City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 5, 2000

James R. Topmiller, P.E.
Vice President, Community Development
Bohannan Huston, Inc.
7500 Jefferson Blvd., NE
Albuquerque, NM 87109

D19

RE: ENGINEER'S CERTIFICATION FOR BERNARDO DEL NORTE GRADING AND DRAINAGE (E-16/ D016) ENGINEER'S STAMP DATED OCTOBER 20, 1999, CERTIFICATION DATED OCTOBER 27, 2000.

Dear Mr. Topmiller,

Based upon the information provided in your submittal dated October 27, 2000, the Engineering Certification for the subdivision improvements agreement for the project referred to above is approved.

If you have any questions, please call me at 924-3988.

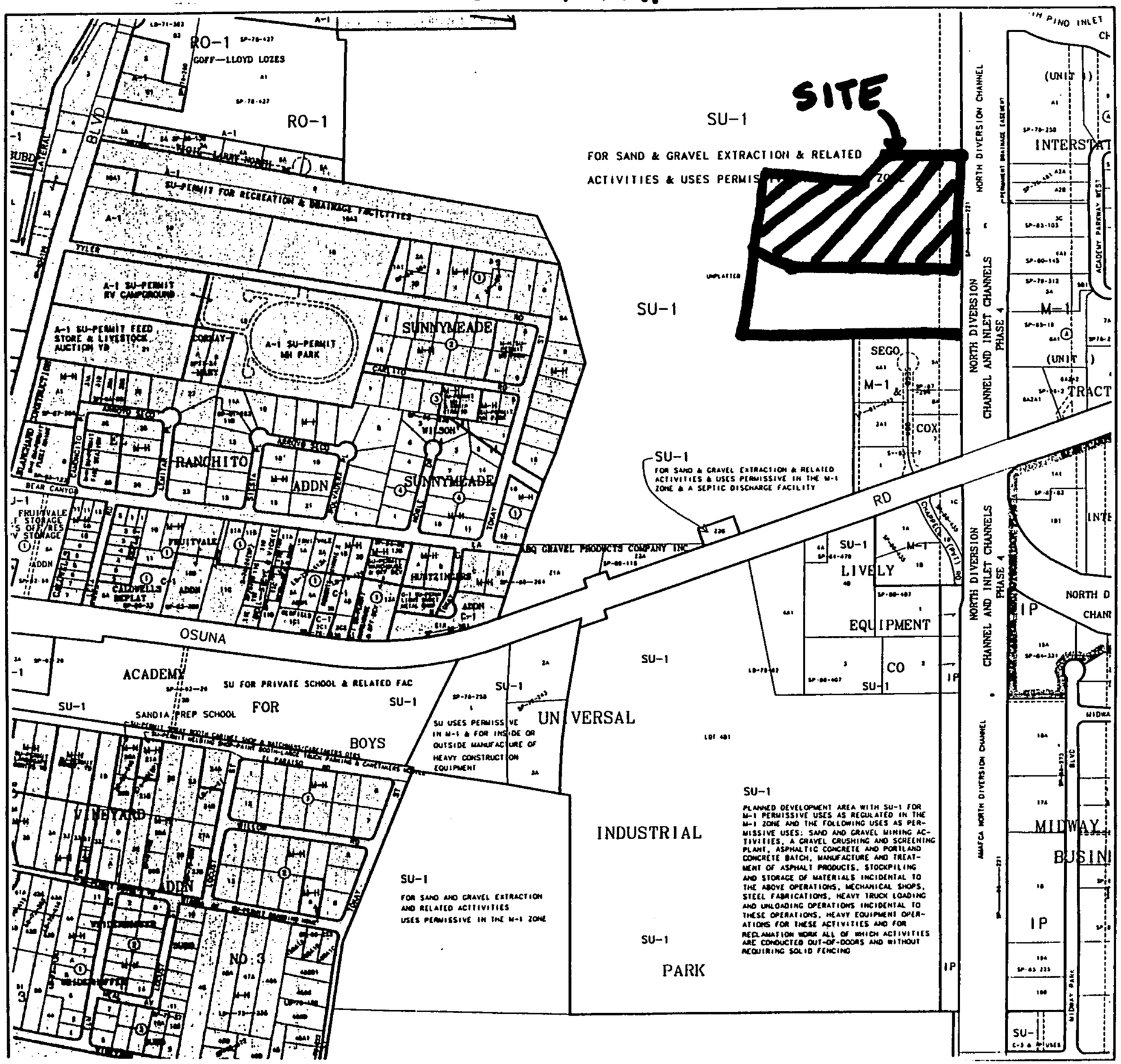
Sincerely,

Stuart Reeder, P.E.

Stuart Reeder, P.E.
Hydrology Division

xc: Whitney Reierson
✓File

LOCATION MAP



CITY OF Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

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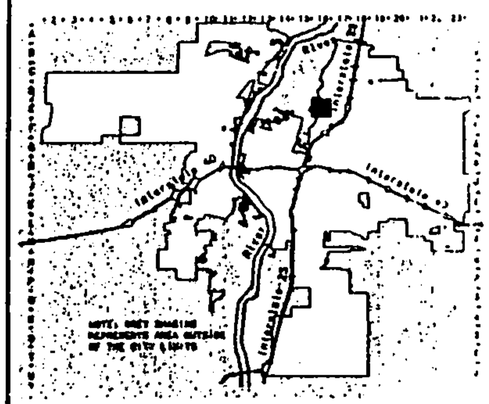


Zone Atlas Page

E-16-Z

Map Amended through
November 23, 1998

A1-1

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 11, 1999

James Topmiller, P.E.
Bohannan-Huston Inc.
7500 Jefferson NE
Albuquerque, New Mexico 87109

RE: Drainage Report and Grading and Drainage Plan for Descansado Del Norte Subdivision (E16/D19) Submitted for Preliminary and Final Plat Approval and Grading Permit Release, Engineer's Stamp Dated 9/29/99 on Report and Plans Dated 10/20/99.

Dear Mr. Topmiller:

Mark H. Burak, P.E., who is under contract with the City, reviewed the above referenced Drainage report and Grading and Drainage Plan and found them acceptable. Attached is a copy of his approval letter.

Based on the information provided in the submittal of September 29, 1999, along with the additional information provided, the above referenced Grading and Drainage Plan for Bernardo (formerly Descansado) del Norte Subdivision is approved for Preliminary Plat action. The above referenced plan is also approved for Rough Grading provided that a topsoil disturbance permit is obtained.

Prior to Final Plat sign-off, the Subdivision Improvements Agreement (SIA) must be in place. As you are aware, the Grading and Drainage Certification is required prior to release of the SIA.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Jerry Sundt, Vista del Norte Development, L.L.C.
File

Mark H. Burak, P.E.

1512 Sagebrush Trail SE Albuquerque, NM 87123 (505) 296-0461 235-2256 cell 296-0467 fax

November 1, 1999

Fred J. Aguirre, P.E., City Engineer
City of Albuquerque
600 2nd Street NW
Albuquerque, NM 87102

- ***Case No:*** E16-D019
- ***Submittal dated:*** September 29, 1999 by Colleen Garcia, BHI
- ***Project Title:*** Descansado Del Norte Subdivision
- ***Location:*** Vista Del Norte and Osuna
- ***Approval Type:*** Prelminary Plat, Final Plat, and Grading Permit Approval

- ***Note:*** *This submittal concerns the development of a 64-lot subdivision on 11-acres. Site will utilize storm drainage system that will discharge into detention ponds.*

Dear Mr. Aguirre:

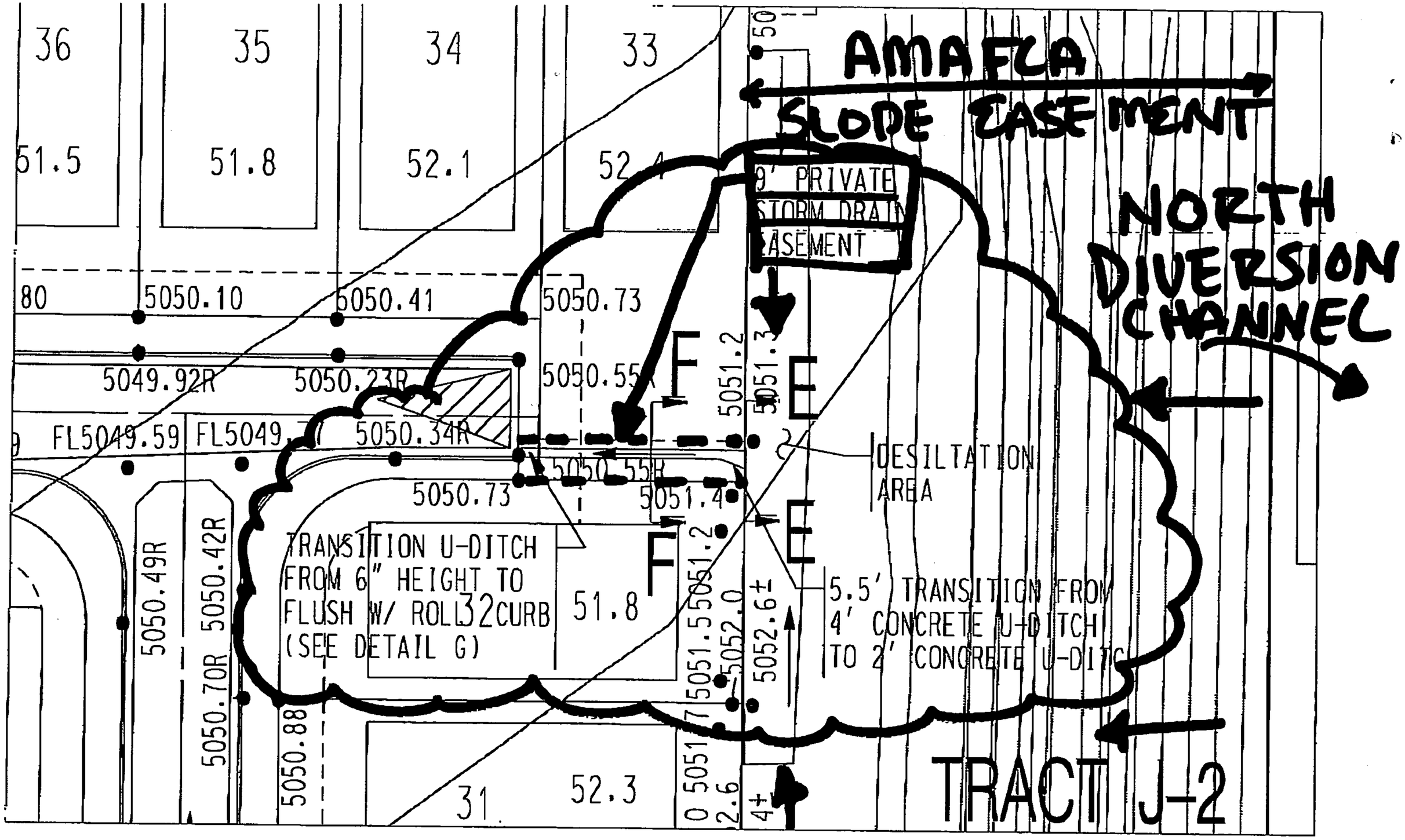
Based on the submittal stamped September 29 1999, the proposed grading and drainage plan appears to be complete and can be approved for Preliminary Plat and Grading Permit approval at this time.

If you have any questions regarding this letter or need any clarification concerning the above project, please feel free to call me at 296-0461.

Sincerely,

Mark Burak

Mark H. Burak, P.E.
Hydrology Consultant


AMAFCA
SLOPE EASEMENT
NORTH DIVERSION CHANNEL
TRACT J-2
9' PRIVATE STORM DRAIN EASEMENT
DESILTATION AREA
TRANSITION U-DITCH FROM 6" HEIGHT TO FLUSH W/ ROLL 32 CURB (SEE DETAIL G)
5.5' TRANSITION FROM 4' CONCRETE U-DITCH TO 2' CONCRETE U-DITCH
36
35
34
33
51.5
51.8
52.1
52.4
51.8
52.3
31
5050.10
5050.41
5050.73
5049.92R
5050.23R
5050.55R
FL5049.59
5050.34R
5050.55R
5050.73
5051.4
5051.2
5051.3
5051.5
5052.0
5052.6±
5050.49R
5050.42R
5050.70R
5050.88

DRAINAGE REPORT
FOR
DESCANSADO DEL NORTE SUBDIVISION

SEPTEMBER 22, 1999

Prepared for:

VISTA DEL NORTE L.L.C
c/o BROWN AND ASSOCIATES
3411 CANDELARIA NE
ALBUQUERQUE, NEW MEXICO 87107

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87109

JAMES R. TOPMILLER
NEW MEXICO
9354
REGISTERED PROFESSIONAL ENGINEER

PREPARED BY:

Colleen Garcia 9-28-99
Colleen M. Garcia, E.I. [Date]

UNDER THE SUPERVISION OF:

James R. Topmiller P.E. [Date]
9/29/99

\\A_BHI_B01\projects\99493\cdp\reports\drainage rpt,rev092299.doc

I. INTRODUCTION

Descansado del Norte is a proposed new subdivision in Vista del Norte consisting of 64 lots on approximately 11.11 acres. This report is in compliance with the City of Albuquerque Subdivision standards and is consistent with the drainage criteria set forth by the Vista del Norte Master Drainage Plan (June 1998).

Detailed drainage and grading plans are included in the Plates section of this report.

This subdivision is located in the northern portion of Tract J of Vista del Norte Subdivision, north of Osuna Road, west of the AMAFCA North Diversion Channel and east of Vista del Norte Drive. The land is zoned for residential development. Please refer to the Location Map enclosed in the Appendices for the specific location.

This report outlines the study methodologies used and summarizes the existing and proposed drainage conditions. Calculations and supporting data are presented in the Appendices. The Drainage Master Plan, drainage basin maps, grading plans and a copy of the Preliminary Plat are included in the pockets of the Plates section at the end of the report.

The purpose of this report is to obtain approval for the Preliminary and Final Plat, grading plans and Public Infrastructure Construction Plans of the Descansado del Norte Subdivision.

II. STUDY METHODOLOGIES

The City of Albuquerque standards for drainage analyses have been incorporated by this report. This drainage report contains all applicable calculations per section 22.2 of the Development Process Manual for deriving the following values using the rational method analysis:

LAND TREATMENT	PEAK DISCHARGE (CFS/ACRE)	EXCESS PRECIPITATION (INCHES)
A	1.56	0.53
B	2.28	0.78
C	3.14	1.13
D	4.70	2.12

ZONE 2

Flow rate references in this report are 6-hour, 100-year storm event values.

Street hydraulics and capacities were analyzed using Manning's equation. Spreadsheets for street capacities are provided in Appendix 3, along with a summary page defining curb type. Streets are designed to convey the energy grade line of the design storm event within the width of the street right-of-way. Normal flow depth is confined to the top of the curb.

The calculated pipe hydraulics assumes pressure flow conditions, and computer spreadsheets containing the HGL analysis are included. Rating curves for storm drain basins, along with inlet design, are found in Appendix 4.

III. EXISTING CONDITIONS

Please reference Plate 2 for interim grading conditions per the previously submitted and approved June 1998 Drainage Master Plan for the entire Vista Del Norte Subdivision.

A. Onsite Drainage Basins

The site sheet flows in a general northwest direction. The flows from Descansado Del Norte Subdivision are directed to the Vista Monte Dr. storm drain system. Detailed hydraulic analysis of the surrounding area can be found in the previously submitted June 1998 report.

Plate 3 is an exhibit of our existing condition analysis, which assumes post construction of the master plan infrastructure and Tract W, and prior to our development. Supporting data and calculations are located in Appendix 2.

