B-11/D2

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.
THE ENGINEERING FIRM OF CHOICE

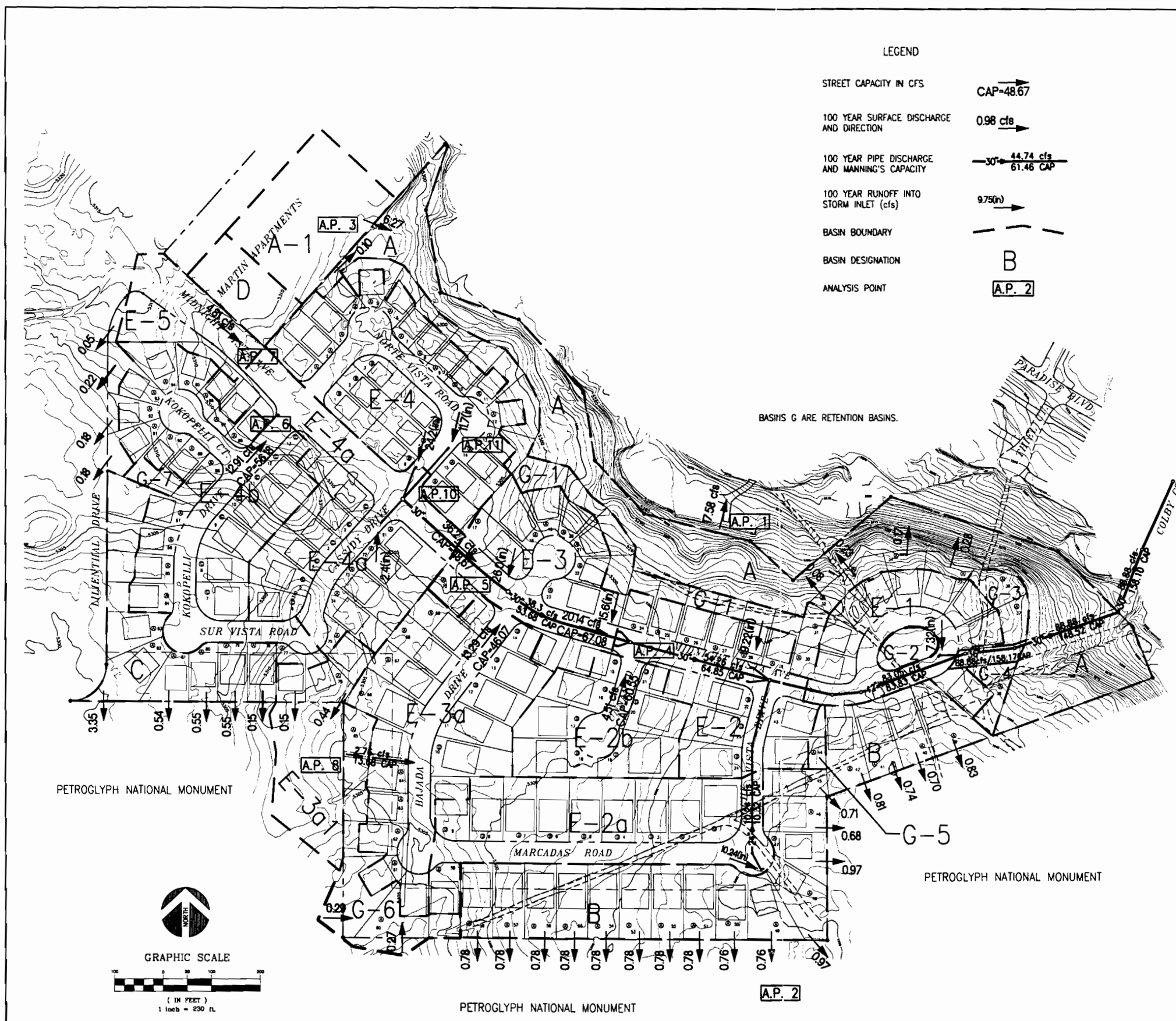
5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343-8759

SUPPLEMENTAL DRAINAGE CALCULATIONS FOR PARADISE BLUFF SUBDIVISION

ALBUQUERQUE, NEW MEXICO

Joe Kelley
April 24, 1997
May 27, 1997

APRIL 1997



TOTAL DISCHARGED TO MONUMENT = 19.31 cfs.

NOTE: THIS MAP INDICATES VALUES FOR THE 100 YEAR STORM.

BENCH MARKS

ACS ALUMINUM CAP "6-B11" LOCATED APPROXIMATELY 475 FEET WEST OF THE INTERSECTION OF JUSTIN DRIVE NW AND BUGLO AVENUE NW. ELEVATION = 5328.378

ACS ALUMINUM CAP "3-B12" LOCATED APPROXIMATELY 0.57 MILES SOUTHEAST OF THE INTERSECTION OF PARADISE BLVD. NW AND RADCLIFF ROAD NW. ELEVATION = 5277.263

SURVEY INFORMATION

FIELD NOTES BY: SURVEY DATA PROVIDED BY TOM MANN & ASSOC. NMPLS 7924

FLIGHT DATE 12/01/93

AS BUILT INFORMATION

CONTRACTOR

WORK STARTED BY — DATE

WORK ACCEPTANCE BY — DATE

FIELD VERIFICATION BY — DATE

DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION

RECORDED BY — DATE

NO.

ENGINEER'S SEAL

CHAVEZ · GRIEVES CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8750

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED J. P. KELLEY	DATE
		DRAWN BY W. M. TOWERS	DATE
		CHECKED BY V.J. CHAVEZ	DATE

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE: PARADISE BLUFF SUBDIVISION
PROPOSED DRAINAGE BASIN MAP

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.

Zone Map No. B-11/12

Sheet DB-2 Of

JOB NO. 408.100-5193
FILE PARADISE
REV. 04/23/97 (MT)

AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

```
AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =04/22/1997
INPUT FILE = AHYMO2X.IN                                                                 USER NO.= CHVZ_GNM.I01

                                FROM  TO                    PEAK        RUNOFF              TIME TO    CFS      PAGE =   1
                     HYDROGRAPH   ID   ID         AREA     DISCHARGE    VOLUME     RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION     NO.  NO.      (SQ MI)      (CFS)      (AC-FT)   (INCHES)  (HOURS)    ACRE     NOTATION

*SS2  !!!!!!!!!!!!>>>>>>>  REVISED YET AGAIN  <<<<<<<<!!!!!!!!!!!!!!!!!!!!!!!!!!!!
*SS1  !!!!!!!!!!!!>>>>>>>  REVISED AGAIN  <<<<<<<<!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
*SS*  !!!!!!!!!!!!!!!!!!!!  REVISED  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
*SS*****************************************************************************
*SS**************    CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.   ***************
*SS**************         PIEDRAS MARCADAS NORTH BRANCH          ***************
*SS**************              PROPOSED CONDITIONS               ***************
*SS*****************************************************************************
*SS2  FILENAME:  G:\N08\N0810051\DOCUMENT\AHYMO2X.IN/OUT
*SS*****************************************************************************
*SS*  THIS IS A REVISION TO THE MOLZEN-CORBIN "EXISTING CONDITIONS" RUN
*SS*  FOR THE NORTH BRANCH OF THE PIEDRAS MARCADAS ARROYO.
*SS*  ALL REVISIONS TO THE ORIGINAL RUN WILL BE PRECEDED BY A COMMENT
*SS*  NOTED WITH A *SS.  THE PART OF THE STUDY THAT IS OF INTEREST IS THE
*SS*  NORTH BRANCH (ALL BASINS NUMBERED IN THE 200'S).  THE REMAINDER OF
*SS*  THE PIEDRAS MARCADAS STUDY BY MOLZEN-CORBIN HAS BEEN DELETED FROM
*SS*  THIS STUDY.
*SS*****************************************************************************
*SS*  THIS RUN HAS BEEN REVISED TO REFLECT THE CONDITIONS THAT WILL OCCUR AS
*SS*  A RESULT OF THE PARADISE BLUFF SUBDIVISION BEING BUILT.  BASIN 205
*SS*  HAS DECREASED IN SIZE BECAUSE SMALLER, MORE DETAILED BASINS FROM THE
*SS*  SITE-SPECIFIC STUDY HAVE BEEN CUT OUT OF IT.  THE DRAINAGE AREA THAT
*SS*  DISCHARGES TO PARADISE BLVD WILL INCREASE IN SIZE BECAUSE A PORTION
*SS*  OF THE AREA THAT USED TO DISCHARGE TO THE MIDDLE BRANCH OF THE PIEDRAS
*SS*  MARCADAS WILL BE DIVERTED TO THE NORTH.
*SS*****************************************************************************
*SS*  SEDIMENT BULKING FACTORS WILL BE ADDED TO THIS RUN.  THE SAME FACTORS
*SS*  WILL BE USED HERE THAT WERE APPLIED IN THE GOLF COURSE ROAD STORM
*SS*  DRAIN DESIGN BY LEEDSHILL-HERKENHOFF TO BASINS 204 AND 205.  TO THE
*SS*  NEW BASINS THAT ARE BEING CREATED, THE SAME BULKING FACTOR WILL BE
*SS*  APPLIED THAT WAS USED ON BASIN 204 (1.003), BECAUSE THE NEW BASIN
*SS*  WILL BE SIMILAR IN NATURE:  RESIDENTIAL DEVELOPMENT WITHOUT MUCH
*SS*  SEDIMENT RUNOFF.  UNDEVELOPED BASINS WILL HAVE THE SAME BULKING
*SS*  FACTOR APPLIED TO THEM THAT WAS APPLIED TO BASIN 205 (1.282), THE
*SS*  SAME AS WAS USED BY LEEDSHILL HERKENHOFF FOR UNDEVELOPED FLOWS.
*SS1****************************************************************************
*SS1  THIS IS A REVISION OF THE ORIGINAL 7/1/96 AHYMO RUN.  IT WAS REVISED
*SS1  TO ADD SOME ADDITIONAL INLETS UPSTREAM.  ALL REVISED DATA WILL BE
*SS1  PRECEDED WITH *SS1.
*SS1****************************************************************************
*SS2  THIS IS A REVISION OF THE 4/22/97 AHYMO RUN.  IT WAS REVISED TO PICK UP
*SS2  1.4 TIMES THE 100-YEAR STORM AT THE LOW POINTS THAT HAVE NO OUTLET.
*SS2  1.4 TIMES THE 100-YEAR WILL BE MODELED BY USING A "DIVIDE HYD" OF
*SS2  1.40 ON THE RUNOFF COLLECTED AT THE SUMPS.  ALL REVISED DATA WILL
*SS2  BE PRECEDED WITH *SS2.
*SS2****************************************************************************
START                                                                          TIME=       .00
RAINFALL  TYPE= 1                                                              RAIN6=    2.200
*SS  APPLY A 1.003 SEDIMENT BULKING FACTOR TO THE BASINS NORTH OF
*SS  PARADISE BLVD.
```

AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
SEDIMENT BULK										PK BF =	1.00
*S********** NORTH BRANCH **********											
*S********** CALCULATE BASIN 204.1 **********											
COMPUTE NM HYD	204.00	-	1	.07200	156.74	5.310	1.38281	1.500	3.401	PER IMP=	50.00
*S**********DIVIDE HYD AT FAIRFAX/SIMON INTERSECTION******											
DIVIDE HYD	204.10	1	2	.05247	60.00	3.870	1.38281	1.400	1.787		
	204.12	AND	3	.01953	96.74	1.440	1.38281	1.500	7.739		
*S***** ROUTE ID=I, MAIN FLOW DOWN FAIRFAX PART WAY******											
ROUTE	204.13	2	4	.05247	59.34	3.870	1.38281	1.732	1.767		
*S********* ROUTE ID=3 (REMAINDER OF FLOW) DOWN SIMON******											
ROUTE	204.14	3	5	.01953	94.38	1.441	1.38299	1.532	7.550		
*S********** CALCULATE BASIN 204.3 **********											
COMPUTE NM HYD	204.30	-	3	.08500	120.43	4.991	1.10090	1.567	2.214	PER IMP=	30.00
*S**** ADD 204.3 AND OVERFLOW FROM FAIRFAX/SIMON INTERSECTION***											
ADD HYD	204.39	5& 3	6	.10453	207.78	6.427	1.15280	1.532	3.106		
*S********** ROUTE THRU POND IN GOLF COURSE ********											
ROUTE RESERVOIR	507.00	6	2	.10453	40.61	1.756	.31506	1.931	.607	AC-FT=	5.061
*S********* ROUTE DISCHARGE FROM POND TO FAIRFAX (MID-POINT)******											
ROUTE	204.32	2	6	.10453	24.80	1.746	.31312	2.098	.371		
*S**** ADD 204.1 AND 204.3 POND ROUTE***											
ADD HYD	204.31	4& 6	9	.15700	59.44	5.615	.67060	1.732	.592		
*S********** CALCULATE BASIN 204.4 **********											
COMPUTE NM HYD	204.40	-	3	.09500	155.64	5.578	1.10090	1.533	2.560	PER IMP=	30.00
*S********* ROUTE 204.4 THROUGH GOLF COURSE TO FAIRFAX MIDPOINT*****											
ROUTE	204.32	3	5	.09500	151.44	5.578	1.10090	1.565	2.491		
*S**** ADD 204.4R AND POND/204.1 ROUTES***											
ADD HYD	204.42	5& 9	7	.25200	206.78	11.193	.83281	1.565	1.282		
*S**** ROUTE THIS TOTAL AT FAIRFAX MIDPOINT TO DISCHARGE AT PARADISE****											
ROUTE	204.39	7	2	.25200	200.39	11.187	.83235	1.598	1.243		
*S********** CALCULATE BASIN 204.2 **********											
COMPUTE NM HYD	204.20	-	3	.04900	88.53	3.290	1.25899	1.533	2.823	PER IMP=	42.00
*S**** ADD 204.2 TO TOTAL ROUTES DOWN FAIRFAX *****											
*SS THIS IS THE TOTAL RUNOFF TO THE NORTH SIDE OF PARADISE BLVD AT FAIRFAX.											
ADD HYD	204.21	2& 3	1	.30100	276.82	14.474	.90162	1.598	1.437		
*SS THIS RUNOFF WILL BE INTERCEPTED BY THE STORM DRAIN DESIGNED BY											
*SS LEEDSHILL-HERKENHOFF. DIVIDE 141 CFS INTO A NEW CATTLE GUARD INLET											
*SS CONNECTED TO THE NEW GOLF COURSE ROAD STORM DRAIN PER LEEDSHILL DESIGN.											
DIVIDE HYD	FRFX_PIP	1	16	.24740	141.00	11.897	.90162	1.465	.890		
	FRFX_STR	AND	12	.05360	135.82	2.577	.90162	1.598	3.960		
*SS BASIN A-1 (EXISTING DEVELOPED DISCHARGE FROM THE MARTIN APTS.											
*SS ONTO PARADISE BLUFF VIA (9) 3" DIA. PIPES THROUGH THE PARKING LOT											
*SS CURB ALONG THE EAST APARTMENT PROPERTY LINE AT ANALYSIS POINT											
*SS 3 (A.P. 3).)											
COMPUTE NM HYD	EXIST_A1	-	2	.00237	6.27	.234	1.85233	1.500	4.136	PER IMP=	90.00
*SS ROUTE BASIN A-1 DISCHARGE TO THE NORTHERN EDGE OF BASIN A											
*SS VIA A CHANNEL WHICH IS APPROXIMATELY SHEET FLOW (A.P.1)											
ROUTE	EXIST_A1	2	6	.00237	6.25	.234	1.85242	1.533	4.127		
*SS BASIN A, WHICH FOLLOWS, IS AN UNDEVELOPED BASIN THAT WILL											
*SS HAVE MORE SEDIMENT RUNOFF. THEREFORE, USE THE 1.282 BULKING											
*SS FACTOR ON THIS BASIN THAT WAS APPLIED TO BASIN 205 BY LEEDSHILL.											
SEDIMENT BULK										PK BF =	1.28
*SS BASIN A (SHEET DISCHARGE ACROSS THE NORTH PROPERTY LINE)											

AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	NEW_A	-	13	.00649	11.37	.315	.90882	1.500	2.736	PER IMP= 1.00
*SS ADD BASIN A-1 FOR THE TOTAL AT THE NORTH PROPERTY LINE (A.P.1).										
ADD HYD	TOTAL_A	13& 6	13	.00886	17.58	.549	1.16081	1.533	3.101	
*SS ROUTE BASIN A RUNOFF TO COLBY COURT/PARADISE BLVD INTERSECTION										
*SS USING A SECTION THAT WILL APPROXIMATE STREET/OVERLAND FLOW.										
*SS THIS IS THE TOTAL THAT WILL GET TO PARADISE BLVD OVERLAND FROM										
*SS FROM THE SITE.										
ROUTE	TO_COLBY	13	6	.00886	13.32	.549	1.16087	1.600	2.348	
*SS ROUTE THIS FLOW TO THE OUTFALL OF BASIN 205 AT PARADISE BLVD										
*SS AND GLOBUS. USE A SECTION THAT APPROXIMATES THE EXISTING										
*SS CHANNEL ALONG PARADISE BLVD										
ROUTE	GLOBUS	6	8	.00886	11.40	.549	1.16087	1.667	2.011	
*SS NOW CHANGE THE BULKING FACTOR BACK TO WHAT IT USED TO BE FOR										
*SS DEVELOPED CONDITIONS (1.003).										
SEDIMENT BULK										PK BF = 1.00
*SS BASIN D (EXISTING DEVELOPED DISCHARGE FROM THE MARTIN APTS.										
*SS ONTO THE HALF-STREET PAVED SECTION OF BUGLO AVE., JUST WEST OF										
*SS PARADISE BLUFF)										
COMPUTE NM HYD	EXIST_D	-	7	.00082	2.18	.081	1.85233	1.500	4.156	PER IMP= 90.00
*SS**********										
*SS CALCULATE BASIN E DISCHARGE, WHICH WILL DISCHARGE THROUGH *										
*SS THE SITE VIA THE ROADS AND THEN OFF-SITE VIA A NEW STORM DRAIN *										
*SS**********										
*SS BASIN E-5										
COMPUTE NM HYD	E-5	-	1	.00118	2.63	.091	1.45593	1.500	3.499	PER IMP= 56.00
*SS ADD BASINS E-5 AND D. THIS IS THE RUNOFF AT A.P.7										
ADD HYD	A_P_7	1& 7	1	.00199	4.81	.172	1.61818	1.500	3.768	
*SS1 ROUTE THIS RUNOFF TO THE NEW INLETS AT A.P.6 VIA 44' F-F STREET										
*SS1 SECTION WITH 8" CURB. THE STREET IS ACTUALLLY 48' F-F WITH A 4'										
*SS1 MEDIAN, BUT THIS SECTION WILL PROVIDE THE SAME CAPACITY.										
ROUTE	A_P_6	1	6	.00199	4.72	.172	1.61844	1.533	3.701	
*SS BASIN E-4b DISCHARGE TO A.P.6.										
COMPUTE NM HYD	E4b	-	1	.00544	12.91	.463	1.59583	1.500	3.711	PER IMP= 68.00
*SS BASIN E-4b WILL DISCHARGE TO A.P.6 VIA A 28' F-F STREET										
*SS SECTION WITH 8" CURB. SLOPE = 0.80%. THE CAPACITY OF THIS										
*SS SECTION IS COMPUTED BELOW.										
*SS1 ADD THIS TO THE OTHER RUNOFF COMING DOWN THE STREET AT THIS POINT,										
*SS1 FOR THE TOTAL RUNOFF AT THE NEW INLETS EAST OF A.P. 6.										
ADD HYD	A-P-6_TOTAL	1& 6	6	.00743	17.63	.635	1.60181	1.500	3.708	
*SS1 ROUTE THE STREET RUNOFF TO A.P.10 VIA 44' F-F STREET SECTION										
*SS1 WITH 8" CURB. THE STREET IS ACTUALLLY 48' F-F WITH A 4' MEDIAN,										
*SS1 BUT THIS SECTION WILL PROVIDE THE SAME CAPACITY (TO CASSIDY, WHICH										
*SS1 IS A.P.10).										
ROUTE	A_P_10	6	7	.00743	17.33	.635	1.60187	1.533	3.645	
*SS BASIN E-4a										
COMPUTE NM HYD	E4a	-	1	.00510	11.75	.415	1.52588	1.500	3.597	PER IMP= 62.00
*SS1 ADD THE RUNOFF AT A.P.10										
ADD HYD	A_P_10	1& 7	7	.01253	28.61	1.050	1.57087	1.533	3.567	
*SS1 24.6 CFS WILL DISCHARGE INTO THE NEW INLETS, WHILE THE REMAINDER										
*SS1 WILL GO DOWN THE STREET.										
DIVIDE HYD	AP10_PIPE	7	3	.01223	24.60	1.025	1.57087	1.500	3.142	
	AP10_STRT	AND	4	.00030	4.01	.025	1.57088	1.533	20.948	
*SS BASIN E-4										

AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	E4	-	1	.00392	10.13	.375	1.79245	1.500	4.032	PER IMP= 85.00
*SS1 ADD BASIN E-4 AT A.P.11 FOR THE TOTAL RUNOFF AT A.P.11. THIS										
*SS1 ALL DISCHARGES INTO THE STORM DRAIN SUMP AT A.P.11.										
ADD HYD	A_P_11TOT	1& 4	7	.00422	13.73	.400	1.77669	1.500	5.082	
*SS2 MULTIPLY THE RUNOFF PICKED UP IN THE SUMP BY A FACTOR OF 1.4										
DIVIDE HYD	A_P_10TOT	7	7	.00422	19.23	.560	2.48736	1.500	7.115	
	NO_VALUE	AND	1	.00422	5.49	.160	.71067	1.500	2.033	
*SS1 ADD TO THE REST OF THE PIPE FLOW AT A.P. 10										
ADD HYD	A_P_10_PIPE	3& 7	7	.01646	43.83	1.585	1.80602	1.500	4.161	
*SS1 ROUTE THE PIPE FLOW TO THE NEXT MANHOLE (A.P.4) VIA A 30" PIPE AT 1.48%										
*SS2 FOR THE PURPOSES OF ROUTING THROUGH THE AHYMO RUN, USE 2.5% (AHYMO										
*SS2 CAN'T MODEL PRESSURE FLOW). THIS WILL HAVE A NEGLIBLE EFFECT ON										
*SS2 THE VALUES COMPUTED.										
ROUTE	30PIPE	7	5	.01646	44.43	1.585	1.80605	1.533	4.218	
*SS BASIN E-3a1 (DISCHARGE TO A.P.8)										
COMPUTE NM HYD	E3a1	-	1	.00212	2.76	.092	.81033	1.500	2.029	PER IMP= 24.00
*SS ROUTE RUNOFF FROM A.P.8 TO BAJADA RD. VIA A 2' CONCRETE CHANNEL.										
ROUTE	TO_BAJA	1	2	.00212	2.75	.092	.81044	1.500	2.024	
*SS ROUTE RUNOFF DOWN BAJADA TO MIDNIGHT VISTA VIA 28' STREET										
*SS W/ 8" CURB AT .538% SLOPE.										
ROUTE	TO_MIDNT	2	3	.00212	2.40	.092	.81044	1.567	1.768	
*SS BASIN E-3a										
COMPUTE NM HYD	E3a	-	1	.00485	11.43	.416	1.60691	1.500	3.681	PER IMP= 72.00
*SS ADD BASIN E-3a AND E-3a1 FOR THE TOTAL RUNOFF INTO MIDNIGHT										
*SS VISTA AT BAJADA.										
ADD HYD	BAJA/MID	1& 3	3	.00697	13.29	.508	1.36431	1.500	2.977	
*SS1 ROUTE RUNOFF FROM BAJADA TO A.P.4 VIA 32' F-F STREET W/ 8" CURB										
*SS AT 1.02% SLOPE										
ROUTE	A_P_4	3	4	.00697	13.31	.508	1.36439	1.533	2.982	
*SS BASIN E-3										
COMPUTE NM HYD	E3	-	1	.00281	7.16	.264	1.75906	1.500	3.982	PER IMP= 82.00
*SS1 ADD BASIN E-3 AT A.P.4 FOR THE TOTAL RUNOFF AT THE INLETS										
*SS ON THE WEST SIDE OF A.P.4										
ADD HYD	AP4_WEST	1& 4	4	.00978	20.14	.771	1.47764	1.533	3.217	
*SS1 15.6 CFS WILL DISCHARGE INTO TWO DOUBLE "A" INLETS AT THIS POINT.										
DIVIDE HYD	AP4PIPE	4	3	.00932	15.60	.734	1.47764	1.467	2.616	
	AP4STRT	AND	4	.00046	4.54	.037	1.47763	1.533	15.278	
*SS THE REMAINING FLOW IN THE STREET AFTER THE INLETS WILL BE AS										
*SS FOLLOWS:										
*SS ADD THE PIPE FLOWS FOR THE TOTAL IN THE PIPE TO NOCHE VISTA.										
ADD HYD	PIPE_TO_NOCH	3& 5	3	.02578	60.03	2.320	1.68730	1.533	3.639	
*SS1 ROUTE THE PIPE FLOW DOWN TO NOCHE VISTA VIA A 30" PIPE AT 2.16%.										
*SS2 FOR THE PURPOSES OF ROUTING THROUGH THE AHYMO RUN, USE 3.5% (AHYMO										
*SS2 CAN'T MODEL PRESSURE FLOW)										
ROUTE	NOCHE_PIPE	3	5	.02578	60.05	2.320	1.68732	1.533	3.640	
*SS COMPUTE BASIN E-2b.										
COMPUTE NM HYD	E2b	-	2	.00237	5.40	.190	1.50256	1.500	3.564	PER IMP= 60.00
*SS THE FOLLOWING CURVE COMPUTES THE CAPACITY OF IGNACIO CT.,										
*SS WHICH IS A 26' F-F STREET WITH 8" CURBS AT 1.00% SLOPE.										
*SS IGNACIO COURT IS THE STREET THAT DISCHARGES BASIN E-2b RUNOFF										
*SS INTO MIDNIGHT VISTA ROAD.										
*SS ADD THE STREET RUNOFF AT IGNACIO/MIDNIGHT VISTA INTERSECTION.										

AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	IGNACIO	4& 2	4	.00283	9.73	.226	1.49837	1.533	5.369	
*SS ROUTE THE STREET RUNOFF FROM IGNACIO EAST ON MIDNIGHT VISTA										
*SS TO THE LOW POINT AT NOCHE VISTA. ROUTE IT VIA A 32' STREET SECTION.										
ROUTE	IGNACIO	4	3	.00283	8.64	.226	1.49856	1.533	4.768	
*SS BASIN E-2a. DISCHARGE TO STORM DRAIN INLET AT LOW POINT.										
*SS2 EXCESS RUNOFF AT THIS SUMP WILL OVERFLOW THE STREET VIA THE OVERFLOW										
*SS2 EASEMENT. DO NOT MULTIPLY BY 1.4 FACTOR.										
COMPUTE NM HYD	E2a	-	1	.00431	10.24	.367	1.59583	1.500	3.712	PER IMP= 68.00
*SS ROUTE FLOWS FROM BASIN E-2a TO THE STORM MAIN AT MIDNIGHT VISTA.										
*SS2 FOR THE PURPOSES OF ROUTING THROUGH THE AHYMO RUN, USE .9% (AHYMO										
*SS2 CAN'T MODEL PRESSURE FLOW)										
ROUTE	MID_PIPE	1	2	.00431	10.07	.367	1.59588	1.533	3.652	
*SS ADD THE PIPE RUNOFF IN MIDNIGHT VISTA.										
ADD HYD	MIDNIGHT	2& 5	5	.03009	70.12	2.686	1.67419	1.533	3.642	
*SS BASIN E-2 (DISCHARGE INTO INLET AT LOW POINT AT MIDNIGHT VISTA/										
*SS NOCHE VISTA INTERSECTION).										
COMPUTE NM HYD	E2	-	1	.00483	11.01	.387	1.50256	1.500	3.559	PER IMP= 60.00
*SS ADD FOR THE TOTAL STREET RUNOFF AT THE LOW POINT IN MIDNIGHT										
*SS VISTA AT NOCHE VISTA.										
ADD HYD	NOCH_STR	3& 1	3	.00767	19.22	.614	1.50098	1.533	3.917	
*SS2 MULTIPLY THE RUNOFF PICKED UP IN THE SUMP BY A FACTOR OF 1.4										
DIVIDE HYD	NOCH_STR	3	3	.00767	26.90	.859	2.10138	1.533	5.484	
	NO_VALUE	AND	1	.00767	7.69	.245	.60039	1.533	1.567	
*SS ADD THIS RUNOFF TO THE STORM DRAIN AT MIDNIGHT VISTA/										
*SS NOCHE VISTA INTERSECTION.										
ADD HYD	NOCH_TOT	5& 3	4	.03775	97.02	3.546	1.76093	1.533	4.016	
*SS ROUTE FLOWS FROM NOCHE VISTA TO THE LOW POINT IN BASIN E-1										
*SS VIA THE STORM DRAIN.										
*SS2 FOR THE PURPOSES OF ROUTING THROUGH THE AHYMO RUN, USE 1.6% (AHYMO										
*SS2 CAN'T MODEL PRESSURE FLOW)										
ROUTE	PIPTO_E1	4	2	.03775	96.80	3.546	1.76094	1.533	4.007	
*SS BASIN E-1. DISCHARGE TO STORM DRAIN INLET AT LOW POINT.										
COMPUTE NM HYD	E1	-	1	.00293	7.32	.267	1.71242	1.500	3.905	PER IMP= 78.00
*SS2 MULTIPLY THE RUNOFF PICKED UP IN THE SUMP BY A FACTOR OF 1.4										
DIVIDE HYD	E1	1	1	.00293	10.25	.374	2.39727	1.500	5.467	
	NO_VALUE	AND	4	.00293	2.93	.107	.68493	1.500	1.562	
*SS ADD TO THE RUNOFF IN THE STORM DRAIN FOR THE TOTAL FROM THE										
*SS SITE IN THE STORM DRAIN.										
ADD HYD	PIPE_TTL	1& 2	2	.04068	106.59	3.920	1.80675	1.533	4.094	
*SS ROUTE THE RUNOFF THROUGH THE STORM DRAIN TO PARADISE BLVD										
*SS AT COLBY COURT (STATION 10+00 - 11+01).										
ROUTE	AP3_PIPE	2	3	.04068	106.60	3.920	1.80676	1.533	4.094	
*SS ROUTE THE RUNOFF THROUGH THE STORM DRAIN TO PARADISE BLVD										
*SS AT COLBY COURT (STATION 11+01 - 13+27).										
ROUTE	AP3_PIPE	3	2	.04068	106.59	3.920	1.80676	1.533	4.094	
*SS ROUTE THE RUNOFF THROUGH THE STORM DRAIN TO PARADISE BLVD										
*SS AT COLBY COURT (STATION 13+27 - 14+65).										
ROUTE	AP3_PIPE	2	4	.04068	106.57	3.920	1.80676	1.533	4.093	
*SS ROUTE THE RUNOFF THROUGH THE STORM DRAIN TO PARADISE BLVD										
*SS AT COLBY COURT (STATION 14+65 - 16+19).										
ROUTE	AP3_PIPE	4	3	.04068	106.55	3.920	1.80676	1.533	4.092	
*SS2 RUNOFF IN EXCESS OF 2 TIMES THE 100-YEAR WILL EXIT THE PIPE										
*SS2 AT THE NEW "INLET" ON COLBY COURT. THUS THE FOLLOWING ROUTING										
*SS2 IS JUST ON PAPER--EXCESS RUNOFF WOULD ACTUALLY PROCEED DOWN										
*SS2 PARADISE BLVD. IN THE ROAD-SIDE DITCH.										
*SS ROUTE THE PIPE FLOW FROM COLBY COURT TO GLOBUS VIA A 36" PIPE.										

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	GLOB_PIP	3	4	.04068	100.71	3.920	1.80676	1.567	3.868	
*SS CHANGE THE BULKING FACTOR TO 1.282 FOR BASIN 205										
SEDIMENT BULK										PK BF = 1.28
*S********** CALCULATE BASIN 205 **********										
SS BASIN 205 WILL DECREASE IN SIZE FOR THIS RUN BECAUSE OF THE										
SS ON-SITE AREAS THAT COME OUT OF BASIN 205, AND THE										
SS PERCENT OF TREATMENT TYPES WILL CHANGE. THE AREA OF BASIN 205										
SS HAS BEEN DECREASED BY .033 SQUARE MILES. THE FOLLOWING										
SS COMPUTATION ASSUMES THAT BASIN 205 IS UNDEVELOPED (I.E.,										
SS EXISTING CONDITIONS).										
COMPUTE NM HYD	205.00	-	14	.17400	228.58	10.803	1.16410	1.633	2.053	PER IMP= 25.00
*SS ADD THE FLOW FROM BASIN A THAT WAS ROUTED EAST ALONG PARADISE										
*SS TO GLOBUS FOR THE TOTAL ON THE SOUTH SIDE OF THE STREET FLOWING										
*SS INTO GLOBUS.										
ADD HYD	GLOB_STR	8&14	2	.18286	239.53	11.351	1.16394	1.633	2.047	
*SS FOR COMPARISON PURPOSES, COMPUTE THE RUNOFF ON THE SOUTH SIDE										
*SS OF THE STREET INTO GLOBUS IF BASIN 205 WERE DEVELOPED.										
*SS FIRST CHANGE THE BULKING FACTOR TO THE DEVELOPED BASIN FACTOR.										
SEDIMENT BULK										PK BF = 1.00
*SS NOW COMPUTE BASIN A USING THE SAME LAND TREATMENT FACTORS AS										
*SS BY MOLZEN-CORBIN IN THE DEVELOPED BASIN 205 IN THEIR STUDY.										
COMPUTE NM HYD	205.00	-	13	.17400	276.89	13.617	1.46740	1.600	2.486	PER IMP= 59.10
*SS NOW ADD THE FLOW FROM BASIN A AT GLOBUS FOR THE TOTAL ON THE										
*SS SOUTH SIDE OF THE STREET AT GLOBUS, UNDER ULTIMATE DEVELOPED										
*SS CONDITIONS.										
ADD HYD	GLOB_CPR	8&13	13	.18286	287.47	14.166	1.45254	1.633	2.456	
*SS COMPARE THIS NUMBER TO THE ONE CALCULATED ABOVE.										
*SS NOW THAT THE COMPARISON IS OVER, CONTINUE WIHT THE CALCULATIONS.										
*SS FIRST RETURN THE BULKING FACTOR TO WHAT IT WAS.										
SEDIMENT BULK										PK BF = 1.28
*SS NOW ADD THE OVERFLOW FROM THE NORTH SIDE OF PARADISE BLVD TO										
*SS THE FLOW ON THE SOUTH SIDE. THIS WILL ALL BE CAPTURED BY THE										
*SS NEW INLET DESIGNED BY LEEDSHILL.										
ADD HYD	PARA_TTL	2&12	2	.23646	372.86	13.931	1.10466	1.600	2.464	
*SS ADD THIS FLOW TO THE FLOW IN THE STORM DRAIN FOR THE TOTAL IN THE										
*SS STORM DRAIN AT GLOBUS/PARADISE.										
ADD HYD	GLOB_PIP	2& 4	2	.27714	473.17	17.851	1.20772	1.600	2.668	
*SS NOW ADD THE FLOW FROM THE CATTLE GUARD INLET NORTH OF PARADISE										
*SS ROAD AT FAIRFAX FOR THE TOTAL IN THE PIPE EAST OF GLOBUS.										
ADD HYD	TOT_PIPE	2&16	2	.52454	614.17	29.758	1.06373	1.600	1.829	
*SS CHANGE THE BULKING FACTOR TO 1.003 FOR DEVELOPED BASINS.										
SEDIMENT BULK										PK BF = 1.00
*S********** CALCULATE BASIN 204.5 **********										
COMPUTE NM HYD	204.50	-	3	.09000	72.91	4.123	.85894	1.700	1.266	PER IMP= 15.00
*SS ADD 204.5 TO REMAINDER OF THE FLOW. THIS WILL RESULT IN THE TOTAL										
*SS COMBINED PIPE AND STREET FLOW AT THE PARADISE BLVD/GOLF COURSE ROAD										
*SS INTERSECTION. THE GOLF COURSE ROAD STORM DRAIN HAS BEEN DESIGNED										
*SS FOR ULTIMATE DISCHARGE AT THIS POINT OF 825 CFS.										
ADD HYD	GRANDTTL	2& 3	4	.61454	675.27	33.881	1.03374	1.600	1.717	
*SS**********										
*SS COMPUTE THE REST OF THE ON-SITE BASINS. FIRST COMPUTE										
*SS THE BASINS THAT DISCHARGE TO THE										
*SS PETROGLYPH NATIONAL MONUMENT TO THE SOUTH.										
*SS BASIN B (DISCHARGE TO THE SOUTH AND EAST).										

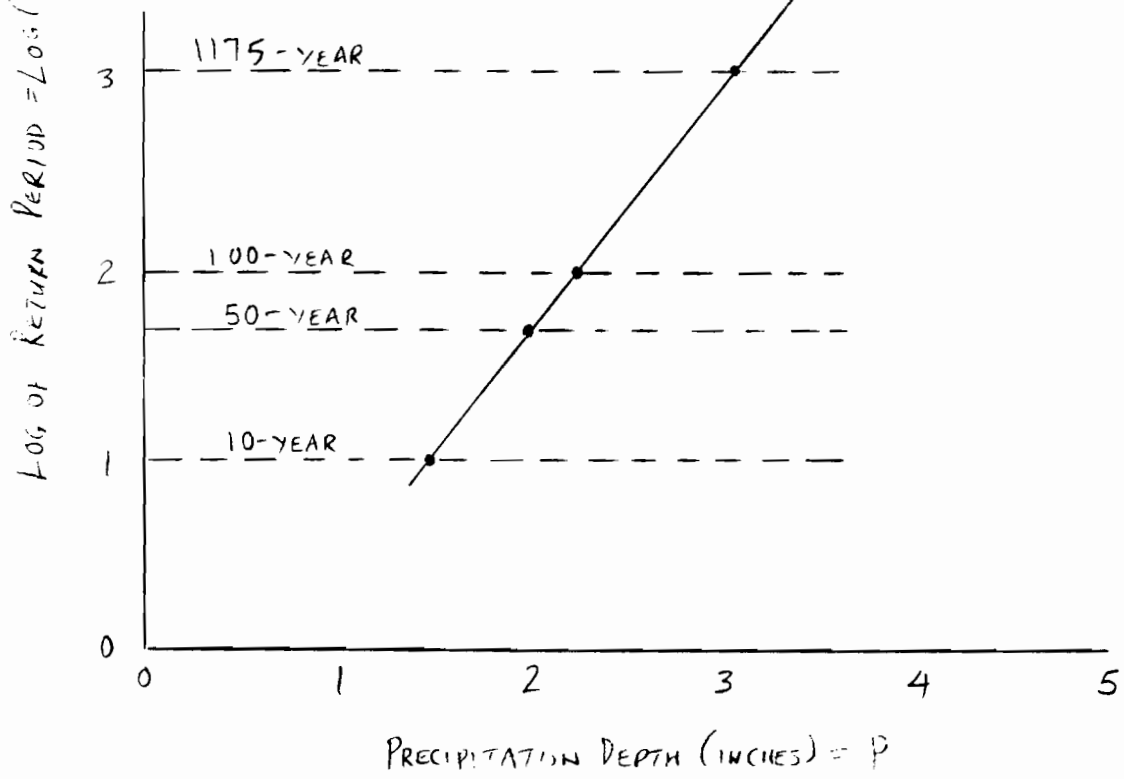
AHYMO Summary -- Paradise Bluff -- 1.4 Times the 100-Year

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	NEW_B	-	1	.00665	14.17	.484	1.36266	1.500	3.329	PER IMP= 48.00
*SS BASIN C (DISCHARGE TO THE SOUTH AND WEST).										
COMPUTE NM HYD	NEW_C	-	1	.00244	5.14	.174	1.33934	1.500	3.297	PER IMP= 46.00
*SS BASIN F (DISCHARGE TO THE WEST INTO THE EXISTING										
*SS LILIENTHAL DRIVE R.O.W.).										
COMPUTE NM HYD	NEW_F	-	1	.00036	.63	.018	.94294	1.500	2.712	PER IMP= 12.00
*SS NOW COMPUTE THE REMAINDER OF THE ON-SITE BASINS.										
*SS THESE ARE ALL IN BASIN G, WHICH WILL BE ON-SITE BACKYARD PONDING.										
*SS BASIN G-1										
COMPUTE NM HYD	BASIN_G-1	-	1	.00203	3.49	.105	.96626	1.500	2.689	PER IMP= 14.00
*SS BASIN G-2										
COMPUTE NM HYD	BASIN_G-2	-	1	.00026	.41	.011	.80303	1.500	2.457	PER IMP= .00
*SS BASIN G-3										
COMPUTE NM HYD	BASIN_G-3	-	1	.00032	.54	.015	.89630	1.500	2.643	PER IMP= 8.00
*SS BASIN G-4										
COMPUTE NM HYD	BASIN_G-4	-	1	.00026	.43	.012	.87299	1.500	2.604	PER IMP= 6.00
*SS BASIN G-5										
COMPUTE NM HYD	BASIN_G-5	-	1	.00015	.29	.008	1.03621	1.500	2.963	PER IMP= 20.00
*SS BASIN G-6										
COMPUTE NM HYD	BASIN_G-6	-	1	.00118	1.95	.056	.89630	1.500	2.584	PER IMP= 8.00
*SS BASIN G-7										
COMPUTE NM HYD	BASIN_G-7	-	1	.00018	.33	.009	.98957	1.500	2.857	PER IMP= 16.00
FINISH										

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. _____ OF _____
JOB Paradise Bluff Subdivision
SUBJECT 61,660-year
CLIENT _____
JOB NO. _____
BY JK DATE 4/17/97

Storm Frequency Evaluation



6-Hour Storm Data

Return Period	Precipitation Depth (P)	Log(R)
100-year	2.20[A]	2
50-year	1.98[B]	1.70
10-year	1.47[B]	1
1175-year[E]	3.08[C]	3.07[D]
61,660-year[G]	4.40[A]	4.79[D]

NOTES:
A. From Fig. C-2, DPM §2.2
B. Computed by multiplying the 100-year storm by the return factors in Table A-3, DPM §22.2.
C. 1.4 times the 100-year storm.
D. Determined by straight-line graph
E. $Log^{-1}(3.07)$
F. 2 times the 100-year storm
G. $Log^{-1}(4.79)$

Chavez-Grieves Consulting Engineers, Inc.
Paradise Bluff Storm Drain
Hydraulic Grade Line Calculations
By: Joe Kelley
Date: July 1, 1996 Revised April 22, 1997
Analysis of pipe under surcaharged conditions: 100-year storm.

