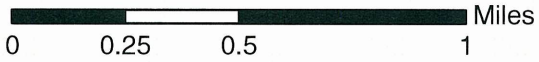
PROJECT LOCATION
SAN DIEGO COUNTY, CA

DRAFTED BY	DATE	SCALE
ADB	11/07	1"=600'

RBF JOB NO.
25-102814

WATERSHED SOIL TYPE MAP





RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
GIS
9755 CLAIREMONT MESA BLVD. STE. 170
SAN DIEGO, CA 92124-1324
858-614-5000 • FAX 858-614-5001 • WWW.RBF.COM

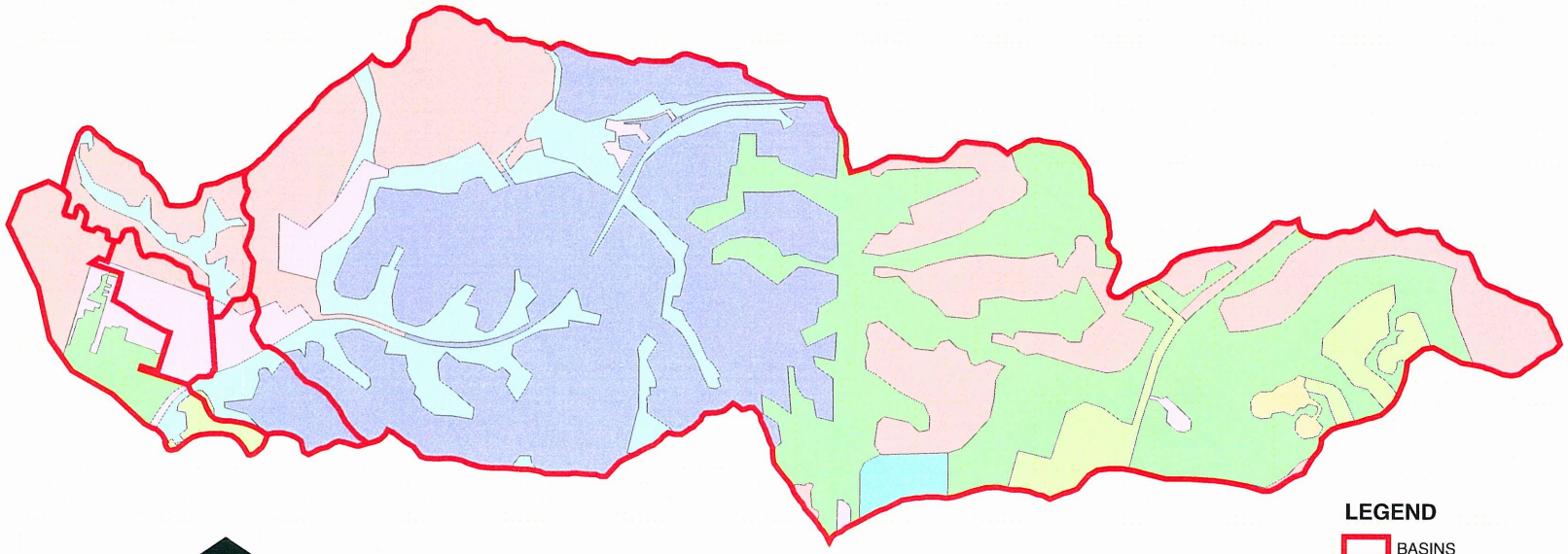
LEGEND

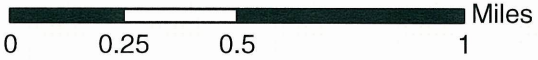
- BASINS

MUSYM

- AtC
- AtD
- AtE
- AwC
- CbB
- CbD
- CbE
- CfB
- DaC
- DaD
- DaE2
- DoE
- GaE
- HrC
- HrC2
- HrD
- HrD2
- HrE2
- LsE
- LvF3
- OhC
- OhE
- OhF
- Rm
- SbA
- SmE
- SnG
- StG
- TeF
- TuB
- VaB
- W

WATERSHED LAND USE MAP





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LEGEND

- BASINS

LAND USE

- LUCOMM
- LUOPEN-50
- LUOPEN50-75
- LUR.13
- LUR.25
- LUR.3
- LUR.5
- LUR1

PRECIPITATION			
P6=		2.75	in
D min	I in/hr	P in	
5	7.25	0.60	
15	3.57	0.89	
60	1.46	1.46	
120	0.93	1.87	
180	0.72	2.15	

BASIN DATA					
BASIN	L (ft)	L (mi)	EL1	EL2	A (sqmi)
WEST	2418	0.457955	36	30.5	0.045
NORTH	3680	0.69697	108	30	0.084
EAST 1	19299	3.655114	648	42	1.998
EAST 2	2186	0.414015	170	40.5	0.060
SOUTH	3519	0.666477	35.5	29	0.112

	LENGTH (ft)			
BASIN	TOTAL	OVERLAND	URBAN*	N
EAST 1	19925	18548	1377	0.049
EAST 2	2186	1080	1106	0.042
NORTH	3680	3030	650	0.044
WEST	2418	1406	1012	0.035
SOUTH	3519	1959	1560	0.034
*.035 FOR EAST, .015 FOR NORTH, WEST AND SOUTH				

NRCS LAG TIME					
	EAST 1	EAST 2	NORTH	WEST	SOUTH
L(mi)=	3.66	0.41	0.7	0.46	0.67
LC(mi)=	1.83	0.205	0.35	0.23	0.335
EL1	648	170	108	36	35.5
EL2	42	40.5	30	30.5	29
n=	0.049	0.042	0.044	0.035	0.034
m=	0.38	0.38	0.38	0.38	0.38
S(ft/mi)=	165.6	315.9	111.4	12.0	9.7
CORPS TL (hr)	0.918	0.132	0.253	0.223	0.300
TP (hr)	0.791	0.114	0.218	0.192	0.259
D (hr)	0.158	0.023	0.044	0.038	0.052
NRCS TL (hr)	0.712	0.102	0.196	0.173	0.233
NRCS TL (min)	**42.7**	**6.1**	**11.8**	**10.4**	**14.0**

EAST 1

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
ILUR.5	VaB	B	135038	70	9452658
ILUR.5	SbA	B	1435	70	100423
ILUR.5	LvF3	C	720059	80	57604711
ILUR.5	LvF3	C	253806	80	20304505
ILUR.5	LvF3	C	163457	80	13076539
ILUR.5	LvF3	C	123377	80	9870142
ILUR.5	HrC	D	2256838	85	191831241
ILUR.5	HrC	D	2102773	85	178735664
ILUR.5	HrD	D	1813020	85	154106684
ILUR.5	HrC2	D	1270340	85	107978929
ILUR.5	HrC	D	1094150	85	93002763
ILUR.5	DoE	D	1070304	85	90975823
ILUR.5	HrD	D	921570	85	78333424
ILUR.5	HrC	D	911710	85	77495349
ILUR.5	DoE	D	677776	85	57610956
ILUR.5	HrC	D	607358	85	51625453
ILUR.5	HrD	D	499276	85	42438482
ILUR.5	AtC	D	493848	85	41977118
ILUR.5	HrD	D	452990	85	38504108
ILUR.5	LsE	D	391320	85	33262201
ILUR.5	SnG	D	359068	85	30520798
ILUR.5	DaE2	D	337861	85	28718179
ILUR.5	GaE	D	236112	85	20069555
ILUR.5	HrE2	D	215976	85	18357953
ILUR.5	DoE	D	202278	85	17193609
ILUR.5	HrE2	D	198300	85	16855493
ILUR.5	OhE	D	179378	85	15247119
ILUR.5	OhF	D	121719	85	10346096
ILUR.5	OhF	D	120587	85	10249925
ILUR.5	DaC	D	86249	85	7331128
ILUR.5	LsE	D	81813	85	6954116
ILUR.5	DaC	D	68102	85	5788656
ILUR.5	HrD	D	46708	85	3970207
ILUR.5	AtC	D	34549	85	2936707
ILUR.5	DaE2	D	33073	85	2811218
ILUR.5	AtC	D	32437	85	2757106
ILUR.5	DaD	D	21387	85	1817926
ILUR.5	StG	D	18861	85	1603191
ILUR.5	DaC	D	11939	85	1014834
ILUR.5	OhC	D	5966	85	507117
ILUR.5	W	D	156	85	13261
LUCOMM	SbA	B	459242	92	42250285
LUCOMM	SbA	B	396147	92	36445532
LUCOMM	VaB	B	35331	92	3250439
LUCOMM	VaB	B	2431	92	223678
LUCOMM	LvF3	C	7453	94	700557
LUCOMM	TeF	D	213818	95	20312699
LUCOMM	HrC	D	99363	95	9439517
LUCOMM	DaD	D	82982	95	7883243

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUCOMM	DaE2	D	56989	95	5413955
LUCOMM	HrC	D	54543	95	5181539
LUCOMM	TeF	D	48564	95	4613579
LUCOMM	TeF	D	43669	95	4148555
LUCOMM	AtC	D	8838	95	839604
LUCOMM	DaC	D	5535	95	525823
LUCOMM	CfB	D	4576	95	434726
LUCOMM	W	D	7	95	634
LUCOMM	HrE2	D	3	95	273
LUOPEN-50	LvF3	C	617868	86	53136620
LUOPEN-50	LvF3	C	588097	86	50576360
LUOPEN-50	LvF3	C	468978	86	40332150
LUOPEN-50	LvF3	C	207133	86	17813451
LUOPEN-50	DaD	D	2100648	89	186957691
LUOPEN-50	HrC	D	1262685	89	112378991
LUOPEN-50	HrC	D	1060556	89	94389515
LUOPEN-50	DaC	D	1033119	89	91947586
LUOPEN-50	OhF	D	841522	89	74895489
LUOPEN-50	AtD	D	593759	89	52844509
LUOPEN-50	DaD	D	529387	89	47115441
LUOPEN-50	DaD	D	498899	89	44401989
LUOPEN-50	HrC	D	496818	89	44216806
LUOPEN-50	DaE2	D	422981	89	37645305
LUOPEN-50	OhE	D	376681	89	33524597
LUOPEN-50	OhC	D	353858	89	31493373
LUOPEN-50	HrD	D	323208	89	28765524
LUOPEN-50	OhE	D	322485	89	28701172
LUOPEN-50	HrD2	D	271538	89	24166843
LUOPEN-50	DaD	D	259864	89	23127918
LUOPEN-50	OhC	D	252166	89	22442743
LUOPEN-50	SmE	D	245871	89	21882493
LUOPEN-50	DoE	D	230897	89	20549789
LUOPEN-50	DaC	D	228390	89	20326676
LUOPEN-50	LsE	D	219664	89	19550071
LUOPEN-50	SnG	D	208472	89	18554029
LUOPEN-50	OhE	D	207885	89	18501745
LUOPEN-50	OhC	D	168462	89	14993148
LUOPEN-50	HrC	D	160447	89	14279764
LUOPEN-50	LsE	D	103287	89	9192511
LUOPEN-50	HrC	D	95729	89	8519893
LUOPEN-50	HrC	D	85427	89	7602970
LUOPEN-50	HrC	D	79135	89	7043028
LUOPEN-50	SnG	D	76989	89	6852041
LUOPEN-50	DoE	D	65950	89	5869566
LUOPEN-50	OhE	D	64566	89	5746404
LUOPEN-50	HrC	D	63697	89	5669064
LUOPEN-50	OhE	D	51335	89	4568823
LUOPEN-50	DaD	D	44470	89	3957846
LUOPEN-50	DaC	D	42442	89	3777302
LUOPEN-50	OhC	D	37045	89	3296989
LUOPEN-50	OhC	D	25822	89	2298199

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUOPEN-50	OhF	D	24972	89	2222474
LUOPEN-50	AwC	D	13537	89	1204798
LUOPEN-50	HrD	D	356	89	31727
LUOPEN50-75	SbA	B	314581	69	21706064
LUOPEN50-75	VaB	B	289879	69	20001646
LUOPEN50-75	VaB	B	230526	69	15906260
LUOPEN50-75	VaB	B	99495	69	6865147
LUOPEN50-75	SbA	B	26680	69	1840930
LUOPEN50-75	LvF3	C	223354	79	17644941
LUOPEN50-75	LvF3	C	205703	79	16250520
LUOPEN50-75	LvF3	C	7143	79	564292
LUOPEN50-75	DaE2	D	633746	84	53234669
LUOPEN50-75	HrD	D	502509	84	42210769
LUOPEN50-75	W	D	394944	84	33175311
LUOPEN50-75	DoE	D	362970	84	30489518
LUOPEN50-75	HrC	D	321334	84	26992019
LUOPEN50-75	HrC	D	227503	84	19110213
LUOPEN50-75	HrC	D	215260	84	18081830
LUOPEN50-75	HrE2	D	205445	84	17257356
LUOPEN50-75	HrD	D	181646	84	15258252
LUOPEN50-75	TeF	D	179684	84	15093435
LUOPEN50-75	HrE2	D	145706	84	12239346
LUOPEN50-75	HrD	D	119813	84	10064286
LUOPEN50-75	HrD	D	115107	84	9668986
LUOPEN50-75	HrC	D	110193	84	9256252
LUOPEN50-75	HrC2	D	81026	84	6806207
LUOPEN50-75	HrC	D	79477	84	6676064
LUOPEN50-75	HrD	D	74442	84	6253089
LUOPEN50-75	StG	D	69464	84	5834999
LUOPEN50-75	AtC	D	67302	84	5653390
LUOPEN50-75	DaE2	D	58450	84	4909825
LUOPEN50-75	HrE2	D	47681	84	4005239
LUOPEN50-75	HrC2	D	45879	84	3853859
LUOPEN50-75	HrC	D	33455	84	2810253
LUOPEN50-75	AtC	D	31659	84	2659339
LUOPEN50-75	HrC2	D	31012	84	2604979
LUOPEN50-75	HrC	D	29857	84	2508021
LUOPEN50-75	SnG	D	21383	84	1796149
LUOPEN50-75	HrD	D	16677	84	1400891
LUOPEN50-75	HrC	D	16261	84	1365911
LUOPEN50-75	HrC	D	16213	84	1361911
LUOPEN50-75	DaC	D	16160	84	1357438
LUOPEN50-75	HrC2	D	14931	84	1254204
LUOPEN50-75	HrC	D	6182	84	519317
LUOPEN50-75	HrC	D	3518	84	295536
LUOPEN50-75	W	D	793	84	66612
LUR.13	SmE	D	200776	92	18471381
LUR.13	DaD	D	106237	92	9773762
LUR.25	HrC	D	465612	87	40508263
LUR.25	DaC	D	368509	87	32060311
LUR.25	HrC	D	298847	87	25999701

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUR.25	GaE	D	258693	87	22506271
LUR.25	AtD	D	241011	87	20967948
LUR.25	AtD	D	150735	87	13113968
LUR.25	DaD	D	139623	87	12147199
LUR.25	DaD	D	131555	87	11445295
LUR.25	SnG	D	40128	87	3491120
LUR.25	OhE	D	30995	87	2696525
LUR.25	OhC	D	18472	87	1607080
LUR.25	OhC	D	16243	87	1413118
LUR.25	AwC	D	13973	87	1215679
LUR.25	DaD	D	7127	87	620013
LUR.25	OhC	D	19	87	1628
LUR.3	HrC	D	608077	86	52294621
LUR1	VaB	B	226598	68	15408673
LUR1	SbA	B	198724	68	13513236
LUR1	SbA	B	2395	68	162852
LUR1	LvF3	C	343933	79	27170714
LUR1	LvF3	C	81478	79	6436749
LUR1	LvF3	C	71738	79	5667327
LUR1	LvF3	C	4061	79	320850
LUR1	LvF3	C	2464	79	194693
LUR1	HrC	D	906236	84	76123865
LUR1	HrC	D	900151	84	75612669
LUR1	CbB	D	831276	84	69827145
LUR1	HrC	D	678865	84	57024662
LUR1	HrD2	D	644319	84	54122771
LUR1	AtD	D	633101	84	53180476
LUR1	TeF	D	518790	84	43578378
LUR1	CbD	D	511060	84	42929075
LUR1	HrC	D	492168	84	41342088
LUR1	HrD	D	455144	84	38232065
LUR1	CfB	D	448825	84	37701324
LUR1	CbB	D	385475	84	32379895
LUR1	DaD	D	358313	84	30098255
LUR1	DoE	D	324432	84	27252295
LUR1	SnG	D	315307	84	26485785
LUR1	DaE2	D	298453	84	25070093
LUR1	HrC	D	254732	84	21397518
LUR1	LsE	D	248436	84	20868589
LUR1	AtC	D	244932	84	20574278
LUR1	OhC	D	219849	84	18467348
LUR1	HrC	D	206498	84	17345813
LUR1	HrE2	D	193567	84	16259659
LUR1	HrC	D	188817	84	15860602
LUR1	OhE	D	170129	84	14290833
LUR1	HrC	D	169666	84	14251955
LUR1	HrD	D	162080	84	13614704
LUR1	HrD	D	160809	84	13507980
LUR1	DaD	D	152910	84	12844435
LUR1	OhE	D	149452	84	12553948
LUR1	OhC	D	97893	84	8223008

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUR1	TeF	D	91169	84	7658231
LUR1	DaC	D	79443	84	6673171
LUR1	HrD	D	75064	84	6305345
LUR1	OhE	D	58005	84	4872438
LUR1	OhC	D	56414	84	4738802
LUR1	DaE2	D	46740	84	3926130
LUR1	TeF	D	41610	84	3495217
LUR1	HrC	D	37303	84	3133453
LUR1	OhE	D	30586	84	2569225
LUR1	OhE	D	26623	84	2236370
LUR1	SmE	D	22888	84	1922595
LUR1	TeF	D	22383	84	1880213
LUR1	DaC	D	22253	84	1869215
LUR1	OhC	D	21274	84	1787050
LUR1	HrE2	D	19065	84	1601434
LUR1	DaC	D	14775	84	1241079
LUR1	DaD	D	12732	84	1069446
LUR1	DaD	D	12731	84	1069443
LUR1	SmE	D	10386	84	872461
LUR1	OhC	D	10315	84	866431
LUR1	OhF	D	9950	84	835765
LUR1	HrC	D	5617	84	471859
LUR1	OhE	D	5073	84	426171
LUR1	DaD	D	1348	84	113246
		TOTAL	57278050		4891151978
		COMPOSITE CN			**85**
			PNZ ADJ		**88**

EAST 2

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
ILUR.5	HrC	D	2102773	85	178735664
ILUR.5	DoE	D	1070304	85	90975823
ILUR.5	DaE2	D	337861	85	28718179
ILUR.5	AtD	D	76166	85	6474069
LUCOMM	TuB	A	96	89	8578
LUCOMM	SbA	B	459242	92	42250285
LUCOMM	DaE2	D	56989	95	5413955
LUCOMM	TeF	D	48564	95	4613579
LUOPEN50-75	SbA	B	26680	69	1840930
LUOPEN50-75	DaE2	D	633746	84	53234669
LUOPEN50-75	HrC	D	215260	84	18081830
LUOPEN50-75	AtE	D	3044	84	255677

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUR.25	HrC	D	12058	87	1049023
LUR.25	AtE	D	10749	87	935138
LUR.25	DaE2	D	3045	87	264885
LUR1	CfB	D	448825	84	37701324
LUR1	TeF	D	91169	84	7658231
		TOTAL	5596570		478211841
		COMPOSITE CN			85
		PNZ ADJ			88

NORTH

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUCOMM	TuB	A	24409	89	2172429
LUCOMM	SbA	B	6297	92	579305
LUCOMM	TeF	D	2722	95	258560
LUOPEN50-75	TuB	A	143229	49	7018199
LUOPEN50-75	CbE	C	440305	79	34784126
LUOPEN50-75	TeF	D	8092	84	679733
LUOPEN50-75	Rm	D	39392	84	3308938
LUOPEN50-75	CfB	D	25649	84	2154522
LUR1	TuB	A	468681	51	23902741
LUR1	TuB	A	14833	51	756503
LUR1	CbE	C	13751	79	1086305
LUR1	CbE	C	433294	79	34230198
LUR1	TeF	D	2432	84	204297
LUR1	TeF	D	45752	84	3843192
LUR1	Rm	D	2348	84	197250
LUR1	Rm	D	15217	84	1278205
LUR1	CfB	D	642050	84	53932227
		TOTAL	2328454		170386729
		COMPOSITE CN			73
		PNZ ADJ			77

WEST

LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUCOMM	TuB	A	537908	89	47873850
LUCOMM	SbA	B	380573	92	35012740
LUCOMM	DaE2	D	19997	95	1899676
LUR1	TuB	A	311400	51	15881409
		TOTAL	1249878		100667674
		COMPOSITE CN			81
		PNZ ADJ			84