B. Offsite Drainage Basins

Currently, flows from the AMAFCA slope easement run towards the eastern boundary of the subdivision. Flows from the east (Offsite Basin 1) are approximately 6.50 cfs.

A portion of Tract J (Offsite Basin 2) currently flows into the subdivision's southern boundary. The area of Offsite Basin 2 is approximately 13.03 acres and generates 24.44 cfs. Another portion of Tract J (Offsite Basin 3) currently flows onto Vista Del Norte Drive. The area of Offsite Basin 3 is 1.96 acres and generates 3.34 cfs.

IV. PROPOSED DEVELOPED CONDITIONS

Please refer to the Proposed Conditions/Drainage Basins Maps in Appendix 2 and Preliminary Plat provided in the pockets in the Plates section at the end of the report for a graphical depiction of the proposed conditions. The Proposed Conditions/Drainage Basins Maps

identify the individual basins and their respective flow rates resulting from the 6-hour, 100-year storm event. The Proposed Conditions Maps also identify the extent of construction to be included with the subdivision. The drainage plan is summarized in the following two sections.

V. SUBDIVISION DEVELOPMENT

A. Onsite Drainage Basins

For the purpose of analysis, Descansado Del Norte Subdivision is subdivided into sub-basins, as shown on the Proposed Conditions Map (Appendix 2).

Sub-basins OS1, 4, 5, 6, and a portion of 3 drain into Sump 1 on Calle Almeria directly in front of the pedestrian access easement. Sump 1 inlets are designed for twice the 100 year storm. These flows are then transported through the proposed storm drain system to Sump 2 adjacent to lot 4. Sub-basins 1, 2, and the remaining portion of 3 are added there through inlets at Sump 2. Sump 2 is designed for the 100 year storm with and emergency overflow down Vista Monte Drive where any residual flows can be picked up in the existing Vista Monte Drive storm drain system. From Sump 2 the combined flows enter the existing Vista Monte Drive storm drain system through a 54" stub in compliance with the Vista del Norte Master Drainage Plan.

Street capacities have been calculated at several analysis points (reference the Proposed Conditions Basin Map in Appendix 2 of this report). The data for street capacities can be found in Appendix 3. Normal depth of flow is contained below the top of curb elevation, and the energy grade line is contained within the street right-of-way.

Individual lot grading has been identified on the Grading Plan located in the rear pockets. A typical lot drainage configuration is used, as shown on the Grading Plan.

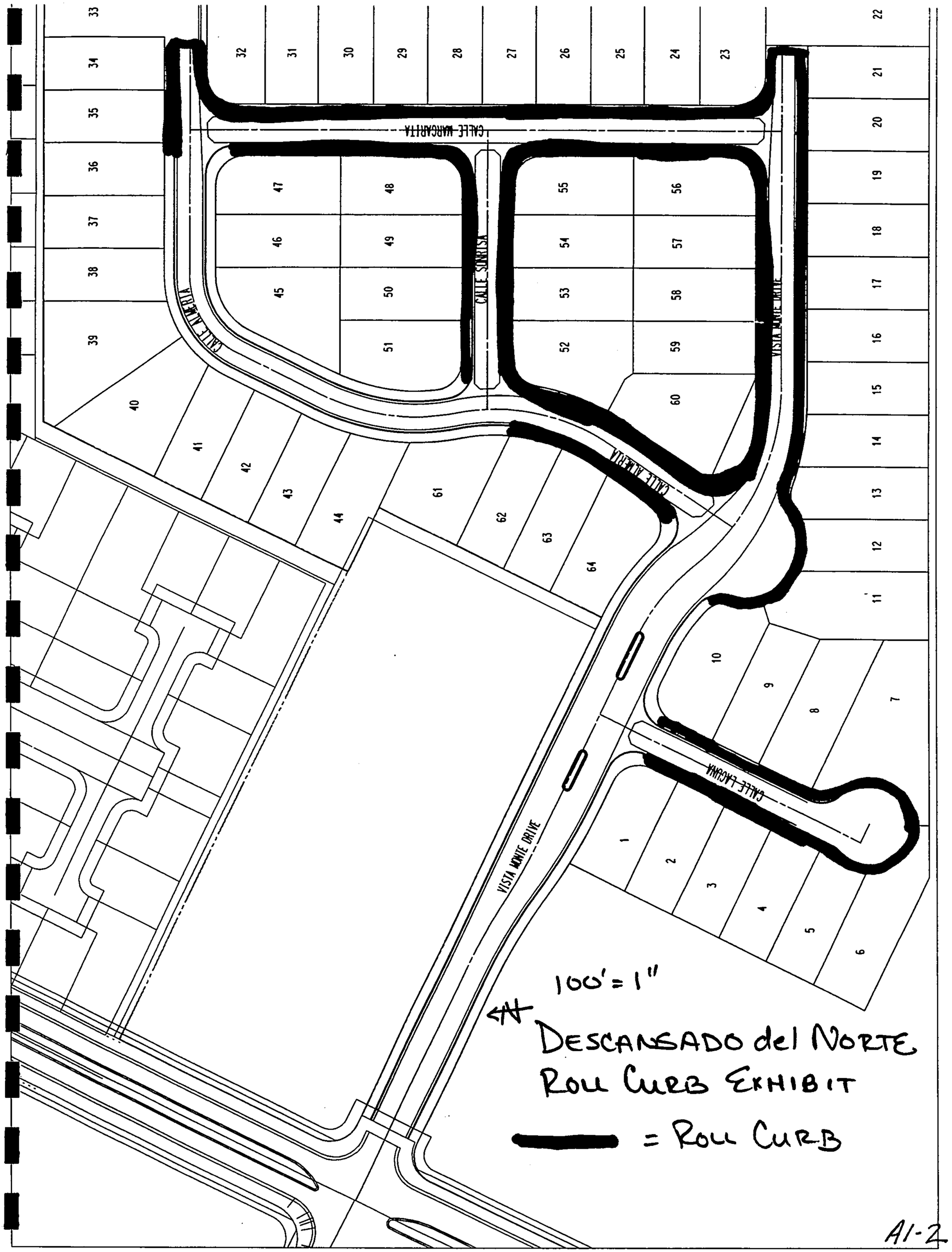
B. Offsite Drainage Basins

Currently flows from the AMAFCA slope easement run towards the eastern boundary of the subdivision. These flows are routed into the subdivision and travel through Calle Almeria into Sump 1.

A southern portion of the undeveloped Tract J's runoff sheet flows to the southern subdivision boundary. The area of Offsite Basin 2 is approximately 13.03 acres and generates 24.44 cfs. An earthen swale will be graded along the south edge of the subdivision to route the offsite flow to the temporary desiltation basin. A temporary desiltation pond will be constructed on Descansado Del Norte Subdivision near the northwestern corner of the subdivision with outflow to Vista del Norte Drive is designed to hold these flows until the remainder of Tract J is constructed. See Appendix 5 for swale and desiltation pond calculations.

VI. CONCLUSION

This report requests approval for the Preliminary and Final Plat, Grading Plans, and Public Infrastructure Construction Plans. The drainage management plan presented in this revised report for Descansado Del Norte provides a workable solution to the drainage issues created by the development of this property. It is recommended that this plan be approved for the Preliminary and Final Plat, as well as for grading and infrastructure plans.


CALLE MARGARITA
CALLE SONRISA
CALLE ALEGRIA
CALLE ALEGRIA
CALLE LAGUNA
VISTA MONTE DRIVE
VISTA MONTE DRIVE
100' = 1"
N
DESCANSADO del NORTE
ROLL CURB EXHIBIT
= ROLL CURB

A1-2

EXISTING CONDITIONS
100 YR, 6 HR. STORM

SUMMARY OF HYDROLOGIC DATA

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT				TIME TO PEAK	100-YR DISCHARGE CFS/AC	Q(100YR) CFS
			A	B	C	D			
SUBDIVISION	11.110	0.0174	80.0	0.0	20.0	0.0	0.1333	1.88	20.84
PARK	2.5	0.0039	80.0	0.0	20.0	0.0	0.1333	1.88	4.69
ONSITE-1	1.96	0.0031	80.0	0.0	20.0	0.0	0.1333	1.88	3.34

EXISTING CONDITIONS
100 YR, 6 HR. STORM

SUMMARY OF OFF-SITE HYDROLOGIC DATA

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT				TIME TO PEAK	100-YR DISCHARGE CFS/AC	Q(100YR) CFS
			A	B	C	D			
OFFSITE-1	2.070	0.0032	0.0	0.0	100.0	0.0	0.1333	3.14	6.50
OFFSITE-2	13.030	0.0204	80.0	0.0	20.0	0.0	0.1333	1.88	24.44

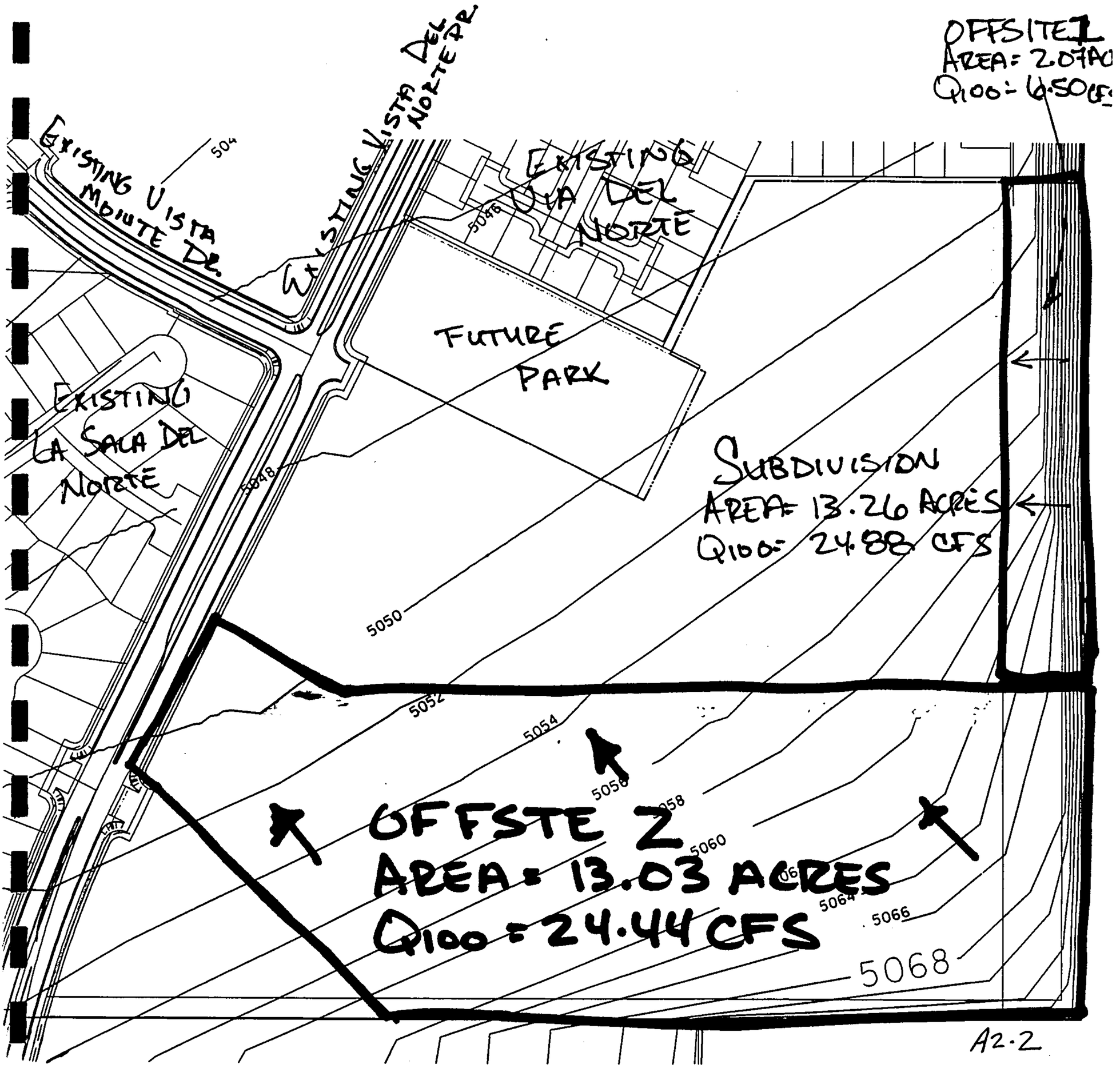
All of Vista del Norte Subdivision has been mass graded to slopes < or = 2%.
Through seeding, ground tilling, and hay mulch, 80% or more of the site has been rehabilitated to the equivalent of "undisturbed" status (i.e. Land treatment "A").

OFFSITE 2 BASIN

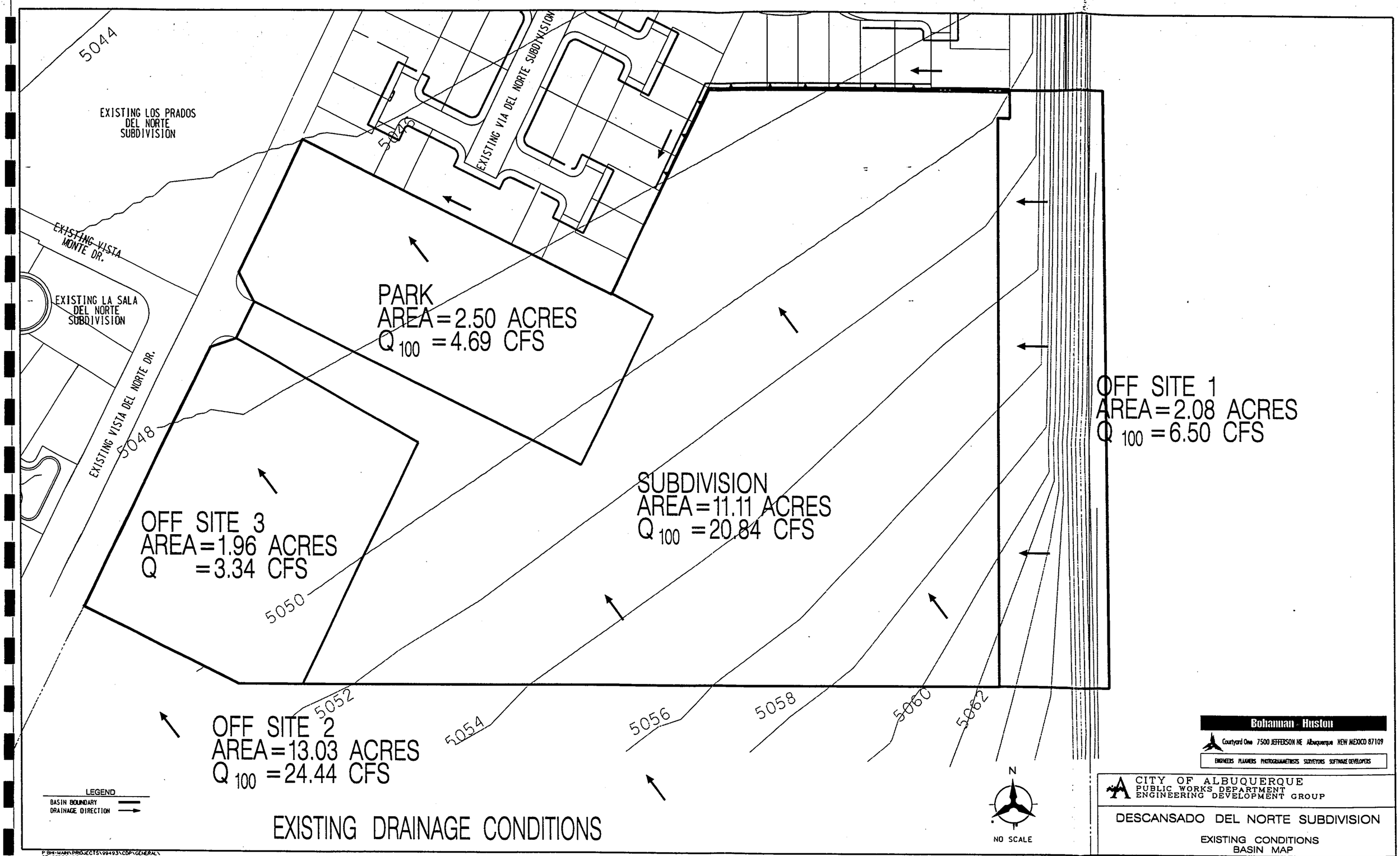
1" = 200'