Station	Structure	Pipe Diameter (inches)	Q Flow (cfs)	Pipe Area (s.f.)	Velocity (fps)	K Factor	Friction Slope Sf	Pipe Length (feet)	Pipe Curve (degrees)	Bend Angle (degrees)	Junction Angle (degrees)	Friction Loss Hf	Curve Loss Hc	Junction Loss Hj	Manhole Loss Hmh	Transition Loss Ht	Bend Loss Hb	Total Losses (feet)	Hydraulic Grade Line (downstream)	Hydraulic Grade Line (upstream)	Pipe Invert	Soffit Elevation	Ground Surface Elevation
16+18.86	MH/outlet																	0.00		34.66	26.60	29.10	34.66
		36	88.88	7.07	12.57	666.98	0.0178	154.15	0			2.74	0.00					2.74					
14+64.71	MH														0.19		0.00	0.19	37.40	39.11	37.60	40.10	46.37
		30	88.88	4.91	18.11	410.17	0.0470	137.43	0			6.45	0.00				[illegible]	6.45					
13+27.28	MH									50					0.19		0.[illegible]	0.75	45.56	55.91	54.5[illegible]	57.00	[illegible]2.12
		36	88.88	7.07	12.57	666.98	0.0178	225.86	0			4.01	0.00				[illegible]	4.01					
11+01.42	MH														0.12		0.00	0.12	[illegible]	[illegible]4.37	79.90	[illegible]	[illegible].98
		36	88.88	7.07	12.57	666.98	0.0178	101.42	0			1.80	0.00					1.80					
[illegible]	MH									5					0.09		0.09	0.18	83.1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		42	83.05	9.62	8.63	1006.10	0.0068	207.32	3			1.41	0.00					1.41					
23+43.68	MH									4					0.06		0.05	0.11	87.[illegible]	[illegible]	85.98	[illegible]	[illegible]
		42	83.05	9.62	8.63	1006.10	0.0068	60.71	0			0.41	0.00					0.41					
22+82.97	MH									4					0.06		0.05	0.11	[illegible]	90.00	[illegible].35	89.[illegible]	[illegible]
		42	83.05	9.62	8.63	1006.10	0.0068	135.12	0			0.92	0.00					0.92					
21+47.85	MH @ NOCHE														[illegible]		0.00	0.08	90.92	91.00	87.16	90.66	95.93
		30	54.26	4.91	11.05	410.17	0.0175	296.10	0			5.18	0.00					5.18					
18+51.75	MH														0.07		0.00	0.07	[illegible]	[illegible]	[illegible]	[illegible]	100.30
		30	38.33	4.91	7.81	410.17	0.0087	271.49	11			2.37	0.00					2.37					
15+80.26	MH														0.05		0.00	0.05	98.62	[illegible]	98.58	[illegible]	102.10
		30	38.33	4.91	7.81	410.17	0.0087	291.16	0			2.55	0.00					2.55					
12+84.10	MH									90					0.08		0.31	0.39	101.55	101.94	99.75	102.25	105.12
		24	36.93	3.14	11.76	226.22	0.0266	45.00	0			1.20	0.00					1.20					
CASSIDY	'B' INLET														0.07		0.00	0.07	103.14	103.2[illegible]	100.32	102.32	105.05
		18	11.73	1.77	6.64	105.04	0.0125	75.00	0			0.94	0.00					0.94					
CASSIDY	'A' INLET																		104.14	104.[illegible]	101.11	102.[illegible]	104.7[illegible]
[illegible]																							
4+56.38	MH										90.00			0.19				0.19	91.00	91.19	87.16	90.66	95.93
		24	10.24	3.14	3.26	226.22	0.0020	139.00	0			0.28	0.00					0.28					
3+17.38	MH									10					0.03		0.04	0.06	91.47	91.54	88.89	90.89	96.40
		24	10.24	3.14	3.26	226.22	0.0020	217.38	0			0.45	0.00					0.45					
1+00	MH														0.03		0.00	0.03	91.98	92.01	89.29	91.29	93.00
		24	10.24	3.14	3.26	226.22	0.0020	35.00	0			0.07	0.00					0.07					
0+70	INLET																0.00	0.00	92.08	92.08	89.35	91.35	92.67

Manning's N = 0.013

Velocity Head Hv	Energy Grade Line (downstream)	Energy Grade Line (upstream)	Junction (3) Diameter (inches)	Junction (3) Area (s.f.)	Junction (3) Vel. Head (feet)	Comments
		37.12				Begin HGL at surface (allow water to run out of inlet).
2.46						
	42.49	44.20		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
5.09						
	48.02	58.37		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
2.46						
	62.38	83.83		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
2.46						
	84.33	87.39		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
1.16						
	88.80	90.64		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
1.16						
	91.05	91.16		0.00		
1.16						
	92.82	92.89		0.00		
1.90						
	97.13	97.20		0.00		
0.95						
	99.57	99.95		0.00		
0.95						
	103.70	104.08		0.00		
2.15						
	103.14	103.21		0.00		
0.68						
	104.14	104.14		0.00		
		91.35	24	3.14	0.16	
0.16						
	91.64	91.70		0.00		
0.16						
	92.15	92.17		0.00		
0.16						
	92.08			0.00		
				0.00		

Chavez-Grieves Consulting Engineers, Inc.
Paradise Bluff Storm Drain
Hydraulic Grade Line Calculations
By: Joe Kelley
Date: July 1, 1996 Revised April 22, 1997
Analysis of pipe under surcharged conditions: 1.4 x 100-year storm.

Station	Structure	Pipe Diameter (inches)	Q Flow (cfs)	Pipe Area (s.f.)	Velocity (fps)	K Factor	Friction Slope Sf	Pipe Length (feet)	Pipe Curve (degrees)	Bend Angle (degrees)	Junction Angle (degrees)	Friction Loss Hf	Curve Loss Hc	Junction Loss Hj	Manhole Loss Hmh	Transition Loss Ht	Bend Loss Hb	Total Losses (feet)	Hydraulic Grade Line (downstream)	Hydraulic Grade Line (upstream)	Pipe Invert	Soffit Elevation	Ground Surface Elevation
16+18.86	MH/outlet																	0.00		34.66	26.60	29.10	34.66
		36	106.59	7.07	15.08	666.98	0.0255	154.15	0			3.94	0.00					3.94					
14+64.71	MH														0.27		0.00	0.27	38.60	38.87	37.60	40.10	46.37
		30	106.59	4.91	21.71	410.17	0.0675	137.43	0			9.28	0.00					9.28					
13+27.28	MH									50					0.27		0.81	1.08	48.58	49.07	47.99	51.00	54.19
		36	106.59	7.07	15.08	666.98	0.0255	225.86	0			5.77	0.00					5.77					
11+01.42	MH														0.18		0.00	0.18	81.84	81.50	78.90	82.90	85.98
		36	106.59	7.07	15.08	666.98	0.0255	101.42	0			2.59	0.00					2.59					
[illegible]	MH									5					0.13		0.12	0.25	84.09	84.34	[illegible]	[illegible]	[illegible]
		42	97.02	9.62	10.08	1006.10	0.0093	207.32	0			1.93	0.00					1.93					
23+43.68	MH									4					0.08		0.07	0.15	88.27	88.42	85.98	89.48	95.20
		42	97.02	9.62	10.08	1006.10	0.0093	60.71	0			0.56	0.00					0.56					
22+82.97	MH									4					0.08		0.07	0.15	90.04	90.19	85.35	89.85	96.49
		42	97.02	9.62	10.08	1006.10	0.0093	135.12	0			1.26	0.00					1.26					
21+47.85	MH @ NOCHE														0.10		0.00	0.10	91.45	91.54	87.19	90.69	95.93
		30	60.03	4.91	12.23	410.17	0.0214	296.10	0			6.34	0.00					6.34					
18+51.75	MH														0.09		0.00	0.09	97.89	97.98	93.51	96.91	100.30
		30	43.83	4.91	8.93	410.17	0.0114	271.49	11			3.10	0.00					3.10					
15+80.26	MH														0.06		0.00	0.06	101.05	101.14	98.80	101.08	105.10
		30	43.83	4.91	8.93	410.17	0.0114	296.16	0			3.38	0.00					3.38					
12+84.1	MH									90					0.06		0.24	0.29	104.52	104.81	99.75	102.25	105.12
		24	26.63	3.14	8.48	226.22	0.0139	45.00	0			0.62	0.00					0.62					
CASSIDY	INLET																		105.44	105.44	100.00	102.00	106.00
Noche Vista:																							
											90.00			0.19				0.19	91.54	91.73	87.15	90.66	95.93
4+56.38	MH	24	10.24	3.14	3.26	226.22	0.0020	139.00	0			0.28	0.00					0.28					
3+17.38	MH									10					0.04		0.05	0.08	92.02	92.10	88.89	90.89	96.40
		24	10.24	3.14	3.26	226.22	0.0020	217.38	0			0.45	0.00					0.45					
1+00	MH														0.04		0.00	0.04	92.54	92.58	89.29	91.29	93.00
		24	10.24	3.14	3.26	226.22	0.0020	35.00	0			0.07	0.00					0.07					
0+70	INLET																0.00	0.00	92.65	92.65	89.35	91.35	92.67

Manning's N = 0.013

Station	Structure	Velocity Head Hv	Energy Grade Line (downstream)	Energy Grade Line (upstream)	Junction (3) Diameter (inches)	Junction (3) Area (s.f.)	Junction (3) Vel. Head (feet)	Comments
16+18.86	MH/outlet			38.19				Begin HGL at surface (allow water to run out of inlet).
		3.53						
14+64.71	MH		45.92	46.60		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
		7.32						
13+27.28	MH		52.09	59.60		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
		3.53						
11+01.42	MH		85.37	85.03		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
		3.53						
25+51/10+00	MH		85.67	87.92		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
		1.58						
23+43.68	MH		89.85	91.06		0.00		HGL below free water surface. Adjust it upwards manually to Manning's depth.
		1.58						
22+82.97	MH		91.62	91.77		0.00		
		1.58						
21+47.85	MH @ NOCHE		93.77	93.87		0.00		
		2.32						
18+51.75	MH		99.12	99.21		0.00		
		1.24						
15+80.26	MH		102.31	102.38		0.00		
		1.24						
12+84.1	MH		105.63	105.93		0.00		
		1.12						
CASSIDY	INLET		105.44	105.44		0.00		
Noche Vista:								
4+56.38	MH			91.90	24	3.14	0.16	
		0.16						
3+17.38	MH		92.18	92.26		0.00		
		0.16						
1+00	MH		92.71	92.74		0.00		
		0.16						
0+70	INLET		92.65			0.00		HGL is at ground level.
						0.00		

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.
5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

INLET CALCULATIONS

PROJECT NAME: Paradise Bluff PROJECT NO.:V12-100-5196(001)
BY: Joe Kelley May 23, 1997

1. Inlets at A.P. 10--3 inlets on grade:

Per the AHYMO run, page B-25: total Q_{STREET} = 28.61 cfs. Approximately 11 cfs of that will be discharging north from Cassidy into Midnight Vista.

B-23 0.39' S = 2% (0.8%) Longitudinal instead of Cross Slope

Per pages C-3a and b: D = 0.27'.

2

Per Plate 22.3, D-6 (page C-4): Q = 2.4 cfs picked up; Q remaining = 8.6 cfs.

The remaining runoff going north on Cassidy will be: 28.61 - 2.4 = 26.21 cfs.

B-23 0.49 S=2% (0.8%)

Per pages C-3c and d: D = 0.47'.

11 22

Per Plate 22.3, D-7 (page C-3e): Q = 12.1 cfs/inlet x 2 inlets = 24.2 cfs.

Total picked up at A.P. 10 = 26.6 cfs.? = 24.2 + 2.4 24

2. Inlet in a sump at A.P. 11:

Per the AHYMO run, page B-26: Q_{100} = 11.73 cfs into inlet.

Because this inlet is in a sump with no overflow, design the opening to collect 2 times the 100-year storm. Also assume a 50% clogging factor:

Q_{DESIGN} = 11.73 x 2 x 1.5 = 35.19 cfs

Use a Type "A" inlet with two 4' "wings". Per Figure 2, the wings accept 2.2 cfs/ft:
Q = 8' x 2.2 cfs/ft = 17.6 cfs.

Per Figure 1, the double grate accepts 25.5 cfs.

Total capacity = 43.1 cfs > 35.19. OK

3. Inlets at A.P. 4--2 inlets on grade:

Per the AHYMO run, page B-32: Q_{STREET} = 20.14 cfs.

From Plate 22.3, D-1: D = 0.45'. S = 1.0%

6 12

Per Plate 22.3, D-6: Q = 7.8 cfs/inlet x 2 inlets = 15.6 cfs.

Total picked up at A.P. 4 = 15.6 cfs.

4. Inlet in a sump at Noche Vista/Midnight Vista Intersection (Basin E-2):

Per the AHYMO run, page B-39: Q_{100} = 19.22 cfs into inlet.

Because this inlet is in a sump with no overflow, design the opening to collect 2 times the 100-year storm. Also assume a 50% clogging factor:

Q_{DESIGN} = 19.22 x 2 x 1.5 = 57.66 cfs

Use one Type "A" inlets with one 4' "wing", and one Type "C" inlet with no wings. Per Figure 2, the wing accepts 2.2 cfs/ft:
Q = 4' x 2.2 cfs/ft = 8.8 cfs.

Per Figure 1, one double grate accepts 25.5 cfs. Use two double-grate inlets, for a capacity of 25.5 x 2 = 51.0 cfs.

Total capacity = 59.8 cfs > 57.66. OK

5. Inlet in a sump at Noche Vista/Marcadas Road Intersection (Basin E-2a):

Per the AHYMO run, page B-37: Q_{100} = 10.24 cfs into inlet.

Because this inlet is in a sump with no overflow, design the opening to collect 2 times the 100-year storm. Also assume a 50% clogging factor:

Q_{DESIGN} = 10.24 x 2 x 1.5 = 30.72 cfs

Use one Type "A" inlets with two 4' "wings". Per Figure 2, the wings accepts 2.2 cfs/ft:
Q = 8' x 2.2 cfs/ft = 17.6 cfs.

Per Figure 1, the single grate accepts 17.0 cfs.

Total capacity = 34.6 cfs > 30.72. OK

6. Inlet in a sump at the end of Midnight Vista (Basin E-1):

Per the AHYMO run, page B-40: Q_{100} = 7.32 cfs into inlet.

Because this inlet is in a sump with no overflow, design the opening to collect 2 times the 100-year storm. Also assume a 50% clogging factor:

Q_{DESIGN} = 7.32 x 2 x 1.5 = 21.96 cfs

Use a double Type "C" inlet with no wings.