SOUTH

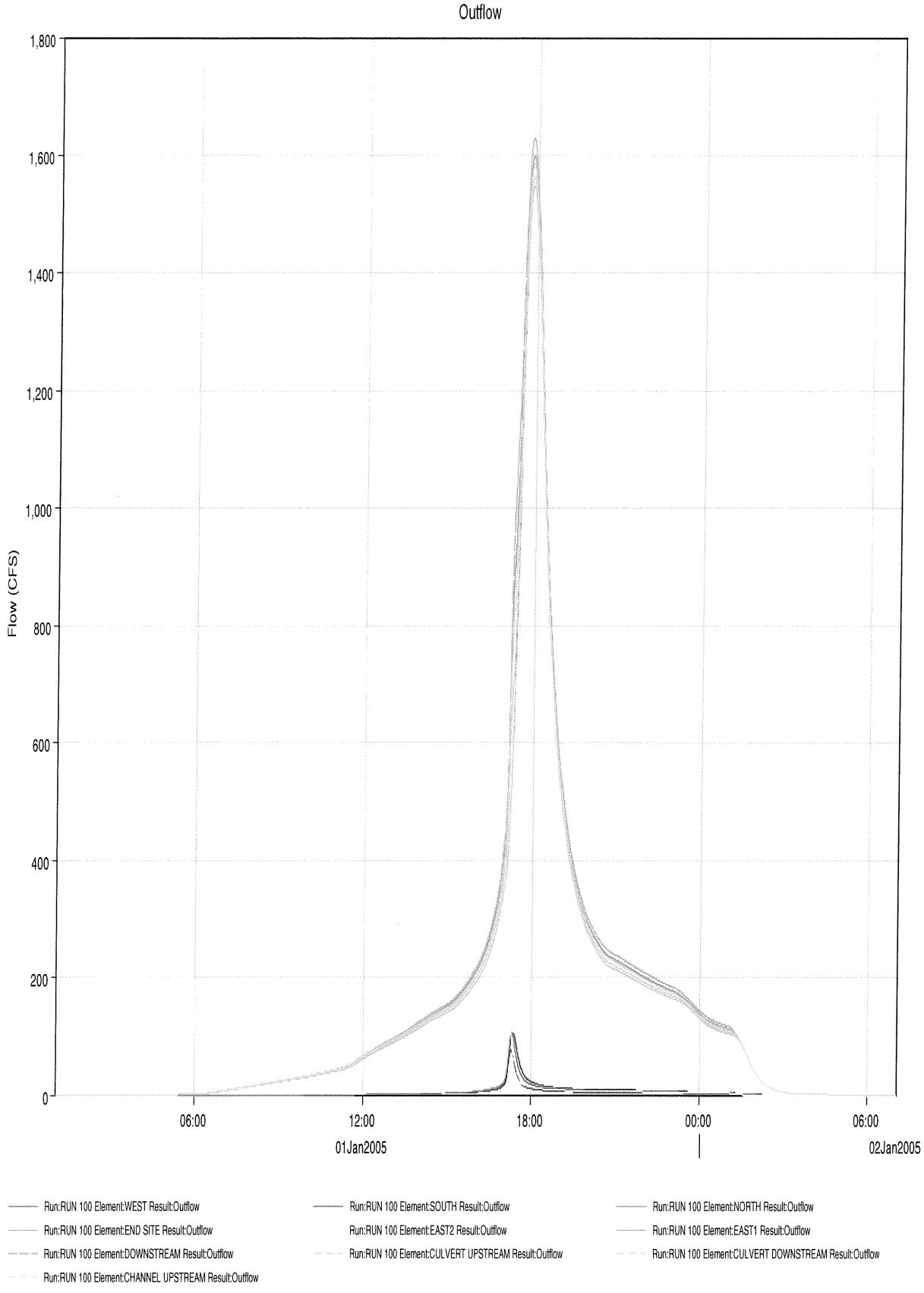
LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUCOMM	TuB	A	422338	89	37588094
LUCOMM	TuB	A	20297	89	1806420
LUCOMM	SbA	B	29472	92	2711395
LUCOMM	DaE2	D	944	95	89724

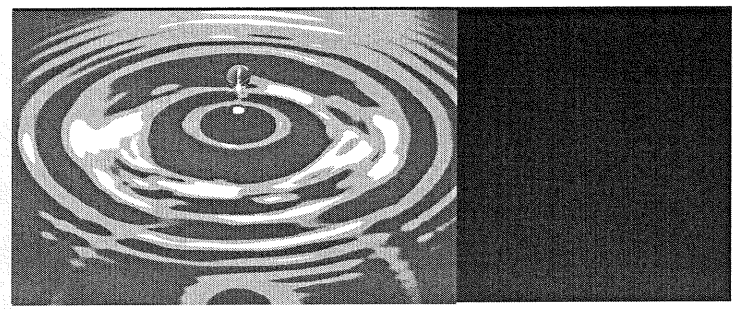
LAND USE	MUSYM	SOILTYPE	Area (sqft)	CN	A*CN
LUOPEN-50	TuB	A	856538	68	58244571
LUOPEN-50	SbA	B	83660	79	6609150
LUOPEN50-75	TuB	A	21912	49	1073666
LUOPEN50-75	SbA	B	41283	69	2848525
LUOPEN50-75	AtE	D	61095	84	5132022
LUOPEN50-75	DaE2	D	6038	84	507226
LUOPEN50-75	HrC	D	1853	84	155632
LUR.25	SbA	B	1590	75	119255
LUR.25	HrC	D	140189	87	12196472
LUR.25	AtE	D	126833	87	11034459
LUR.25	AtD	D	37386	87	3252615
LUR.25	DaE2	D	3503	87	304720
LUR1	TuB	A	1253747	51	63941116
		TOTAL	3108679		207615063
		COMPOSITE CN			**67**
			PNZ ADJ		**72**

PNZ CONDITION CURVE NUMBER (CN) ADJUSTMENT				
BASIN	CN FOR PNZ=2	PNZ CONDITION	CONVERT TO PNZ	ADJ CN
E1	85	1.3	2.3	**88**
E2	85	1.3	2.3	**88**
N	73	1.3	2.3	**77**
W	81	1.3	2.3	**84**
S	67	1.3	2.3	**72**

BASED UPON INTERPOLATION OF FIGURE C-1, TABLE 4-6 AND TABLE 4-10, SAN DIEGO COUNTY HYDROLOGY MANUAL

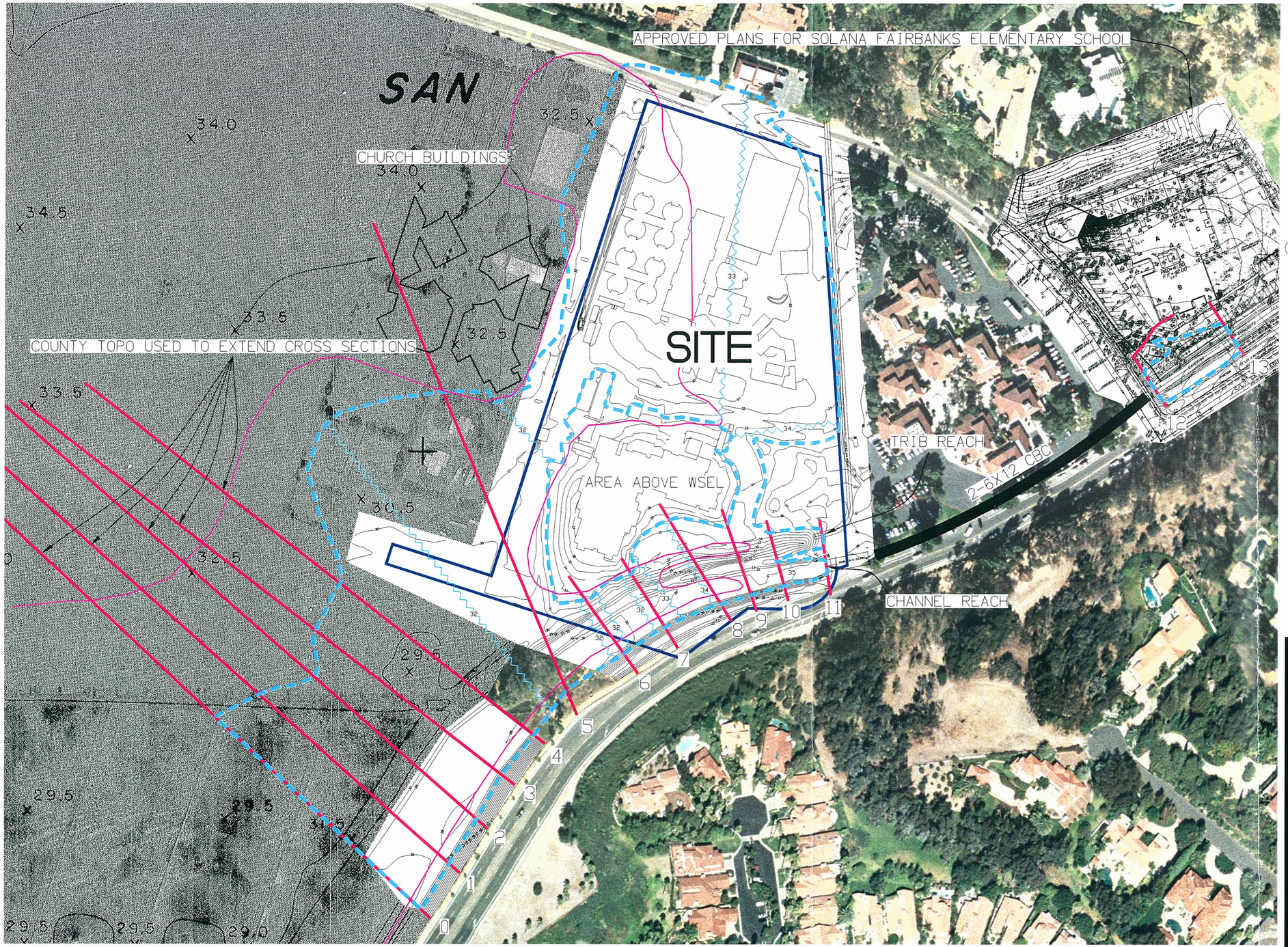
HYDROLOGIC ELEMENT	DRAINAGE AREA (mi^2)	PEAK DISCHARGE (cfs)	TIME OF PEAK
CHANNEL UPSTREAM	2.142	1586.5	01Jan2005, 17:50
CULVERT DOWNSTREAM	2.058	1564.17	01Jan2005, 17:50
CULVERT UPSTREAM	1.998	1548.13	01Jan2005, 17:50
DOWNSTREAM	2.299	1629.4	01Jan2005, 17:49
EAST1	1.998	1548.13	01Jan2005, 17:50
EAST2	0.06	150.35	01Jan2005, 17:12
END SITE	2.187	1599.58	01Jan2005, 17:50
NORTH	0.084	106.08	01Jan2005, 17:18
SOUTH	0.112	105.61	01Jan2005, 17:20
WEST	0.045	75.87	01Jan2005, 17:16


Outflow
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Flow (CFS)
06:00
12:00
18:00
00:00
06:00
01Jan2005
02Jan2005
Run:RUN 100 Element:WEST Result:Outflow
Run:RUN 100 Element:SOUTH Result:Outflow
Run:RUN 100 Element:NORTH Result:Outflow
Run:RUN 100 Element:END SITE Result:Outflow
Run:RUN 100 Element:EAST2 Result:Outflow
Run:RUN 100 Element:EAST1 Result:Outflow
Run:RUN 100 Element:DOWNSTREAM Result:Outflow
Run:RUN 100 Element:CULVERT UPSTREAM Result:Outflow
Run:RUN 100 Element:CULVERT DOWNSTREAM Result:Outflow
Run:RUN 100 Element:CHANNEL UPSTREAM Result:Outflow



APPENDIX B
HYDRAULIC ANALYSES

RBF CONSULTING



0 200 400 600

LEGEND

- SITE BOUNDARY
- STRUCTURES
- CONTOUR
- CROSS SECTION
- LIMIT OF INUNDATION
- 32 WATER SURFACE CONTOUR
- EL APAJO DRAINAGE STUDY FLOODPLAIN

NOTES:
NATURAL AREAS OF CROSS SECTIONS BASED UPON SURVEY POINTS, NOT DISPLAYED CONTOURS.

WOODWARD CENTER

EXISTING CONDITION INUNDATION MAP

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324
858.614.5000 ▪ FAX 858.614.5001 ▪ www.RBF.com

PROJECT LOCATION
SAN DIEGO COUNTY, CA

DRAFTED BY	DATE	SCALE
ADB	11/07	1"=200'

RBF JOB NO.
25-102814

H:\PDATA\25102814\Cadd\Stormwater\EXHIBITS\FP-HWMEX02.dwg 12/20/07 - 7:42am ABARRY

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
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: CHANNEL 08EX
Project File : CH08EX.prj
Run Date and Time: 11/26/2007 2:49:46 PM

Project in English units

*****************************************************************************

PLAN DATA

Plan Title: CHANNEL
Plan File : H:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CH08EX.p01

          Geometry Title: CHANNEL
          Geometry File : H:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CH08EX.g01

          Flow Title    : CHANNEL
          Flow File     : H:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CH08EX.f01

Plan Summary Information:
Number of:  Cross Sections =   16    Mulitple Openings =    0
            Culverts       =    1    Inline Weirs      =    0
            Bridges        =    0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  20
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

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


*****************************************************************************

FLOW DATA

Flow Title: CHANNEL
Flow File : H:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CH08EX.f01

Flow Data (cfs)
**********************************************************
* River           Reach           RS      *          100 YR *
* CHANNEL         1               13      *            1548 *
* CHANNEL         1               11      *            1564 *
* CHANNEL         2               9       *            1587 *
* CHANNEL         2               5       *            1600 *
* CHANNEL         2               0       *            1629 *
* TRIB            TRIB            11      *              91 *
**********************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile         *           Upstream                 Downstream    *
*****************************************************************************************************
* CHANNEL         1               100 YR          *         Normal S = .0049                        *
* CHANNEL         2               100 YR          *                                 Known WS = 31.2 *
* TRIB            TRIB            100 YR          *           Normal S = .01                        *
*****************************************************************************************************

*****************************************************************************

GEOMETRY DATA

Geometry Title: CHANNEL
Geometry File : H:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CH08EX.g01

Reach Connection Table
*****************************************************************************
* River           Reach           *  Upstream Boundary  * Downstream Boundary *
*****************************************************************************
* CHANNEL         1               *                     *   J1                *
* CHANNEL         2               *   J1                *                     *
* TRIB            TRIB            *                     *   J1                *
*****************************************************************************

JUNCTION INFORMATION
```

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	42.65	0	51.7	42.02	0	96.3	41.8	0
117.4	41.6	0	147.4	41.08	0	147.4	40.58	0
186	40.5	0	186	41	0	203.3	41.36	0
231.4	41.96	0	231.4	51.96	0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	44	2.6	43	4.1	43	7.5	42	9.9	41
14.1	40	17.1	39	22.2	38	26.4	35.89	26.4	29.89
51.4	29.89	51.4	35.89	52.2	37	55.5	38	58.5	39
67.3	40	96.1	41	117.4	41.6	147.4	41.08	147.4	40.58
186	40.5	186	41	203.3	41.36	231.4	41.96	231.4	51.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	22.2	.013	55.5	.015

Bank Sta: Left Right Coeff Contr. Expan.
22.2 55.5 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	F		
888	F		

Downstream Deck/Roadway Coordinates
num= 11

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	42.65	0	51.7	42.02	0	96.3	41.8	0
117.4	41.6	0	147.4	41.08	0	147.4	40.58	0
186	40.5	0	186	41	0	203.3	41.36	0
231.4	41.96	0	231.4	51.96	0			

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.3	34.43	36.7	42.77	37	42.8	35.3	42.8	29.3
67.8	29.3	67.8	35.3	67.83	36.9	71.44	37		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	42.77	.035	67.83	.035

Bank Sta: Left Right Coeff Contr. Expan.
42.77 67.83 .3 .5

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 = 40.5
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
Culvert #1 Box 6 12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
	5	715	.013	.5	1

Number of Barrels = 2
Upstream Elevation = 29.89
Centerline Stations

Sta.	Sta.
32.4	45.4

Downstream Elevation = 29.3
Centerline Stations

Sta.	Sta.
48.8	61.8

CULVERT OUTPUT Profile #100 YR
Culvert ID : Culvert #1

* Culv Q (cfs)	* 1548.00	* Culv Ful Lngh (ft)	* 715.00 *
* # Barrels	* 2	* Culv Vel US (ft/s)	* 10.75 *
* Q Barrel (cfs)	* 774.00	* Culv Vel DS (ft/s)	* 10.75 *
* E.G. US. (ft)	* 40.92	* Culv Inv El Up (ft)	* 29.89 *
* W.S. US. (ft)	* 40.51	* Culv Inv El Dn (ft)	* 29.30 *
* E.G. DS (ft)	* 37.19	* Culv Frctn Ls (ft)	* 2.51 *
* W.S. DS (ft)	* 35.72	* Culv Ext Lss (ft)	* 0.32 *
* Delta EG (ft)	* 3.73	* Culv Ent Lss (ft)	* 0.90 *
* Delta WS (ft)	* 4.79	* Q Weir (cfs)	* *
* E.G. IC (ft)	* 39.70	* Weir Sta Lft (ft)	* *
* E.G. OC (ft)	* 40.92	* Weir Sta Rgt (ft)	* *
* Culvert Control	* Outlet	* Weir Submerg	* *
* Culv WS Inlet (ft)	* 35.89	* Weir Max Depth (ft)	* *
* Culv WS Outlet (ft)	* 35.30	* Weir Avg Depth (ft)	* *
* Culv Nml Depth (ft)	*	* Wr Flw Area (sq ft)	* *
* Culv Crt Depth (ft)	* 5.06	* Min El Weir Flow (ft)	* 41.93 *

CROSS SECTION RIVER: CHANNEL
REACH: 1 RS: 11

```
         21.74  129.95              64.2   72.23   82.21             .1       .3

 CROSS SECTION OUTPUT    Profile #100 YR
 ********************************************************************************************
 * E.G. Elev (ft)         *   34.56  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.035  *   0.035  *
 * W.S. Elev (ft)         *   34.07  * Reach Len. (ft)        *   64.20  *   72.23  *   82.21  *
 * Crit W.S. (ft)         *   32.93  * Flow Area (sq ft)      *          *  275.04  *   20.21  *
 * E.G. Slope (ft/ft)     *0.004140  * Area (sq ft)           *          *  275.04  *   20.21  *
 * Q Total (cfs)          * 1587.00  * Flow (cfs)             *          * 1554.47  *   32.53  *
 * Top Width (ft)         *  134.18  * Top Width (ft)         *          *   89.52  *   44.65  *
 * Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *          *    5.65  *    1.61  *
 * Max Chl Dpth (ft)      *    5.27  * Hydr. Depth (ft)       *          *    3.07  *    0.45  *
 * Conv. Total (cfs)      * 24663.7  * Conv. (cfs)            *          * 24158.1  *   505.6  *
 * Length Wtd. (ft)       *   72.61  * Wetted Per. (ft)       *          *   92.43  *   44.70  *
 * Min Ch El (ft)         *   28.80  * Shear (lb/sq ft)       *          *    0.77  *    0.12  *
 * Alpha                  *    1.08  * Stream Power (lb/ft s) *          *    4.35  *    0.19  *
 * Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *    0.11  *    8.03  *    8.34  *
 * C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    0.09  *    2.90  *   11.19  *
 ********************************************************************************************

 Warning: Divided flow computed for this cross-section.

 CROSS SECTION          RIVER: CHANNEL
 REACH: 2                  RS: 8

 INPUT
 Description:
 Station Elevation Data    num=      18
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 ********************************************************************************
        0    42.1    8.23    42.5   14.34    40.3   28.03    39.3   45.39    30.4
    54.83    30.3   60.49    29.9  113.27    33.3  126.76    29.2  133.57    29.1
   139.23    29.6  149.46    30.7   162.7    33.2   172.4    33.2  207.63      33
   229.58      34  241.84      35  266.83      36

 Manning's n Values        num=       3
      Sta   n Val     Sta   n Val     Sta   n Val
 ***********************************************
        0    .035   28.03    .035   162.7    .035

 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          28.03   162.7             117.39  119.84  120.57            .1       .3

 CROSS SECTION OUTPUT    Profile #100 YR
 ********************************************************************************************
 * E.G. Elev (ft)         *   34.27  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.035  *   0.035  *
 * W.S. Elev (ft)         *   34.01  * Reach Len. (ft)        *  117.39  *  119.84  *  120.57  *
 * Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *  359.81  *   50.98  *
 * E.G. Slope (ft/ft)     *0.002383  * Area (sq ft)           *          *  359.81  *   50.98  *
 * Q Total (cfs)          * 1587.00  * Flow (cfs)             *          * 1498.95  *   88.06  *
 * Top Width (ft)         *  191.33  * Top Width (ft)         *          *  124.35  *   66.98  *
 * Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *          *    4.17  *    1.73  *
 * Max Chl Dpth (ft)      *    4.91  * Hydr. Depth (ft)       *          *    2.89  *    0.76  *
 * Conv. Total (cfs)      * 32506.7  * Conv. (cfs)            *          * 30703.1  *  1803.6  *
 * Length Wtd. (ft)       *  119.86  * Wetted Per. (ft)       *          *  126.27  *   67.00  *
 * Min Ch El (ft)         *   29.10  * Shear (lb/sq ft)       *          *    0.42  *    0.11  *
 * Alpha                  *    1.11  * Stream Power (lb/ft s) *          *    1.77  *    0.20  *
 * Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *    0.11  *    7.50  *    8.27  *
 * C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.09  *    2.73  *   11.08  *
 ********************************************************************************************

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

 CROSS SECTION          RIVER: CHANNEL
 REACH: 2                  RS: 7

 INPUT
 Description:
 Station Elevation Data    num=      21
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 ********************************************************************************
        0    43.1    9.43    43.4   19.09    40.4   36.28    39.1   54.02    30.5
    58.36    30.5   62.72    29.8   69.95    29.5   79.22    29.5   92.19    29.5
   101.03    39.5  106.19      30  122.08    33.1  132.31    33.4  145.28    29.1
   149.16    29.1  169.27    33.2   177.9    33.6  184.92      34  196.45      35
   205.48      36

 Manning's n Values        num=       3
      Sta   n Val     Sta   n Val     Sta   n Val
 ***********************************************
        0    .035   36.28    .035  169.27    .035

 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          36.28  169.27             95.02   97.29   99.66            .1       .3