N

EXISTING CONDITIONS



A2.2



EXISTING DRAINAGE CONDITIONS

A2-3

Vista del Norte Tract J Proposed Conditions Analysis

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Vista del Norte Subdivision is in Zone 2 (between Rio Grande and San Mateo)

Percent Treatment D (impervious) Calculation (DPM Section 22.2 Table A-5):

Single Family Residential (N = Units / Acre)

Units: 79 lots

Acreage:

Total =	17.83	Acres
Park =	2.50	Acres
Offsite (East)=	2.07	Acres
Subdivision=	11.11	Acres

N =76 lots / 13.26 acres = 5.73

%D = 7*((N*N)+5*N)^.5

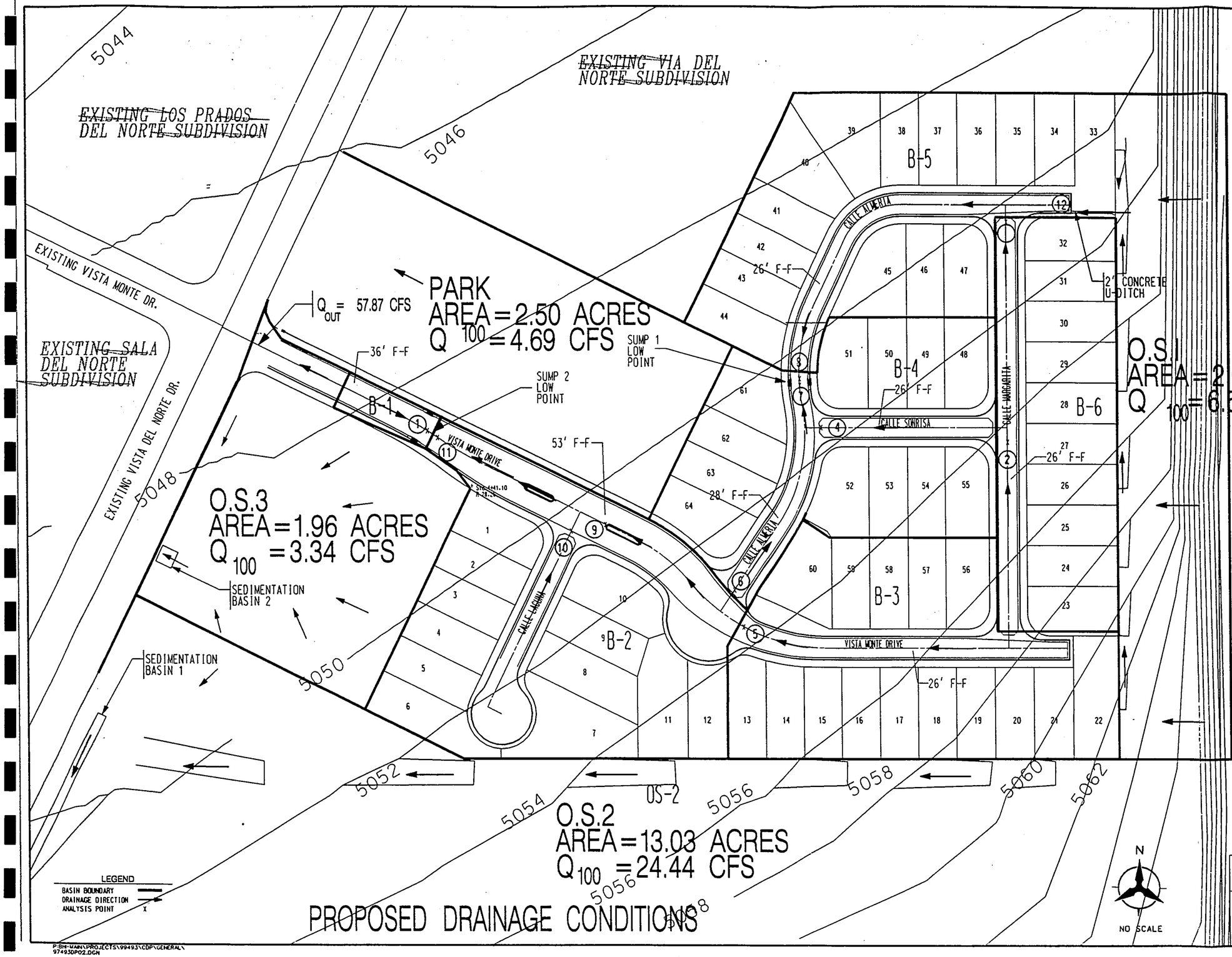
% D = 55

Tract J

Proposed Conditions Basin Data Table

This table is based on the DPM Section 22.2, Zone: 2

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	Q(100) (cfs/ac.)	Q(100) (CFS)
1	6098.4	0.14	0.0%	22.5%	22.5%	55.0%	3.80	*0.53*
2	96703.2	2.22	0.0%	22.5%	22.5%	55.0%	3.80	*8.10*
3	97319.29	2.23	0.0%	22.5%	22.5%	55.0%	3.80	*8.50*
4	89125.65	2.05	0.0%	22.5%	22.5%	55.0%	3.80	*7.78*
5	103565.4	2.38	0.0%	22.5%	22.5%	55.0%	3.80	*9.05*
6	66608.4	1.53	0.0%	22.5%	22.5%	55.0%	3.80	*5.82*
OS-1	90364.77	2.07	0.0%	0.0%	100.0%	0.0%	3.14	*6.50*
OS-2	567586.8	13.03	80.0%	0.0%	20.0%	0.0%	1.88	*24.44*
OS-3	85377.6	1.96	80.0%	0.0%	20.0%	0.0%	1.88	*3.34*
PARK	108900	2.50	80.0%	0.0%	20.0%	0.0%	1.88	*4.69*



PROPOSED DRAINAGE CONDITIONS

DEVELOPED FLOWS		
BASIN	AREA	Q_{100} (cfs)
B-1	0.14 ac.	0.53
B-2	2.58 ac.	9.82
B-3	2.23 ac.	8.50
B-4	2.05 ac.	7.78
B-5	2.37 ac.	9.05
B-6	1.53 ac.	5.82
PARK = 2.5 ACRES		4.69 CFS
OS-1 = 2.08 ACRES		6.50 CFS
OS-2 = 13.03 ACRES		24.44 CFS
OS-3 = 1.96 ACRES		3.34 CFS

ANALYSIS POINTS	
#	Q_{100} (cfs)
1	0.53
2	2.91
3	5.82
4	5.19
5	8.50
6	2.85
7	10.63
8	21.37
SUMP 1	32.00
9	7.00
10	8.18
11	13.75
SUMP 2	14.28

Bohannan Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

DESCONSADO DEL NORTE SUBDIVISION

PROPOSED CONDITIONS
BASIN MAP

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DATE: MAY. 1999

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97493DP02.DGN

A2-5

STREET CAPACITY ANALYSIS SUMMARY
Tract J OF VISTA DEL NORTE
9/9/99

ANALYSIS POINT	SLOPE, %	Q-100 YR (CFS)	DEPTH (FT)	V-100YR (FPS)	E-100YR (FT)	E<? (R/W)	TRIBUTARY BASIN(S)	EQUATIONS
1	0.60%	0.53	0.44	1.9	0.4	YES	B-1	B1
2	1.11%	2.91	0.27	2.0	0.3	YES	B-6	B6 / 2 SEE NOTE 1
3	1.11%	5.82	0.33	2.3	0.4	YES	B-6	B6
4	2.20%	5.19	0.30	3.0	0.4	YES	B-4,6	(8/12)*B4 SEE NOTE 2
5	1.00%	8.50	0.36	2.4	0.5	YES	B-3	B3
6	1.85%	2.85	0.24	2.3	0.3	YES	B-4	AP5 / 2+ (S1 / (S1+S2) SEE NOTE 3
7	1.85%	10.63	0.36	3.2	0.5	YES	B-4,6	AP6 +B4
8	0.68%	21.37	0.49	3.0	0.6	YES	B-5,6	B5 + B6 + OS1
Sump1	0.68%	32.00	0.55	3.4	0.7	YES	B4,5,6	AP7 +AP8
9	0.60%	7.00	0.33	2.1	0.4	YES	B-2,3	B3 - AP6 +(2/12)*B2 SEE NOTE 2
10	0.60%	8.18	0.15	1.0	0.2	YES	B-2,3	(10/12)*B2 SEE NOTE 2
11	1.75%	13.75	0.39	3.3	0.6	YES	B-2,3	B2 + B3 - AP6
Sump2	1.75%	14.28	0.48	4.1	0.7	YES	B-3,2,1	AP1 + AP11

LEGEND:
S = SLOPE
AP = ANALYSIS POINT
Bx = BASIN

NOTE 1: CONTRIBUTING LOTS ARE ALL ON THE EAST SIDE OF THE STREET. NO ACCOUNTABLE FLOWS CAN TURN DOWN SONRISA AT THE INTERSECTION.

NOTE 2: (# / #)*B# REPRESENTS THE NUMBER OF LOTS CONTRIBUTING DIVIDED BY THE TOTAL NUMBER OF LOTS IN THE BASIN ALL MULTIPLIED BY THE TOTAL FLOW WITHIN THE BASIN. THIS EQUATION PROVIDES A RATIO OF THE FLOW AT A SPECIFIC LOCATION WITHIN A BASIN.

NOTE 3: HALF OF THE STREETS FLOWS COULD TURN DOWN THE SIDE STREET. VECTOR ANALYSIS CALCULATES THE PORTION OF THE WHOLE FLOW LIKELY TO CONTINUE ON ITS COURSE OR TURN.

ANALYSIS PT. 1

Q_{100} = 12.59 CFS

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

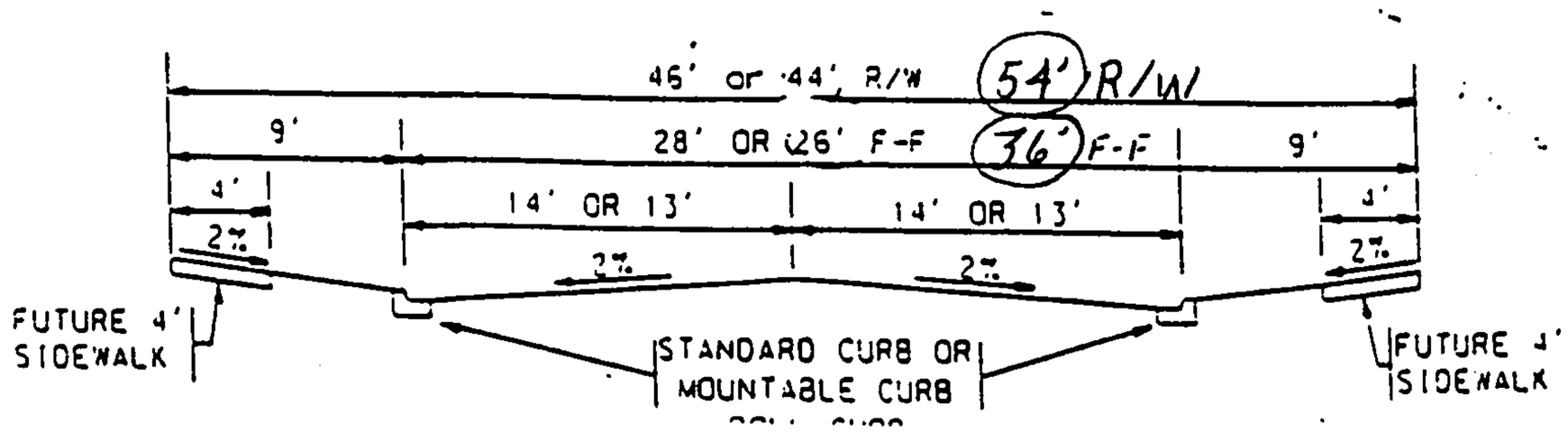
ANALYSIS PT. 1

VISTA-MONTE DR.

MANNING'S N= .017 SLOPE= .006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	27.00	0.45	9	54.00	0.85
2	8.83	0.67	6	43.00	0.13	10	0.00	0.00
3	9.00	0.00	7	45.00	0.00	11	0.00	0.00
4	11.00	0.13	8	45.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.03	0.03	0.01	0.0	0.99	0.40	0.94	0.00	0.03	
0.06	0.06	0.06	0.0	1.97	0.63	1.88	0.01	0.07	
0.09	0.09	0.13	0.1	2.96	0.83	2.81	0.01	0.10	
0.12	0.12	0.23	0.2	3.95	1.00	3.75	0.02	0.14	
0.15	0.15	0.37	0.4	6.32	1.01	6.08	0.02	0.17	
0.18	0.18	0.59	0.6	9.38	1.07	9.09	0.02	0.20	
0.21	0.21	0.91	1.1	12.44	1.19	12.11	0.02	0.23	
0.24	0.24	1.32	1.7	15.51	1.31	15.12	0.03	0.27	
0.27	0.27	1.82	2.6	18.57	1.44	18.14	0.03	0.30	
0.30	0.30	2.41	3.8	21.63	1.57	21.15	0.04	0.34	
0.33	0.33	3.09	5.2	24.69	1.69	24.17	0.04	0.37	
0.36	0.36	3.86	7.0	27.76	1.82	27.18	0.05	0.41	
0.39	0.39	4.72	9.1	30.82	1.94	30.20	0.06	0.45	
0.42	0.42	5.67	11.7	33.88	2.06	33.21	0.07	0.49	✓ Ok
0.45	0.45	6.71	14.6	36.94	2.17	36.23	0.07	0.52	< .82' R/W
0.48	0.48	7.80	18.7	37.01	2.40	36.24	0.09	0.57	
0.51	0.51	8.89	23.2	37.07	2.61	36.26	0.11	0.62	
0.54	0.54	9.97	28.1	37.13	2.82	36.27	0.12	0.66	
0.57	0.57	11.06	33.4	37.19	3.02	36.29	0.14	0.71	
0.60	0.60	12.15	39.0	37.25	3.21	36.30	0.16	0.76	
0.63	0.63	13.24	44.9	37.31	3.39	36.32	0.18	0.81	
0.66	0.66	14.33	51.2	37.38	3.57	36.33	0.20	0.86	
0.69	0.69	15.44	56.0	39.36	3.63	38.30	0.20	0.89	
0.72	0.72	16.63	60.4	42.30	3.63	41.25	0.21	0.93	
0.75	0.75	17.92	65.4	45.25	3.65	44.19	0.21	0.96	
0.78	0.78	19.28	70.9	48.19	3.68	47.13	0.21	0.99	
0.81	0.81	20.74	77.0	51.14	3.71	50.08	0.21	1.02	
0.84	0.84	22.29	83.6	54.08	3.75	53.02	0.22	1.06	
0.85	0.85	22.82	85.9	55.06	3.76	54.00	0.22	1.07	