Per Figure 1, one double grate accepts 25.5 cfs.

Total capacity = 25.5 cfs > 21.96. OK

100-Year Water Surface
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Cassidy Drive--south of Midnight Vista
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.025000	ft/ft

Elevation range: 4.00 ft to 4.80 ft.

Station (ft)	Elevation (ft)
-10.00	4.80
-6.00	4.72
-0.50	4.33
0.00	4.33
0.98	4.00
2.00	4.06
13.00	4.28
24.00	4.06
25.02	4.00
26.00	4.33
26.50	4.33
32.00	4.72
36.00	4.80

Start Station	End Station	Roughness
-10.00	-6.00	0.013
-6.00	-0.50	0.030
-0.50	2.00	0.013
2.00	24.00	0.017
24.00	26.50	0.013
26.50	32.00	0.030
32.00	36.00	0.013

Discharge	11.00	cfs

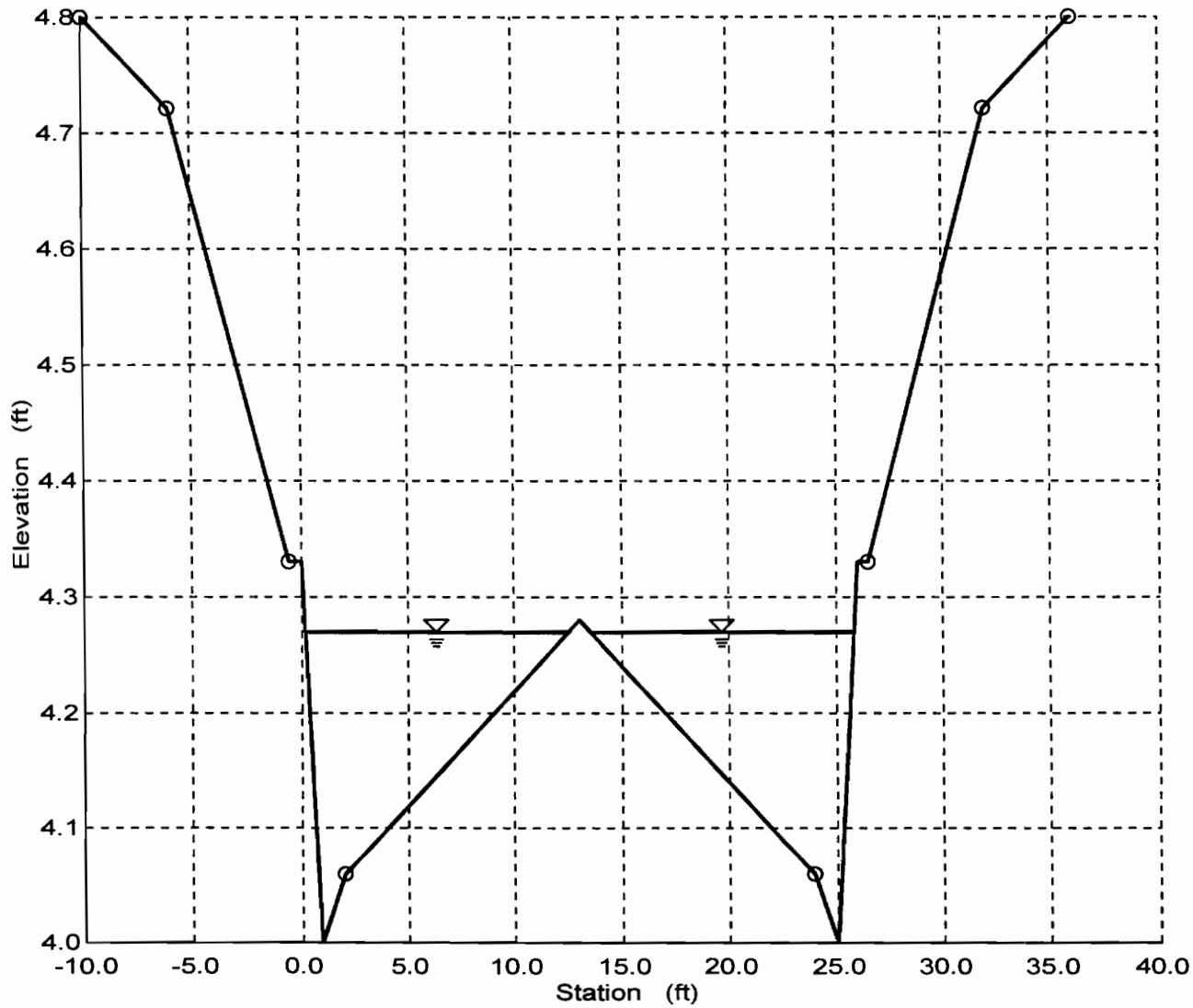
Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	4.27	ft
Flow Area	2.91	ft²
Wetted Perimeter	24.75	ft
Top Width	24.66	ft
Height	0.27	ft
Critical Depth	4.34	ft
Critical Slope	0.006581	ft/ft
Velocity	3.77	ft/s
Velocity Head	0.22	ft
Specific Energy	4.49	ft
Froude Number	1.94	
Flow is supercritical.		
Flow is divided.		

C-3a

100-Year Water Surface
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Cassidy Drive--south of Midnight Vista
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.025000	ft/ft
Water Surface Elevation	4.27	ft
Discharge	11.00	cfs



C-3b

100-Year Water Surface
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Cassidy Drive--north of Midnight Vista
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

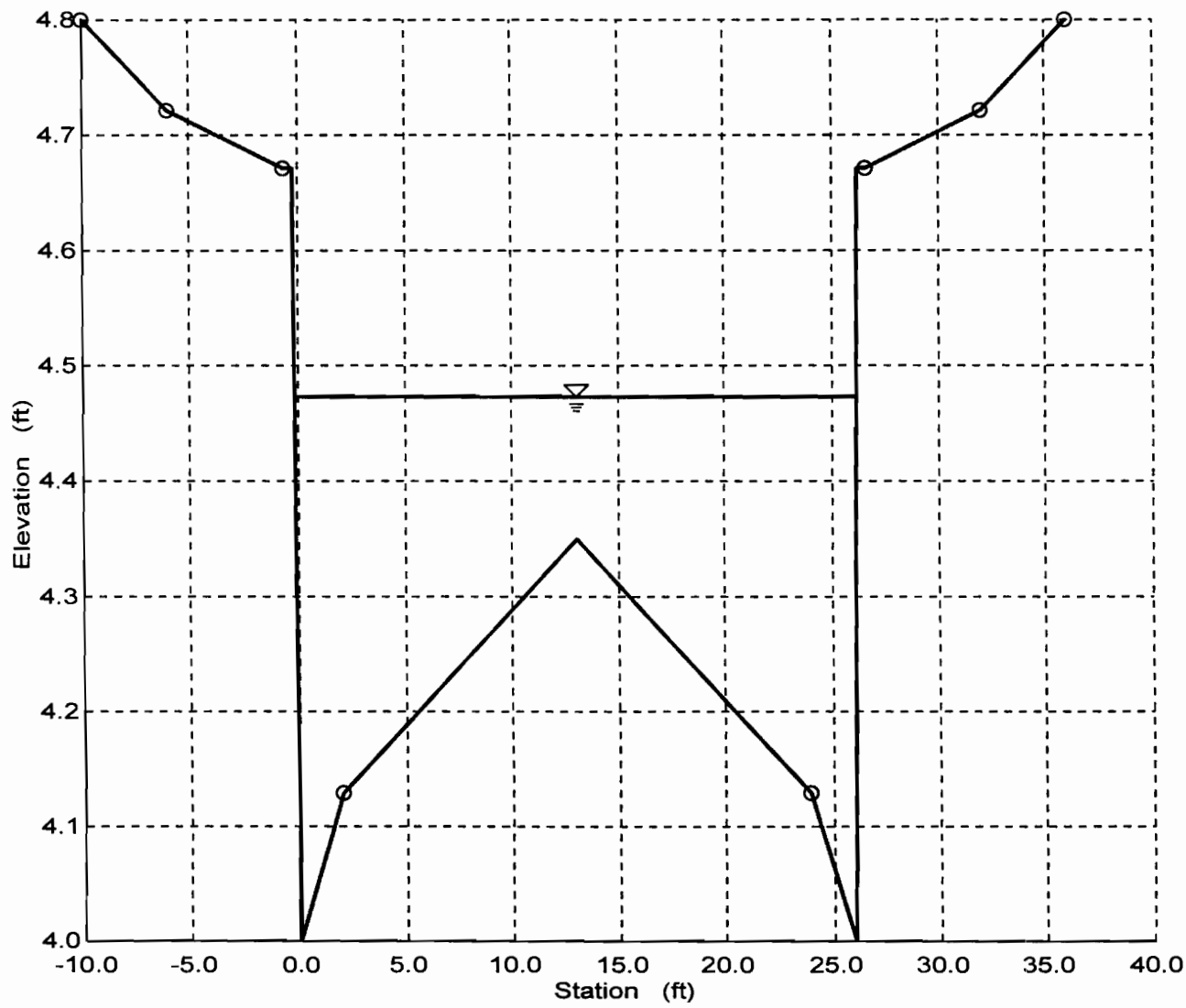
Input Data				
Channel Slope	0.010000 ft/ft			
Elevation range: 4.00 ft to 4.80 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
-10.00	4.80	-10.00	-6.00	0.013
-6.00	4.72	-6.00	-0.63	0.030
-0.63	4.67	-0.63	2.00	0.013
-0.17	4.67	2.00	24.00	0.017
0.00	4.00	24.00	26.63	0.013
2.00	4.13	26.63	32.00	0.030
13.00	4.35	32.00	36.00	0.013
24.00	4.13			
26.00	4.00			
26.17	4.67			
26.63	4.67			
32.00	4.72			
36.00	4.80			
Discharge	26.21	cfs		

Results		
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	4.47	ft
Flow Area	6.79	ft²
Wetted Perimeter	26.99	ft
Top Width	26.24	ft
Height	0.47	ft
Critical Depth	4.53	ft
Critical Slope	0.005439	ft/ft
Velocity	3.86	ft/s
Velocity Head	0.23	ft
Specific Energy	4.70	ft
Froude Number	1.34	
Flow is supercritical.		

100-Year Water Surface
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Cassidy Drive--north of Midnight Vista
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.010000	ft/ft
Water Surface Elevation	4.47	ft
Discharge	26.21	cfs



C-3d

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.
5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

OUTLET CALCULATIONS

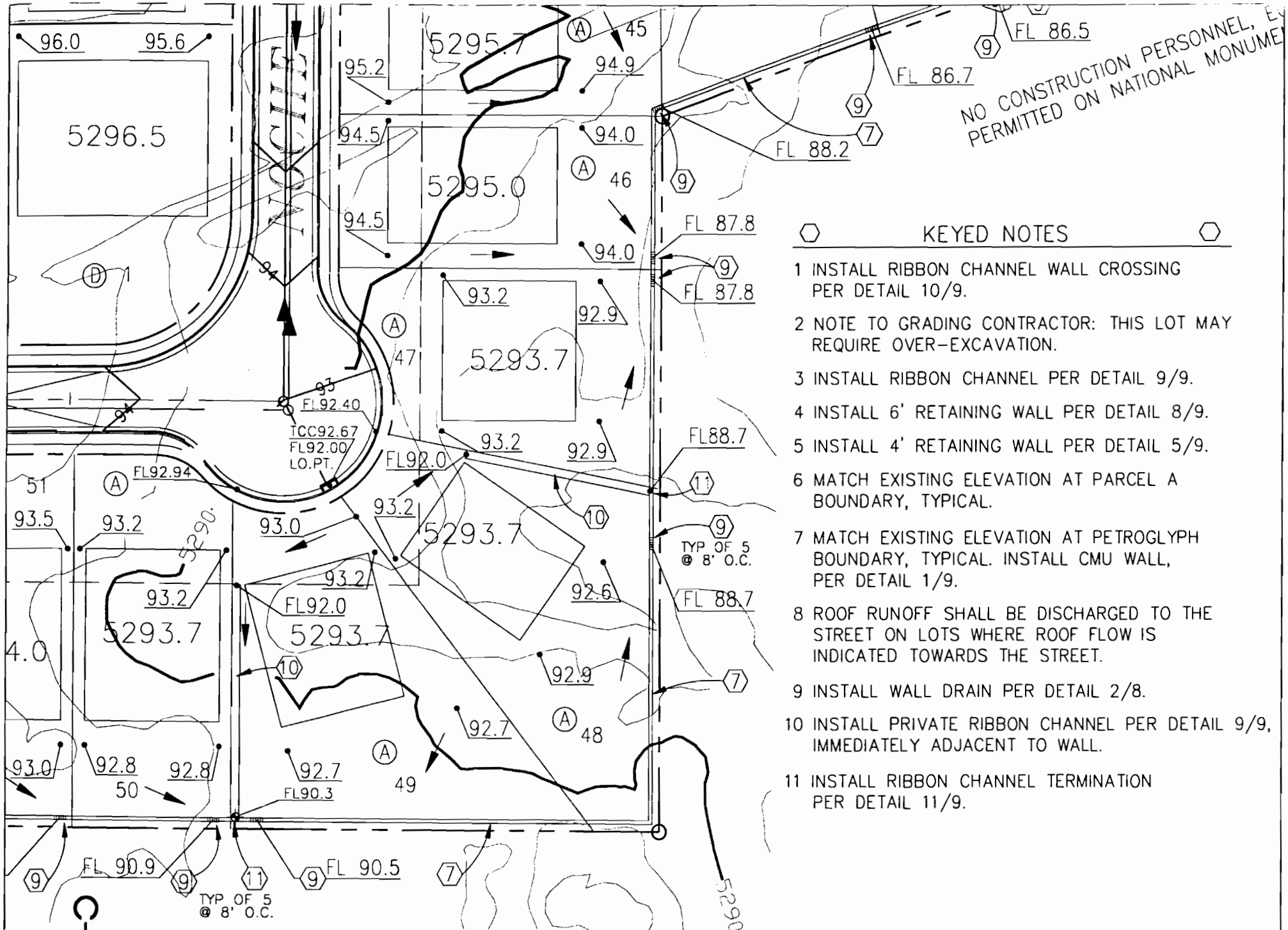
PROJECT NAME: Paradise Bluff PROJECT NO.:V12-100-5196(001)
BY: Joe Kelley May 27, 1997

1. Compute the number of openings required in the rear wall of lots 48 and 49 so that 2 times the 100-year storm will not result in degradation of the National Monument.