 CROSS SECTION OUTPUT    Profile #100 YR
 ********************************************************************************************
 * E.G. Elev (ft)         *   33.78  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)          *    0.59  * Wt. n-Val.             *          *   0.035  *          *
 * W.S. Elev (ft)         *   33.19  * Reach Len. (ft)        *   95.02  *   97.29  *   99.66  *
 * Crit W.S. (ft)         *   32.49  * Flow Area (sq ft)      *          *  257.16  *          *
 * E.G. Slope (ft/ft)     *0.006774  * Area (sq ft)           *          *  257.16  *          *
 * Q Total (cfs)          * 1587.00  * Flow (cfs)             *          * 1587.00  *          *
 * Top Width (ft)         *  103.95  * Top Width (ft)         *          *  103.95  *          *
 * Vel Total (ft/s)       *    6.17  * Avg. Vel. (ft/s)       *          *    6.17  *          *
 * Max Chl Dpth (ft)      *    4.09  * Hydr. Depth (ft)       *          *    2.47  *          *
 * Conv. Total (cfs)      * 19282.1  * Conv. (cfs)            *          * 19282.1  *          *
 * Length Wtd. (ft)       *   97.29  * Wetted Per. (ft)       *          *  109.57  *          *
 * Min Ch El (ft)         *   29.10  * Shear (lb/sq ft)       *          *    0.99  *          *
 * Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.13  *          *
 * Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *    0.11  *    6.66  *    8.20  *
```

REACH: 2 RS: 4

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43.5	33.43	28.9	55.46	27.9	103.29	28.4	130.09	28.9
139.84	30.3	712	32.5	1129	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	33.43	.035	139.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
33.43	139.84	98.28	99.63	103.48	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	31.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.69	Reach Len. (ft)	98.28	99.63	103.48
Crit W.S. (ft)		Flow Area (sq ft)	8.93	343.97	252.35
E.G. Slope (ft/ft)	0.001541	Area (sq ft)	8.93	343.97	252.35
Q Total (cfs)	1600.00	Flow (cfs)	17.54	1252.05	330.40
Top Width (ft)	475.10	Top Width (ft)	6.40	106.41	362.29
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.96	3.64	1.31
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)	1.40	3.23	0.70
Conv. Total (cfs)	40764.7	Conv. (cfs)	447.0	31899.8	8418.0
Length Wtd. (ft)	100.29	Wetted Per. (ft)	6.98	106.54	362.30
Min Ch El (ft)	27.90	Shear (lb/sq ft)	0.12	0.31	0.07
Alpha	1.54	Stream Power (lb/ft s)	0.24	1.13	0.09
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.10	3.78	1.56
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	1.20	2.47

CROSS SECTION RIVER: CHANNEL
REACH: 2 RS: 3

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.2	41.15	28.8	68.42	28.2	129.41	28.3	152.94	28.1
166.4	30.3	735	32.5	1209	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	41.15	.035	166.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
41.15	166.4	99.43	100.2	47.26	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	31.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.55	Reach Len. (ft)	99.43	100.20	47.26
Crit W.S. (ft)		Flow Area (sq ft)	11.58	394.41	200.66
E.G. Slope (ft/ft)	0.001401	Area (sq ft)	11.58	394.41	200.66
Q Total (cfs)	1600.00	Flow (cfs)	21.98	1345.38	232.64
Top Width (ft)	455.74	Top Width (ft)	8.43	125.25	322.06
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.90	3.41	1.16
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)	1.37	3.15	0.62
Conv. Total (cfs)	42739.4	Conv. (cfs)	587.2	35938.0	6214.3
Length Wtd. (ft)	94.00	Wetted Per. (ft)	8.87	125.44	322.06
Min Ch El (ft)	28.10	Shear (lb/sq ft)	0.11	0.28	0.05
Alpha	1.44	Stream Power (lb/ft s)	0.22	0.94	0.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.08	2.93	1.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	0.94	1.65

CROSS SECTION RIVER: CHANNEL
REACH: 2 RS: 2

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	35.9	28.8	47.48	27.9	137.65	28.4	156.86	28.6
170.25	30.4	756	32.5	1262	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	35.9	.035	170.25	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.9	170.25	100.95	99.23	93.18	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	31.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.38	Reach Len. (ft)	100.95	99.23	93.18
Crit W.S. (ft)		Flow Area (sq ft)	9.82	407.25	134.80
E.G. Slope (ft/ft)	0.001582	Area (sq ft)	9.82	407.25	134.80
Q Total (cfs)	1600.00	Flow (cfs)	18.96	1439.27	141.77
Top Width (ft)	416.17	Top Width (ft)	7.60	134.35	274.22
Vel Total (ft/s)	2.90	Avg. Vel. (ft/s)	1.93	3.53	1.05

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	34.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	34.81	Reach Len. (ft)	93.17	96.06	98.94
Crit W.S. (ft)	31.66	Flow Area (sq ft)	9.31	42.85	11.32
E.G. Slope (ft/ft)	0.000421	Area (sq ft)	9.31	42.85	11.32
Q Total (cfs)	91.00	Flow (cfs)	6.24	75.80	8.96
Top Width (ft)	37.19	Top Width (ft)	13.76	10.46	12.97
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)	0.67	1.77	0.79
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)	0.68	4.10	0.87
Conv. Total (cfs)	4433.7	Conv. (cfs)	304.1	3693.1	436.6
Length Wtd. (ft)	96.10	Wetted Per. (ft)	13.82	14.82	13.07
Min Ch El (ft)	29.70	Shear (lb/sq ft)	0.02	0.08	0.02
Alpha	1.31	Stream Power (lb/ft s)	0.01	0.13	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.56	0.03
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.06	0.02

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

CROSS SECTION RIVER: TRIB
REACH: TRIB RS: 10

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.9	13.26	29.5	15.82	29.4	20.03	29.5	30.6	30
42.19	34.7	46.6	34.8	73.05	35.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	42.19	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	42.19	71.28	71.99	.3	.5

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	34.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	0.035
W.S. Elev (ft)	34.82	Reach Len. (ft)	68.87	68.87	68.87
Crit W.S. (ft)		Flow Area (sq ft)		153.37	0.33
E.G. Slope (ft/ft)	0.000037	Area (sq ft)		153.37	0.33
Q Total (cfs)	91.00	Flow (cfs)		90.99	0.01
Top Width (ft)	47.52	Top Width (ft)		42.00	5.52
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)		0.59	0.04
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		3.65	0.06
Conv. Total (cfs)	14977.2	Conv. (cfs)		14975.2	2.1
Length Wtd. (ft)	68.87	Wetted Per. (ft)		43.97	5.53
Min Ch El (ft)	29.40	Shear (lb/sq ft)		0.01	0.00
Alpha	1.00	Stream Power (lb/ft s)		0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		0.34	0.02
C & E Loss (ft)	0.14	Cum SA (acres)			

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

SUMMARY OF MANNING'S N VALUES

River:CHANNEL

Reach	River Sta.	n1	n2	n3
1	13	.035	.013	.015
1	12	.035	.013	.015
1	11.5	Culvert		
1	11	.035	.035	.035
1	10	.035	.035	.035
2	9	.035	.035	.035
2	8	.035	.035	.035
2	7	.035	.035	.035
2	6	.035	.035	.035
2	5	.035	.035	.035
2	4	.035	.035	.035
2	3	.035	.035	.035
2	2	.035	.035	.035
2	1	.035	.035	.035
2	0	.035	.035	.035

River:TRIB

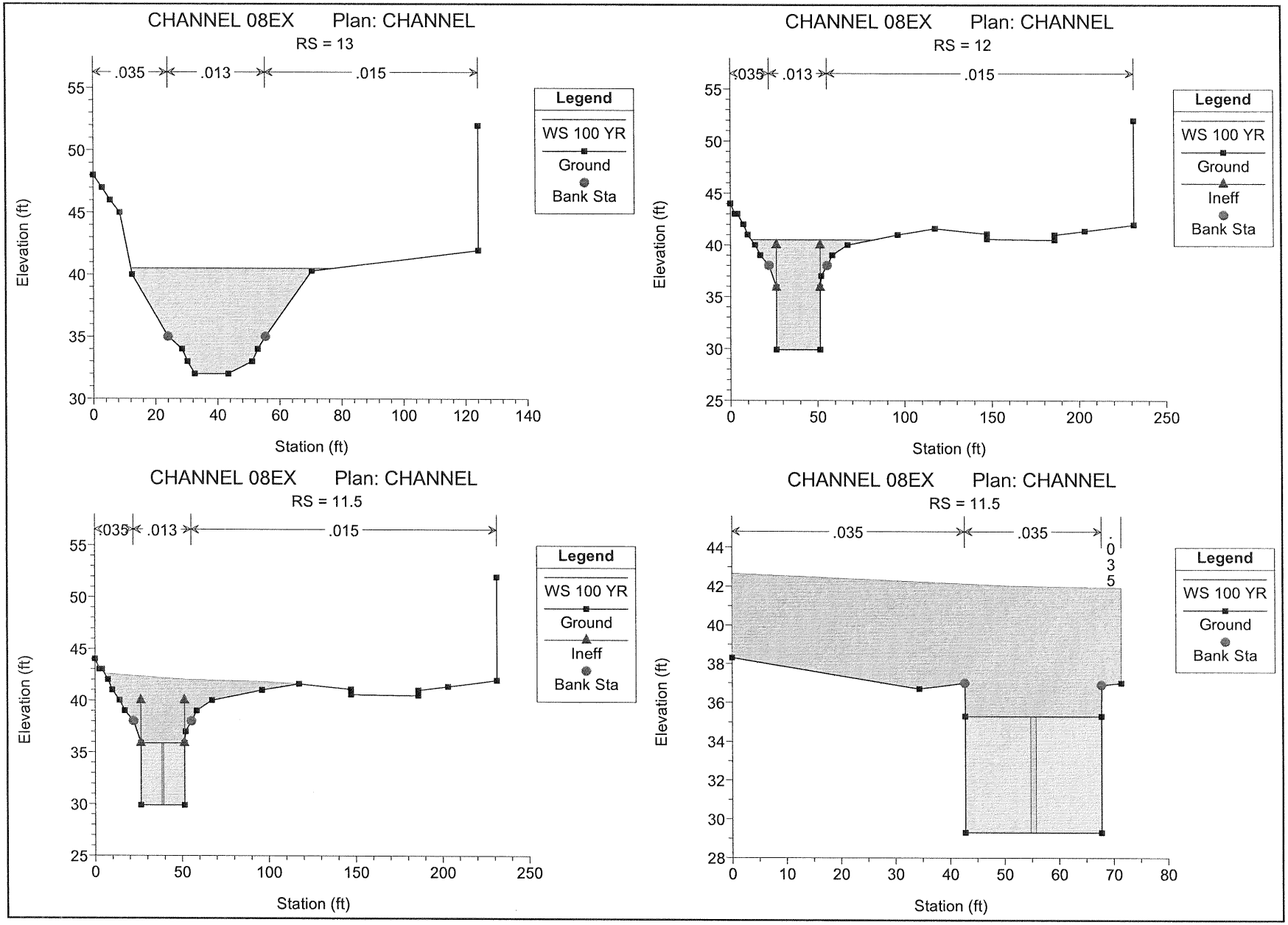
Reach	River Sta.	n1	n2	n3
TRIB	11	.035	.035	.035
TRIB	10	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: CHANNEL

Reach	River Sta.	Left	Channel	Right

River	Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
CHANNEL	1	13	41.00	40.50	0.51	0.03	0.05	38.31	1417.81	91.88	64.62
CHANNEL	1	12	40.92	40.51	0.41			9.32	1519.35	19.33	75.52
CHANNEL	1	11.5	Culvert								
CHANNEL	1	11	37.19	35.72	1.48	0.87	0.03		1564.00		25.02
CHANNEL	1	10	36.29	34.87	1.42	0.47	0.47		1564.00		57.48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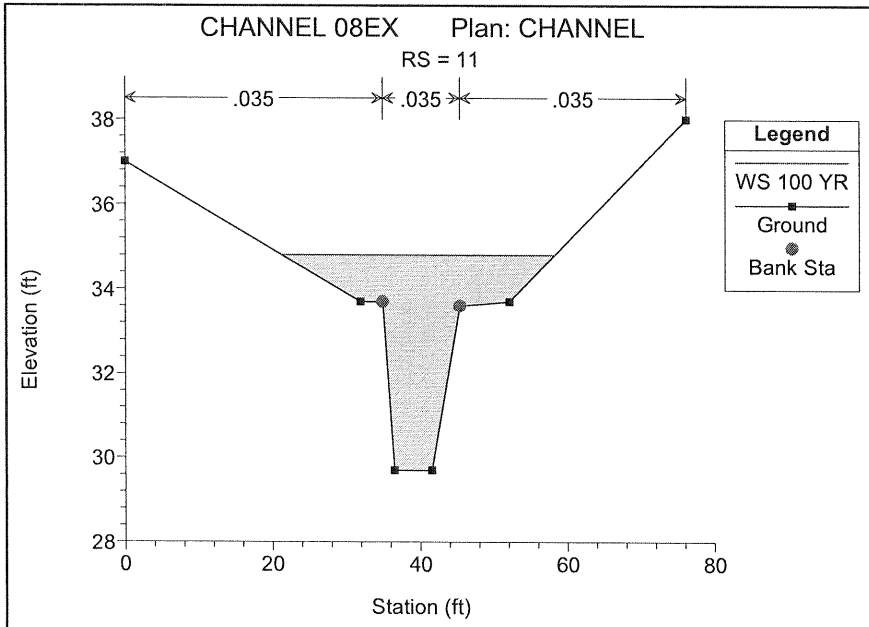
RS = 13
.035
.013
.015
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 12
.035
.013
.015
Legend
WS 100 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 11.5
.035
.013
.015
Legend
WS 100 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 11.5
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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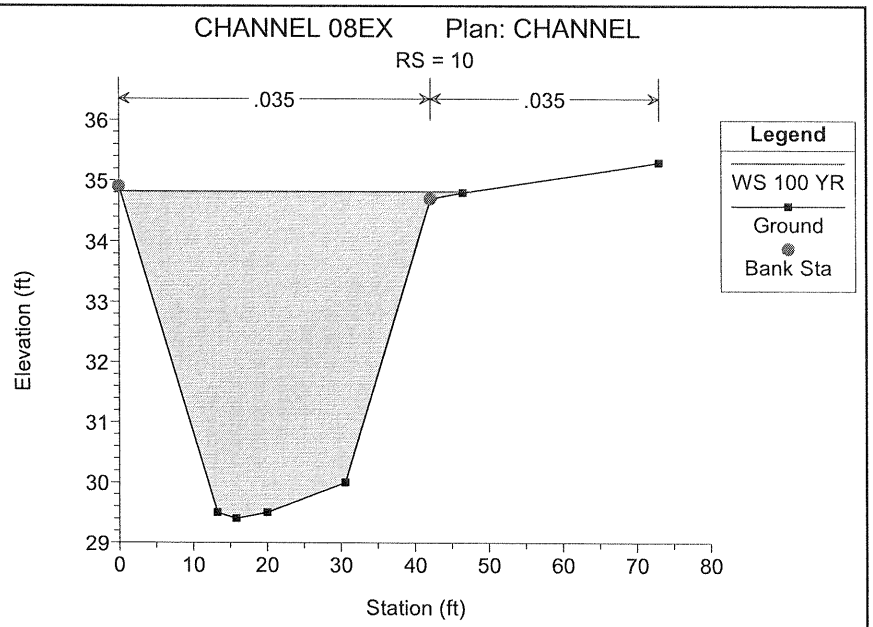
RS = 11
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
38
36
34
32
30
28
0
20
40
60
80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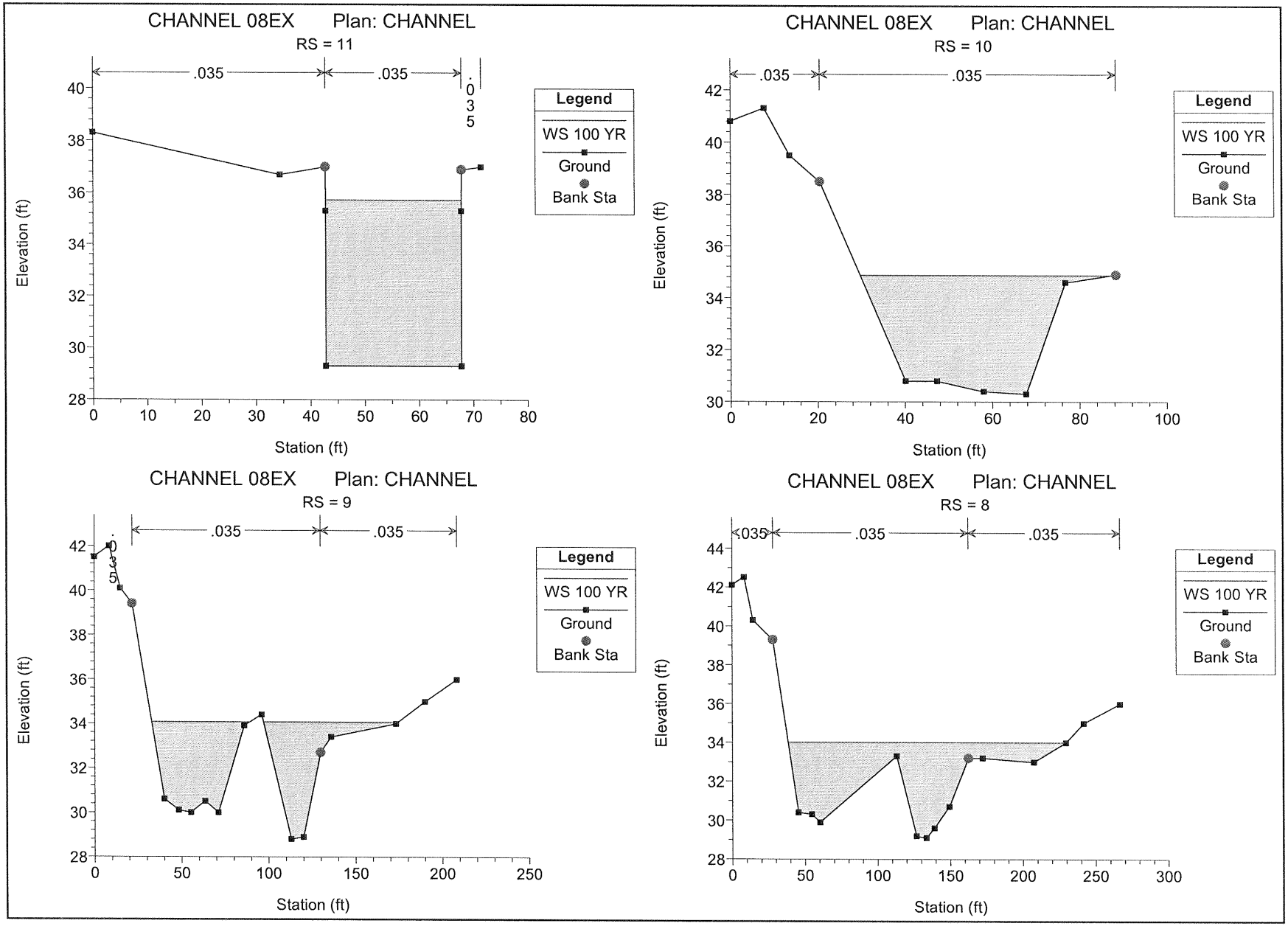
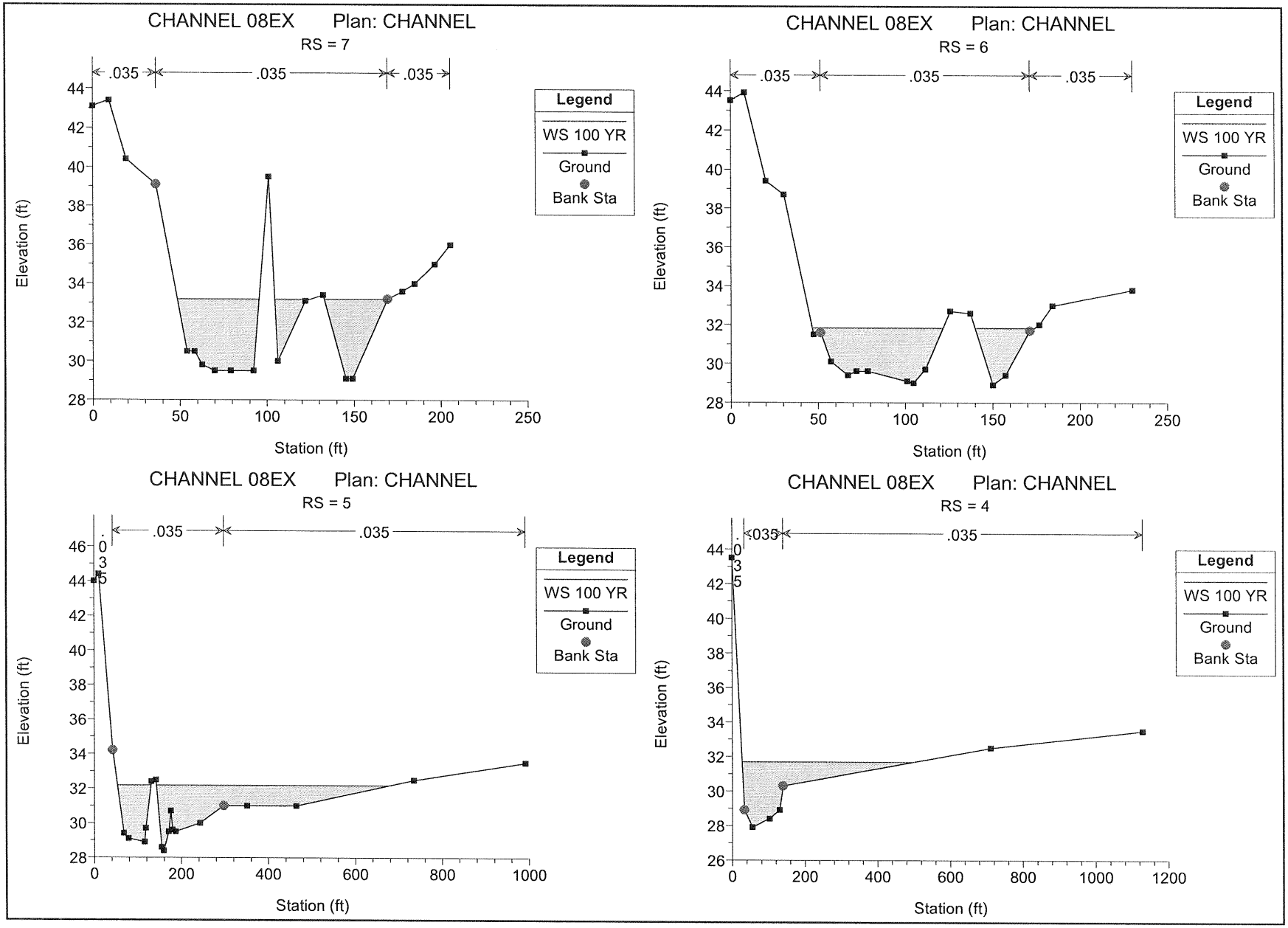
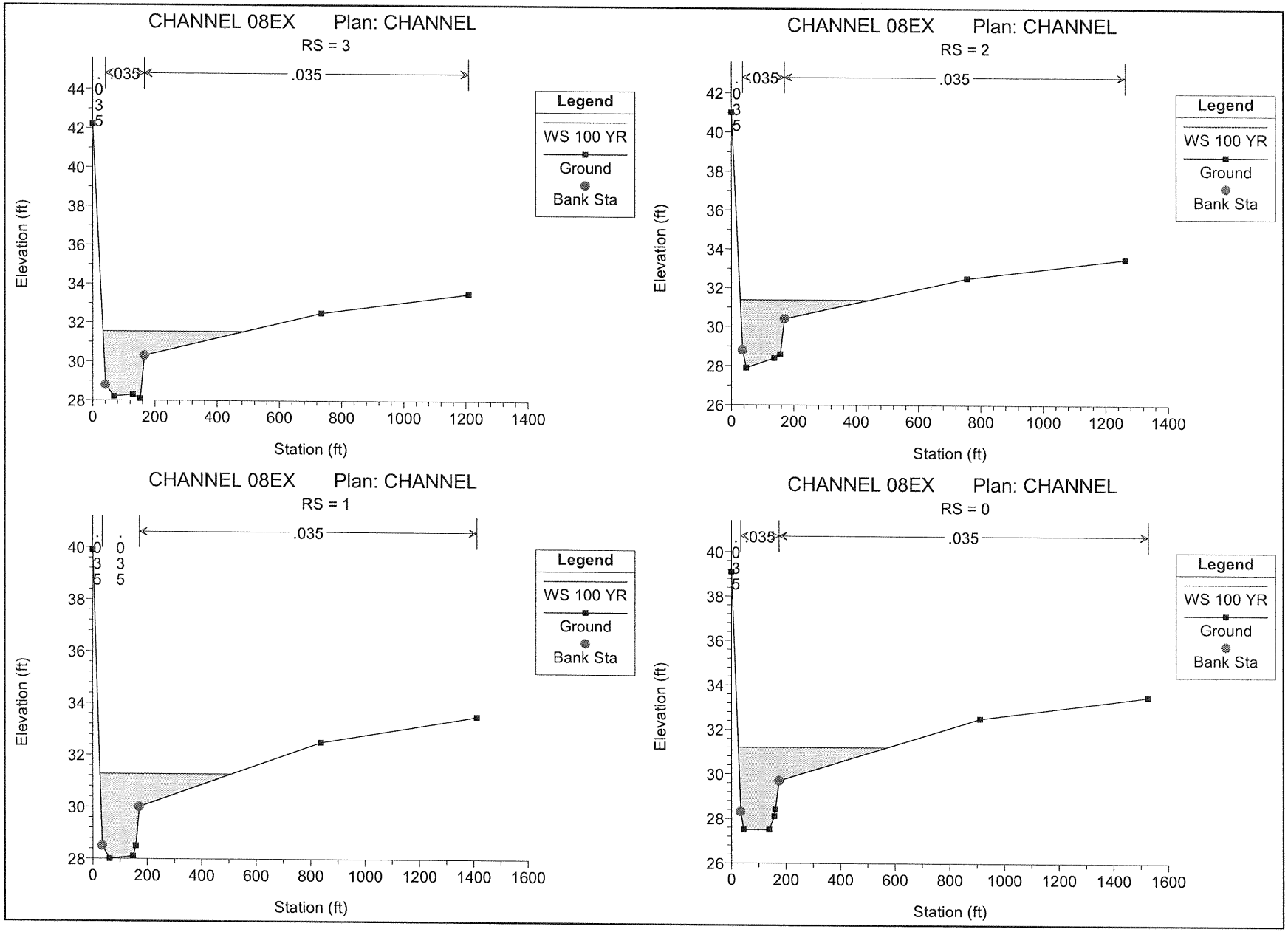
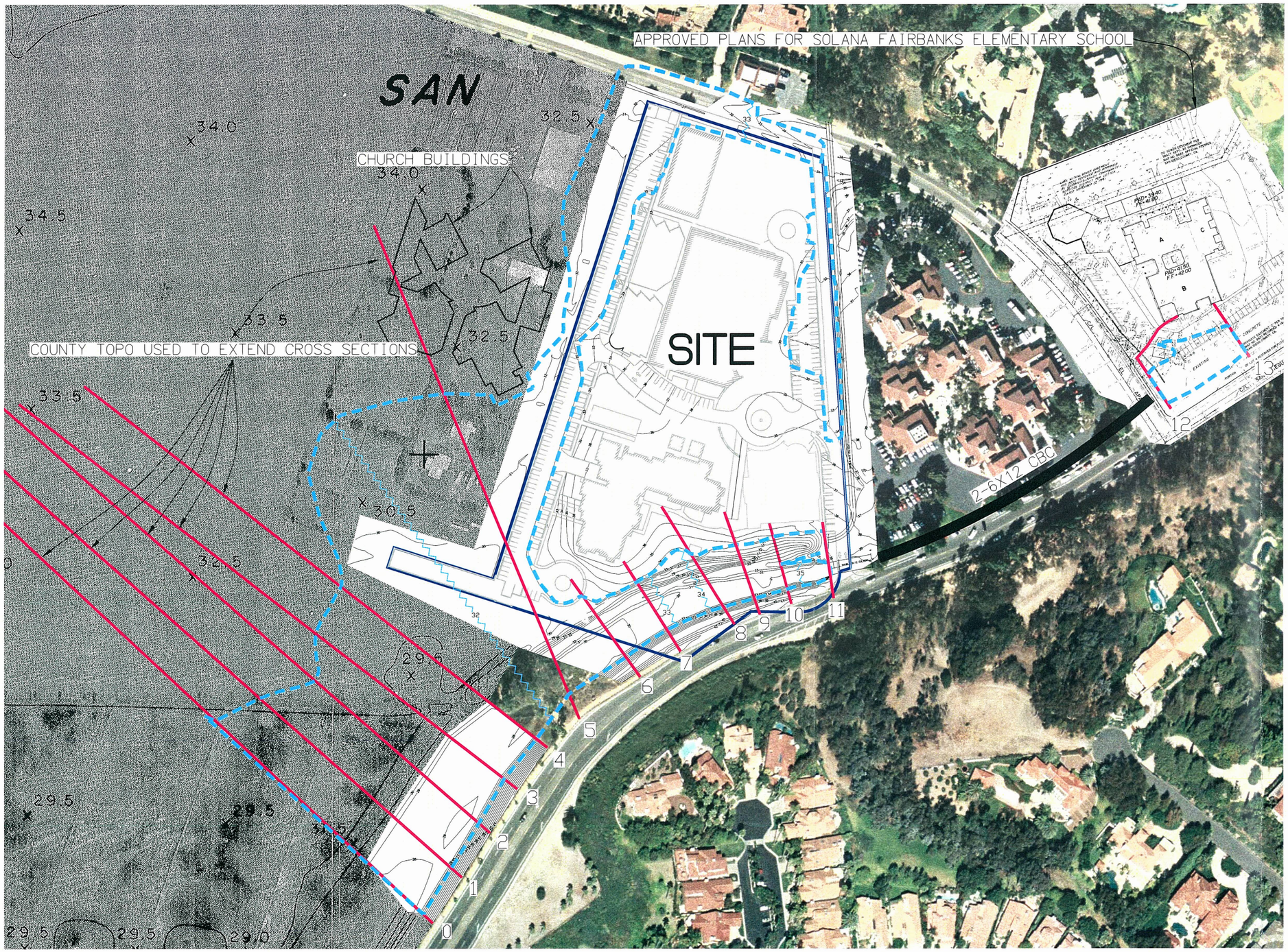
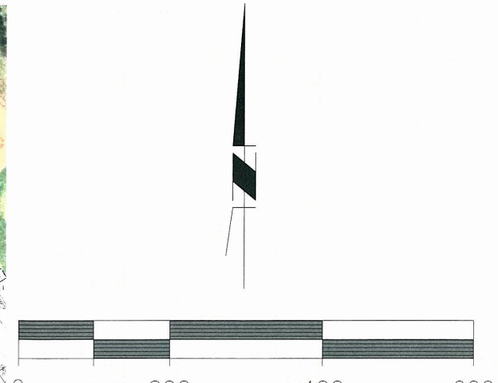
RS = 10
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
36
35
34
33
32
31
30
29
0
10
20
30
40
50
60
70
80


CHANNEL 08EX Plan: CHANNEL
RS = 11
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100 YR
Ground
Bank Sta
CHANNEL 08EX Plan: CHANNEL
RS = 10
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100 YR
Ground
Bank Sta
CHANNEL 08EX Plan: CHANNEL
RS = 9
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100 YR
Ground
Bank Sta
CHANNEL 08EX Plan: CHANNEL
RS = 8
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100 YR
Ground
Bank Sta


CHANNEL 08EX Plan: CHANNEL
RS = 7
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 6
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 5
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 4
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 08EX Plan: CHANNEL
RS = 3
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 2
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 1
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 08EX Plan: CHANNEL
RS = 0
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)





LEGEND

- SITE BOUNDARY
- SITE PLAN
- CONTOUR
- CROSS SECTION
- LIMIT OF INUNDATION
- 32 WATER SURFACE CONTOUR

NOTES:
NATURAL AREAS OF CROSS SECTIONS BASED UPON SURVEY POINTS, NOT DISPLAYED CONTOURS.

WOODWARD CENTER

PROPOSED CONDITION INUNDATION MAP

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324
858.614.5000 ▪ FAX 858.614.5001 ▪ www.RBF.com

PROJECT LOCATION
SAN DIEGO COUNTY, CA

DRAFTED BY	DATE	SCALE
ADB	3/08	1"=200'

RBF JOB NO.
25-102814

H:\PDATA\25102814\Cadd\Stormwater\EXHIBITS\FP-HMPR03.dwg 03/12/08 - 2:08pm ABARRY

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
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
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PROJECT DATA
Project Title: CHANNEL 09EXPR
Project File : CHO9EXPR.prj
Run Date and Time: 3/13/2008 7:47:32 AM

Project in English units

PLAN DATA

Plan Title: CHANNEL PR
Plan File : h:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CHO9EXPR.p02

Geometry Title: CHANNEL PR
Geometry File : h:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CHO9EXPR.g02

Flow Title : CHANNEL PR
Flow File : h:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CHO9EXPR.f02

Plan Summary Information:

Number of:	Cross Sections	= 16	Mulitple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculaton tolerance	= 0.01
Maximum number of interations	= 20
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

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

FLOW DATA

Flow Title: CHANNEL PR
Flow File : h:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CHO9EXPR.f02

Flow Data (cfs)

River	Reach	RS	100 YR
CHANNEL	1	13	1548
CHANNEL	1	11	1564
CHANNEL	2	9	1587
CHANNEL	2	5	1600
CHANNEL	2	0	1629
TRIB	TRIB	11	91