A-3-2

ANALYSIS PT. 2

CALLE MARGARITA
~~STREET C~~

Q_{100} = 2.91 CFS

MANNING'S N= .017 SLOPE= .0111

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.54	0.94	0.00	0.03
0.06	0.06	0.06	0.0	1.97	0.86	1.88	0.01	0.07
0.09	0.09	0.13	0.1	2.96	1.13	2.81	0.02	0.11
0.12	0.12	0.23	0.3	3.95	1.36	3.75	0.03	0.15
0.15	0.15	0.37	0.5	6.32	1.38	6.08	0.03	0.18
0.18	0.18	0.59	0.9	9.38	1.46	9.09	0.03	0.21
0.21	0.21	0.91	1.5	12.44	1.61	12.11	0.04	0.25
0.24	0.24	1.32	2.4	15.51	1.78	15.12	0.05	0.29
0.27	0.27	1.82	3.6	18.57	1.96	18.14	0.06	0.33
0.30	0.30	2.41	5.1	21.63	2.13	21.15	0.07	0.37
0.33	0.33	3.09	7.1	24.69	2.30	24.17	0.08	0.41
0.36	0.36	3.85	9.7	26.76	2.53	26.18	0.10	0.46
0.39	0.39	4.64	13.3	26.82	2.86	26.20	0.13	0.52
0.42	0.42	5.42	17.2	26.88	3.17	26.21	0.16	0.58
0.45	0.45	6.21	21.5	26.94	3.46	26.23	0.19	0.64
0.48	0.48	7.00	26.2	27.00	3.74	26.24	0.22	0.70
0.51	0.51	7.79	31.2	27.07	4.01	26.26	0.25	0.76
0.54	0.54	8.57	36.6	27.13	4.27	26.27	0.28	0.82
0.57	0.57	9.36	42.4	27.19	4.52	26.29	0.32	0.89
0.60	0.60	10.15	48.4	27.25	4.77	26.30	0.35	0.95
0.63	0.63	10.94	54.8	27.31	5.00	26.32	0.39	1.02
0.66	0.66	11.73	61.4	27.37	5.23	26.33	0.43	1.09
0.69	0.69	12.54	65.5	29.36	5.22	28.30	0.42	1.11
0.72	0.72	13.43	68.9	32.30	5.13	31.25	0.41	1.13
0.75	0.75	14.42	73.1	35.25	5.07	34.19	0.40	1.15
0.78	0.78	15.48	78.1	38.19	5.05	37.13	0.40	1.18
0.81	0.81	16.64	83.8	41.13	5.04	40.08	0.39	1.20
0.84	0.84	17.89	90.3	44.08	5.05	43.02	0.40	1.24
0.85	0.85	18.32	92.6	45.06	5.06	44.00	0.40	1.25

≤ 0.52' R/W
ROLL CURB
OK

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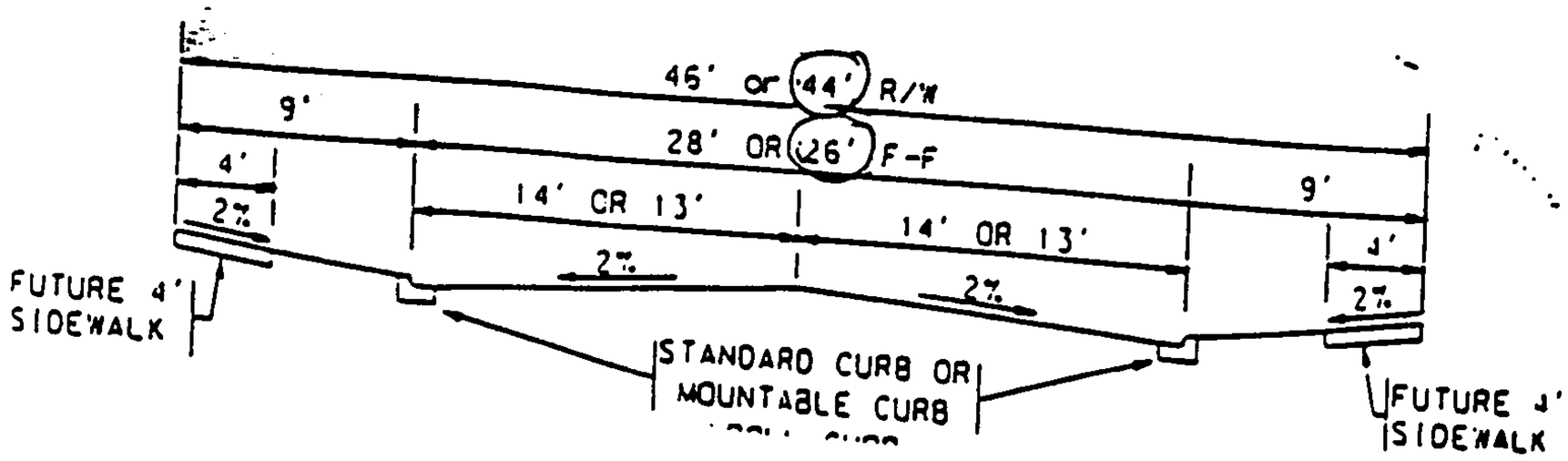


ANALYSIS PT. 3

CALLE MARGARITA
~~STREET C~~

Q_{100} = 5.82 CFS

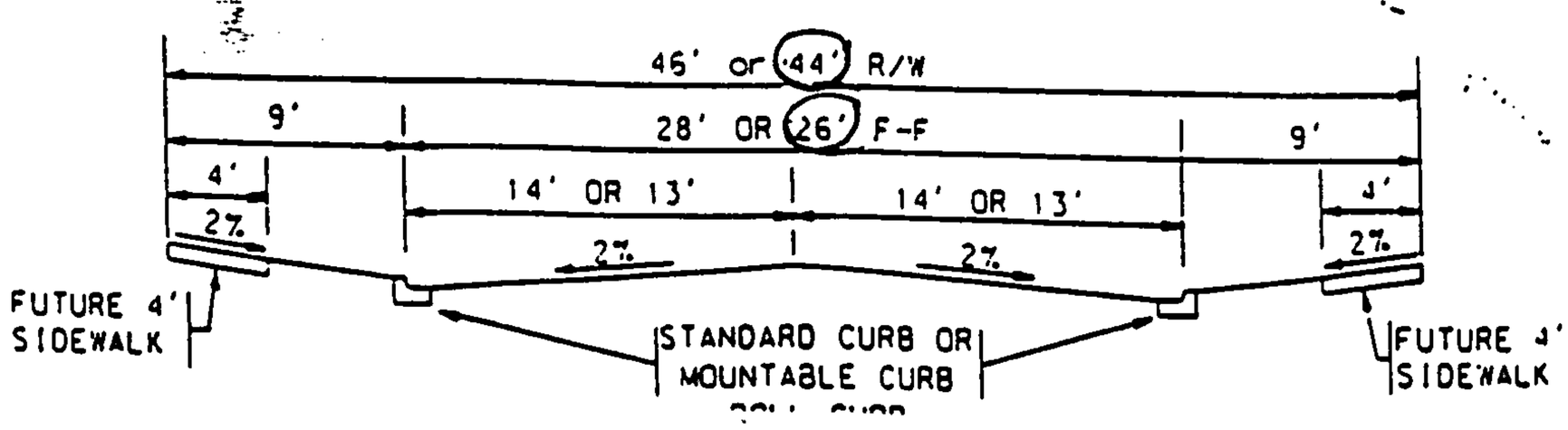
MANNING'S N= .017 SLOPE= .0111

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.54	0.94	0.00	0.03
0.06	0.06	0.06	0.0	1.97	0.86	1.88	0.01	0.07
0.09	0.09	0.13	0.1	2.96	1.13	2.81	0.02	0.11
0.12	0.12	0.23	0.3	3.95	1.36	3.75	0.03	0.15
0.15	0.15	0.37	0.5	6.32	1.38	6.08	0.03	0.18
0.18	0.18	0.59	0.9	9.38	1.46	9.09	0.03	0.21
0.21	0.21	0.91	1.5	12.44	1.61	12.11	0.04	0.25
0.24	0.24	1.32	2.4	15.51	1.78	15.12	0.05	0.29
0.27	0.27	1.82	3.6	18.57	1.96	18.14	0.06	0.33
0.30	0.30	2.41	5.1	21.63	2.13	21.15	0.07	0.37
0.33	0.33	3.09	7.1	24.69	2.30	24.17	0.08	0.41
0.36	0.36	3.85	9.7	26.76	2.53	26.18	0.10	0.46
0.39	0.39	4.64	13.3	26.82	2.86	26.20	0.13	0.52
0.42	0.42	5.42	17.2	26.88	3.17	26.21	0.16	0.58
0.45	0.45	6.21	21.5	26.94	3.46	26.23	0.19	0.64
0.48	0.48	7.00	26.2	27.00	3.74	26.24	0.22	0.70
0.51	0.51	7.79	31.2	27.07	4.01	26.26	0.25	0.76
0.54	0.54	8.57	36.6	27.13	4.27	26.27	0.28	0.82
0.57	0.57	9.36	42.4	27.19	4.52	26.29	0.32	0.89
0.60	0.60	10.15	48.4	27.25	4.77	26.30	0.35	0.95
0.63	0.63	10.94	54.8	27.31	5.00	26.32	0.39	1.02
0.66	0.66	11.73	61.4	27.37	5.23	26.33	0.43	1.09
0.69	0.69	12.54	65.5	29.36	5.22	28.30	0.42	1.11
0.72	0.72	13.43	68.9	32.30	5.13	31.25	0.41	1.13
0.75	0.75	14.42	73.1	35.25	5.07	34.19	0.40	1.15
0.78	0.78	15.48	78.1	38.19	5.05	37.13	0.40	1.18
0.81	0.81	16.64	83.8	41.13	5.04	40.08	0.39	1.20
0.84	0.84	17.89	90.3	44.08	5.05	43.02	0.40	1.24
0.85	0.85	18.32	92.6	45.06	5.06	44.00	0.40	1.25

<0.52'
H/W ✓ OK

ROLL CURB



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ANALYSIS PT 4

CALLE SONRISA
~~STREET D~~

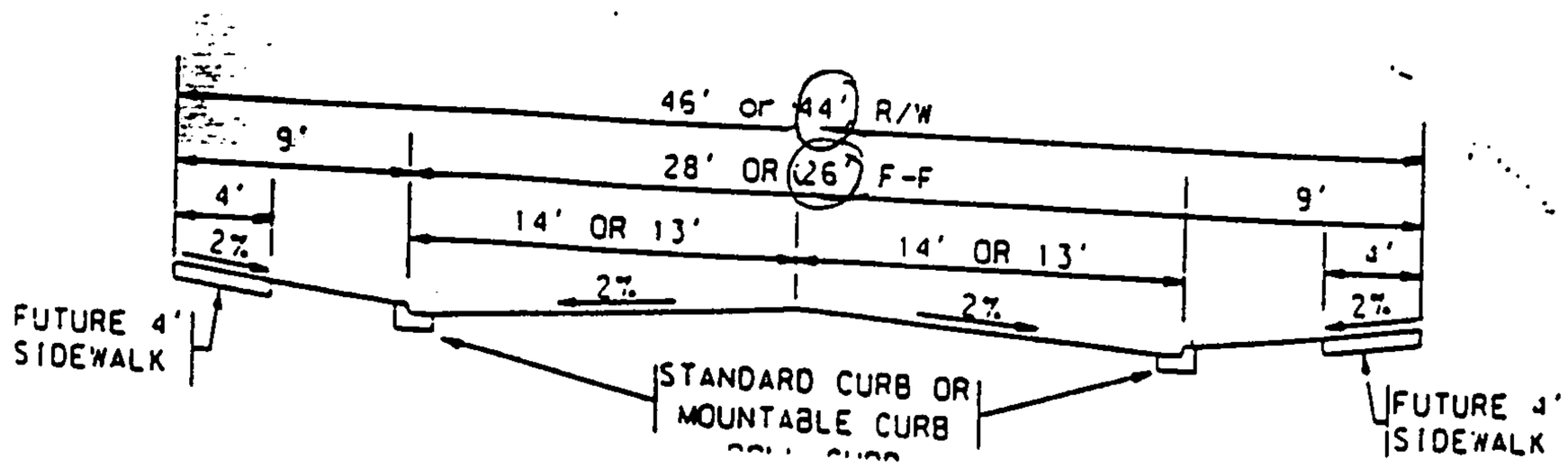
Q_{100} = 5.19 CFS

MANNING'S N= .017 SLOPE= .022

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.76	0.94	0.01	0.04
0.06	0.06	0.06	0.1	1.97	1.21	1.88	0.02	0.08
0.09	0.09	0.13	0.2	2.96	1.59	2.81	0.04	0.13
0.12	0.12	0.23	0.4	3.95	1.92	3.75	0.06	0.18
0.15	0.15	0.37	0.7	6.32	1.94	6.08	0.06	0.21
0.18	0.18	0.59	1.2	9.38	2.06	9.09	0.07	0.25
0.21	0.21	0.91	2.1	12.44	2.27	12.11	0.08	0.29
0.24	0.24	1.32	3.3	15.51	2.51	15.12	0.10	0.34
0.27	0.27	1.82	5.0	18.57	2.75	18.14	0.12	0.39
0.30	0.30	2.41	7.2	21.63	3.00	21.15	0.14	0.44
0.33	0.33	3.09	10.0	24.69	3.24	24.17	0.16	0.49
0.36	0.36	3.85	13.7	26.76	3.56	26.18	0.20	0.56
0.39	0.39	4.64	18.7	26.82	4.02	26.20	0.25	0.64
0.42	0.42	5.42	24.2	26.88	4.46	26.21	0.31	0.73
0.45	0.45	6.21	30.3	26.94	4.87	26.23	0.37	0.82
0.48	0.48	7.00	36.9	27.00	5.27	26.24	0.43	0.91
0.51	0.51	7.79	44.0	27.07	5.65	26.26	0.50	1.01
0.54	0.54	8.57	51.6	27.13	6.02	26.27	0.56	1.10
0.57	0.57	9.36	59.6	27.19	6.37	26.29	0.63	1.20
0.60	0.60	10.15	68.1	27.25	6.71	26.30	0.70	1.30
0.63	0.63	10.94	77.1	27.31	7.05	26.32	0.77	1.40
0.66	0.66	11.73	86.4	27.37	7.37	26.33	0.84	1.50
0.69	0.69	12.54	92.2	29.36	7.35	28.30	0.84	1.53
0.72	0.72	13.43	97.0	32.30	7.22	31.25	0.81	1.53
0.75	0.75	14.42	103.0	35.25	7.14	34.19	0.79	1.54
0.78	0.78	15.48	110.0	38.19	7.10	37.13	0.78	1.56
0.81	0.81	16.64	118.0	41.13	7.09	40.08	0.78	1.59
0.84	0.84	17.89	127.1	44.08	7.11	43.02	0.78	1.62
0.85	0.85	18.32	130.4	45.06	7.12	44.00	0.79	1.64

✓ OK
< 0.52'
R/W
ROLL CURB



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ANALYSIS PT 5

$Q_{100} = 8.50$ CFS

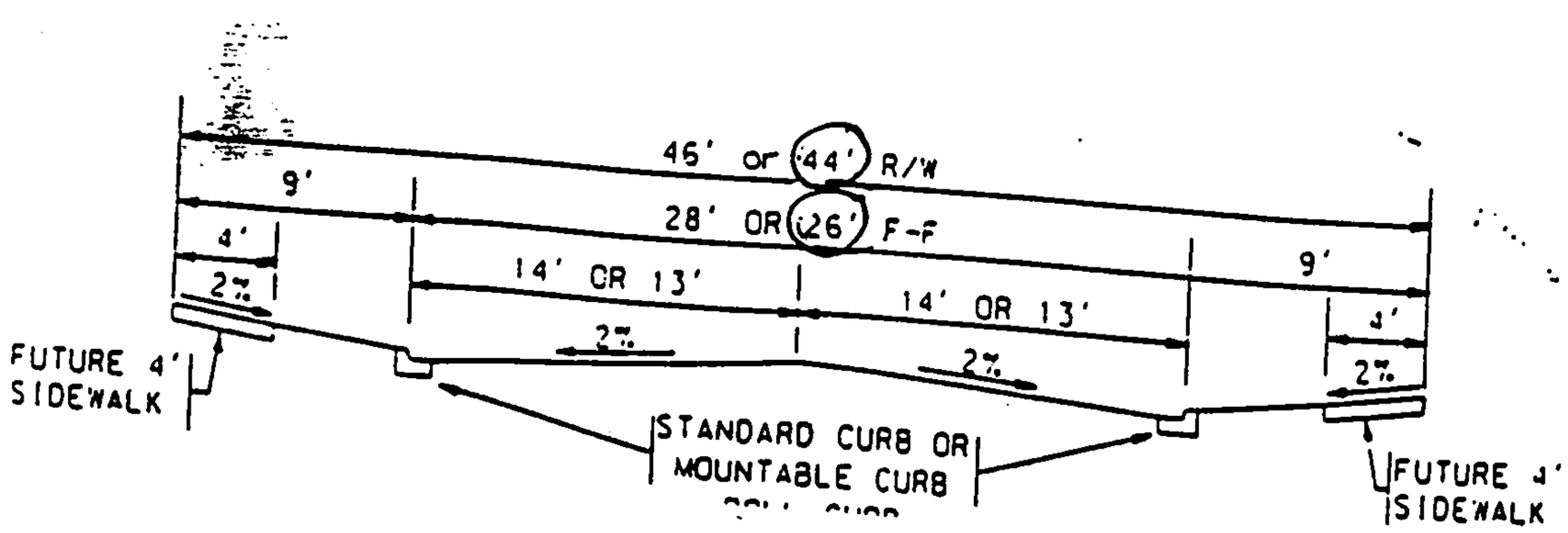
VISTA MONTE DR.