   The storm drain in the cul-de-sac bulb in front of these lots discharges the 100-year storm from Basin E-2a, which is 10.24 cfs. So design the openings to carry an additional 10.24 cfs which would theoretically overflow from the street. Plus design the opening to convey 2 times the 100-year runoff produced by lots 48 and 49, which is 2 x (0.76 + 0.97 cfs) = 3.46 cfs. The total discharge is therefore:

   10.24 + 3.46 = 13.70 cfs

   Per the computations discussed on page C-8, each wall opening (2 blocks wide) has been designed to convey 1.30 cfs without being erosive. Therefore, these lots should have 5 wall openings each, which would convey a total of 13.0 cfs. These each need to be at the same elevation in order to work properly. This can easily be done on these lots because the rear lot line is essentially level for some distance at the low point.



KEYED NOTES

1 INSTALL RIBBON CHANNEL WALL CROSSING PER DETAIL 10/9.

2 NOTE TO GRADING CONTRACTOR: THIS LOT MAY REQUIRE OVER-EXCAVATION.

3 INSTALL RIBBON CHANNEL PER DETAIL 9/9.

4 INSTALL 6' RETAINING WALL PER DETAIL 8/9.

5 INSTALL 4' RETAINING WALL PER DETAIL 5/9.

6 MATCH EXISTING ELEVATION AT PARCEL A BOUNDARY, TYPICAL.

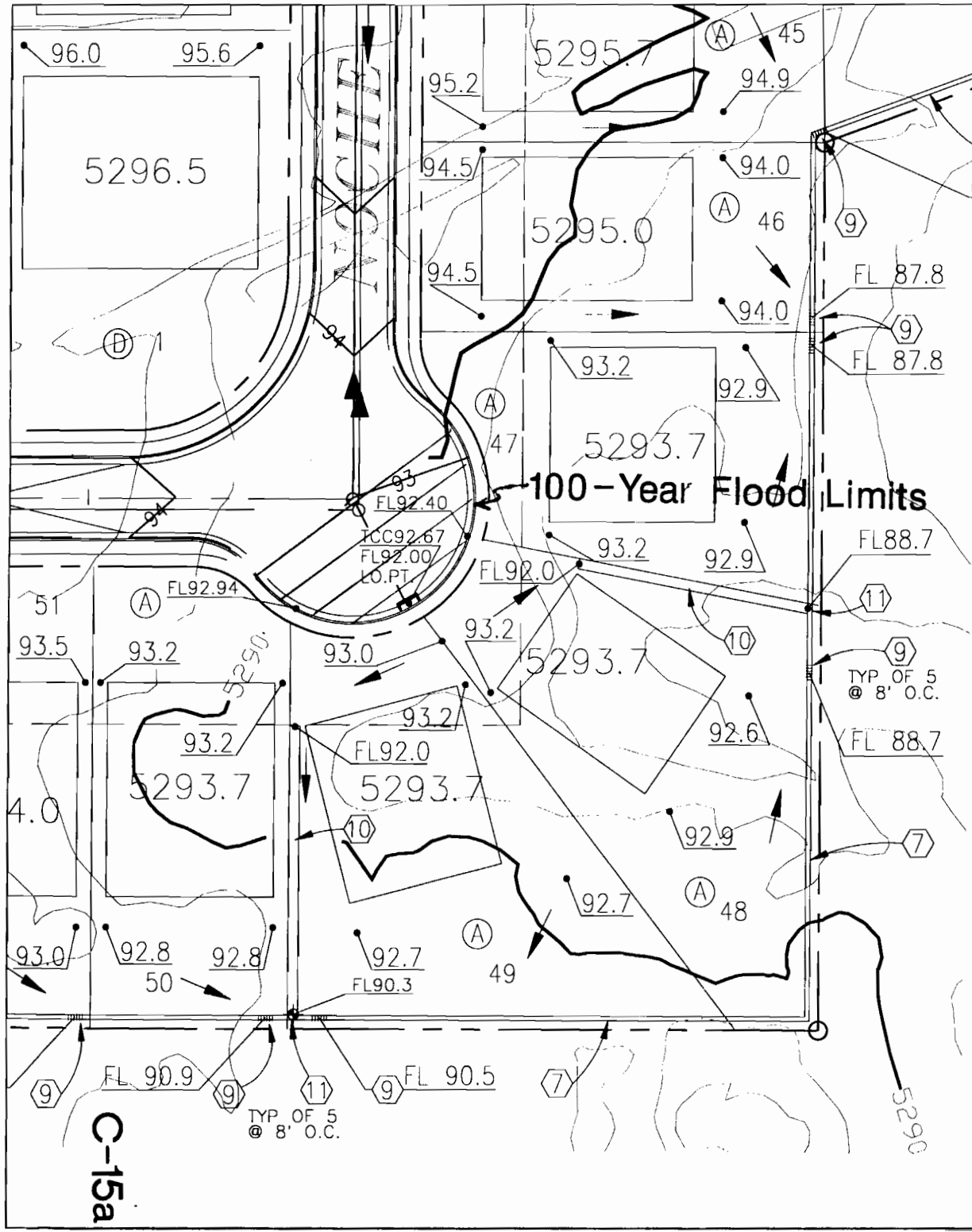
7 MATCH EXISTING ELEVATION AT PETROGLYPH BOUNDARY, TYPICAL. INSTALL CMU WALL, PER DETAIL 1/9.

8 ROOF RUNOFF SHALL BE DISCHARGED TO THE STREET ON LOTS WHERE ROOF FLOW IS INDICATED TOWARDS THE STREET.

9 INSTALL WALL DRAIN PER DETAIL 2/8.

10 INSTALL PRIVATE RIBBON CHANNEL PER DETAIL 9/9, IMMEDIATELY ADJACENT TO WALL.

11 INSTALL RIBBON CHANNEL TERMINATION PER DETAIL 11/9.



KEYED NOTES

1 INSTALL RIBBON CHANNEL WALL CROSSING PER DETAIL 10/9.

2 NOTE TO GRADING CONTRACTOR: THIS LOT MAY REQUIRE OVER-EXCAVATION.

3 INSTALL RIBBON CHANNEL PER DETAIL 9/9.

4 INSTALL 6' RETAINING WALL PER DETAIL 8/9.

5 INSTALL 4' RETAINING WALL PER DETAIL 5/9.

6 MATCH EXISTING ELEVATION AT PARCEL A BOUNDARY, TYPICAL.

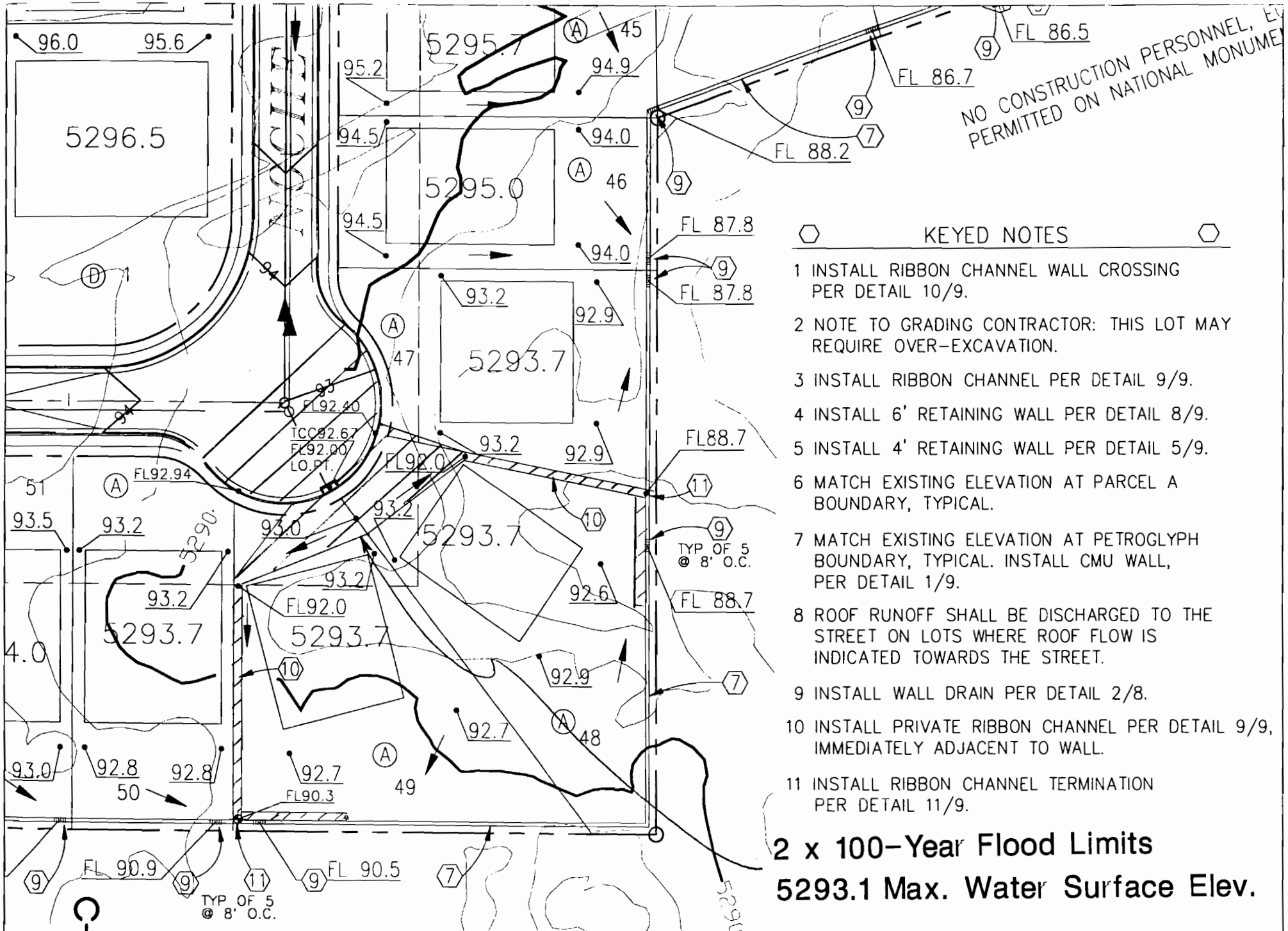
7 MATCH EXISTING ELEVATION AT PETROGLYPH BOUNDARY, TYPICAL. INSTALL CMU WALL, PER DETAIL 1/9.

8 ROOF RUNOFF SHALL BE DISCHARGED TO THE STREET ON LOTS WHERE ROOF FLOW IS INDICATED TOWARDS THE STREET.

9 INSTALL WALL DRAIN PER DETAIL 2/8.

10 INSTALL PRIVATE RIBBON CHANNEL PER DETAIL 9/9, IMMEDIATELY ADJACENT TO WALL.

11 INSTALL RIBBON CHANNEL TERMINATION PER DETAIL 11/9.



KEYED NOTES

1 INSTALL RIBBON CHANNEL WALL CROSSING PER DETAIL 10/9.

2 NOTE TO GRADING CONTRACTOR: THIS LOT MAY REQUIRE OVER-EXCAVATION.

3 INSTALL RIBBON CHANNEL PER DETAIL 9/9.

4 INSTALL 6' RETAINING WALL PER DETAIL 8/9.

5 INSTALL 4' RETAINING WALL PER DETAIL 5/9.

6 MATCH EXISTING ELEVATION AT PARCEL A BOUNDARY, TYPICAL.

7 MATCH EXISTING ELEVATION AT PETROGLYPH BOUNDARY, TYPICAL. INSTALL CMU WALL, PER DETAIL 1/9.

8 ROOF RUNOFF SHALL BE DISCHARGED TO THE STREET ON LOTS WHERE ROOF FLOW IS INDICATED TOWARDS THE STREET.

9 INSTALL WALL DRAIN PER DETAIL 2/8.

10 INSTALL PRIVATE RIBBON CHANNEL PER DETAIL 9/9, IMMEDIATELY ADJACENT TO WALL.

11 INSTALL RIBBON CHANNEL TERMINATION PER DETAIL 11/9.

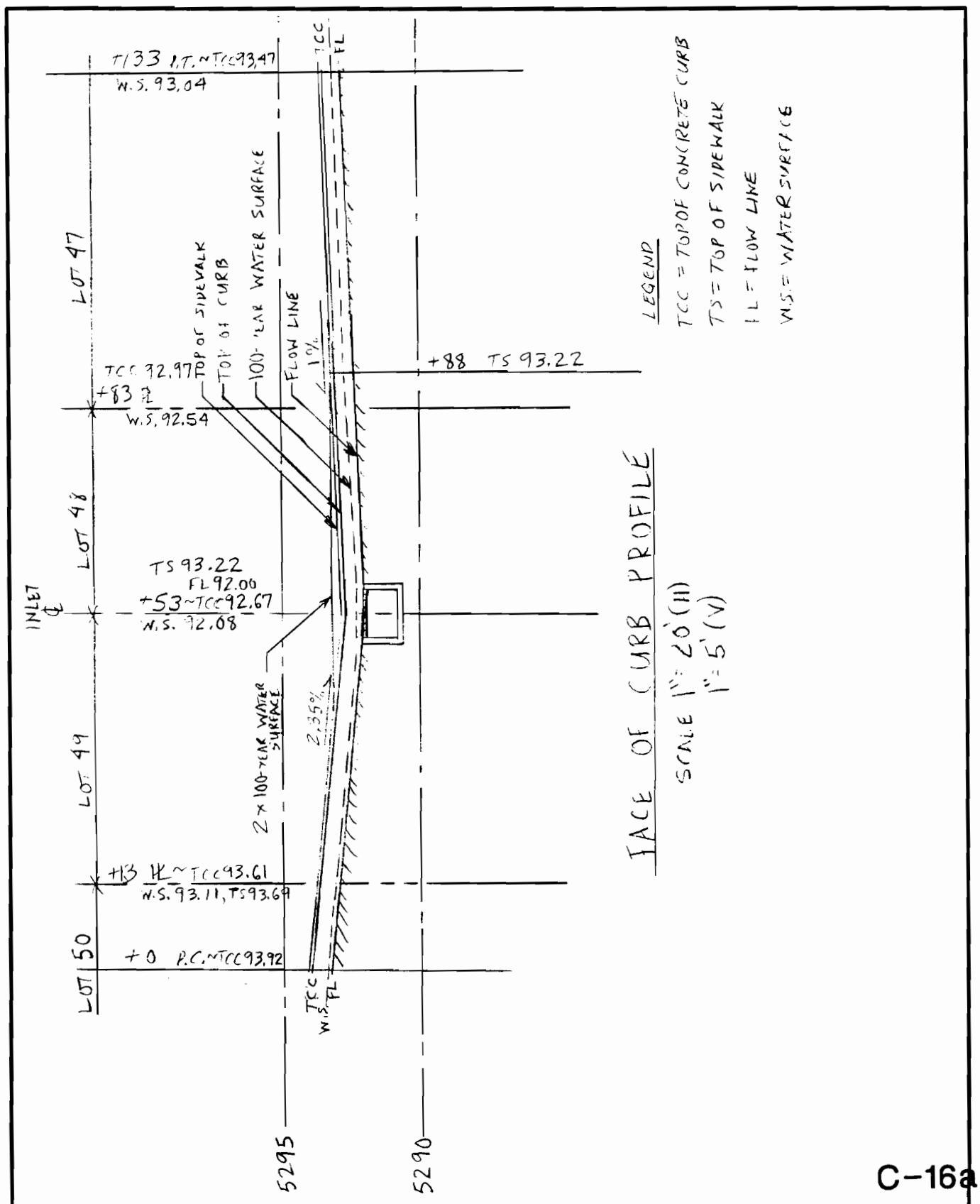
2 x 100-Year Flood Limits

5293.1 Max. Water Surface Elev.

C-15b

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. _____ OF _____
JOB _____
SUBJECT Nacho Vista / Maranda Curb Design
CLIENT _____
JOB NO. _____
BY JV DATE 5/22/97



C-16a

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. _____ OF _____
JOB _____
SUBJECT LOT 42 & 43 OVERFLOW DEPTH
CLIENT _____ JOB NO. _____
BY JK DATE 5/22/97
CHECKED BY _____ DATE _____

COMPUTE THE DEPTH OF 2 x 100-YEAR OVERFLOW

2 x 100-YEAR FOR BASIN E-2a (PAGE B-37):

2 x 10.24 CFS = 20.48 CFS.