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
CHANNEL	1	100 YR	Normal S = 0.0049	
CHANNEL	2	100 YR		Known WS = 31.2
TRIB	TRIB	100 YR	Normal S = 0.01	

GEOMETRY DATA

Geometry Title: CHANNEL PR
Geometry File : h:\PDATA\25102814\Calcs\Strmwater\Hydraulics\RAS\CHO9EXPR.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
CHANNEL	1		J1
CHANNEL	2	J1	
TRIB	TRIB		J1

JUNCTION INFORMATION

INPUT
Description:
Distance from Upstream XS = 5
Deck/Roadway Width = 715
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 11

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	42.65	0	51.7	42.02	0	96.3	41.8	0
117.4	41.6	0	147.4	41.08	0	147.4	40.58	0
186	40.5	0	186	41	0	203.3	41.36	0
231.4	41.96	0	231.4	51.96	0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	44	2.6	43	4.1	43	7.5	42	9.9	41
14.1	40	17.1	39	22.2	38	26.4	35.89	26.4	29.89
51.4	29.89	51.4	35.89	52.2	37	55.5	38	58.5	39
67.3	40	96.1	41	117.4	41.6	147.4	41.08	147.4	40.58
186	40.5	186	41	203.3	41.36	231.4	41.96	231.4	51.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	22.2	.013	55.5	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
22.2	55.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	26.4	40	F
51.4	231.4	40	F

Downstream Deck/Roadway Coordinates
num= 11

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	42.65	0	51.7	42.02	0	96.3	41.8	0
117.4	41.6	0	147.4	41.08	0	147.4	40.58	0
186	40.5	0	186	41	0	203.3	41.36	0
231.4	41.96	0	231.4	51.96	0			

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.3	34.43	36.7	42.77	37	42.8	35.3	42.8	29.3
67.8	29.3	67.8	35.3	67.83	36.9	71.44	37		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	42.77	.035	67.83	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
42.77	67.83	.3	.5

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 = 40.5
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
Culvert #1	Box	6	12

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	5	715	.013	.013	0	.5	1

Number of Barrels = 2
Upstream Elevation = 29.89
Centerline Stations

Sta.	Sta.
32.4	45.4

Downstream Elevation = 29.3
Centerline Stations

Sta.	Sta.
48.8	61.8

CULVERT OUTPUT Profile #100 YR Culv Group: Culvert #1

Q Culv Group (cfs)	1548.00	Culv Full Len (ft)	715.00
# Barrels	2	Culv Vel US (ft/s)	10.75
Q Barrel (cfs)	774.00	Culv Vel DS (ft/s)	10.75
E.G. US. (ft)	40.92	Culv Inv El Up (ft)	29.89
W.S. US. (ft)	40.51	Culv Inv El Dn (ft)	29.30
E.G. DS (ft)	37.19	Culv Frctn Ls (ft)	2.51
W.S. DS (ft)	35.72	Culv Exit Loss (ft)	0.32
Delta EG (ft)	3.73	Culv Entr Loss (ft)	0.90
Delta WS (ft)	4.79	Q Weir (cfs)	
E.G. IC (ft)	39.70	Weir Sta Lft (ft)	
E.G. OC (ft)	40.92	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	35.89	Weir Max Depth (ft)	
Culv WS Outlet (ft)	35.30	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.06	Min El Weir Flow (ft)	41.93

CROSS SECTION

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
21.74	129.95	64.2	72.23	82.21	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	34.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.035	0.035
W.S. Elev (ft)	34.30	Reach Len. (ft)	64.20	72.23	82.21
Crit W.S. (ft)	32.93	Flow Area (sq ft)		295.76	8.21
E.G. Slope (ft/ft)	0.003595	Area (sq ft)		295.76	8.21
Q Total (cfs)	1587.00	Flow (cfs)		1570.46	16.54
Top Width (ft)	106.68	Top Width (ft)		95.18	11.51
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.31	2.02
Max Chl Dpth (ft)	5.50	Hydr. Depth (ft)		3.11	0.71
Conv. Total (cfs)	26468.3	Conv. (cfs)		26192.4	275.9
Length Wtd. (ft)	72.28	Wetted Per. (ft)		98.17	11.65
Min Ch El (ft)	28.80	Shear (lb/sq ft)		0.68	0.16
Alpha	1.03	Stream Power (lb/ft s)		3.59	0.32
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.12	7.95	8.14
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	2.89	10.97

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: CHANNEL
REACH: 2 RS: 8

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.1	8.23	42.5	14.34	40.3	28.03	39.3	45.39	30.4
54.83	30.3	60.49	29.9	113.27	33.3	126.76	29.2	133.57	29.1
139.23	29.6	141.2	30	143.1	31	145.4	32	147.3	33
154.7	34	202.1	35	228.8	36				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	28.03	.035	154.7	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
28.03	154.7	117.39	119.84	120.57	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	34.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	0.035
W.S. Elev (ft)	34.10	Reach Len. (ft)	117.39	119.84	120.57
Crit W.S. (ft)		Flow Area (sq ft)		331.67	0.26
E.G. Slope (ft/ft)	0.003238	Area (sq ft)		331.67	0.26
Q Total (cfs)	1587.00	Flow (cfs)		1586.91	0.09
Top Width (ft)	121.49	Top Width (ft)		116.54	4.95
Vel Total (ft/s)	4.78	Avg. Vel. (ft/s)		4.78	0.34
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)		2.85	0.05
Conv. Total (cfs)	27889.6	Conv. (cfs)		27888.1	1.5
Length Wtd. (ft)	119.84	Wetted Per. (ft)		119.00	4.95
Min Ch El (ft)	29.10	Shear (lb/sq ft)		0.56	0.01
Alpha	1.00	Stream Power (lb/ft s)		2.70	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.12	7.43	8.14
C & E Loss (ft)	0.05	Cum SA (acres)	0.09	2.72	10.95

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: CHANNEL
REACH: 2 RS: 7

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43.1	9.43	43.4	19.09	40.4	36.28	39.1	54.02	30.5
58.36	30.5	62.72	29.8	69.95	29.5	79.22	29.5	92.19	29.5
101.03	39.5	106.19	30	122.08	33.1	132.31	33.4	145.28	29.1
149.16	29.1	149.9	29	152	30	154.2	31	156.2	32
158.2	33	163.2	34	183.1	35	200.3	36		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	36.28	.035	163.2	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.28	163.2	95.02	97.29	99.66	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

E.G. Elev (ft)	33.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.035	
W.S. Elev (ft)	32.89	Reach Len. (ft)	95.02	97.29	99.66
Crit W.S. (ft)	32.60	Flow Area (sq ft)		210.87	
E.G. Slope (ft/ft)	0.010435	Area (sq ft)		210.87	
Q Total (cfs)	1587.00	Flow (cfs)		1587.00	
Top Width (ft)	86.60	Top Width (ft)		86.60	
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)		7.53	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		2.44	

RIVER: CHANNEL
REACH: 2 RS: 4

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43.5	33.43	28.9	55.46	27.9	103.29	28.4	130.09	28.9
139.84	30.3	712	32.5	1129	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	33.43	.035	139.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
33.43	139.84	98.28	99.63	103.48	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

			Left OB	Channel	Right OB
E.G. Elev (ft)	31.85	Element			
Vel Head (ft)	0.17	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.69	Reach Len. (ft)	98.28	99.63	103.48
Crit W.S. (ft)		Flow Area (sq ft)	8.88	343.13	249.48
E.G. Slope (ft/ft)	0.001560	Area (sq ft)	8.88	343.13	249.48
Q Total (cfs)	1600.00	Flow (cfs)	17.52	1254.97	327.51
Top Width (ft)	473.02	Top Width (ft)	6.38	106.41	360.23
Vel Total (ft/s)	2.66	Avg. Vel. (ft/s)	1.97	3.66	1.31
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)	1.39	3.22	0.69
Conv. Total (cfs)	40503.6	Conv. (cfs)	443.6	31769.3	8290.7
Length Wtd. (ft)	100.29	Wetted Per. (ft)	6.96	106.54	360.23
Min Ch El (ft)	27.90	Shear (lb/sq ft)	0.12	0.31	0.07
Alpha	1.54	Stream Power (lb/ft s)	0.25	1.15	0.09
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.10	3.78	1.56
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	1.20	2.46

CROSS SECTION

RIVER: CHANNEL
REACH: 2 RS: 3

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.2	41.15	28.8	68.42	28.2	129.41	28.3	152.94	28.1
166.4	30.3	735	32.5	1209	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	41.15	.035	166.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
41.15	166.4	99.43	100.2	47.26	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

			Left OB	Channel	Right OB
E.G. Elev (ft)	31.70	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.55	Reach Len. (ft)	99.43	100.20	47.26
Crit W.S. (ft)		Flow Area (sq ft)	11.58	394.35	200.52
E.G. Slope (ft/ft)	0.001402	Area (sq ft)	11.58	394.35	200.52
Q Total (cfs)	1600.00	Flow (cfs)	21.98	1345.52	232.50
Top Width (ft)	455.63	Top Width (ft)	8.43	125.25	321.95
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.90	3.41	1.16
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)	1.37	3.15	0.62
Conv. Total (cfs)	42725.5	Conv. (cfs)	587.0	35929.9	6208.6
Length Wtd. (ft)	94.00	Wetted Per. (ft)	8.87	125.44	321.95
Min Ch El (ft)	28.10	Shear (lb/sq ft)	0.11	0.28	0.05
Alpha	1.44	Stream Power (lb/ft s)	0.22	0.94	0.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.08	2.93	1.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	0.94	1.65

CROSS SECTION

RIVER: CHANNEL
REACH: 2 RS: 2

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	35.9	28.8	47.48	27.9	137.65	28.4	156.86	28.6
170.25	30.4	756	32.5	1262	33.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	35.9	.035	170.25	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.9	170.25	100.95	99.23	93.18	.1	.3

CROSS SECTION OUTPUT Profile #100 YR

			Left OB	Channel	Right OB
E.G. Elev (ft)	31.56	Element			
Vel Head (ft)	0.18	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	31.38	Reach Len. (ft)	100.95	99.23	93.18
Crit W.S. (ft)		Flow Area (sq ft)	9.81	407.20	134.68
E.G. Slope (ft/ft)	0.001583	Area (sq ft)	9.81	407.20	134.68

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	34.94	.035	45.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
34.94	45.4	93.17	96.06	98.94	.3	.5

CROSS SECTION OUTPUT Profile #100 YR

			Left OB	Channel	Right OB
E.G. Elev (ft)	34.99	Element			
Vel Head (ft)	0.04	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	34.95	Reach Len. (ft)	93.17	96.06	98.94
Crit W.S. (ft)	31.66	Flow Area (sq ft)	11.34	44.32	13.19
E.G. Slope (ft/ft)	0.000353	Area (sq ft)	11.34	44.32	13.19
Q Total (cfs)	91.00	Flow (cfs)	7.45	73.38	10.18
Top Width (ft)	39.33	Top Width (ft)	15.12	10.46	13.76
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)	0.66	1.66	0.77
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)	0.75	4.24	0.96
Conv. Total (cfs)	4844.4	Conv. (cfs)	396.3	3906.2	541.8
Length Wtd. (ft)	96.11	Wetted Per. (ft)	15.18	14.82	13.87
Min Ch El (ft)	29.70	Shear (lb/sq ft)	0.02	0.07	0.02
Alpha	1.32	Stream Power (lb/ft s)	0.01	0.11	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.58	0.03
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	0.05	0.03

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

CROSS SECTION

RIVER: TRIB
REACH: TRIB RS: 10

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.9	13.26	29.5	15.82	29.4	20.03	29.5	30.6	30
39.35	34	48.04	35	61.29	36				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	39.35	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	39.35	71.28	71.28	71.99	.3	.5

CROSS SECTION OUTPUT Profile #100 YR

			Left OB	Channel	Right OB
E.G. Elev (ft)	34.97	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.035	0.035
W.S. Elev (ft)	34.96	Reach Len. (ft)	68.87	68.87	68.87
Crit W.S. (ft)		Flow Area (sq ft)		154.92	4.01
E.G. Slope (ft/ft)	0.000032	Area (sq ft)		154.92	4.01
Q Total (cfs)	91.00	Flow (cfs)		90.41	0.59
Top Width (ft)	47.70	Top Width (ft)		39.35	8.35
Vel Total (ft/s)	0.57	Avg. Vel. (ft/s)		0.58	0.15
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		3.94	0.48
Conv. Total (cfs)	15968.0	Conv. (cfs)		15863.9	104.1