~~VISTA 18~~

MANNING'S N= .017 SLOPE= .01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.03	0.03	0.01	0.0	0.99	0.51	0.94	0.00	0.03	
0.06	0.06	0.06	0.0	1.97	0.82	1.88	0.01	0.07	
0.09	0.09	0.13	0.1	2.96	1.07	2.81	0.02	0.11	
0.12	0.12	0.23	0.3	3.95	1.30	3.75	0.03	0.15	
0.15	0.15	0.37	0.5	6.32	1.31	6.08	0.03	0.18	
0.18	0.18	0.59	0.8	9.38	1.39	9.09	0.03	0.21	
0.21	0.21	0.91	1.4	12.44	1.53	12.11	0.04	0.25	
0.24	0.24	1.32	2.2	15.51	1.69	15.12	0.04	0.28	
0.27	0.27	1.82	3.4	18.57	1.86	18.14	0.05	0.32	
0.30	0.30	2.41	4.9	21.63	2.02	21.15	0.06	0.36	✓ OK!
0.33	0.33	3.09	6.7	24.69	2.19	24.17	0.07	0.40	<0.52' R/W
0.36	0.36	3.85	9.3	26.76	2.40	26.18	0.09	0.45	
0.39	0.39	4.64	12.6	26.82	2.71	26.20	0.11	0.50	ROLL CURB
0.42	0.42	5.42	16.3	26.88	3.01	26.21	0.14	0.56	→ STANDARD
0.45	0.45	6.21	20.4	26.94	3.29	26.23	0.17	0.62	CURB
0.48	0.48	7.00	24.9	27.00	3.55	26.24	0.20	0.68	TRANSITION
0.51	0.51	7.79	29.7	27.07	3.81	26.26	0.23	0.74	
0.54	0.54	8.57	34.8	27.13	4.06	26.27	0.26	0.80	
0.57	0.57	9.36	40.2	27.19	4.29	26.29	0.29	0.86	
0.60	0.60	10.15	45.9	27.25	4.53	26.30	0.32	0.92	
0.63	0.63	10.94	52.0	27.31	4.75	26.32	0.35	0.98	
0.66	0.66	11.73	58.3	27.37	4.97	26.33	0.38	1.04	
0.69	0.69	12.54	62.2	29.36	4.96	28.30	0.38	1.07	
0.72	0.72	13.43	65.4	32.30	4.87	31.25	0.37	1.09	
0.75	0.75	14.42	69.4	35.25	4.82	34.19	0.36	1.11	
0.78	0.78	15.48	74.2	38.19	4.79	37.13	0.36	1.14	
0.81	0.81	16.64	79.6	41.13	4.78	40.08	0.36	1.17	
0.84	0.84	17.89	85.7	44.08	4.79	43.02	0.36	1.20	
0.85	0.85	18.32	87.9	45.06	4.80	44.00	0.36	1.21	



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ANALYSIS PT. 6

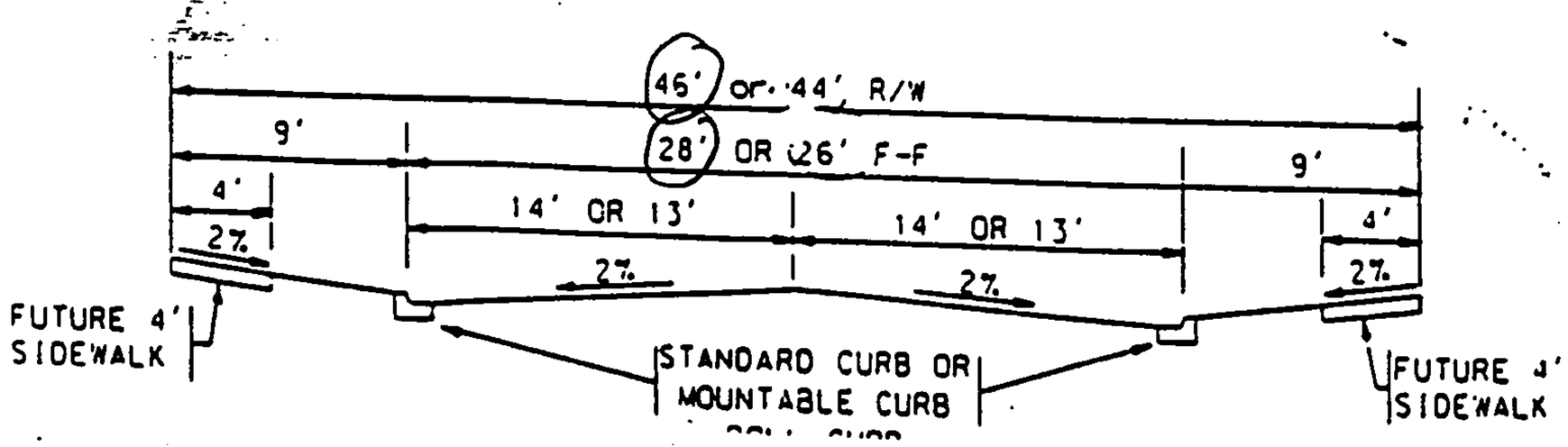
Q_{100} = 2.85 CFS

~~STREET B~~ CALLE ALMERIA

MANNING'S N= .017 SLOPE= .0185

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	23.00	0.37	9	46.00	0.85
2	8.83	0.67	6	35.00	0.13	10	0.00	0.00
3	9.00	0.00	7	37.00	0.00	11	0.00	0.00
4	11.00	0.13	8	37.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.03	0.03	0.01	0.0	0.99	0.70	0.94	0.01	0.04	
0.06	0.06	0.06	0.1	1.97	1.11	1.88	0.02	0.08	
0.09	0.09	0.13	0.2	2.96	1.45	2.81	0.03	0.12	
0.12	0.12	0.23	0.4	3.95	1.76	3.75	0.05	0.17	
0.15	0.15	0.37	0.7	6.32	1.78	6.08	0.05	0.20	
0.18	0.18	0.59	1.1	9.38	1.89	9.09	0.06	0.24	
0.21	0.21	0.91	1.9	12.44	2.08	12.11	0.07	0.28	✓ OK
0.24	0.24	1.32	3.0	15.51	2.30	15.12	0.08	0.32	< 0.52' R/W
0.27	0.27	1.82	4.6	18.57	2.53	18.14	0.10	0.37	
0.30	0.30	2.41	6.6	21.63	2.75	21.15	0.12	0.42	
0.33	0.33	3.09	9.2	24.69	2.97	24.17	0.14	0.47	TOP CURB
0.36	0.36	3.86	12.3	27.76	3.19	27.18	0.16	0.52	
0.39	0.39	4.70	16.7	28.82	3.55	28.20	0.20	0.59	
0.42	0.42	5.54	21.9	28.88	3.96	28.21	0.24	0.66	
0.45	0.45	6.39	27.8	28.94	4.34	28.23	0.29	0.74	
0.48	0.48	7.24	34.1	29.00	4.71	28.24	0.34	0.82	
0.51	0.51	8.09	41.0	29.07	5.07	28.26	0.40	0.91	
0.54	0.54	8.93	48.3	29.13	5.41	28.27	0.45	0.99	
0.57	0.57	9.78	56.1	29.19	5.74	28.29	0.51	1.08	
0.60	0.60	10.63	64.4	29.25	6.06	28.30	0.57	1.17	
0.63	0.63	11.48	73.1	29.31	6.36	28.32	0.63	1.26	
0.66	0.66	12.33	82.2	29.38	6.67	28.33	0.69	1.35	
0.69	0.69	13.20	88.2	31.36	6.68	30.30	0.69	1.38	
0.72	0.72	14.15	93.3	34.30	6.59	33.25	0.67	1.39	
0.75	0.75	15.20	99.4	37.25	6.54	36.19	0.66	1.41	
0.78	0.78	16.32	106.5	40.19	6.52	39.13	0.66	1.44	
0.81	0.81	17.54	114.5	43.13	6.53	42.08	0.66	1.47	
0.84	0.84	18.85	123.5	46.08	6.55	45.02	0.67	1.51	
0.85	0.85	19.30	126.7	47.06	6.56	46.00	0.67	1.52	



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ANALYSIS PT 7

Q_{100} = 10.63 CFS

~~STREET B~~ CALLE ALMERIA

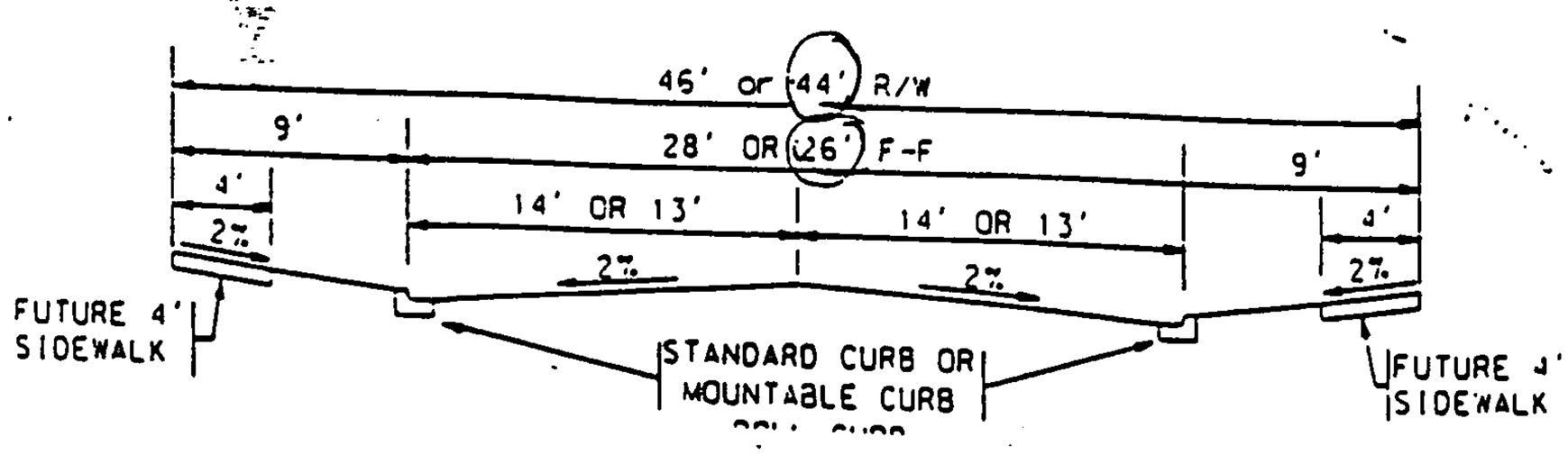
MANNING'S N= .017 SLOPE= .0185

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	23.00	0.37	9	46.00	0.85
2	8.83	0.67	6	35.00	0.13	10	0.00	0.00
3	9.00	0.00	7	37.00	0.00	11	0.00	0.00
4	11.00	0.13	8	37.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.70	0.94	0.01	0.04
0.06	0.06	0.06	0.1	1.97	1.11	1.88	0.02	0.08
0.09	0.09	0.13	0.2	2.96	1.45	2.81	0.03	0.12
0.12	0.12	0.23	0.4	3.95	1.76	3.75	0.05	0.17
0.15	0.15	0.37	0.7	6.32	1.78	6.08	0.05	0.20
0.18	0.18	0.59	1.1	9.38	1.89	9.09	0.06	0.24
0.21	0.21	0.91	1.9	12.44	2.08	12.11	0.07	0.28
0.24	0.24	1.32	3.0	15.51	2.30	15.12	0.08	0.32
0.27	0.27	1.82	4.6	18.57	2.53	18.14	0.10	0.37
0.30	0.30	2.41	6.6	21.63	2.75	21.15	0.12	0.42
0.33	0.33	3.09	9.2	24.69	2.97	24.17	0.14	0.47
0.36	0.36	3.86	12.3	27.76	3.19	27.18	0.16	0.52
0.39	0.39	4.70	16.7	28.82	3.55	28.20	0.20	0.59
0.42	0.42	5.54	21.9	28.88	3.96	28.21	0.24	0.66
0.45	0.45	6.39	27.8	28.94	4.34	28.23	0.29	0.74
0.48	0.48	7.24	34.1	29.00	4.71	28.24	0.34	0.82
0.51	0.51	8.09	41.0	29.07	5.07	28.26	0.40	0.91
0.54	0.54	8.93	48.3	29.13	5.41	28.27	0.45	0.99
0.57	0.57	9.78	56.1	29.19	5.74	28.29	0.51	1.08
0.60	0.60	10.63	64.4	29.25	6.06	28.30	0.57	1.17
0.63	0.63	11.48	73.1	29.31	6.36	28.32	0.63	1.26
0.66	0.66	12.33	82.2	29.38	6.67	28.33	0.69	1.35
0.69	0.69	13.20	88.2	31.36	6.68	30.30	0.69	1.38
0.72	0.72	14.15	93.3	34.30	6.59	33.25	0.67	1.39
0.75	0.75	15.20	99.4	37.25	6.54	36.19	0.66	1.41
0.78	0.78	16.32	106.5	40.19	6.52	39.13	0.66	1.44
0.81	0.81	17.54	114.5	43.13	6.53	42.08	0.66	1.47
0.84	0.84	18.85	123.5	46.08	6.55	45.02	0.67	1.51
0.85	0.85	19.30	126.7	47.06	6.56	46.00	0.67	1.52