ASSUME THE 100-YEAR DISCHARGE ENTERS THE STORM DRAIN (WHICH IT DOES PER DESIGN), AND THE EXCESS OVERFLOWS THE BACK OF SIDEWALK.

EXCESS = 10.24 CFS

IT WILL OVERFLOW VIA WEIR FLOW:

$$Q = c \cdot p \cdot h^{1.5}$$

TAKE C = 3.0 FOR A BROAD-CRESTED WEIR

VALUES OF p AND the corresponding h (average) ARE DERIVED FROM THE SIDEWALK PROFILE ON PAGE C-16a.

p (FT)	h (FT)	h_{AVE} (FT)	Q (CFS) FROM EQUATION
14.25'	.10	.05	0.48
28.50	.20	.10	2.70
42.77	.30	.15	7.45
57.02	.40	.20	15.36
49.89	.35	.175	10.96
47.97	.34	.17	10.19

SO AT .35' ABOVE THE SIDEWALK AT THE INLET, THE 2 x 100-YEAR STORM REACHES ITS CREST. THIS IS ELEVATION:

$$\underset{\text{TCC}}{92.67} + \underset{\text{SIDEWALK}}{0.08} + .35 = 93.10$$

Street Flow Even with Crown
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Marcadas Road
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.021500	ft/ft
Water Surface Elevation	0.35	ft

Elevation range: 0.00 ft to 0.67 ft.

Station (ft)	Elevation (ft)
0.00	0.67
0.00	0.00
2.00	0.13
13.00	0.35
24.00	0.13
26.00	0.00
26.00	0.67

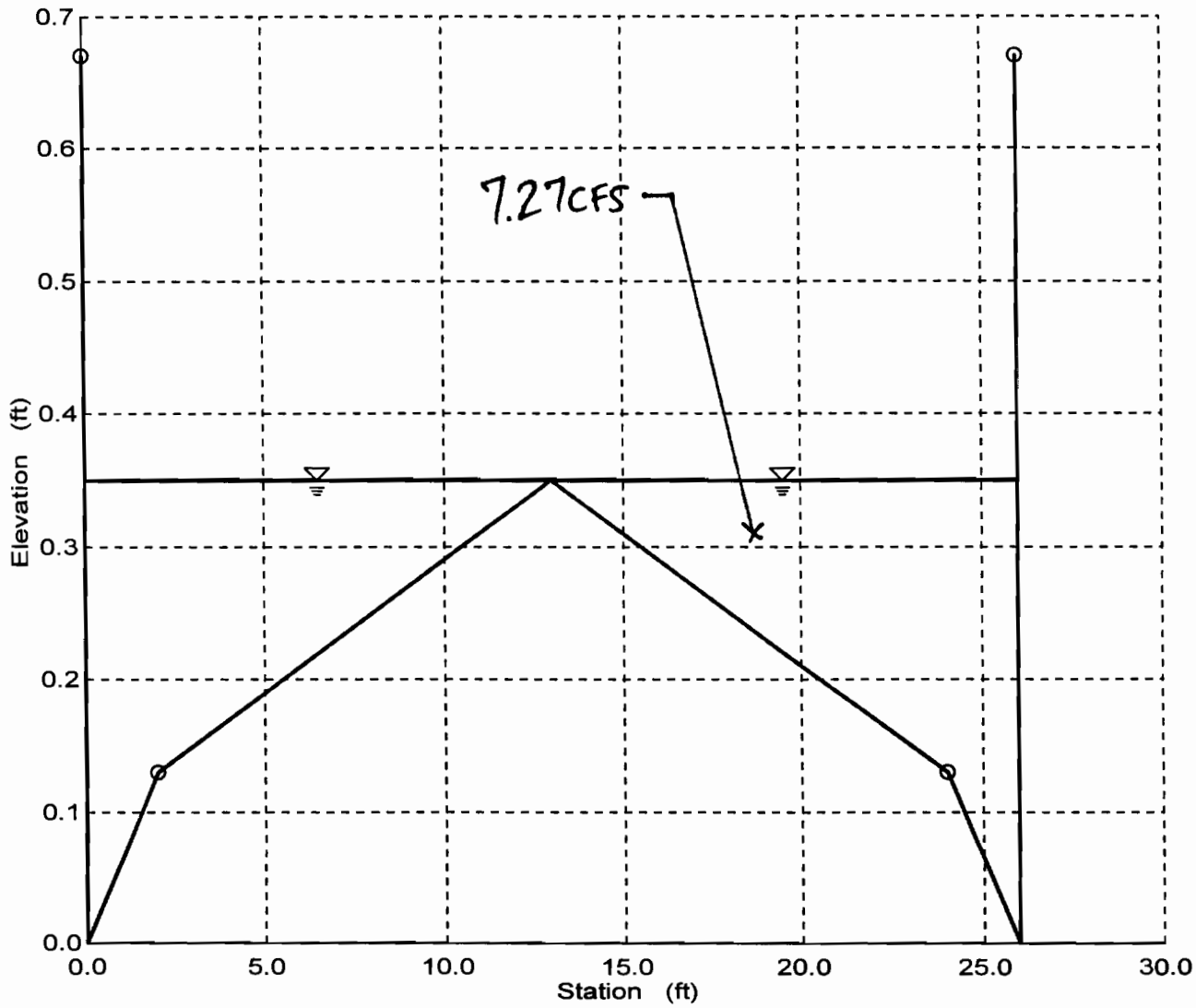
Start Station	End Station	Roughness
0.00	2.00	0.013
2.00	24.00	0.017
24.00	26.00	0.013

Results		
Wtd. Mannings Coefficient	0.014	
Discharge	14.54	cfs
Flow Area	3.56	ft²
Wetted Perimeter	26.71	ft
Top Width	26.00	ft
Height	0.35	ft
Critical Depth	0.43	ft
Critical Slope	0.005814	ft/ft
Velocity	4.08	ft/s
Velocity Head	0.26	ft
Specific Energy	0.61	ft
Froude Number	1.95	
Flow is supercritical.		
Flow is divided.		

Street Flow Even with Crown
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Marcadas Road
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.021500	ft/ft
Water Surface Elevation	0.35	ft
Discharge	14.54	cfs



Flow in South Gutter
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Marcadas Road
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

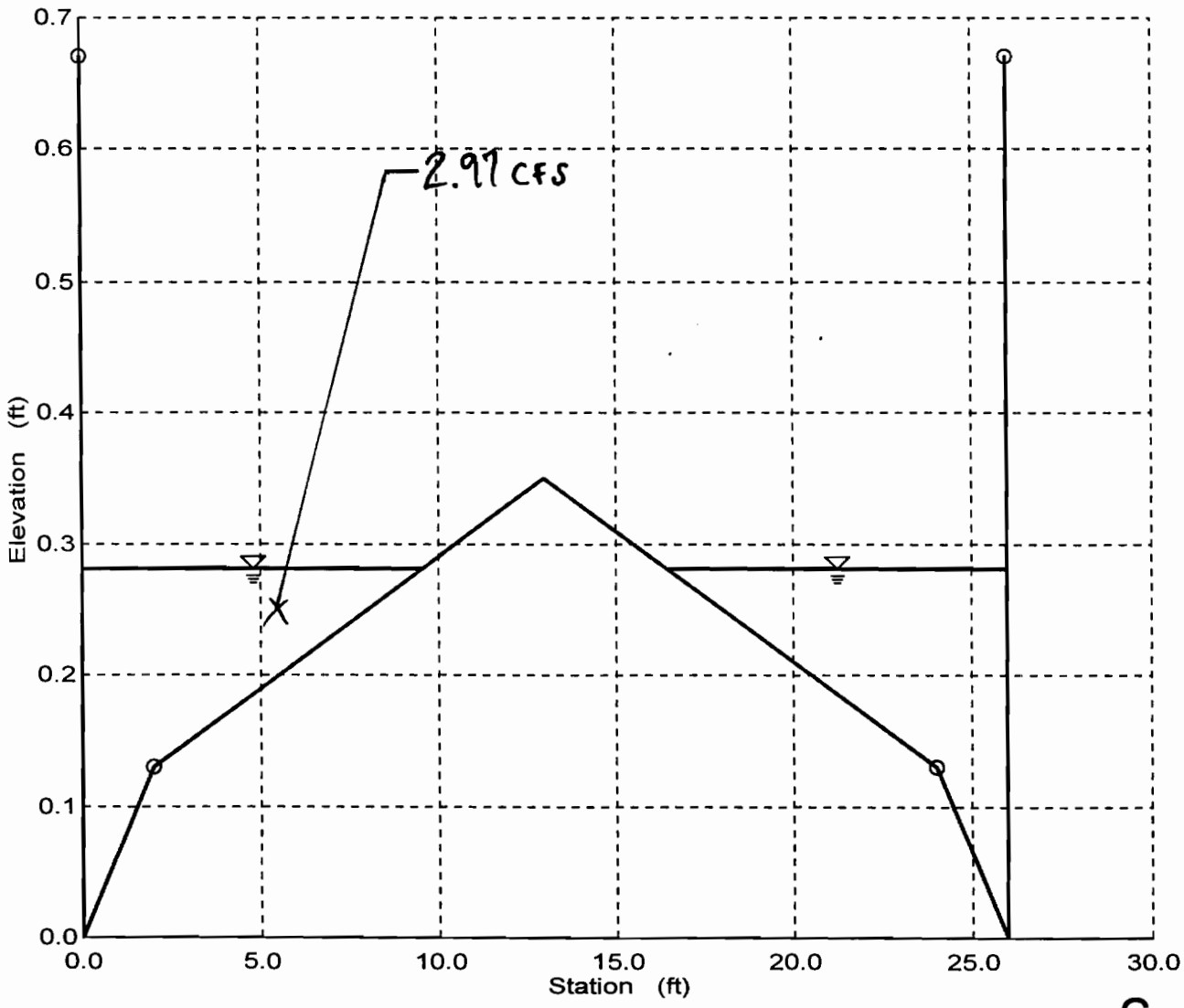
Input Data				
Channel Slope	0.021500 ft/ft			
Elevation range: 0.00 ft to 0.67 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	2.00	0.013
0.00	0.00	2.00	24.00	0.017
2.00	0.13	24.00	26.00	0.013
13.00	0.35			
24.00	0.13			
26.00	0.00			
26.00	0.67			
Discharge	5.94 cfs			

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.28	ft
Flow Area	2.01	ft^2
Wetted Perimeter	19.72	ft
Top Width	19.14	ft
Height	0.28	ft
Critical Depth	0.33	ft
Critical Slope	0.005591	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Energy	0.42	ft
Froude Number	1.61	
Flow is supercritical.		
Flow is divided.		

Flow in South Gutter
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Marcadas Road
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.016	
Channel Slope	0.021500	ft/ft
Water Surface Elevation	0.28	ft
Discharge	5.94	cfs



C-20

Marcadas Road/Noche Vista Bubble
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Street/Gutter Capacity
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.025000	ft/ft
Discharge	10.24	cfs

Elevation range: 92.80 ft to 93.62 ft.