Length Wtd. (ft)	68.87	Wetted Per. (ft)		41.35	8.41
Min Ch El (ft)	29.40	Shear (lb/sq ft)		0.01	0.00
Alpha	1.03	Stream Power (lb/ft s)		0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		0.36	0.01
C & E Loss (ft)	0.13	Cum SA (acres)			

Warning: The cross-section end points had to be extended vertically for the computed water surface.

SUMMARY OF MANNING'S N VALUES

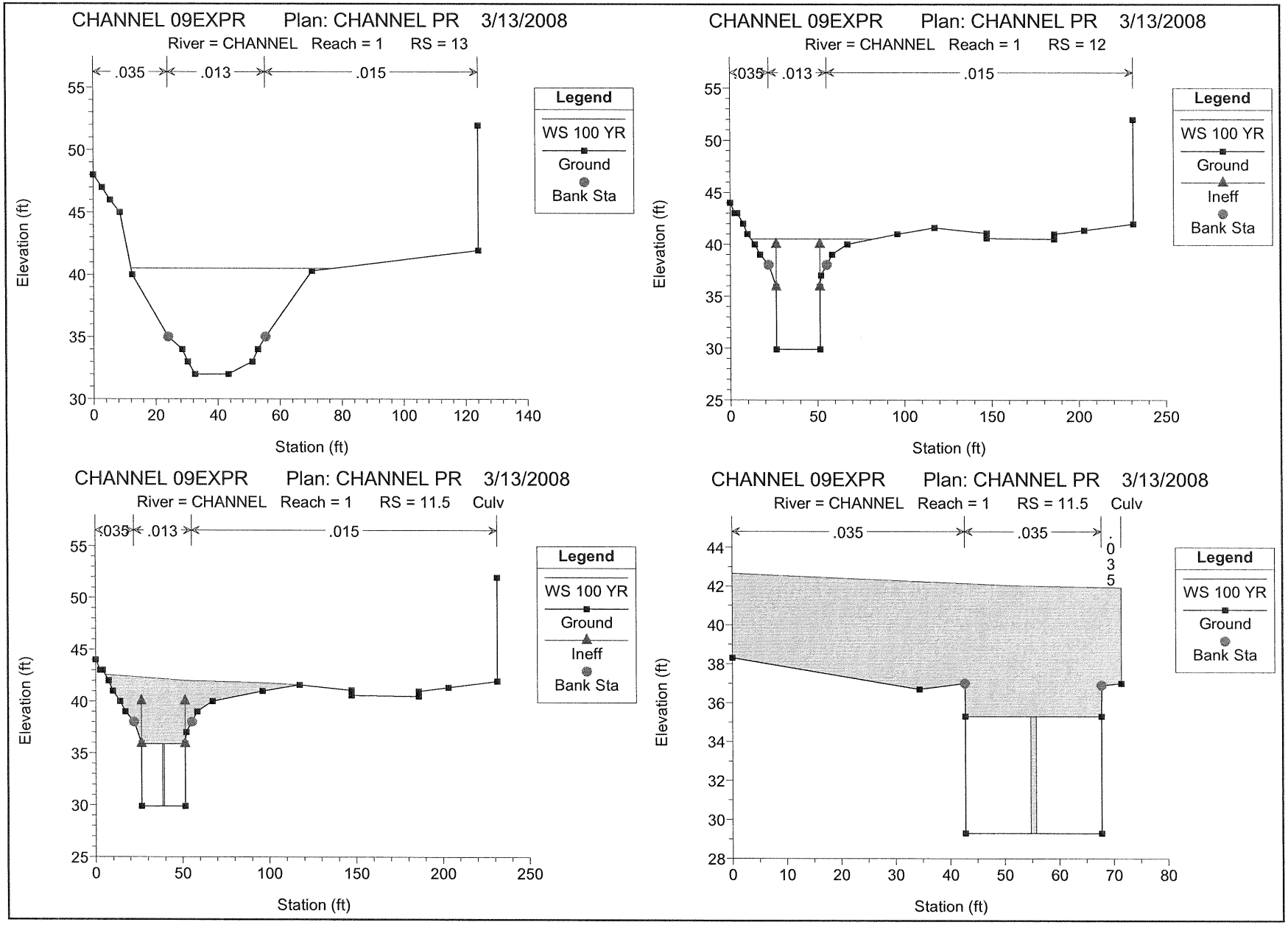
River:CHANNEL

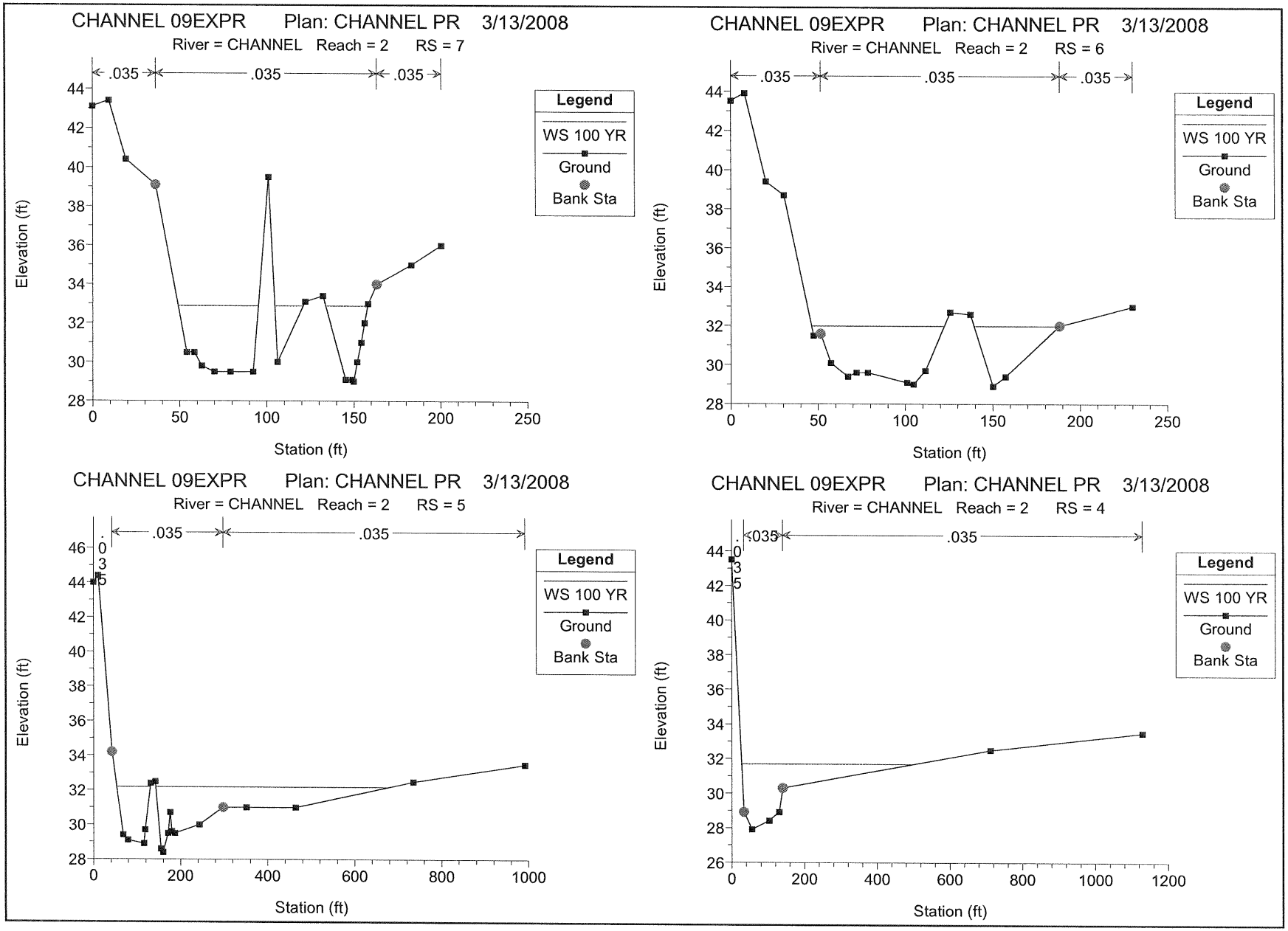
Reach	River Sta.	n1	n2	n3
1	13	.035	.013	.015
1	12	.035	.013	.015
1	11.5	Culvert		
1	11	.035	.035	.035
1	10	.035	.035	.035
2	9	.035	.035	.035
2	8	.035	.035	.035
2	7	.035	.035	.035
2	6	.035	.035	.035
2	5	.035	.035	.035
2	4	.035	.035	.035
2	3	.035	.035	.035
2	2	.035	.035	.035
2	1	.035	.035	.035
2	0	.035	.035	.035

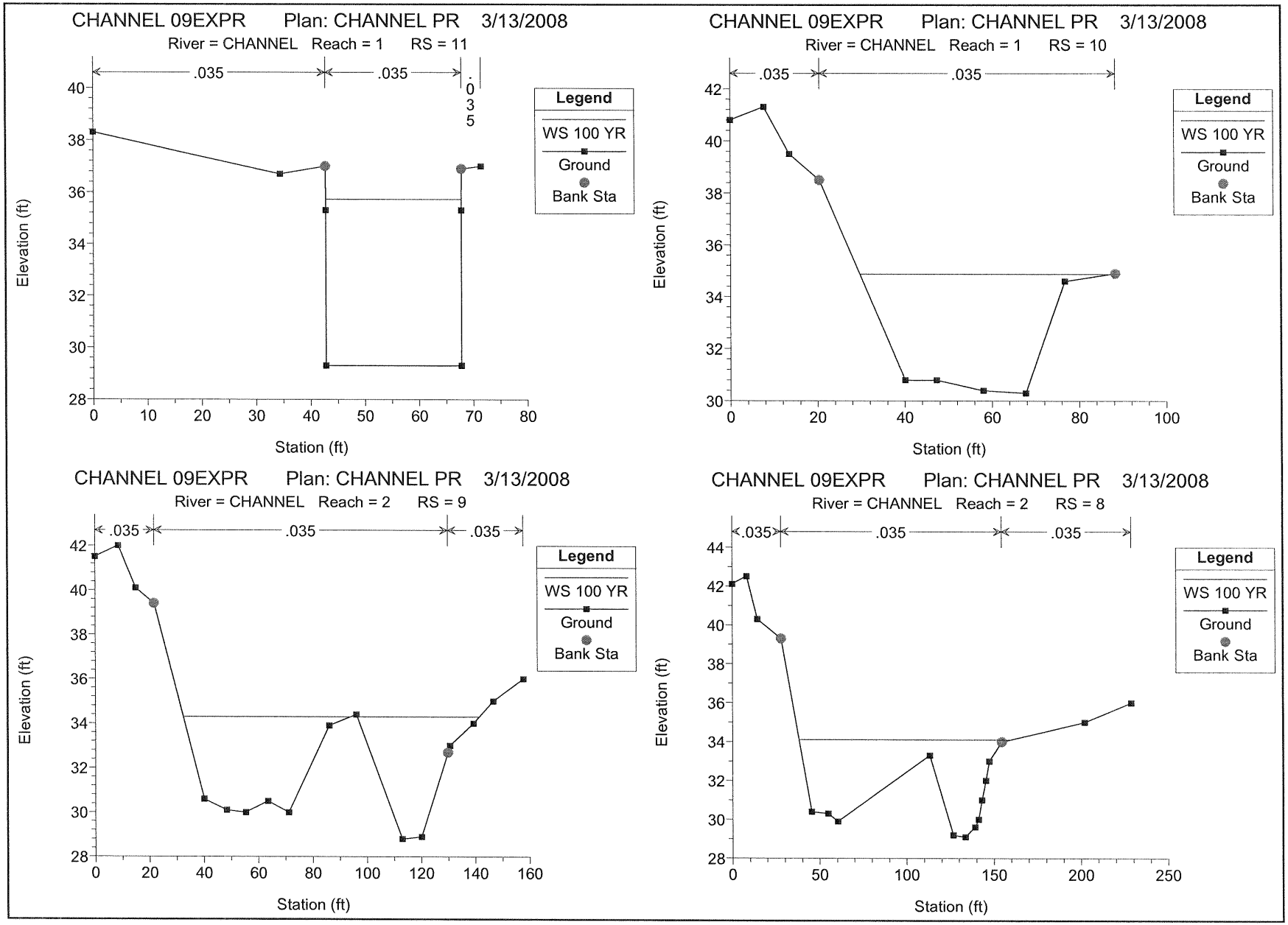
River:TRIB

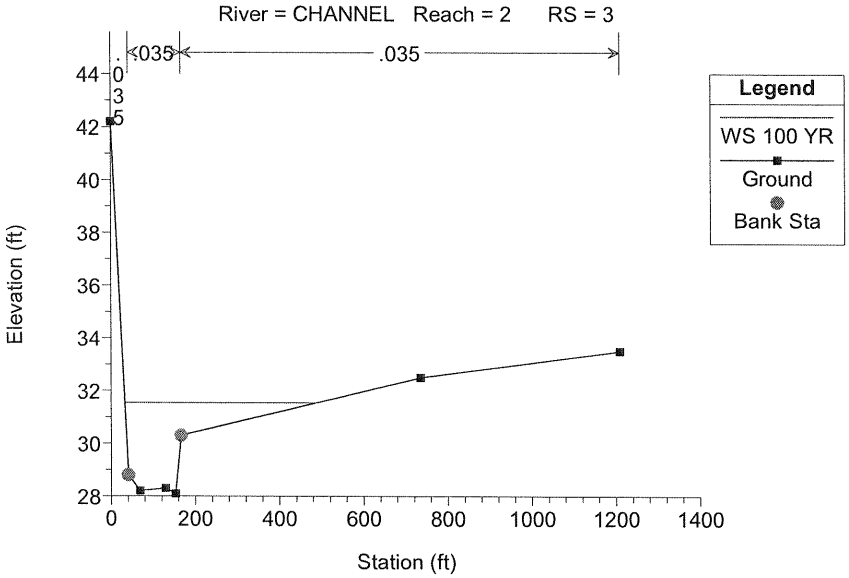
Reach	River Sta.	n1	n2	n3
TRIB	11	.035	.035	.035
TRIB	10	.035	.035	.035

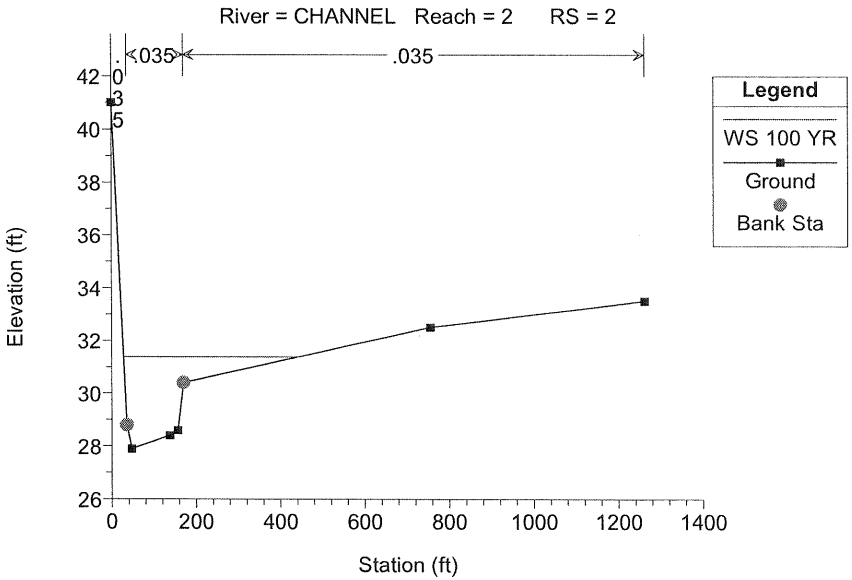
CHANNEL	2	7	100 YR	1587.00	29.00	32.89	32.60	33.77	0.010435	7.53	210.87	86.60
0.85												
CHANNEL	2	6	100 YR	1587.00	28.90	31.99	31.77	32.70	0.010478	6.76	236.26	125.00
0.85												
CHANNEL	2	5	100 YR	1600.00	28.40	32.18		32.24	0.000966	2.29	854.57	611.02
0.27												
CHANNEL	2	4	100 YR	1600.00	27.90	31.69		31.85	0.001560	3.66	601.48	473.02
0.36												
CHANNEL	2	3	100 YR	1600.00	28.10	31.55		31.70	0.001402	3.41	606.45	455.63
0.34												
CHANNEL	2	2	100 YR	1600.00	27.90	31.38		31.56	0.001583	3.53	551.69	416.05
0.36												
CHANNEL	2	1	100 YR	1600.00	28.00	31.27		31.41	0.001304	3.22	641.72	483.74
0.33												
CHANNEL	2	0	100 YR	1629.00	27.50	31.20	29.32	31.30	0.000778	2.71	797.02	545.00
0.26												


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 13
.035
.013
.015
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 12
.035
.013
.015
Legend
WS 100 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 11.5 Culv
.035
.013
.015
Legend
WS 100 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 11.5 Culv
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 7
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 6
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 5
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 4
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 11
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 1 RS = 10
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 9
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 8
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 3
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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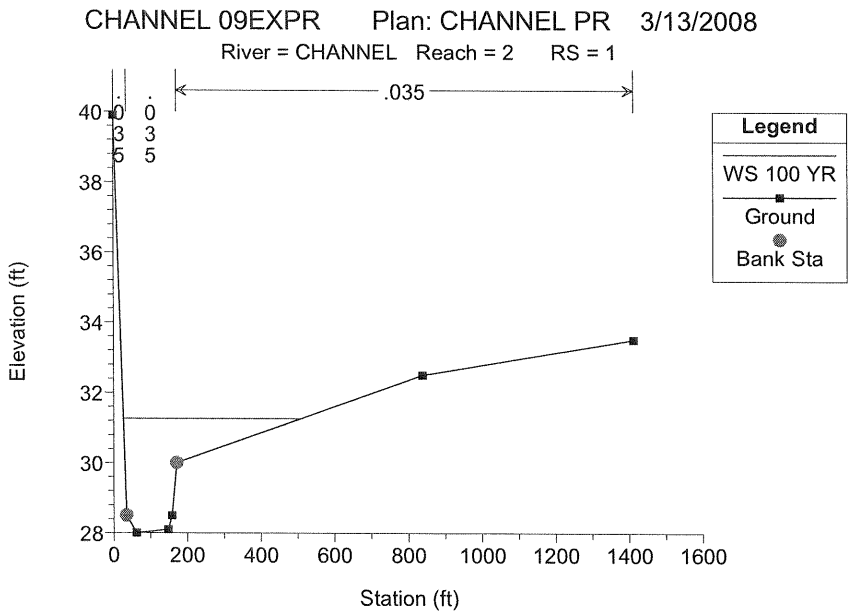
River = CHANNEL Reach = 2 RS = 2
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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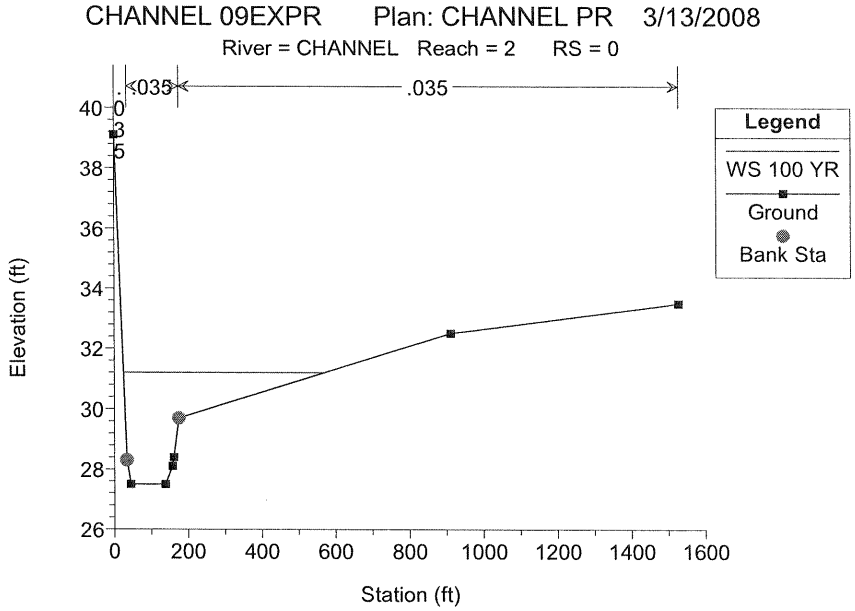
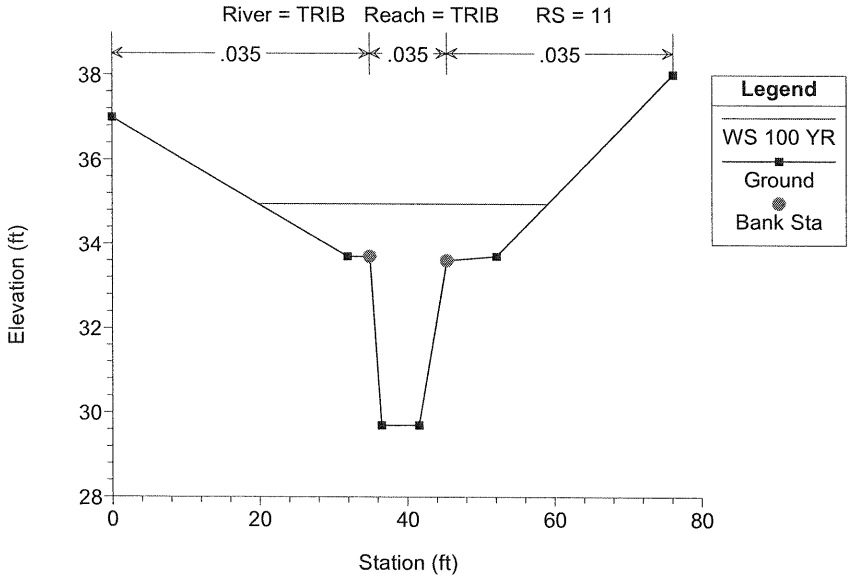
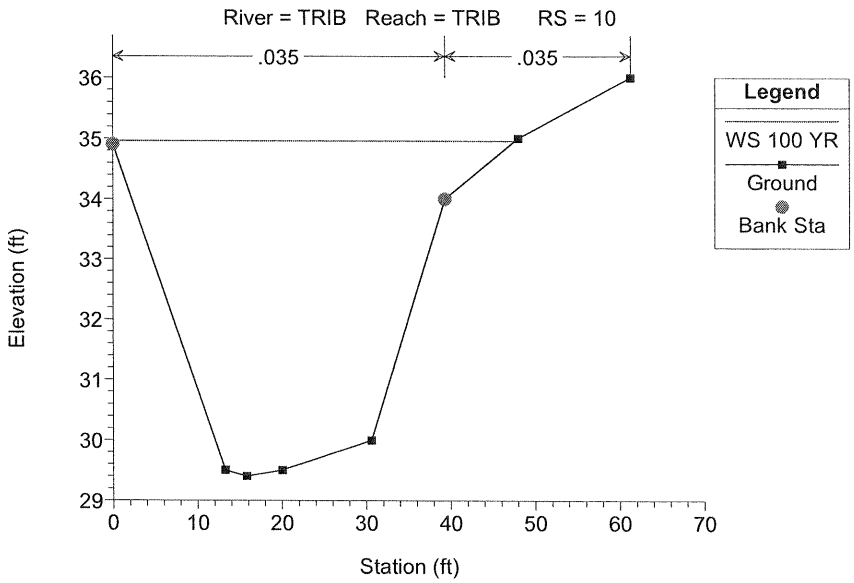
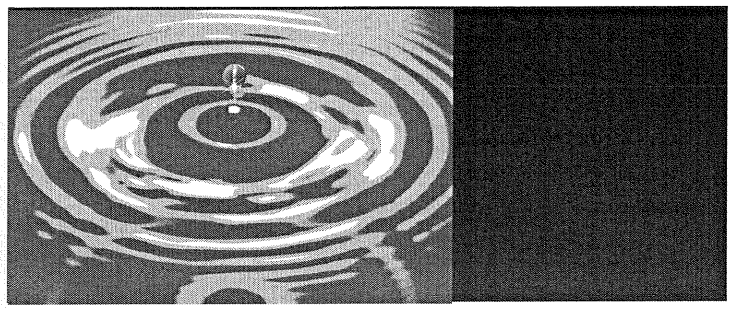
River = CHANNEL Reach = 2 RS = 1
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = CHANNEL Reach = 2 RS = 0
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = TRIB Reach = TRIB RS = 11
.035
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
38
36
34
32
30
28
0
20
40
60
80


CHANNEL 09EXPR Plan: CHANNEL PR 3/13/2008
River = TRIB Reach = TRIB RS = 10
.035
.035
Legend
WS 100 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
36
35
34
33
32
31
30
29
0
10
20
30
40
50
60
70



APPENDIX C
SUPPORTING DOCUMENTATION

RBF
CONSULTING

CONSTRUCTION NOTES

1. CONSTRUCT 3" A.C. OVER 10" A.B. PER SOILS ENGINEER RECOMMENDATIONS.
2. CONSTRUCT 3" A.C. OVER COMPACTED NATIVE SOIL PER SOILS ENGINEER RECOMMENDATIONS.
3. CONSTRUCT 6" CURB AND GUTTER PER SAN DIEGO REGIONAL STD. DWG. G-2.
4. CONSTRUCT 6" CURB ONLY PER SAN DIEGO REGIONAL STD. DWG. G-1.
5. CONSTRUCT SIDEWALK PER SAN DIEGO REGIONAL STD. DWG. G-7.
6. CONSTRUCT CROSS GUTTER PER SAN DIEGO REGIONAL STD. DWG. G-12.
7. CONSTRUCT CONCRETE VEE-GUTTER PER DETAIL NO.2 SHT. C-1.
8. CONSTRUCT CONCRETE OUTLET DRAIN AS PER SECTION B-B HEREON.
9. CONSTRUCT 6" THICK CONCRETE PAVING.
10. CONSTRUCT PEDESTRIAN RAMP TYPE A PER SAN DIEGO REGIONAL STD. DWG. G-27.
11. REMOVE AND/OR RELOCATE EXIST. IRRIGATION BOX
12. REMOVE EXISTING CONCRETE DRAINAGE DITCH.
13. REMOVE EXISTING CONCRETE DRIVEWAY
14. SAWCUT AND REMOVE EXISTING CURB, GUTTER, AND SIDEWALK
15. CONSTRUCT CONCRETE VEE-GUTTER PER SECTION A-A HEREON.
16. CONSTRUCT 4" THICK CONCRETE WALK PER ARCHITECTS DETAIL AND SPECIFICATIONS.
17. CONSTRUCT GRAVEL FILLED WELL 3' DIA. X 10' DEEP
18. REMOVE EXISTING TREES
19. REMOVE EXISTING A.C. PAVEMENT
37. CONST. 5' HIGH CHAIN LINK FENCE PER S.D. CO. FLOOD CONTROL DIST. ENCROACHMENT PERMIT NO. URS-398

STD. DWG. D-75 (MODIFIED)
SECTION A-A

TREE REMOVAL

TREE REMOVAL WILL CONSIST MOSTLY OF EUCALYPTUS WITH SOME PINE. RANGING FROM 6" TO 12" DIA. AND 8' TO 40' HIGH. SOME TREES INDIVIDUALLY NOTED FOR REMOVAL, NOT ALL TREES ARE SHOWN. THERE IS A GROVE OF EUCALYPTUS ALONG THE N'LY SIDE OF THE EXISTING CONC CHANNEL THAT WILL BE REMOVED THE QUANTITY SHOWN (24,000 SQ.FT.) IS THE APPROXIMATE SQUARE FOOTAGE OF TREE REMOVAL AREA.

KEY MAP
SCALE: 1" = 200'

CURVE DATA

	Δ	R	L	T
(A)	90°00'00"	30'	47.12'	30.00'
(B)	88°50'08"	30'	46.52'	29.40'
(C)	135°34'08"	30'	69.27'	54.07'
(D)	38°17'16"	30'	20.05'	10.41'
(E)	89°10'19"	30'	46.72'	29.11'
(F)	47°46'19"	30'	25.02'	13.29'

SECTION B-B

GRAPHIC SCALE 30 15 0 30 60 90

SCALE: 1" = 30'

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

NAME OF COMPANY RHA ENGINEERING, INC.
ADDRESS 7177 BROCKTON AVE., SUITE 220
RIVERSIDE, CA 92506
TELEPHONE NO. (714) 683-8088 FAX (714) 683-6915
BY Steven L. Ray DATE 11-7-91
R.C.E. NO. 35334 EXPIRES 9-30-95

COUNTY APPROVED CHANGES

No.	Description	Approved by	Date

OWNER'S/PERMITTEE'S

NAME: SOLANA BEACH SCHOOL DISTRICT
ADDRESS: 309 NORTH RIOS AVENUE
SOLANA BEACH, CALIFORNIA 92075-1293
TELEPHONE NO.: (619) 481-6026
SHORT LEGAL DESCRIPTION: LOT 4 OF TRACT 3877-1 AS SHOWN ON MAP NO. 9622 FILED IN SAN DIEGO COUNTY, CA
SITE ADDRESS: NORTHEAST CORNER OF EL APAJO AND SAN DIEGUITO ROAD (NO ADDRESS # AT THIS TIME)
A.P.N. NO. 269-152-02

PERMITS

REZONE PERMIT NO. N/A
SPECIAL USE PERMIT NO. N/A
TENTATIVE MAP NO. N/A

BENCH MARK

DESCRIPTION: COUNTY BENCHMARK HC033 6"X6" CONC. MONUMENT WITH BRASS DISC.
LOCATION: AT FAIRBANKS LAKE 30' WEST OF ROAD AT FORK, 3' ABOVE ROAD, 1' WEST OF FENCE
RECORD FROM:
ELEVATION: 160.518 DATUM: U.S.G.S.

PRIVATE CONTRACT

SHEET 2 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 3 SHEETS

GRADING PLANS FOR:
SOLANA FAIRBANKS ELEMENTARY
CALIFORNIA COORDINATE INDEX 302-1707

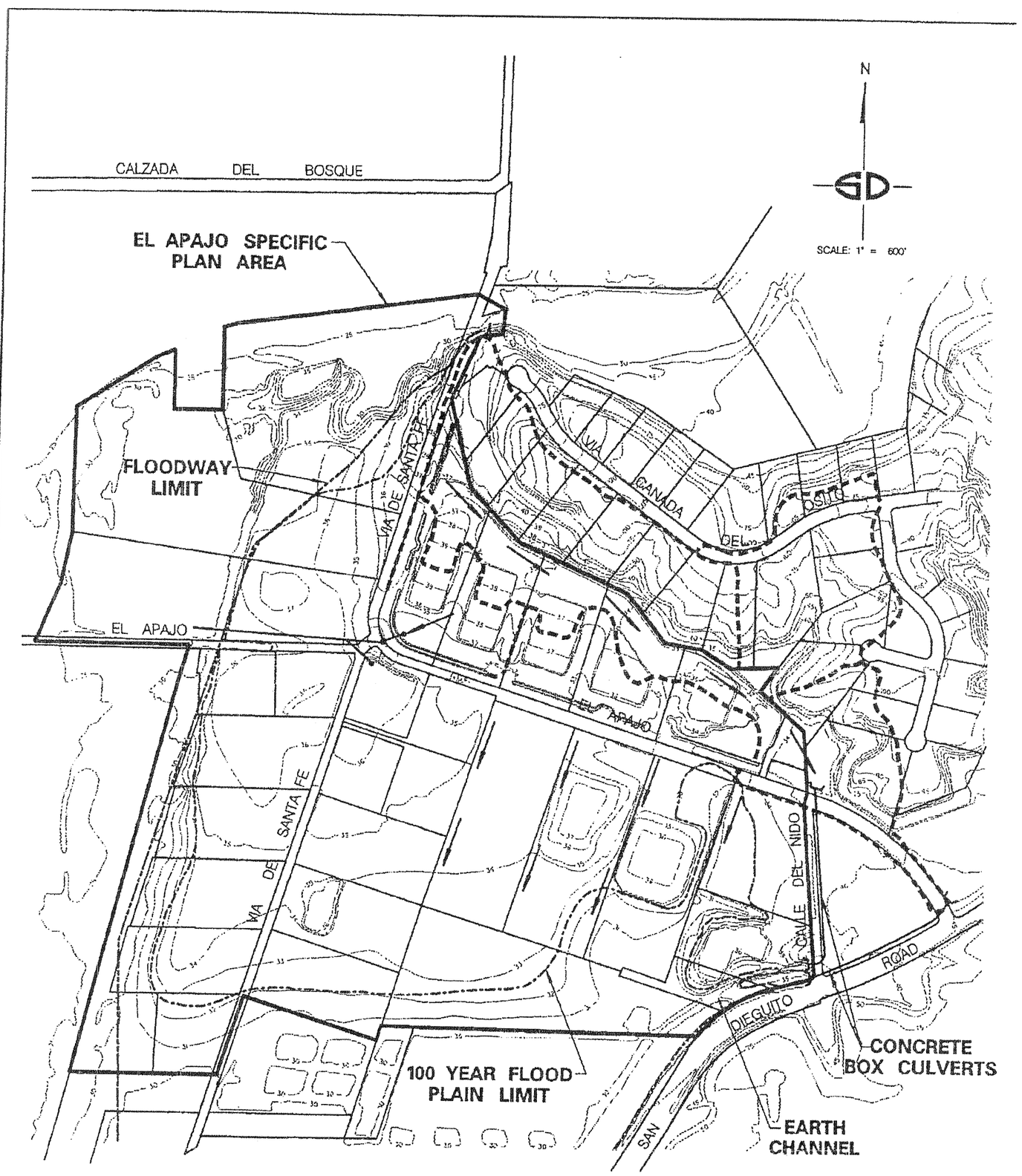
Approved Granville M. Bowman
DIRECTOR OF PUBLIC WORKS
By _____
2/11/92
Date

Engineer of work: Steven L. Ray RCE 35334

Grading Permit No. L-2024

FILE NO.

ENGINEER'S NAME: RHA ENGINEERING, INC.
PHONE NO. (714) 683-8088



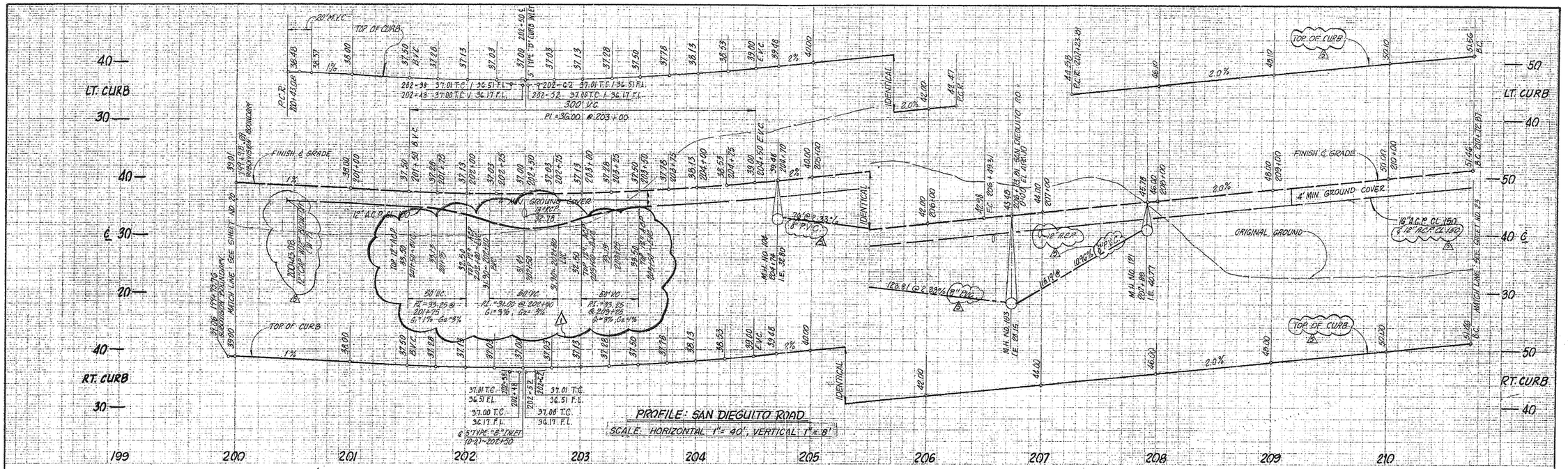
LOCAL DRAINAGE BASINS

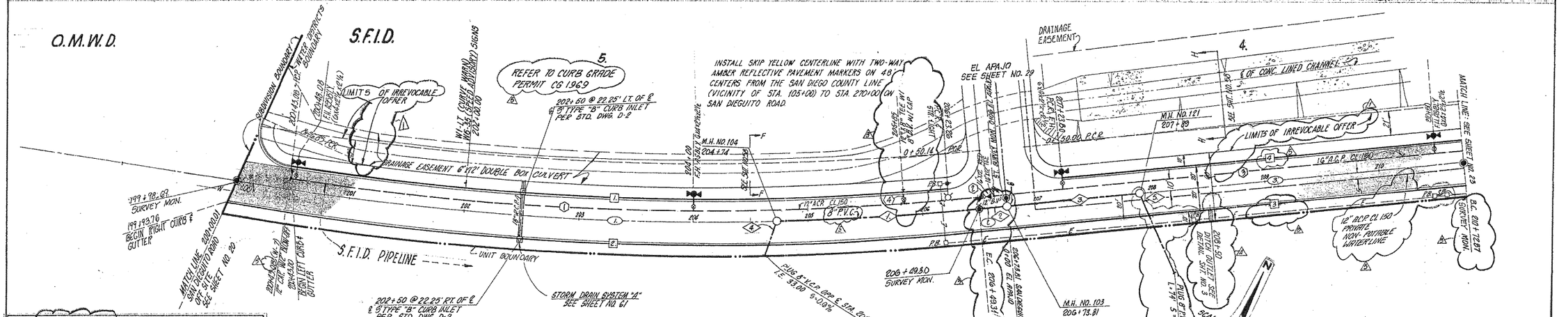
SCALE: 1" = 600'

——— ..... DENOTES DIRECTION OF DRAINAGE

– – – ..... DENOTES LIMITS OF MAJOR DRAINAGE BASIN

FIGURE **6**





DIKE AND CURB DATA

NO.	DELTA OR BRG.	RADIUS	LENGTH	REMARKS
1	Δ=13°51'04"	2390.00'	575.36	6" TYPE G CURB
2	Δ=15°39'00"	2420.00'	661.01'	6" TYPE G CURB
3	N56°03'53"E	—	423.36'	6" TYPE G CURB
4	N56°03'53"E	—	349.06'	6" TYPE G CURB
5				
6				
7				
8				

WATER DATA

NO.	DELTA OR BRG.	RADIUS	LENGTH	REMARKS
1	Δ=14°25'29"	2390.00'	603.69'	12" A.C.P. CL.150
2	N56°03'53"E		14.50'	"
3	N56°03'53"E		409.06'	16" A.C.P. CL.150
4	N32°24'01"E		15.00'	8" ASP CL 150 W/ 4' MIN. COVER
5				
6				

CENTERLINE DATA

NO.	DELTA OR BRG.	RADIUS	LENGTH	REMARKS
1	Δ=15°31'56"	2400.00'	660.62'	T=326.65'
2	N56°03'53"E	—	24.50'	—
3	N56°03'53"E	—	399.06'	—
4				
5				
6				

SEWER DATA

NO.	DELTA OR BRG.	RADIUS	LENGTH	REMARKS
1	4°11'07"	2400.00'	175.31'	8" P.V.C.
2	N56°03'53"E	—	24.50'	8" "
3	N56°03'53"E	—	115.19'	8" "
4	N19°24'15"W	—	31.90'	8" "
5	N42°54'11"W	—	74.00'	8" "
6				

FUTURE COUNTY OF SAN DIEGO
TRACT 3877-5
"SAME OWNERSHIP"

PLAN: SAN DIEGUITO ROAD

RICK ENGINEERING COMPANY
PLANNERS · CIVIL ENGINEERS · LAND SURVEYORS
5620 FRIARS ROAD, SAN DIEGO, CALIFORNIA 92110 · TELEPHONE (714) 291.0707

OLIVENHAIN MUNICIPAL WATER DISTRICT
WATER WORKS APPROVAL
Approved by: BOYLE ENGINEERING
Engineers for the District
R.C.E. 15325 — DATE 12/9/80 — I.D. NO. C-001-268-02

COUNTY APPROVED CHANGES

No.	Description	Approved by	Date
1	ADD DITCH OUTLET		6/24/81
2	AS-BUILT		8/6/82

COUNTY APPROVED CHANGES

No.	Description	Approved by	Date
1	CONSTRUCTION CHANGE: ADDED VERT. CURVE DATA TO 12"A.C.P. (FROM STA. 201+50 TO 203+50) ADDED NEW 6" WATERLINE		9/27/80
2	REVISED DATA TABLES		1/20/81

BENCH MARK
DESCRIPTION: COUNTY BENCH MARK H0033, 6"x6" CONC. MON. WITH BRASS DISC
LOCATION: AT FAIRBANKS LAKE 30' WEST OF ℄ OF ROAD AT FORK, 3' ABOVE ROAD 1' WEST OF FENCE
RECORD FROM: COUNTY BENCH LEVELS
ELEVATION: 160.518 DATUM: U.S.G.S.

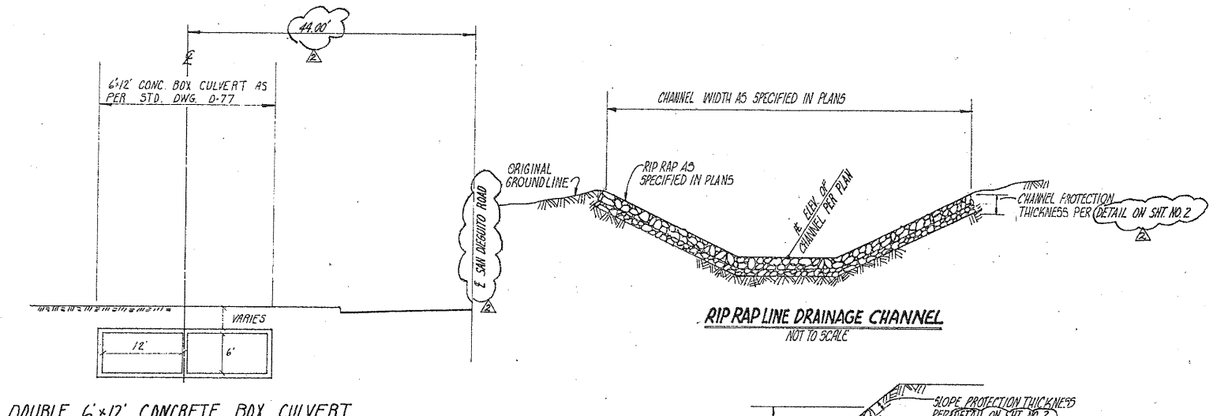
PRIVATE CONTRACT

SHEET 22 | COUNTY OF SAN DIEGO DEPARTMENT OF TRANSPORTATION | 96 SHEETS

PLANS FOR THE IMPROVEMENT OF:
COUNTY OF SAN DIEGO
TRACT 3877-1

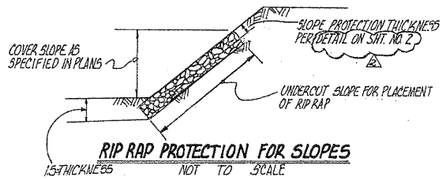
Recommended for approval: SUBDIVISION ENGINEER
Approved: FOR R.J. MASSIRAH DIRECTOR OF TRANSPORTATION
Surveyed by: LYLE F. GABRIELSON R.C.E. 18174
Checked by: G.W.C. T.M.
Approval date: 3/13/1980
3877-1

MAR 31 1980
MAR 18 1980
JUN 7 1982
3-10-81
FILE NO.
PROJECT NO. 6845

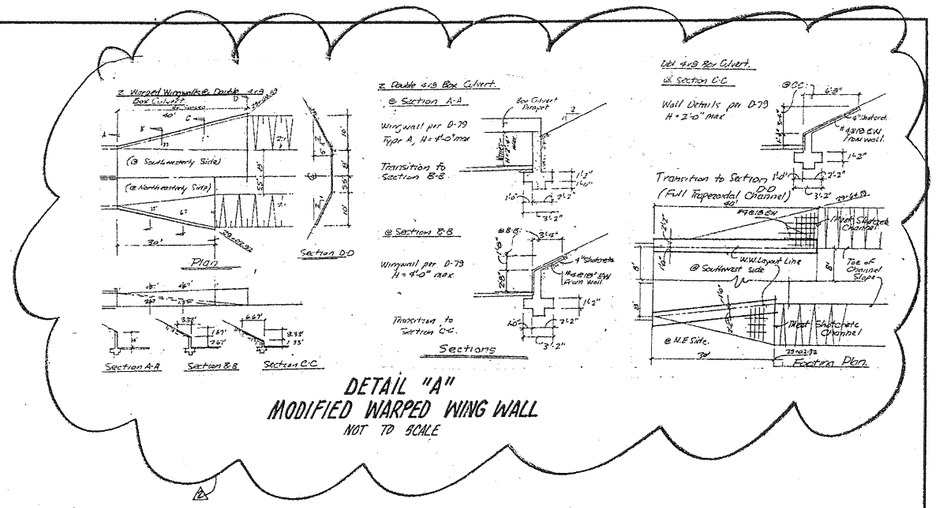


DOUBLE 6'×12' CONCRETE BOX CULVERT
SECTION "F-F"
NO. SCALE
SEE SHT. NO. 22

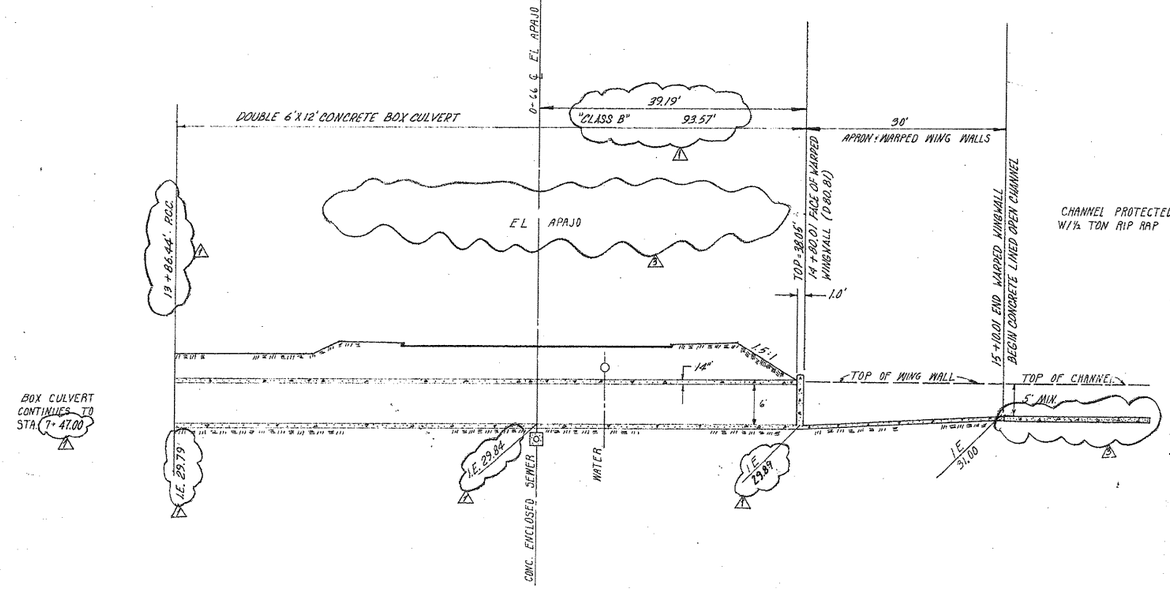
RIP RAP LINE DRAINAGE CHANNEL
NOT TO SCALE



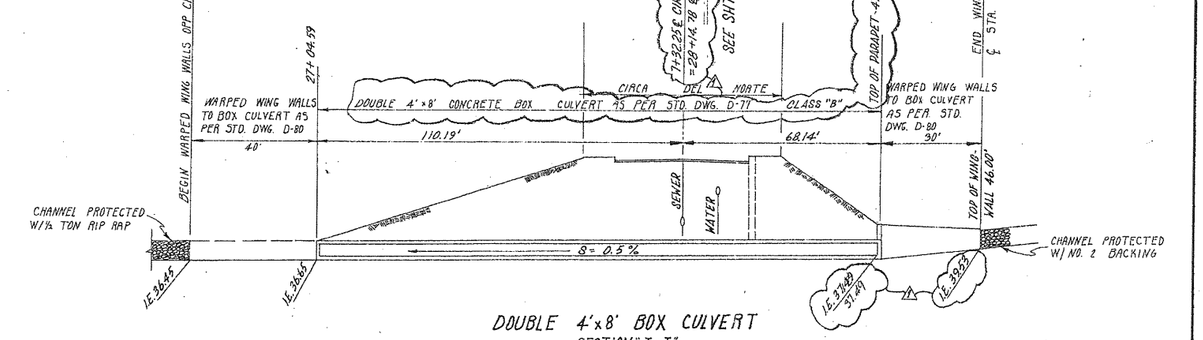
RIP RAP PROTECTION FOR SLOPES
NOT TO SCALE



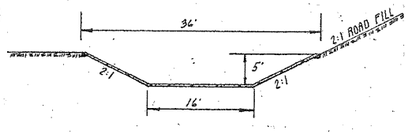
DETAIL "A"
MODIFIED WARPED WING WALL
NOT TO SCALE



DOUBLE 6'×12' BOX CULVERT & DRAINAGE CHANNEL
SECTION "G-G"
NO SCALE
SEE SHT. NO. 66



DOUBLE 4'×8' BOX CULVERT
SECTION "I-I"
NO SCALE
SEE SHT. NO. 66



CONCRETE LINED
DRAINAGE CHANNEL
SECTION "H-H" (PER STD. DWG. D-71)
NO SCALE
SEE SHEET NO. 22

COUNTY APPROVED CHANGES

No.	Description	Approved By	Date
1	CONSTRUCTION CHANGE DETAILS SECTION "B-B" & SECTION "I-I"		9/23/80
2	ADDED DETAIL "A"		11/20/80
3	AS-BUILT		5/18/82

BENCH MARK
Description: COUNTY BENCH MARK H0033, 6"x6" CONC. MON. WITH BRASS DISC.
Location: AT FAIRBANKS LAKE 30' WEST OF ℄ OF ROAD AT FORK, 3' ABOVE ROAD 1' WEST OF FENCE.
Record From: COUNTY BENCH LEVELS
Elev: 160.518 Datum: U.S.G.S.

RICK ENGINEERING COMPANY
PLANNERS · ARCHITECTS · CIVIL ENGINEERS · LAND SURVEYORS
5620 FRIARS ROAD, SAN DIEGO, CALIFORNIA 92110 · TELEPHONE (714) 291-0707

SHEET 58	COUNTY OF SAN DIEGO DEPARTMENT OF TRANSPORTATION	96 SHEETS

PLANS FOR THE IMPROVEMENT FOR:
COUNTY OF SAN DIEGO
TRACT 3877-1

Recommended for approval: SUBDIVISION ENGINEER	Approved: FOR R.C. KLOSSARY DIRECTOR OF TRANSPORTATION
Surveyor of work: LYLE F. GABRIELSON R.C.E. 18174	Checked by: G.W.S. Approval date: 5/13/1980 — T.M. 3877-1

FILE NO.

PROJECT NO. 6845

PRECISION MAR 31 1980 MICROFILMED
PRECISION MAR 16 1981 MICROFILMED
PRECISION JUN 7 1982 MICROFILMED