OK'
$V \leq 0.52'$
R/W

ROLL CURB →
STANDARD
CURB TRANS



A-3-2

P:\99493\cdp\hydro\46-1.85%.txt

ANALYSIS PT. B
Q100 = 21.37 CFS

CALLE ALMERIA
~~STREET B~~-2

MANNING'S N= .017 SLOPE= .0068

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.42	0.94	0.00	0.03
0.06	0.06	0.06	0.0	1.97	0.67	1.88	0.01	0.07
0.09	0.09	0.13	0.1	2.96	0.88	2.81	0.01	0.10
0.12	0.12	0.23	0.2	3.95	1.07	3.75	0.02	0.14
0.15	0.15	0.37	0.4	6.32	1.08	6.08	0.02	0.17
0.18	0.18	0.59	0.7	9.38	1.14	9.09	0.02	0.20
0.21	0.21	0.91	1.1	12.44	1.26	12.11	0.02	0.23
0.24	0.24	1.32	1.8	15.51	1.39	15.12	0.03	0.27
0.27	0.27	1.82	2.8	18.57	1.53	18.14	0.04	0.31
0.30	0.30	2.41	4.0	21.63	1.67	21.15	0.04	0.34
0.33	0.33	3.09	5.6	24.69	1.80	24.17	0.05	0.38
0.36	0.36	3.85	7.6	26.76	1.98	26.18	0.06	0.42
0.39	0.39	4.64	10.4	26.82	2.24	26.20	0.08	0.47
0.42	0.42	5.42	13.5	26.88	2.48	26.21	0.10	0.52
0.45	0.45	6.21	16.8	26.94	2.71	26.23	0.11	0.56
0.48	0.48	7.00	20.5	27.00	2.93	26.24	0.13	0.61
0.51	0.51	7.79	24.5	27.07	3.14	26.26	0.15	0.66
0.54	0.54	8.57	28.7	27.13	3.34	26.27	0.17	0.71
0.57	0.57	9.36	33.2	27.19	3.54	26.29	0.19	0.76
0.60	0.60	10.15	37.9	27.25	3.73	26.30	0.22	0.82
0.63	0.63	10.94	42.9	27.31	3.92	26.32	0.24	0.87
0.66	0.66	11.73	48.1	27.37	4.10	26.33	0.26	0.92
0.69	0.69	12.54	51.3	29.36	4.09	28.30	0.26	0.95
0.72	0.72	13.43	53.9	32.30	4.02	31.25	0.25	0.97
0.75	0.75	14.42	57.3	35.25	3.97	34.19	0.24	0.99
0.78	0.78	15.48	61.1	38.19	3.95	37.13	0.24	1.02
0.81	0.81	16.64	65.6	41.13	3.94	40.08	0.24	1.05
0.84	0.84	17.89	70.7	44.08	3.95	43.02	0.24	1.08
0.85	0.85	18.32	72.5	45.06	3.96	44.00	0.24	1.09

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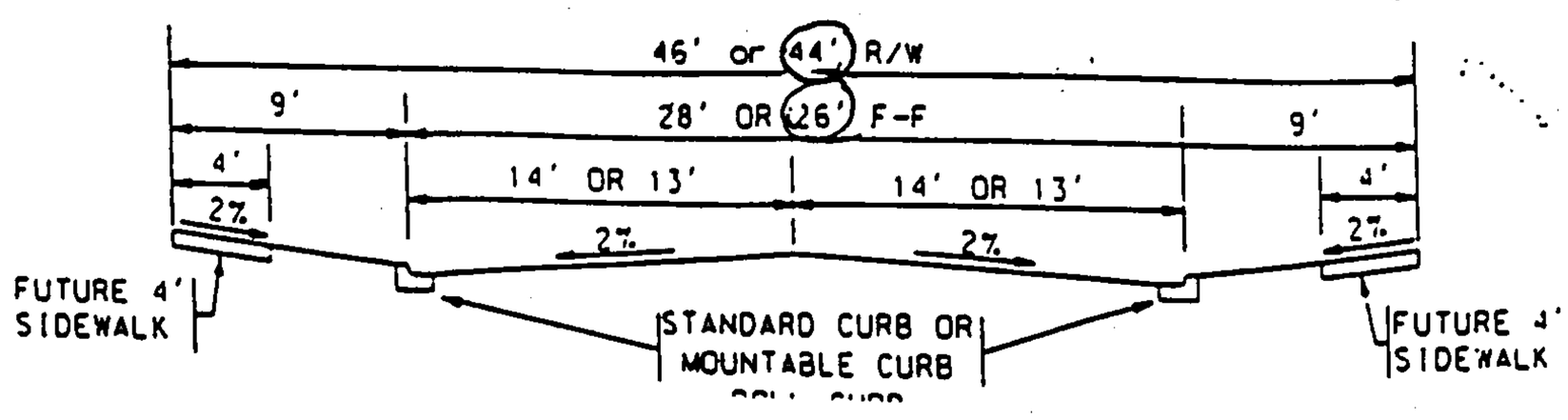


A3-9

ANALYSIS Pt 7

Q_{100} = 10.63 CFS

~~STREET B~~ CALLE ALMERIA

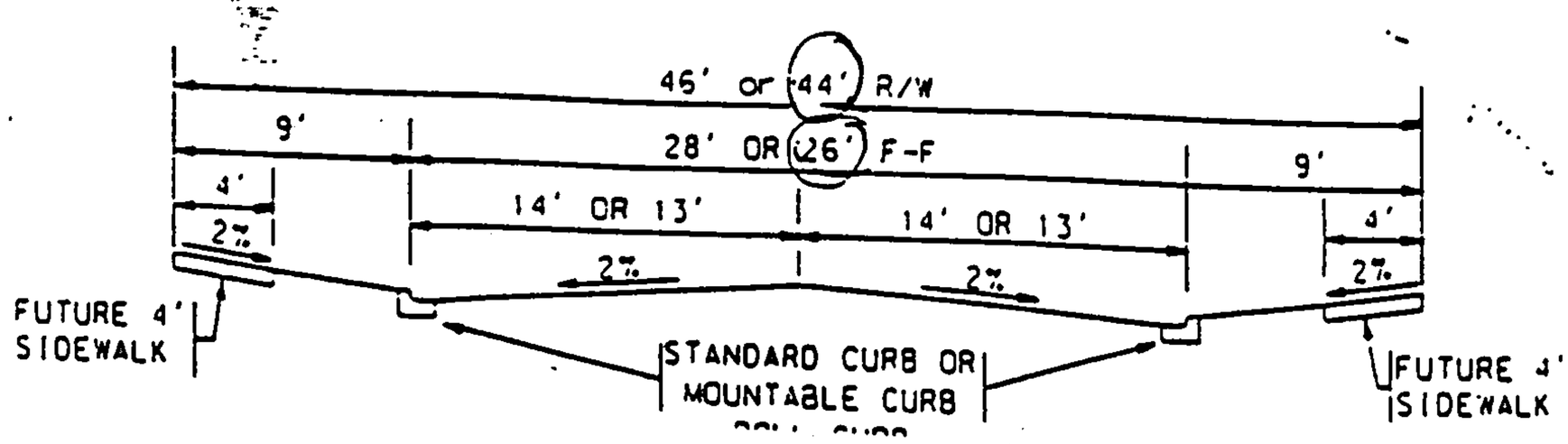
MANNING'S N= .017 SLOPE= .0185

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	23.00	0.37	9	46.00	0.85
*** 2	8.83	0.67	6	35.00	0.13	10	0.00	0.00
3	9.00	0.00	7	37.00	0.00	11	0.00	0.00
4	11.00	0.13	8	37.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.70	0.94	0.01	0.04
0.06	0.06	0.06	0.1	1.97	1.11	1.88	0.02	0.08
0.09	0.09	0.13	0.2	2.96	1.45	2.81	0.03	0.12
0.12	0.12	0.23	0.4	3.95	1.76	3.75	0.05	0.17
0.15	0.15	0.37	0.7	6.32	1.78	6.08	0.05	0.20
0.18	0.18	0.59	1.1	9.38	1.89	9.09	0.06	0.24
0.21	0.21	0.91	1.9	12.44	2.08	12.11	0.07	0.28
0.24	0.24	1.32	3.0	15.51	2.30	15.12	0.08	0.32
0.27	0.27	1.82	4.6	18.57	2.53	18.14	0.10	0.37
0.30	0.30	2.41	6.6	21.63	2.75	21.15	0.12	0.42
0.33	0.33	3.09	9.2	24.69	2.97	24.17	0.14	0.47
0.36	0.36	3.86	12.3	27.76	3.19	27.18	0.16	0.52
0.39	0.39	4.70	16.7	28.82	3.55	28.20	0.20	0.59
0.42	0.42	5.54	21.9	28.88	3.96	28.21	0.24	0.66
0.45	0.45	6.39	27.8	28.94	4.34	28.23	0.29	0.74
0.48	0.48	7.24	34.1	29.00	4.71	28.24	0.34	0.82
0.51	0.51	8.09	41.0	29.07	5.07	28.26	0.40	0.91
0.54	0.54	8.93	48.3	29.13	5.41	28.27	0.45	0.99
0.57	0.57	9.78	56.1	29.19	5.74	28.29	0.51	1.08
0.60	0.60	10.63	64.4	29.25	6.06	28.30	0.57	1.17
0.63	0.63	11.48	73.1	29.31	6.36	28.32	0.63	1.26
0.66	0.66	12.33	82.2	29.38	6.67	28.33	0.69	1.35
0.69	0.69	13.20	88.2	31.36	6.68	30.30	0.69	1.38
0.72	0.72	14.15	93.3	34.30	6.59	33.25	0.67	1.39
0.75	0.75	15.20	99.4	37.25	6.54	36.19	0.66	1.41
0.78	0.78	16.32	106.5	40.19	6.52	39.13	0.66	1.44
0.81	0.81	17.54	114.5	43.13	6.53	42.08	0.66	1.47
0.84	0.84	18.85	123.5	46.08	6.55	45.02	0.67	1.51
0.85	0.85	19.30	126.7	47.06	6.56	46.00	0.67	1.52

OK'
V ≤ 0.52'
R/W

ROLL CURB →
STANDARD
CURB TRANS



A-3-2

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ANALYSIS PT. 9

Q_{100} = 7.00 CFS

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

TRACT J ANALYSIS PT 9 VISTA MONTE DR.

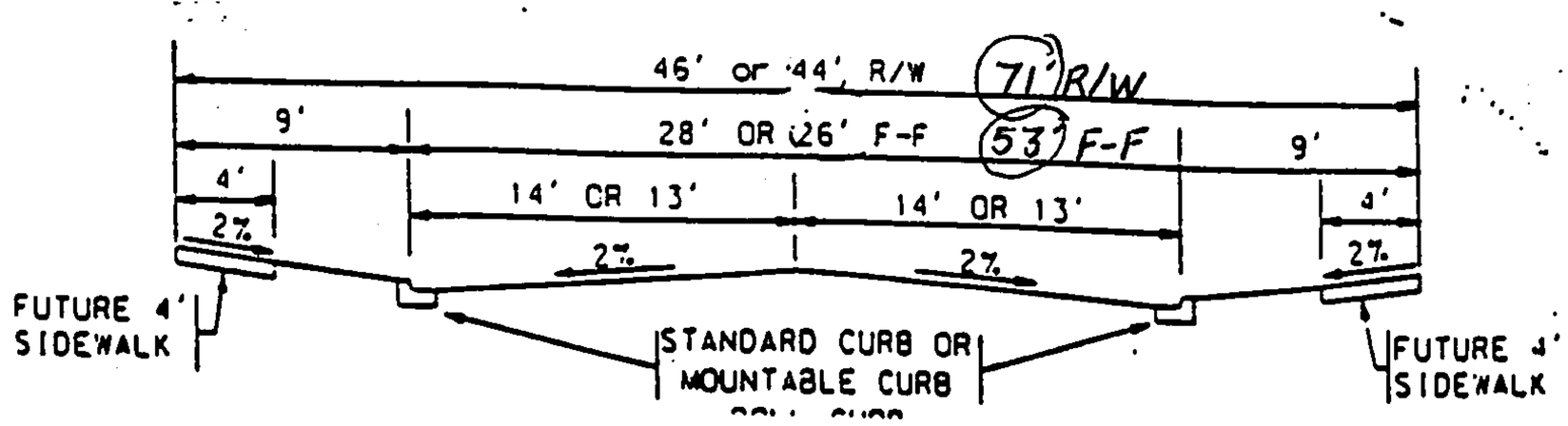
MANNING'S N= .017 SLOPE= .01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	35.50	0.53	9	71.00	0.85
2	8.83	0.67	6	60.00	0.13	10	0.00	0.00
3	9.00	0.00	7	62.00	0.00	11	0.00	0.00
4	11.00	0.13	8	62.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.51	0.94	0.00	0.03
0.06	0.06	0.06	0.0	1.97	0.82	1.88	0.01	0.07
0.09	0.09	0.13	0.1	2.96	1.07	2.81	0.02	0.11
0.12	0.12	0.23	0.3	3.95	1.30	3.75	0.03	0.15
0.15	0.15	0.37	0.5	6.77	1.26	6.53	0.02	0.17
0.18	0.18	0.62	0.8	10.51	1.33	10.22	0.03	0.21
0.21	0.21	0.98	1.4	14.24	1.47	13.91	0.03	0.24
0.24	0.24	1.46	2.4	17.98	1.64	17.60	0.04	0.28
0.27	0.27	2.04	3.7	21.72	1.81	21.29	0.05	0.32
0.30	0.30	2.73	5.4	25.46	1.97	24.98	0.06	0.36
0.33	0.33	3.54	7.6	29.19	2.14	28.67	0.07	0.40
0.36	0.36	4.45	10.3	32.93	2.30	32.36	0.08	0.44
0.39	0.39	5.48	13.5	36.67	2.46	36.05	0.09	0.48
0.42	0.42	6.62	17.3	40.40	2.62	39.74	0.11	0.53
0.45	0.45	7.86	21.8	44.14	2.77	43.43	0.12	0.57
0.48	0.48	9.22	26.9	47.88	2.92	47.12	0.13	0.61
0.51	0.51	10.69	32.7	51.62	3.06	50.81	0.15	0.66
0.54	0.54	12.26	39.8	54.13	3.25	53.27	0.16	0.70
0.57	0.57	13.86	48.8	54.19	3.52	53.29	0.19	0.76
0.60	0.60	15.46	58.5	54.25	3.79	53.30	0.22	0.82
0.63	0.63	17.06	68.9	54.31	4.04	53.32	0.25	0.88
0.66	0.66	18.66	80.0	54.38	4.28	53.33	0.29	0.95
0.69	0.69	20.28	89.7	56.36	4.42	55.30	0.30	0.99
0.72	0.72	21.98	99.2	59.30	4.51	58.25	0.32	1.04
0.75	0.75	23.78	109.4	62.25	4.60	61.19	0.33	1.08
0.78	0.78	25.65	120.4	65.19	4.69	64.13	0.34	1.12
0.81	0.81	27.62	132.3	68.14	4.79	67.08	0.36	1.17
0.84	0.84	29.68	144.9	71.08	4.88	70.02	0.37	1.21
0.85	0.85	30.38	149.3	72.06	4.92	71.00	0.38	1.23

✓ OK

< 0.82' R/W



A-3-2

ANALYSIS PT. 10

Q_{100} = 5.73 CFS

Tract J

~~STREET E~~ CALLE LAGUNA

MANNING'S N= .017 SLOPE= .006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	22.00	0.35	9	44.00	0.85
2	8.83	0.67	6	33.00	0.13	10	0.00	0.00
3	9.00	0.00	7	35.00	0.00	11	0.00	0.00
4	11.00	0.13	8	35.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.40	0.94	0.00	0.03
0.06	0.06	0.06	0.0	1.97	0.63	1.88	0.01	0.07
0.09	0.09	0.13	0.1	2.96	0.83	2.81	0.01	0.10
0.12	0.12	0.23	0.2	3.95	1.00	3.75	0.02	0.14
0.15	0.15	0.37	0.4	6.32	1.01	6.08	0.02	0.17
0.18	0.18	0.59	0.6	9.38	1.07	9.09	0.02	0.20
0.21	0.21	0.91	1.1	12.44	1.19	12.11	0.02	0.23
0.24	0.24	1.32	1.7	15.51	1.31	15.12	0.03	0.27
0.27	0.27	1.82	2.6	18.57	1.44	18.14	0.03	0.30
0.30	0.30	2.41	3.8	21.63	1.57	21.15	0.04	0.34
0.33	0.33	3.09	5.2	24.69	1.69	24.17	0.04	0.37
0.36	0.36	3.85	7.2	26.76	1.86	26.18	0.05	0.41
0.39	0.39	4.64	9.8	26.82	2.10	26.20	0.07	0.46
0.42	0.42	5.42	12.6	26.88	2.33	26.21	0.08	0.50
0.45	0.45	6.21	15.8	26.94	2.55	26.23	0.10	0.55
0.48	0.48	7.00	19.3	27.00	2.75	26.24	0.12	0.60
0.51	0.51	7.79	23.0	27.07	2.95	26.26	0.14	0.65
0.54	0.54	8.57	26.9	27.13	3.14	26.27	0.15	0.69
0.57	0.57	9.36	31.1	27.19	3.33	26.29	0.17	0.74
0.60	0.60	10.15	35.6	27.25	3.51	26.30	0.19	0.79
0.63	0.63	10.94	40.3	27.31	3.68	26.32	0.21	0.84
0.66	0.66	11.73	45.1	27.37	3.85	26.33	0.23	0.89
0.69	0.69	12.54	48.2	29.36	3.84	28.30	0.23	0.92
0.72	0.72	13.43	50.7	32.30	3.77	31.25	0.22	0.94
0.75	0.75	14.42	53.8	35.25	3.73	34.19	0.22	0.97
0.78	0.78	15.48	57.4	38.19	3.71	37.13	0.21	0.99
0.81	0.81	16.64	61.6	41.13	3.70	40.08	0.21	1.02
0.84	0.84	17.89	66.4	44.08	3.71	43.02	0.21	1.05
0.85	0.85	18.32	68.1	45.06	3.72	44.00	0.21	1.06

< 0.52' R/W

✓ ROLL CURB OK.