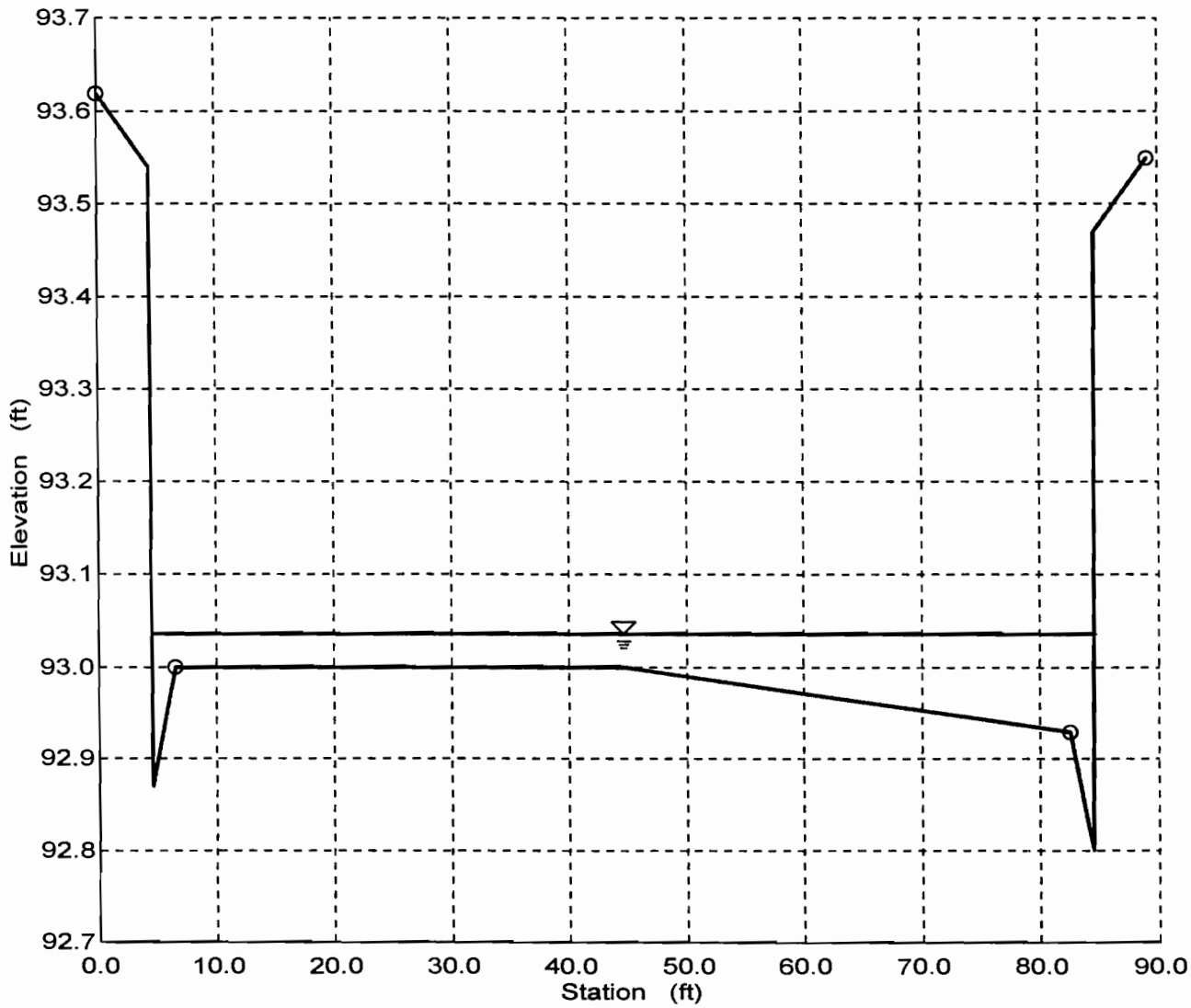
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	93.62	0.00	6.55	0.013
4.50	93.54	6.55	82.55	0.017
4.55	92.87	82.55	89.10	0.013
6.55	93.00			
44.55	93.00			
82.55	92.93			
84.55	92.80			
84.60	93.47			
89.10	93.55			

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	93.04	ft
Flow Area	4.59	ft²
Wetted Perimeter	80.41	ft
Top Width	80.03	ft
Height	0.24	ft
Critical Depth	93.06	ft
Critical Slope	0.008816	ft/ft
Velocity	2.23	ft/s
Velocity Head	0.08	ft
Specific Energy	93.11	ft
Froude Number	1.64	
Flow is supercritical.		

Marcadas/Noche Vista Bubble
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Street/Gutter Capacity
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.016	
Channel Slope	0.025000	ft/ft
Water Surface Elevation	93.04	ft
Discharge	10.24	cfs



Marcadas Road/Noche Vista Bubble
Rating Table for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Street/Gutter Capacity
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.025000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Discharge	0.00	30.00	1.00 cfs

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
0.00	0.016	92.80	0.00
1.00	0.016	92.97	1.34
2.00	0.017	92.99	1.54
3.00	0.013	93.00	1.56
4.00	0.014	93.01	1.66
5.00	0.014	93.01	1.77
6.00	0.015	93.02	1.87
7.00	0.015	93.02	1.96
8.00	0.015	93.03	2.05
9.00	0.015	93.03	2.13
10.00	0.016	93.03	2.21
11.00	0.016	93.04	2.29
12.00	0.016	93.04	2.36
13.00	0.016	93.05	2.43
14.00	0.016	93.05	2.50
15.00	0.016	93.05	2.56
16.00	0.016	93.05	2.62
17.00	0.016	93.06	2.68
18.00	0.016	93.06	2.74
19.00	0.016	93.06	2.80
20.00	0.016	93.07	2.85
21.00	0.016	93.07	2.91
22.00	0.016	93.07	2.96
23.00	0.016	93.07	3.01
24.00	0.016	93.08	3.06
25.00	0.016	93.08	3.11

Marcadas Road/Noche Vista Bubble
Rating Table for Irregular Channel

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
26.00	0.016	93.08	3.15
27.00	0.016	93.08	3.20
28.00	0.016	93.09	3.24
29.00	0.016	93.09	3.29
30.00	0.016	93.09	3.33

Depth at two times the 100-Year Storm
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Lots 48 & 49 Sideyard Channels
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

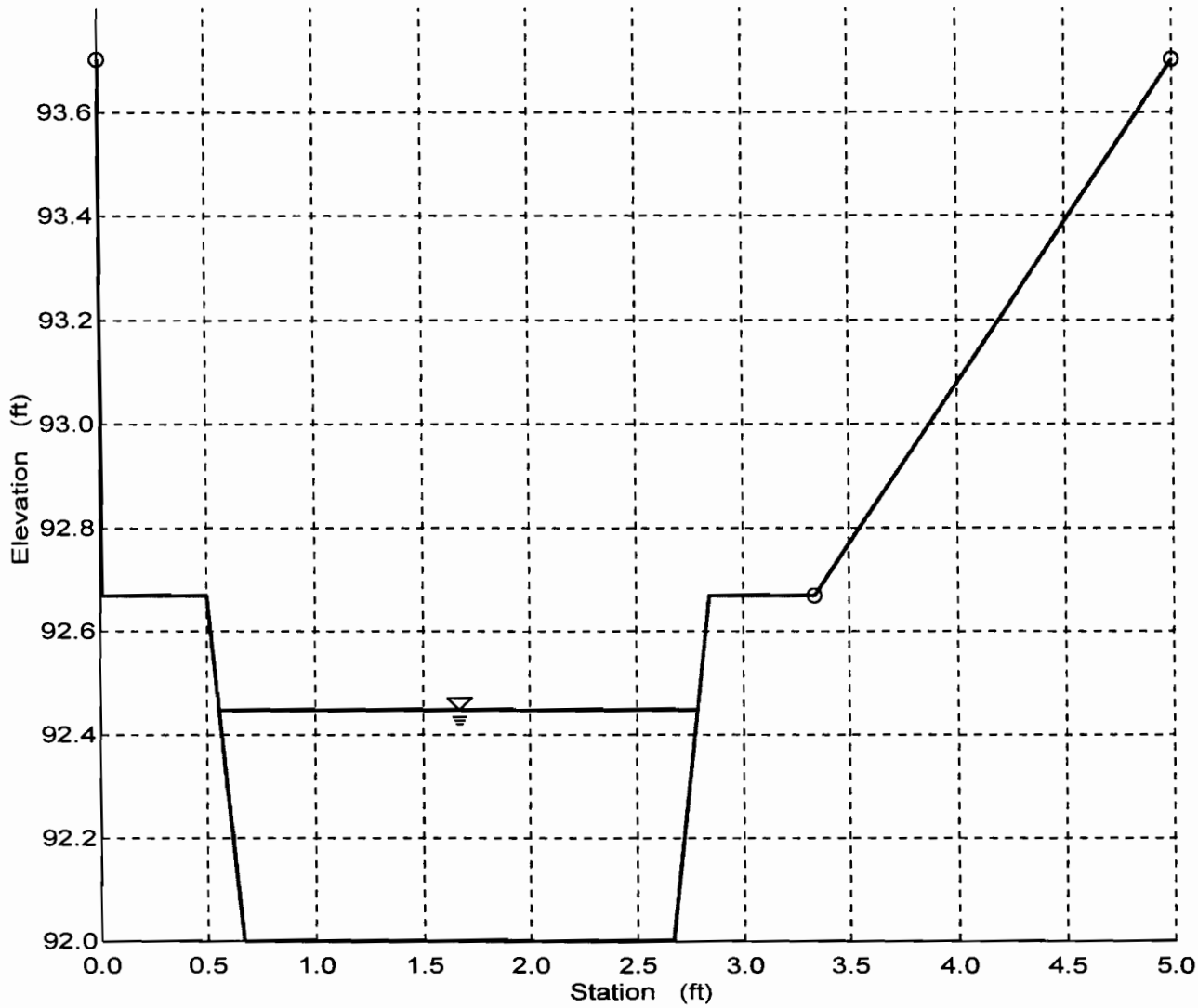
Input Data				
Channel Slope	0.010000 ft/ft			
Elevation range: 92.00 ft to 93.70 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	93.70	0.00	3.34	0.013
0.01	92.67	3.34	5.00	0.030
0.50	92.67			
0.67	92.00			
2.67	92.00			
2.84	92.67			
3.34	92.67			
5.00	93.70			
Discharge	5.12 cfs			

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	92.45	ft
Flow Area	0.95	ft²
Wetted Perimeter	2.93	ft
Top Width	2.23	ft
Height	0.45	ft
Critical Depth	92.57	ft
Critical Slope	0.004698	ft/ft
Velocity	5.40	ft/s
Velocity Head	0.45	ft
Specific Energy	92.90	ft
Froude Number	1.46	
Flow is supercritical.		

Depth at Two Times the 100-Year Storm
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Lots 48 & 49 Sideyard Channels
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Water Surface Elevation	92.45	ft
Discharge	5.12	cfs



Depth at 2 x 100-Year Storm w/SD blocked
Worksheet for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Lots 48 & 49 Sideyard Channels
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.010000	ft/ft
Elevation range: 92.00 ft to 93.70 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	93.70	0.00	3.34	0.013
0.01	92.67	3.34	5.00	0.030
0.50	92.67			
0.67	92.00			
2.67	92.00			
2.84	92.67			
3.34	92.67			
5.00	93.70			

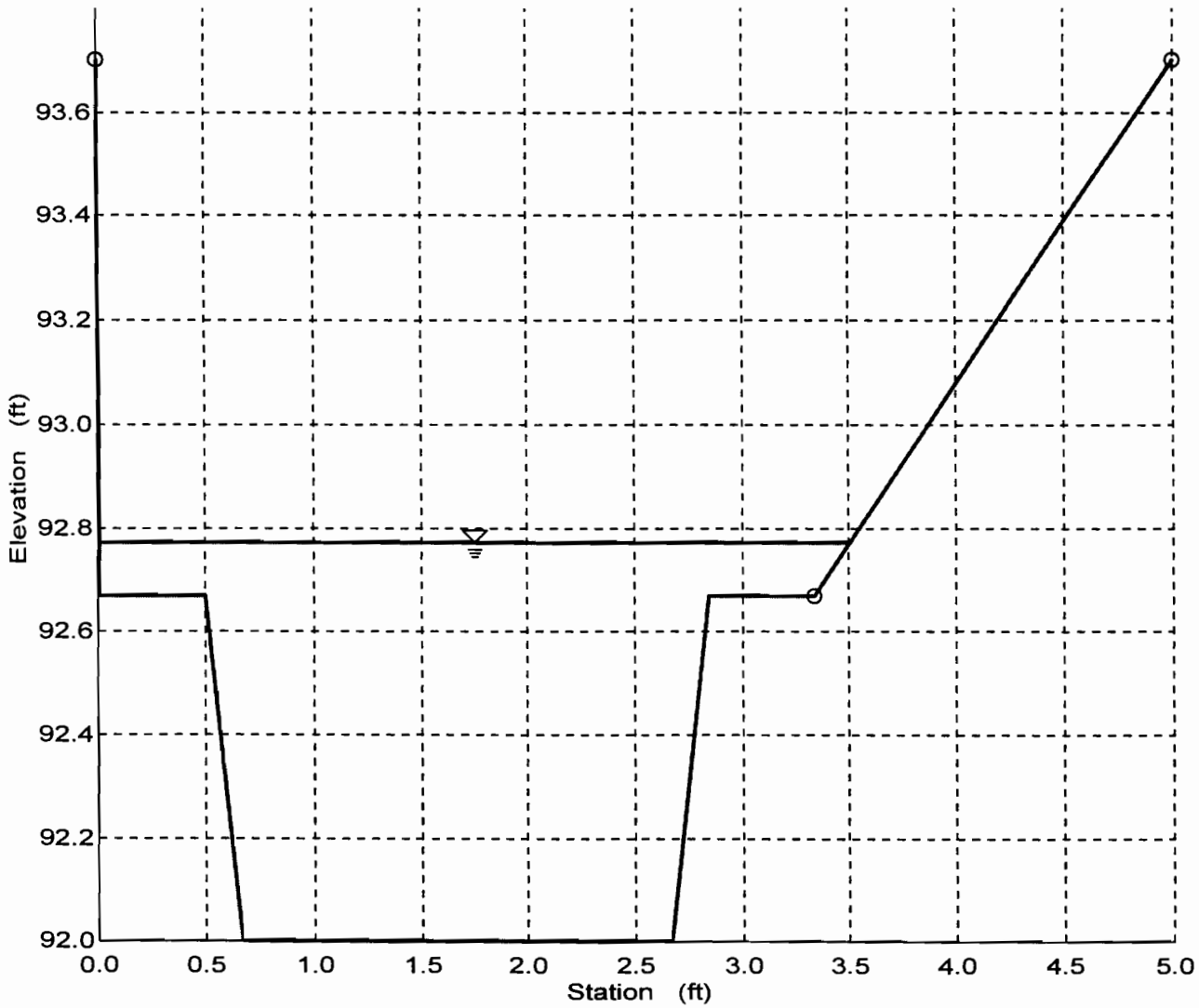
Discharge	10.24	cfs

Results		
Wtd. Mannings Coefficient	0.014	
Water Surface Elevation	92.77	ft
Flow Area	1.80	ft²
Wetted Perimeter	4.67	ft
Top Width	3.50	ft
Height	0.77	ft
Critical Depth	92.91	ft
Critical Slope	0.005721	ft/ft
Velocity	5.67	ft/s
Velocity Head	0.50	ft
Specific Energy	93.27	ft
Froude Number	1.39	
Flow is supercritical.		

Depth at 2 x 100-Year Storm w/SD blocked
Cross Section for Irregular Channel

Project Description	
Project File	g:\n08\100\document\marcadas.fm2
Worksheet	Lots 48 & 49 Sideyard Channels
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.010000	ft/ft
Water Surface Elevation	92.77	ft
Discharge	10.24	cfs



C-28