```
T1     SAN DIEGUITO RIVER NEAR VIA DE SANTA FE BRIDGE
T2    FEBRUARY 1980 FLOOD
T3    NOVEMBER 1981   HOWARD H. CHANG
J1  -1.     5.                                      -1.      0.      31.2
J2  1.          -1.
NC 0.025 0.030   0.030   0.1     0.3
QT  2.  50000.   50000.  4000.  22000.
ET                9.1                                                 180.    1260.
X1    43       48      184     1537      600      600      600
X3  10.
GR 42.29       0.    40.90      32.    33.90      97.    33.80    117.    33.90 184.
GR 26.00     274.    24.30     383.    24.10     517.    23.50    614.    22.29    677.
GR 25.20     738.    21.80     763.    14.5      802.    21.50    840.    27.60    875.
GR 28.70     995.    29.79    1110.    31.80    1218.    35.00   1314.    34.50   1436.
GR 35.30    1537.    35.00    1637.    34.60    1745.    34.70   1866.    34.40   1979.
GR 34.40    2120.    33.60    2252.    33.60    2382.    33.70   2478.   33.6    2601.
GR 32.60    2726.    32.90    2837.    31.80    2953.    31.50   3066.    30.90   3171.
GR 30.60    3281.    30.40    3384.    30.50    3485.    30.90   3591.    30.10   3674.
GR 30.70    3765.    30.79    3869.    30.60    3977.    31.29   4060.    34.70 4091.
GR 33.90    4144.    34.50    4165.    40.00    4175
NC   .04     .035     .035      .6       .8
NH     4     .040      173     .035      308     .025     1228     .035    4053
ET                9.1                                                 185.    1140.
X1    44       52      308     1380      830      780      800
X3  10.
GR 37.40       0.    36.90      36.    35.60      80.    33.70    128.    32.60  173.
GR 29.10     222.    26.70     308.    25.40     381.    24.00    447.    24.00    520.
GR 23.60     588.    25.40     660.    26.10     731.    26.70    807.    26.20    878.
GR 28.89     921.    31.60     965.    33.50    1022.    33.80   1052.    31.60   1086.
GR 33.10    1137.    35.10    1177.    38.30    1228.    36.90   1297.    36.90   1380.
GR 36.80    1461.    36.70    1535.    37.10    1632.    36.90   1732.    36.70   1843.
GR 36.60    1949.    36.00    2063.    35.10    2168.    34.50   2280.    35.00   2392.
GR 35.20    2511.    34.90    2630.    34.30    2731.    34.00   2848.    33.90   2941.
GR 33.80    3038.    33.30    3116.    33.00    3228.    32.90   3324.    32.90   3454.
GR 32.30    3579.    32.00    3712.    32.30    3826.    32.90   3930.    36.50   4005.
GR 45.00    4028.    47.79    4053.
NH     3      .04      617     .025     1700     .035     4848
ET                9.1                                                 615.    1660.
X1    45       66      617     1700      830      790      810
X3  10.
GR 74.00       0.    72.20      25.    61.00      55.    46.00     85.    37.60     99.
GR 37.00     131.    36.70     142.    32.20     173.    32.80    277.    34.10    375.
GR 33.90     458.    35.10     545.    34.70     617.    29.30    637.    27.10    657.
GR 27.00     694.    23.89     723.    16.80     772.    24.60    806.    28.70    840.
GR 27.10     932.    25.90    1013.    25.00    1098.    25.79   1189.    26.20   1280.
GR 27.20    1371.    28.79    1454.    29.40    1555.    31.39   1638.    37.20   1700.
GR 36.90    1782.    36.50    1865.    36.40    1974.    36.20   2072.    34.70 2186.
GR 35.00    2287.    35.00    2343.    36.00    2444.    36.40   2548.    36.60   2650.
GR 35.90    2752.    35.80    2871.    35.00    2982.    35.50   3087.    34.90   3203.
GR 34.20    3305.    34.30    3420.    33.60    3536.    33.20   3623.    33.10 3726.
GR 33.40    3832.    33.00    3903.    33.60    3990.    33.50   4092.    32.70   4175.
GR 32.40    4260.    32.40    4341.    32.60    4434.    33.00   4478.    46.90   4517.
GR 82.80    4580.    92.09    4621.    92.40    4665.    91.30   4725.    92.90   4800.
GR 95.59    4848.
ET                9.1                                                1357.   2616.
X1    46       51     1357     2616      750      600      700 0.766
X3  10.
GR 40.00       0    35.90        0    32.72       53    34.02     159    34.45     255
GR 34.17     398    34.60      546    34.31      645    35.52     770    35.52     917
GR 35.32    1028    35.90     1180    36.91     1357    35.75    1421   28.7      1444
GR 24.4     1493   23.6       1527   25.0      1535   30.0      1645   30.0      1645
GR 32.14    1660    35.61     1712    35.61     1782    36.33    1831    35.61  1867.
GR 28.3     1904   26.1       1978   27.9      2033   32.4      2099   31.8      2178
GR 33.88    2255    33.15     2345    34.60     2444    34.45    2538    36.04    2616
GR 34.31    2725    36.19     2833    35.90     2962    34.89    3048    35.18    3134
GR 35.61    3147    35.03     3156    35.75     3172    35.75    3173    35.47    3206
GR 36.04    3275    36.62     3340    37.50     3379    37.90    3423    37.70   3442.
GR 37.90    3455
ET                9.1                                                1815.   2900.
X1    47       76     1646     3014      450      310      480 0.766
X3  10.
GR 47.59       0    36.75       27    37.57       56   37.2        86   36.2       132
GR 35.0      179    35.0       233    33.2       302   34.9       350   36.5       426
GR  37.0     491    37.7       555    38.56      630    38.79     699    38.67     765
GR 38.44     854    37.89      924    37.89      991    39.30    1023    39.80    1078
GR 39.80    1117    38.31     1144    38.04     1191    38.90    1212    38.56    1299
GR 38.31    1366    38.79     1424    38.56     1543    38.56    1646    36.58    1666
GR 36.58    1669    37.08     1713    37.08     1762    36.75    1827    36.25    1885
GR 34.6     1947   26.1       1978   25.4      2018   23.7      2040    19.74    2073
GR 19.74    2080    25.0      2190    25.0      2190    25.0     2190    25.0     2190
GR 28.9     2198    33.94     2230    34.60     2264    34.93    2297    34.93    2344
GR 34.76    2390    33.44     2436    27.82     2463    32.12    2494    34.60    2526
GR 25.7     2562   24.7       2611   29.0      2650 25.3        2676 27.3        2718
GR 28.5     2762   30.8       2799   35.6      2833    35.6     2873   37.0      2922
GR36.9      2972    38.44     3014    37.57     3060    37.57    3103    37.57    3146
GR 37.08    3195    36.25     3229    36.09     3240    36.42    3248    36.09    3261
GR 40.00    3275
ET                9.1                                                2205.   2920.
X1    48       66     2030     3063      530      100      400 0.866
X3  10.
GR 48.90       0    46.80       42    46.80       68    43.09     109    41.50     161
GR 40.09     206    38.81      235    30.62      275    37.26     315    40.09     323
GR 39.80     346    41.20      370    40.50      411    40.80     438    40.29     504
GR 40.20     543    39.59      595    39.22      634    38.17     687    38.95     765
GR 39.80     829    40.20      912    40.29     1012    40.09    1099    40.09    1169
GR 40.09    1270    40.09     1367    40.59     1454    40.40    1559    40.59    1633
GR 40.90    1682    42.00     1709    40.80     1749    41.00    1836    40.90    1914
GR 39.35    1985    39.35     1986    39.22     2030    39.09    2082    38.17    2132
GR 37.63    2175    32.65     2215    32.46     2251  31.91      2267 28.2      2306.
GR26.8  2362.   13.69   2405.   15.     2545.   20.     2560.   21.2    2562.
GR25.9  2598.   25.9    2598.   25.9    2598.   25.9    2598.   25.9    2598.
GR25.1  2642.   24.89   2687.   24.5    2734.   28.1    2783.   34.9    2834.
GR 36.1  2874.    37.1    2919.   38.3   2970.    37.63   3021.  38.81   3063.
GR38.81  3094.
ET                9.1                                                2790.   3215.
X1    49       68     2678     3255      310      170      250
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X3  10.
GR 47.50       0   44.20      76   43.30     150   41.80     209   41.50     248
GR 37.0      299  36.2       355  36.5      417  36.6       480  37.4       552
GR 38.5      591  38.3       651  39.2      702  39.2       759   39.79     810
GR 40.29     870   40.40     927   40.50     979   42.09    1019   41.00    1081
GR 41.00    1178   41.00    1270   41.70    1355   41.00    1433   40.70    1503
GR 40.50    1554   41.20    1588   41.30    1646   41.10    1705   41.30    1786
GR 41.80    1878   42.50    1963   42.40    2056   42.09    2133   41.50    2219
GR 42.20    2280   42.29    2319   43.09    2357   41.80    2382   41.80    2426
GR 41.10    2493   41.10    2610   41.10    2678   40.20    2722   38.60    2747
GR 39.2 2749.   35.1    2779.   34.1    2820.   30.1    2862.   27.5    2909.
GR 18.2 2952.   20.1    2980.   20.4    3004.   25.5    3031.   26.9    3064.
GR 27.6 3104.   30.1    3146.   30.29   3181.   34.5    3214.   39.7    3239.
GR 40.50    3255   34.86    3273   36.76    3301   38.35    3340   41.20    3363
GR 40.20    3388   39.79    3410   41.59    3432
ET              9.1                                              1440.   1785.
X1    50      48    1374    1866     265      90     160
X3  10.
GR 54.50       0   54.50      14   51.20      36   50.00      68   46.00      84
GR 43.70     107   42.09     137   40.80     174  39.5       211  38.0       239
GR 36.7      259  39.6       279   41.10     321   42.90     355   42.7      384
GR 42.50     417   43.09     477   43.50     564   43.60     636   43.70     700
GR 43.60     796   43.60     858   43.40     915   43.09     980   42.90    1021
GR 43.09    1058   42.20    1093   41.30    1134   41.40    1201   41.70    1260
GR42.   1321.   41.59   1374.   38.7    1441.   38.7    1442.   36.7    1491.
GR29.8  1541.   26.6    1593.   18.8    1611.   18.5    1647.   18.     1680.
GR28.4  1703.   32.4    1727.   37.3    1764.   39.     1810.   41.3    1866.
GR 42.00    1906   44.59    1938   44.90    1976
NC  .030    .090    .090      .6      .8
ET              9.1                                              1860.   2090.
X1 50.1   44.   1825.   2125.   190.    170.    180.
X3  10.
GR 59.70       0   52.79      46   47.40      96   45.50     115   45.09     266
GR 43.88     340   43.58     434   43.27     540   43.17     638   43.27     719
GR 44.19     808   44.39     890   44.79     979   45.00    1062   44.79    1139
GR 44.79    1230   44.59    1327   44.39    1402   44.90    1467   45.70    1509
GR 47.5  1575.   50.2   1631.   51.9    1692.   51.9    1763.   51.4    1790.
GR51.   1808.   35.     1825.   33.     1835.   32.5     1860.   31.2   1890.
GR31.2  1915.   32.5    1927.   31.     1950.   30.0    1977.   28.0    2000.
GR 25.  2030.   25.0    2050.   25.0    2080.   26.5    2096.   29.1    2110.
GR32.6  2125.   50.5    2135.   51.0    2162.   60.     2170.
SB1.25  1.25    3.1     0.      100.    22.5    4300.   4.39    25.     25.
ET                                                               1860.   2090.
X151.1    44.   1825.   2125.   25.     25.     25.
X2              1.      47.8    43.2
BT33.   0.      59.7    59.7    46.     52.79   52.79   96.     47.4    47.4
BT115.  45.5    45.5    266.    45.09   45.09   340.    43.9    43.9    434.
BT43.6  43.6    540.    43.3    43.3    638.    43.2    43.2    719.    43.3
BT43.3  808.    44.2    44.2    890.    44.4    44.4    979.    44.79   44.79
BT1062. 45.     45.     1139.   44.79   44.79   1230.   44.79   44.79   1327.
BT44.59 44.59   1402.   44.4    44.4    1467.   44.9    44.9    1509.   45.7
BT45.7  1575.   47.5    47.5    1631.   50.2    50.2    1692.   51.9    51.9
BT1763. 51.9    51.9    1790.   51.4    51.4    1825.   51.3    47.8    1890.
BT51.2  47.8    1977.   50.9    47.8    2050.   50.9    47.8    2110.   50.59
BT47.8  2125.   50.7    47.8    2162.   51.     51.     2170.   60.     60.
GR 59.70       0   52.79      46   47.40      96   45.50     115   45.09     266
GR 43.88     340   43.58     434   43.27     540   43.17     638   43.27     719
GR 44.19     808   44.39     890   44.79     979   45.00    1062   44.79    1139
GR 44.79    1230   44.59    1327   44.39    1402   44.90    1467   45.70    1509
GR 47.5  1575.   50.2   1631.   51.9    1692.   51.9    1763.   51.4    1790.
GR51.   1808.   35.     1825.   33.     1835.   32.5     1860.   31.2   1890.
GR31.2  1915.   32.5    1927.   31.     1950.   30.0    1977.   28.0    2000.
GR 25.  2030.   25.0    2050.   25.0    2080.   26.5    2096.   29.1    2110.
GR32.6  2125.   50.5    2135.   51.0    2162.   60.     2170.
ET              9.1                                              1915.   2325.
X1    52      59    1738    2364  125.    125.     125.
X3  10.
GR 62.00       0   58.00      41   52.79      75   52.00     108   47.19     142
GR 44.86     192   43.22     246   43.43     299   44.03     362   44.54     427
GR 44.74     482   45.05     521   43.32     574   41.95     625   41.95     689
GR 42.28     749   42.81     802   43.00     854   43.53     911   44.03     967
GR 44.14    1039   44.14    1110   44.65    1177   44.54    1239   44.35    1316
GR 44.54    1384   44.35    1445   43.84    1500   43.00    1557   42.07    1613
GR 41.86    1663   41.86    1738   41.21    1795   40.67    1853   40.13    1875
GR31.3      1900  30.6      1926  28.1     1959  27.0      1993  24.7      2021
GR22.6      2059 22.5       2096  18.1     2113  10.9      2136  10.9      2162
GR12.9      2178  13.1      2205  21.9     2226  21.9      2239  21.9      2239
GR 23.76    2295   23.98    2313   35.35   2338   42.17    2364   42.17    2382
GR 53.09    2405   61.00    2425   69.10   2455   69.30    2495
ET              9.1                                              1615.   2695.
X1    53      60    1580    2754     360     450     420  0.927
X3  10.
GR 65.80       0   61.90      22   62.20      51   59.40      76   56.80     102
GR 50.70     135   50.50     205   44.98     226   43.97     267   43.57     304
GR 43.57     351   44.17     397   44.38     463   45.18     523   45.27     574
GR 44.28     613   43.05     666   42.96     732   43.27     794   43.87     851
GR 44.48     895   45.48     961   45.27    1016   44.68    1086   44.57    1154
GR 45.07    1208   45.18    1264   45.18    1324   45.07    1399   43.97    1460
GR 43.37    1518   43.05    1580   38.59    1597  13.3      1667  13.3      1696
GR 13.3     1696  13.3      1696  13.4     1731   13.4     1873   21.24    1883
GR 21.24    1904   21.24    1923   21.24    1925   21.24    1972   21.24    2027
GR 21.24    2084   21.24    2136   21.24    2185   21.79    2236   21.88    2286
GR 22.39    2345   22.10    2401   26.58    2459   34.21    2517   34.62    2579
GR 35.33    2641   35.64    2693   35.94    2723   42.66    2754   55.40    2784
ET              9.1                                              1370.   2470.
X1    54      88    1281    2517     470     750     600 0.940
X3  10.
GR 63.70       0   62.79      22   61.59      44   56.40      81   50.59     119
GR 47.00     174   45.50     211   45.09     243   45.20     422   45.40     480
GR 45.59     544   44.70     606   45.40     633   46.10     668   46.20     715
GR 46.10     773   45.50     813   44.59     837   44.50     892   44.40     937
GR 44.30     984   44.20    1021   46.00    1033   45.40    1076   45.20    1124
GR 45.29    1178   45.50    1223   45.29    1281   36.89    1299   35.69    1335
GR35.49  1357.   30.28   1374.   30.39   1409.   30.39  1433.    32.09   1455.
GR 31.89    1476   34.09    1505   28.01    1516   28.01    1538   28.01    1565
GR 29.78    1574  24.3      1591  19.1     1630  17.5      1664   28.99    1692
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GR 29.99    1710   29.69    1728   29.39    1747   37.19    1778   37.19    1795
GR 36.89    1816   42.90    1843   42.20    1865   38.89    1898   32.09    1915
GR 32.29    1938  23.4      1961  23.1      1985   23.1     2022  22.9      2057
GR 22.9     2057  25.1      2082   30.99    2097   33.29    2114   32.99    2147
GR 31.89    2186   30.78    2230   31.19    2261    19.5    2283   18.1     2305
GR 20.4     2356   32.79    2416   35.89    2463  41.29   2501.    42.79   2517.
GR 42.29    2565   42.50    2628   42.29    2692   42.59    2748   42.20    2807
GR 42.29    2873   42.70    2949   42.40    3006   42.40    3070   42.59    3122
GR 57.70    3162   77.60    3199   86.30    3218
NH     3    .030    1439    .035    1604    .035    3001
ET                 9.1                                          1565.    2280.
X1    55      65    1604    2085    460.    600.     510
GR 72.50      0.    72.80     57.   71.30     110.   65.80    164.   58.60     215.
GR 53.09    268.   50.09     309.   47.29     340.   47.20    397.   47.50     454.
GR 46.50    517.   46.30     586.   46.00     656.   45.80    708.   46.10     758.
GR 46.10    810.   46.59     863.   46.20     922.   45.80    978.   46.40    1032.
GR 45.70   1089.   45.59    1155.   45.50    1218.   45.70   1270.   45.09    1312.
GR 43.90    1358   42.90    1398   41.80     1439   41.59    1512   39.10     1538
GR 35.20    1554   35.00    1576   35.00     1604   32.20    1672   31.39     1701
GR 31.20    1742   30.90    1770   29.89     1793   26.80    1806   27.00     1844
GR 27.50    1869   22.70    1891   27.50     1922   27.50    1961   27.10     2007
GR 27.00    2045   27.90    2076   32.20     2085   35.00    2204   35.00     2204
GR 36.40   2235.   38.70   2255.   39.70    2297.   46.00   2324.   44.79    2371.
GR 44.50   2433.   44.00   2505.   44.70    2580.   43.70   2664.   44.09    2727.
GR 43.50   2800.   43.60   2862.   44.00    2908.   59.20   2958.   73.80    3001.
NC  .040    .035    .035      .6      .8
NH     3    .040     726    .035     745    .035    1917
ET                 9.1                                          745.    1162.
X1    56      51     745    1151     520     800     600
X3    10
GR 54.79      0.    53.90     35.   52.59      82.   50.40    128.   48.70     186.
GR 47.50    217.   47.50     258.   46.70     313.   46.40    374.   45.00     426.
GR 44.90    488.   44.09     522.   45.70     536.   47.00    571.   47.79     599.
GR 46.00    621.   47.79     638.   45.90     667.   46.80    704.   47.29     726.
GR 37.    745.    30.2    779.    27.9     818.    27.7    848.    27.7     848.
GR 26.29    893.   27.10     927.   27.60     953.   28.50    981.   25.70    1007.
GR 28.70   1024.   28.29    1052.   27.29    1088.   29.10   1118.   34.80    1151.
GR 43.80   1201.   44.59    1219.   47.90    1237.   48.30   1263.   48.00    1317.
GR 48.09   1376.   48.30    1449.   48.40    1512.   48.00   1570.   48.20    1629.
GR 47.90   1683.   47.09    1731.   45.90    1792.   45.29   1860.   45.50    1889.
GR 56.40   1917.
NH     3    .040     430    .035     544    .035    1840
ET                 9.1                                          540.     830.
X1    57      42     544     842     520     580     530
GR 54.59      0.    52.70     61.   50.00     128.   47.20    195.   45.40     257.
GR 45.29    301.   44.90     341.   44.79     390.   45.20    430.   43.20     464.
GR42.09   506.    42.2   0    544.   31.10     565.   30.20    589.   30.00     622.
GR 29.00    659.   28.70     681.   28.70     681.   28.70    681.   27.20     747.
GR 27.20    806.   39.90     842.   48.50     870.   48.30    905.   48.90     939.
GR 49.59    993.   49.59    1072.   49.59    1141.   49.09   1207.   48.60    1278.
GR 48.00   1345.   47.70    1411.   48.70    1486.   47.70   1559.   47.20    1623.
GR 48.20   1668.   49.00    1711.   49.70    1740.   55.70   1767.   63.60    1799.
GR 70.10   1817.   76.10    1840.
NH     3    .040     115    .035     231    .035    1395
ET                 9.1                                          240.     680.
X1    58      33     231     675     670     670     670
GR 57.09      0.    53.90     58.   52.40      95.   52.40    115.   40.90     137.
GR 40.00    176.   38.40     207.   34.90     231.   32.00    270.   30.50     313.
GR 29.79    350.   27.50     360.   27.90     419.   27.90    451.   27.90     478.
GR 27.00    491.   27.10     543.   27.70     576.   27.70    636.   38.10     675.
GR 50.00    722.   51.50     755.   51.10     821.   51.90    894.   52.50     952.
GR 52.40   1030.   51.30    1092.   51.40    1166.   49.90   1244.   49.50    1283.
GR 54.40   1303.   70.80    1340.  100.10    1395.
ET                 9.1                                          283.     618.
X1    59      36     394     638     600     480     510
GR 57.59      0.    54.40     35.   43.80      70.   42.29     95.   41.40     136.
GR 43.09    166.   41.40     193.   43.00     222.   42.20    256.   44.79     281.
GR 41.2     331.  40.5       372.  40.0      394.   29.10    426.   28.60     464.
GR 28.89    503.   29.40     529.   27.79     539.   27.79    569.  41.76      597.
GR 48.9     626.  51.3       638.  51.3      672.  52.2      731.  52.7       795.
GR 53.00    863.   54.09     924.   53.70     992.   53.40   1059.   52.70    1128.
GR 51.20   1175.   50.80    1215.   51.30    1249.   58.00   1277.   66.80    1300.
GR 75.80   1320.
NC  .040    .035    .040      .6      .8
ET                 9.1                                          70.      580.
X1    60      40      74     585     600     500     520
GR 77.50      0.   64.10      24.   40.59      74.  40.90      97.   41.30     129.
GR 41.70    165.   41.70     197.   40.       223.  40.0      260.  40.0       306.
GR 41.7     328.  36.4       343.  41.9      358.  42.79     389.   42.79     413.
GR 41.1     429.  42.4       442.  39.      461.   41.9      474.  42.29      498.
GR41.4      529.  33.4       553.  33.5      570.  47.09     585.  51.4       601.
GR 50.80    633.   52.20     684.   52.90     735.   53.20    796.   53.60     854.
GR 54.09    915.   53.80     986.   53.20    1064.   52.40   1125.   52.09    1180.
GR 51.90   1203.   52.00    1212.   52.50    1220.   55.20   1231.   60.00    1231.
ET                 9.1                                          85.      587.
X1    61      30      74     571     620     570     580
GR 70.80      0.   62.50      22.   51.50      51.  46.50      74.   44.20     109.
GR 42.90    153.   42.90     199.   41.70     233.   37.30    247.   37.70     268.
GR 41.00    291.   40.20     314.   41.80     348.  44.       382.  44.09      415.
GR44.59     450.  46.5       469.  42.5      489.  47.0      515.  45.0       547.
GR 50.      571.   53.20     618.   53.30     666.   53.40    713.   54.09     738.
GR 54.30    753.   54.09     765.   55.00     840.   60.00    920.   75.00    1050.
NC  .040    .040    .040      .6      .8
ET                 9.1                                          55.      580.
X1    62      28      63     535     600     360     500
GR 75.20      0.   59.79      22.   52.20      38.  51.50      63.   41.20      80.
GR 41.40     99.   42.20     128.   45.59     154.   45.80    180.   40.50     202.
GR 40.90    235.   42.00     263.   41.00     295.   42.50    326.   41.59     366.
GR 41.59    396.   43.70     429.   44.09     481.   47.09    512.   53.30     535.
GR 54.40    563.   54.40     598.   54.70     645.   56.30    686.   59.20     711.
GR 61.20    739.   64.10     768.   75.00     768.
ET                 9.1                                          70.      570.
X1    63      22     113     570     490     420     450
GR 61.00      0.   55.80      16.   53.30      45.  50.20      93.   48.90     113.
GR 41.40    126.   41.20     139.   43.80     166.   44.90    202.   46.40     236.
GR 44.90    269.   41.10     290.   40.90     329.   43.09    344.   43.20     383.
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GR 43.30    423.   41.30    458.   42.79    495.   46.10    536.   54.30    570.
GR 59.40    623.   75.00    663.
X1    64     30     203      631     430      420     420
GR 88.30      0.   70.70     37.   56.50     60.   55.70     81.   51.20    100.
GR 48.80    119.   50.50    146.   52.29    169.   53.20    203.   46.10    222.
GR 44.79    256.   45.70    289.   46.50    325.   47.50    354.   45.50    378.
GR 45.29    395.   42.00    403.   43.60    421.   43.60    463.   46.30    480.
GR 46.90    511.   44.40    533.   41.80    555.   41.80    571.   44.70    587.
GR 46.40    615.   49.40    631.   61.50    656.   82.00    700.   92.80    739.
NC  .060    .060    .060      .6      .8
ET                 9.1                                              265.    765.
X1    65     26     329      738     540      500     500
GR 78.60      0.   67.70     26.   60.20     50.   56.20     84.   52.59    113.
GR 52.50    148.   52.90    186.   53.20    232.   55.40    265.   56.80    294.
GR 56.20    329.   46.70    363.   46.59    402.   47.29    441.   46.59    479.
GR 47.20    514.   46.80    543.   43.20    562.   43.20    624.   47.59    640.
GR 47.79    675.   48.90    706.   52.79    738.   57.09    776.   59.90    802.
GR 73.60    830.
ET                 9.1                                              230.    770.
X1    66     24     353      746     600      620     610
GR 69.80      0.   58.80     38.   56.00     50.   56.80     75.   55.80     98.
GR 57.09    131.   57.29    181.   58.80    239.   59.90    296.   60.29    353.
GR 47.40    388.   48.09    432.   48.80    472.   50.40    489.   50.00    529.
GR 49.90    564.   50.80    613.   46.20    639.   45.59    661.   48.20    692.
GR 52.09    730.   57.70    746.   59.40    763.   82.60    823.
X1    71     39      96      691     100      500     170
GR112.90      0.   91.10     33.   62.79     72.   59.50     96.   55.70    118.
GR 53.50    147.   52.50    175.   49.09    191.   48.09    221.   49.70    239.
GR 54.30    261.   48.70    287.   48.40    307.   52.09    322.   53.30    340.
GR 49.50    380.   51.59    401.   54.40    427.   62.09    458.   61.00    481.
GR 60.59    498.   58.80    513.   63.30    545.   64.30    576.   63.50    605.
GR 62.00    652.   57.40    671.   63.20    691.   65.40    713.   65.50    766.
GR 64.60    810.   64.10    858.   63.20    888.   65.30    922.   68.00    960.
GR 72.30    993.   74.70   1015.   77.60   1037.   78.90   1055.
NC  .070    .035    .070      .6      .8
NH     3    .070      56    .070     416    .035     924
X1    72     33      56      388     100      280     160
GR110.50      0.   62.00     56.   57.00     77.   52.40    103.   51.00    136.
GR 49.59    155.   49.79    181.   50.29    207.   52.00    216.   50.90    237.
GR 51.30    257.   50.50    284.   51.10    301.   53.00    312.   51.00    335.
GR 51.00    355.   61.40    388.   63.00    416.   63.30    469.   64.20    531.
GR 66.00    575.   66.00    621.   65.20    678.   64.20    710.   65.90    729.
GR 65.50    760.   64.50    780.   66.00    812.   68.40    841.   71.10    876.
GR 72.70    896.   74.30    911.   76.10    924.
NH     3    .070      31    .070     351    .035     780
X1    73     27      31      337     190      200     190
GR112.00      0.   85.30     31.   50.00     78.   49.70    100.   51.50    121.
GR 50.20    152.   49.09    181.   50.29    206.   47.90    226.   49.40    242.
GR 47.40    256.   49.40    275.   53.30    306.   59.79    337.   62.59    351.
GR 62.29    392.   62.70    451.   63.30    516.   65.00    554.   65.10    602.
GR 66.00    644.   65.50    684.   65.10    709.   68.40    733.   68.50    749.
GR 73.40    765.   77.70    780.
X1    74     18      46      290     420      425     440
GR103.50      0.   53.70     46.   47.90     75.   47.70    127.   48.80    185.
GR 56.20    247.   61.00    290.   62.90    339.   63.30    387.   64.40    452.
GR 64.90    511.   65.30    575.   65.80    611.   65.40    656.   67.30    708.
GR 69.20    750.   70.20    760.   75.40    775.
NH     3    .070      77    .070     306    .035     750
X1    75     19      77      271     410      400     405
GR119.50      0.   85.40     35.   55.09     77.   48.90    101.   50.09    145.
GR 52.79    196.   54.00    239.   60.70    271.   63.80    306.   64.90    356.
GR 65.50    410.   65.40    473.   65.10    529.   66.10    602.   68.40    662.
GR 71.20    712.   72.00    720.   72.90    728.   75.00    750.
NH     3    .070      38    .070     365    .035     630
X1    76     16      38      329     400      400     400
GR107.30      0.   68.90     38.   48.30     75.   48.09    125.   54.30    173.
GR 52.70    222.   57.79    269.   57.50    306.   63.30    329.   66.10    365.
GR 66.60    411.   66.80    460.   67.30    511.   68.00    538.   70.20    569.
GR 80.00    630.
NH     3    .070      38    .070     308    .035     505
X1    77     18      38      281     480      390     460
GR107.50      0.   78.40     38.   52.09     79.   49.59     94.   50.00    126.
GR 50.40    162.   50.80    196.   53.40    239.   55.50    267.   60.59    281.
GR 64.50    308.   65.60    356.   67.70    395.   73.30    449.   78.00    476.
GR 79.30    486.   80.59    496.   82.20    505.
EJ
T1    SAN DIEGUITO RIVER NEAR VIA DE SANTA FE BRIDGE
T2    MARCH 1978 FLOOD
T3    NOVEMBER 1981   HOWARD H. CHANG
J1       4.                                                          26.0
J2  2.          -1.
T1    SAN DIEGUITO RIVER NEAR VIA DE SANTA FE BRIDGE
T2    100 YEAR FLOOD
T3    NOVEMBER 1981   HOWARD H. CHANG
J1       2.                                                          34.2
J2 15.          -1.