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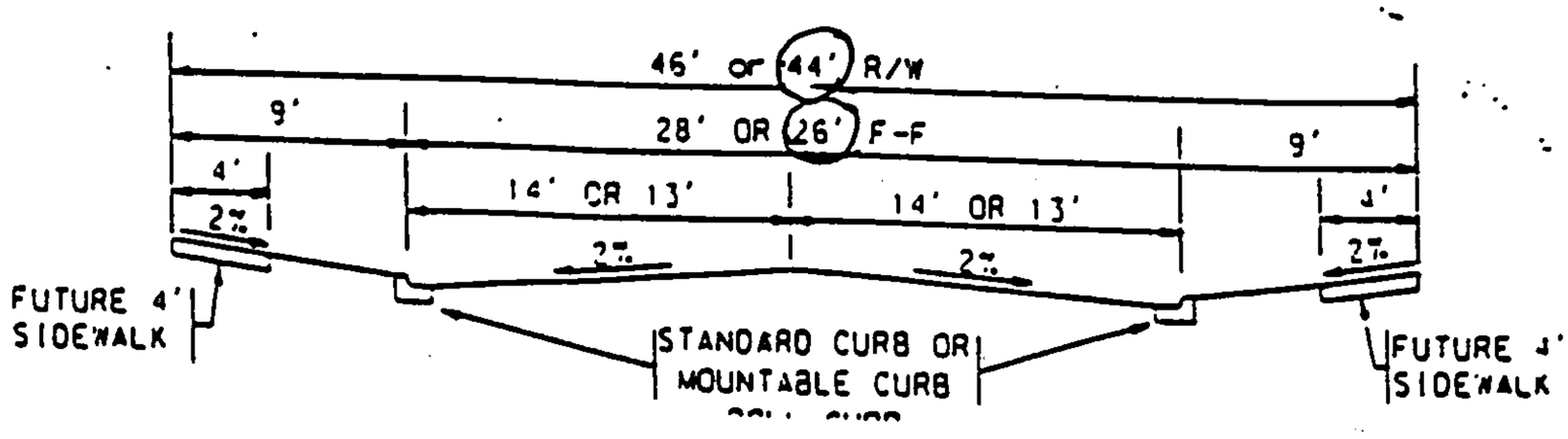


A3-11

ANALYSIS PT 11
Q_{100} = 13.75CFS

VISTA-11 VISTA MONTE DR.

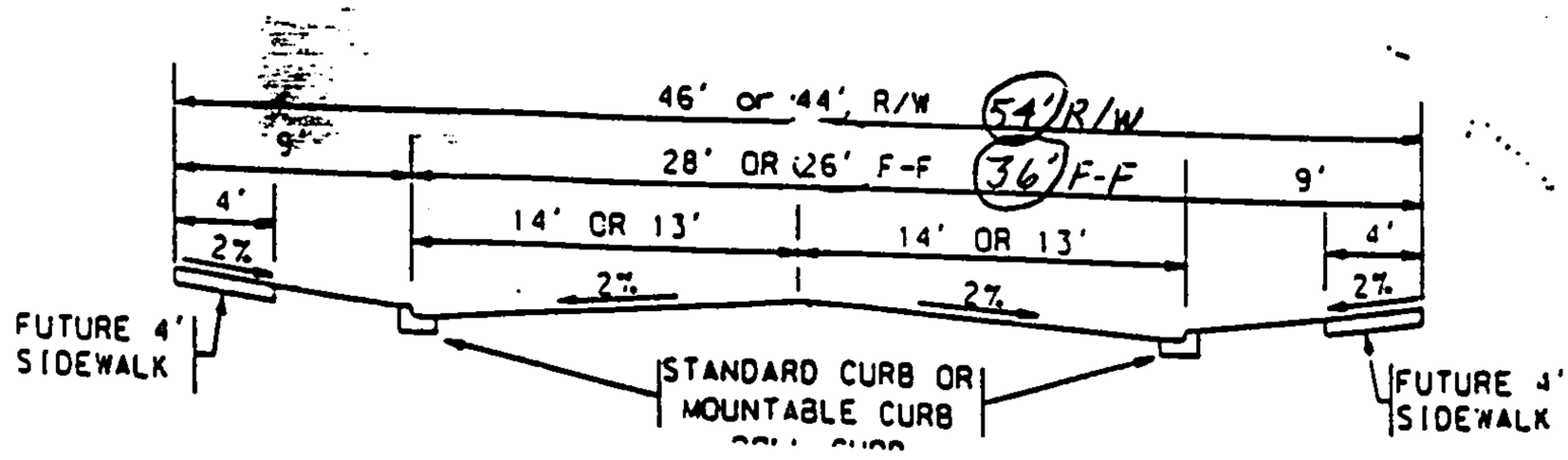
MANNING'S N= .017 SLOPE= .0175

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	27.00	0.45	9	54.00	0.85
2	8.83	0.67	6	43.00	0.13	10	0.00	0.00
3	9.00	0.00	7	45.00	0.00	11	0.00	0.00
4	11.00	0.13	8	45.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.68	0.94	0.01	0.04
0.06	0.06	0.06	0.1	1.97	1.08	1.88	0.02	0.08
0.09	0.09	0.13	0.2	2.96	1.41	2.81	0.03	0.12
0.12	0.12	0.23	0.4	3.95	1.71	3.75	0.05	0.17
0.15	0.15	0.37	0.6	6.32	1.73	6.08	0.05	0.20
0.18	0.18	0.59	1.1	9.38	1.84	9.09	0.05	0.23
0.21	0.21	0.91	1.8	12.44	2.02	12.11	0.06	0.27
0.24	0.24	1.32	3.0	15.51	2.24	15.12	0.08	0.32
0.27	0.27	1.82	4.5	18.57	2.46	18.14	0.09	0.36
0.30	0.30	2.41	6.4	21.63	2.68	21.15	0.11	0.41
0.33	0.33	3.09	8.9	24.69	2.89	24.17	0.13	0.46
0.36	0.36	3.86	12.0	27.76	3.10	27.18	0.15	0.51
0.39	0.39	4.72	15.6	30.82	3.31	30.20	0.17	0.56
0.42	0.42	5.67	19.9	33.88	3.51	33.21	0.19	0.61
0.45	0.45	6.71	24.9	36.94	3.71	36.23	0.21	0.66
0.48	0.48	7.80	31.9	37.01	4.09	36.24	0.26	0.74
0.51	0.51	8.89	39.7	37.07	4.46	36.26	0.31	0.82
0.54	0.54	9.97	48.0	37.13	4.81	36.27	0.36	0.90
0.57	0.57	11.06	57.0	37.19	5.15	36.29	0.41	0.98
0.60	0.60	12.15	66.6	37.25	5.48	36.30	0.47	1.07
0.63	0.63	13.24	76.7	37.31	5.80	36.32	0.52	1.15
0.66	0.66	14.33	87.5	37.38	6.10	36.33	0.58	1.24
0.69	0.69	15.44	95.7	39.36	6.20	38.30	0.60	1.29
0.72	0.72	16.63	103.2	42.30	6.21	41.25	0.60	1.32
0.75	0.75	17.92	111.7	45.25	6.23	44.19	0.60	1.35
0.78	0.78	19.28	121.1	48.19	6.28	47.13	0.61	1.39
0.81	0.81	20.74	131.4	51.14	6.34	50.08	0.62	1.43
0.84	0.84	22.29	142.7	54.08	6.40	53.02	0.64	1.48
0.85	0.85	22.82	146.7	55.06	6.43	54.00	0.64	1.49

<0.82' V OK R/W

STANDARD CURB



A-3-2

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Sump 2 Q_{100} = 14.28 CFS

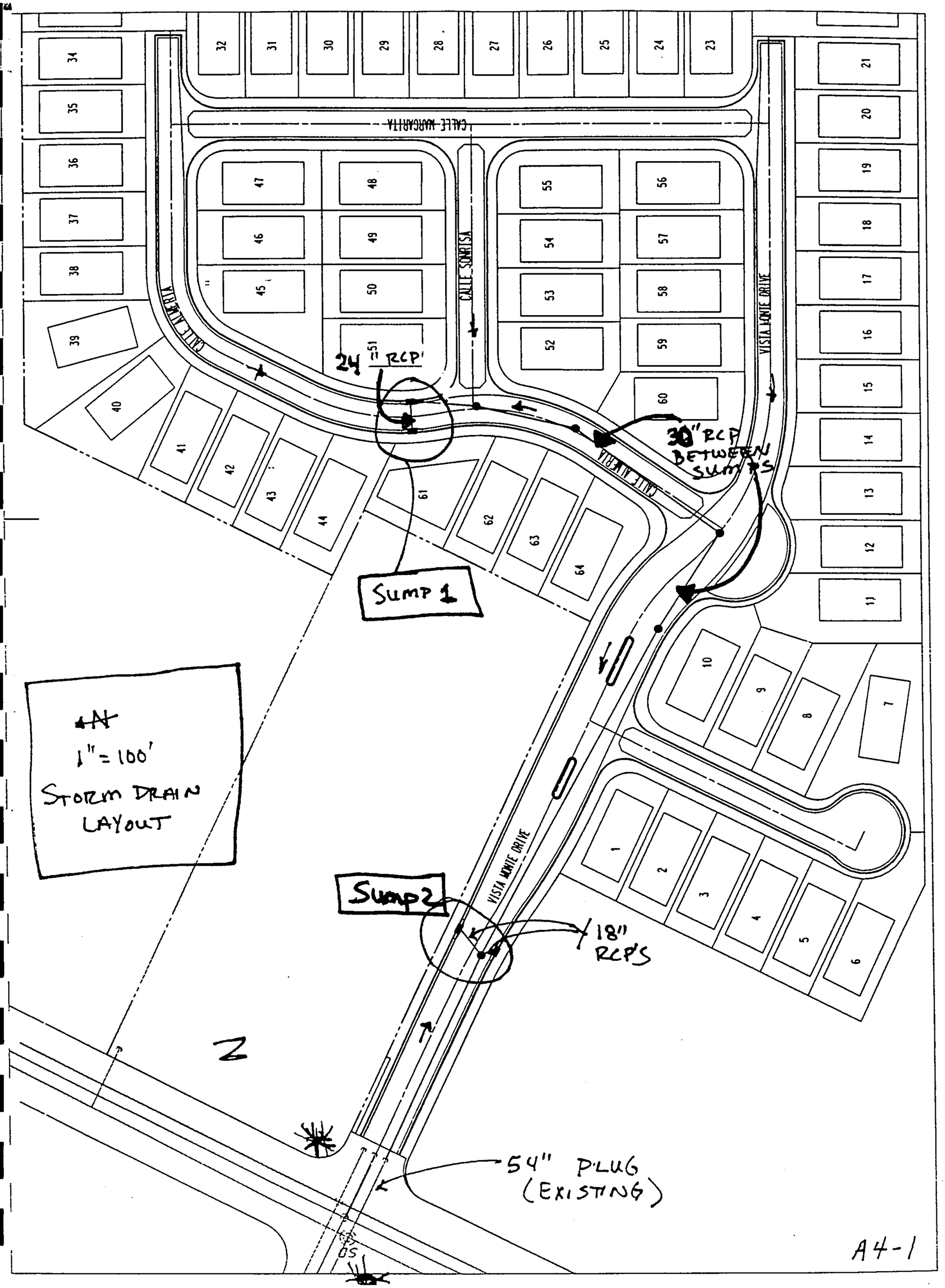
VISTA-11

MANNING'S N= .017 SLOPE= .0175

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.85	5	27.00	0.45	9	54.00	0.85
2	8.83	0.67	6	43.00	0.13	10	0.00	0.00
3	9.00	0.00	7	45.00	0.00	11	0.00	0.00
4	11.00	0.13	8	45.17	0.67	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.03	0.03	0.01	0.0	0.99	0.68	0.94	0.01	0.04
0.06	0.06	0.06	0.1	1.97	1.08	1.88	0.02	0.08
0.09	0.09	0.13	0.2	2.96	1.41	2.81	0.03	0.12
0.12	0.12	0.23	0.4	3.95	1.71	3.75	0.05	0.17
0.15	0.15	0.37	0.6	6.32	1.73	6.08	0.05	0.20
0.18	0.18	0.59	1.1	9.38	1.84	9.09	0.05	0.23
0.21	0.21	0.91	1.8	12.44	2.02	12.11	0.06	0.27
0.24	0.24	1.32	3.0	15.51	2.24	15.12	0.08	0.32
0.27	0.27	1.82	4.5	18.57	2.46	18.14	0.09	0.36
0.30	0.30	2.41	6.4	21.63	2.68	21.15	0.11	0.41
0.33	0.33	3.09	8.9	24.69	2.89	24.17	0.13	0.46
0.36	0.36	3.86	12.0	27.76	3.10	27.18	0.15	0.51
0.39	0.39	4.72	15.6	30.82	3.31	30.20	0.17	0.56
0.42	0.42	5.67	19.9	33.88	3.51	33.21	0.19	0.61
0.45	0.45	6.71	24.9	36.94	3.71	36.23	0.21	0.66
0.48	0.48	7.80	31.9	37.01	4.09	36.24	0.26	0.74
0.51	0.51	8.89	39.7	37.07	4.46	36.26	0.31	0.82
0.54	0.54	9.97	48.0	37.13	4.81	36.27	0.36	0.90
0.57	0.57	11.06	57.0	37.19	5.15	36.29	0.41	0.98
0.60	0.60	12.15	66.6	37.25	5.48	36.30	0.47	1.07
0.63	0.63	13.24	76.7	37.31	5.80	36.32	0.52	1.15
0.66	0.66	14.33	87.5	37.38	6.10	36.33	0.58	1.24
0.69	0.69	15.44	95.7	39.36	6.20	38.30	0.60	1.29
0.72	0.72	16.63	103.2	42.30	6.21	41.25	0.60	1.32
0.75	0.75	17.92	111.7	45.25	6.23	44.19	0.60	1.35
0.78	0.78	19.28	121.1	48.19	6.28	47.13	0.61	1.39
0.81	0.81	20.74	131.4	51.14	6.34	50.08	0.62	1.43
0.84	0.84	22.29	142.7	54.08	6.40	53.02	0.64	1.48
0.85	0.85	22.82	146.7	55.06	6.43	54.00	0.64	1.49