ER
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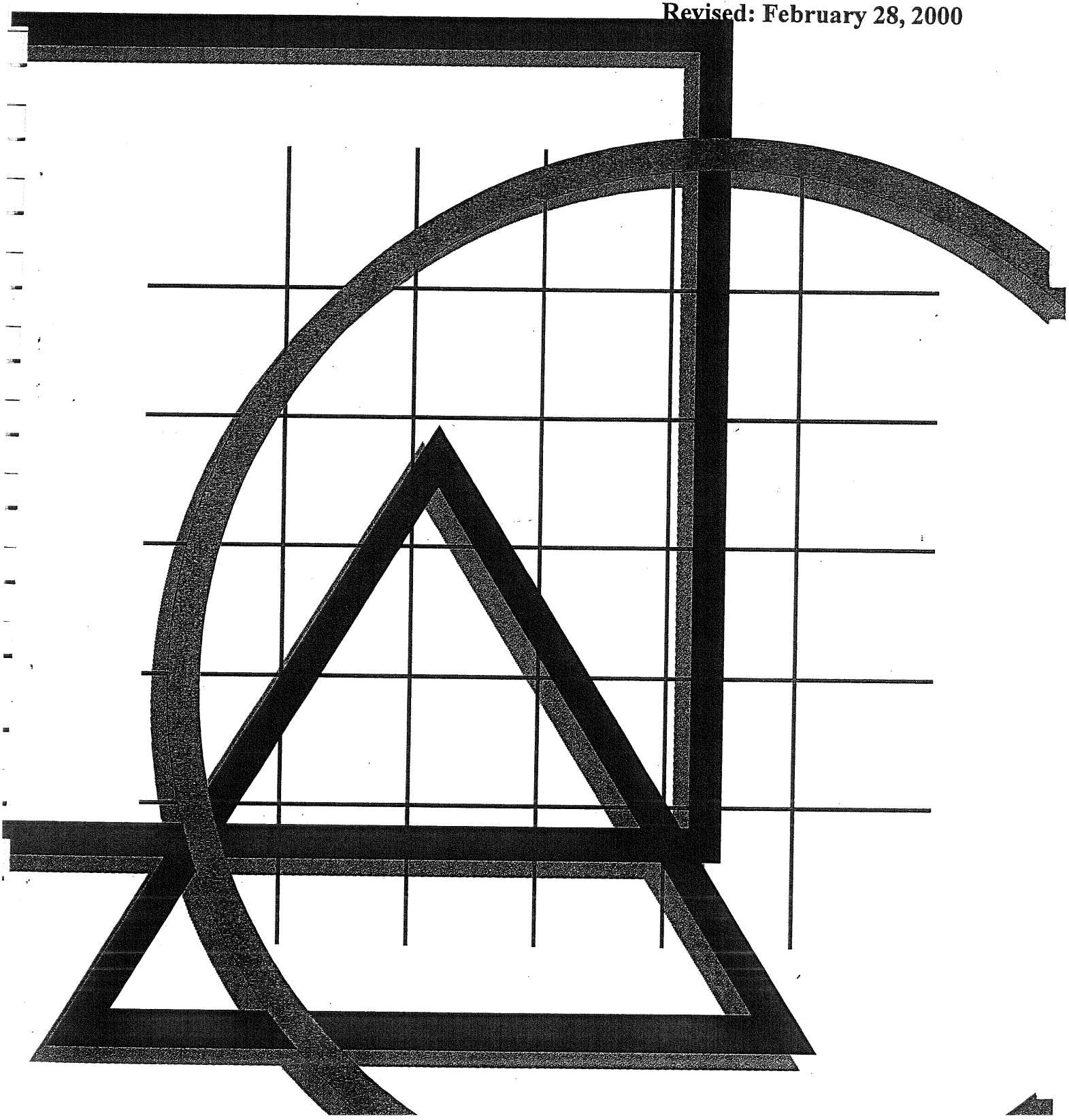
RICK ENGINEERING COMPANY

#727

SHOENFELDER PROPERTY
HYDRAULIC ANALYSIS
(TPM 20277)

(Job Number 13603-A)
January 26, 2000
Revised: February 28, 2000



UPDATED TOPOGRAPHY

A supplemental survey of the breakout area was performed on January 25, 2000. The results of this survey are incorporated with the original topography dated, November 11, 1999. This supplemental survey shows an earthen berm adjacent to the riverbank. The construction date and methods for the berm are unknown. The berm is labeled on the "Schoenfelder Property and Vicinity, Updated Topographic Map" exhibit in Map Pocket 6. The top of berm elevation is approximately 37.0. According to the County of San Diego Floodplain Map Sheet Number 302-1707 (see Map Pocket 3), the water surface elevation at the location of the berm is approximately 35.6. Comparing these elevations indicates that the earthen berm will prevent floodwaters from breaking out of the main channel at this location.

Therefore, the berm will prevent the 100-year San Dieguito River flow from inundating the Schoenfelder property as well as the adjacent streets, El Apajo and Via de Santa Fe.

The analyses in previous sections of this report have been performed to determine the impact from the project on riverine flow that breaks out of the San Dieguito River. While the breakout may have been present at the time the Master Drainage Plan was prepared, the breakout no longer exists due to the construction of the berm. Therefore, the 100-year floodplain does not extend into the Schoenfelder property, but is maintained within the main San Dieguito River channel banks.