✓ OK
< 0.82' F/W
STANDARD CURB


CALLE MARGARITA
CALLE ALTAMIRA
CALLE SONRISA
VISTA MONTE DRIVE
24" RCP
30" RCP BETWEEN SUMPS
SUMP 1
SUMP 2
18" RCP'S
54" PLUG (EXISTING)
1" = 100'
STORM DRAIN LAYOUT
A4-1

Sump 1 - Grate Sizing Calculations
STA 3+92.04
FL @ sump = 47.16

TC = 47.83
Grate = 46.93

head from grate to top of curb = 10¾" = 0.89'

2 - Double Winged Grates

$Q_{100\ TOTAL}$ = 32 CFS

DESIGNED FOR 2Q100

Double A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.):	7.7977431
Length of Weir (feet):	7.9791667
Orifice Coeficient	0.6
Weir Coeficient	3

Head (ft)	Head (in)	1 Wing Weir Q (cfs)	Grate Weir Q (cfs)	Grate Orifice Q (cfs)	Control Q Sgl Wing (cfs)	Control Q Dbl Wing (cfs)
0.05	0.6	0.13	0.27	8.40	0.40	0.54
0.1	1.2	0.38	0.76	11.87	1.14	1.52
0.15	1.8	0.70	1.39	14.54	2.09	2.78
0.2	2.4	1.07	2.14	16.79	3.21	4.29
0.25	3	1.50	2.99	18.77	4.49	5.99
0.3	3.6	1.97	3.93	20.56	5.91	7.88
0.35	4.2	2.48	4.96	22.21	7.44	9.93
0.4	4.8	3.04	6.06	23.75	9.09	12.13
0.45	5.4	3.62	7.23	25.19	10.85	14.47
0.5	6	4.24	8.46	26.55	12.71	16.95
0.55	6.6	4.89	9.76	27.84	14.66	19.55
0.6	7.2	5.58	11.13	29.08	16.70	22.28
0.65	7.8	6.29	12.54	30.27	18.83	25.12
0.667	8.0	6.54	13.04	30.66	19.58	26.11
0.7	8.4	7.03	14.02	31.41	21.05	28.08
0.75	9	7.79	15.55	32.52	23.34	31.14
0.8	9.6	8.59	17.13	33.58	25.71	34.30
0.85	10.2	9.40	18.76	34.62	28.16	37.57
0.9	10.8	10.25	20.44	35.62	30.68	40.93 CFS
0.95	11.4	11.11	22.16	36.60	33.28	44.39
1	12	12.00	23.94	37.55	35.94	47.94
1.05	12.6	12.91	25.76	38.47	38.67	51.58
1.1	13.2	13.84	27.62	39.38	41.46	55.31
1.15	13.8	14.80	29.52	40.26	44.32	59.12
0.567	6.804	5.12	10.22	28.27	15.34	20.47

Capacity for Grate

Calculation of open area:

Total Grate Area	2000	13.888889
Cross Bar Area	-732	-5.083333
Supports (ends)	-115.625	-0.802951
(middle)	-100	-0.694444
Areas Counted Twice	70.5	0.4895833
	1122.875	7.7977431

Calculation of Length of Weir:

Total Perimeter of Grate	130	10.833333
Short Cross Bars	-7	-0.583333
Bearing Bars	-13	-1.083333
End Supports	-9.25	-0.770833
Middle Supports	-5	-0.416667
	110	7.9791667

Size each grate for 2 Q100 = 32.0 CFS / grate

Capacity of each double winged double 'A' grate is 40.93 CFS > 32.0 ✓ OK.

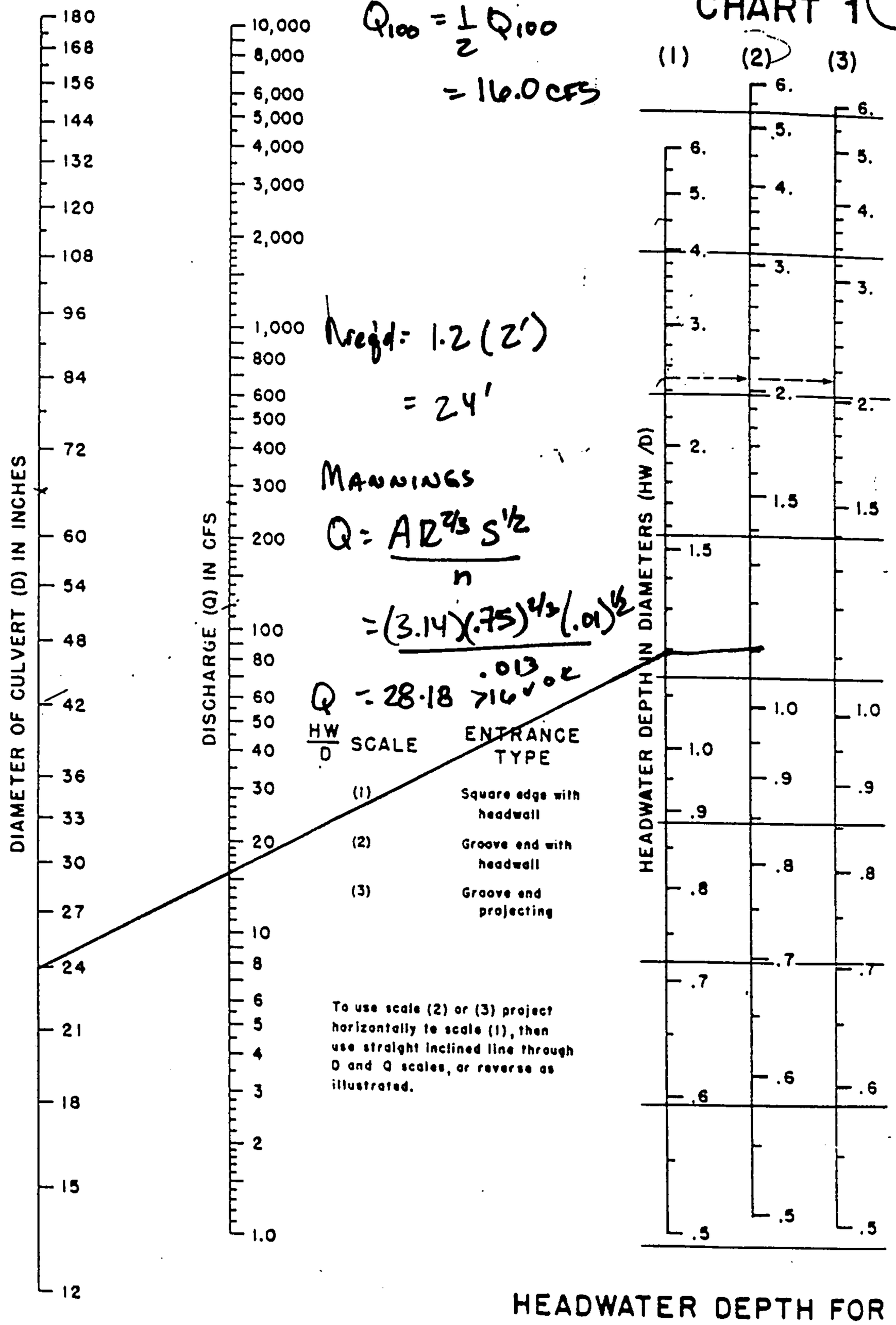
H4-2

24" PIPE
BETWEEN INLETS @ SUMP 1

CHART 1

$Q_{100} = \frac{1}{2} Q_{100}$

$= 16.0$ CFS



Hreqd = 1.2 (2')

= 24'

MANNINGS

$Q = \frac{A R^{2/3} S^{1/2}}{n}$

$= \frac{(3.14)(.75)^{2/3}(.01)^{1/2}}{.013}$

$Q = 28.18 > 16 \checkmark$ OK

HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN 1963

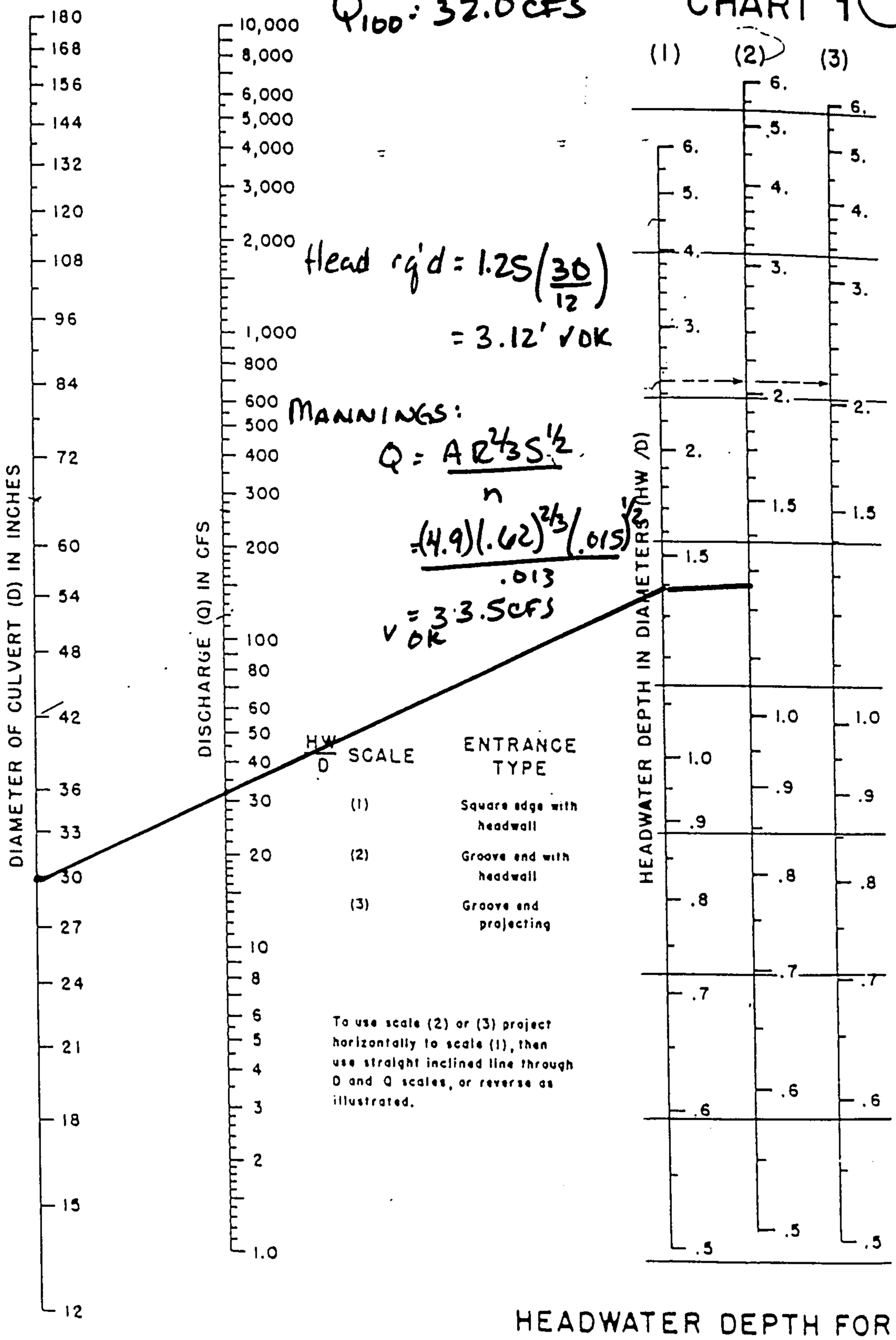
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

A4-3

30" PIPE BETWEEN SUMPS

Q_{100}: 32.0 CFS

CHART 1



HEADWATER SCALES 2 & 3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

A4-4

EACH GRATES REQUIRED Q = 7.14 CFS

Single A inlet, in sump condition with curb openings on both sides:

Open Area (for orifice calc in sq. ft.): 3.9314236

Length of Weir (feet): 11.354167

HEAD = DIST. FROM GRATE TO TOP OF CURB = 10 3/4" = 0.89'

Head (ft)	Head (in)	Weir Q	Orifice Q	Control Q
0.05	0.6	0.34	4.23	0.34
0.1	1.2	0.96	5.99	0.96
0.15	1.8	1.77	7.33	1.77
0.2	2.4	2.72	8.47	2.72
0.25	3	3.80	9.46	3.80
0.3	3.6	5.00	10.37	5.00
0.35	4.2	6.30	11.20	6.30
0.4	4.8	7.70	11.97	7.70
0.45	5.4	9.19	12.70	9.19
0.5	6	10.76	13.39	10.76
0.55	6.6	12.41	14.04	12.41
0.6	7.2	14.14	14.66	14.14
0.65	7.8	15.95	15.26	15.26
0.7	8.4	17.82	15.84	15.84
0.75	9	19.76	16.39	16.39
0.8	9.6	21.77	16.93	16.93
0.85	10.2	23.85	17.45	17.45
0.9	**10.8**	**25.98**	**17.96**	**17.96**
0.95	11.4	28.18	18.45	18.45
1	12	30.43	18.93	18.93

A SINGLE TYPE A DOUBLE WINGED GRATE IS SUFFICIENT

GRATE SIZING
SUMP 2

Q_{100} = 14.28 CFS w/ EMERGENCY OVERFLOW INTO VISTA DEL MAR DRIVE

Calculation of open area:

	(in^2)	(ft^2)
Total Grate Area	1000	6.9444444
Cross Bar Area	-366	-2.541667
Supports (ends)	-115.625	-0.802951
Areas Counted Twice	47.75	0.3315972
	566.125	3.9314236

Calculation of Length of Weir:

	(in)	(ft)
Total Perimeter of Grate	90	7.5
Short Cross Bars	-3.5	-0.291667
End Supports	-9.25	-0.770833
Bearing Bars	-13	-1.083333
Curb Openings	72	6
	136.25	11.354167

Q_{100} FROM EACH INLET TO MANHOLE = 7.14 CFS

INLET CONTROLED

PIPE SIZING
SUMP 2
BETWEEN INLETS

CULVERT PROGRAM

18 INCH DIAMETER PIPE

Manning's N= .013 Increment= .5 in.SLP= .015

FLOW DEPTH INCHES	FLOW AREA SQ. FT.	DISCHARGE CFS	VELOCITY FPS.
0.50	0.01	0.02	1.27
1.00	0.04	0.08	2.00
1.50	0.07	0.18	2.60
2.00	0.11	0.34	3.12
2.50	0.15	0.53	3.59
3.00	0.19	0.78	4.01
3.50	0.24	1.06	4.40
4.00	0.29	1.39	4.76
4.50	0.35	1.76	5.10
5.00	0.40	2.17	5.41
5.50	0.46	2.61	5.71
6.00	0.52	3.08	5.98
6.50	0.58	3.59	6.24
7.00	0.64	4.12	6.48
7.50	0.70	4.67	6.70
8.00	0.76	5.24	6.91
8.50	0.82	5.83	7.10
9.00	0.88	6.43	7.28
9.50	0.95	7.04	7.44
10.00	1.01	7.66	7.60
10.50	1.07	8.27	7.73
11.00	1.13	8.89	7.85
11.50	1.19	9.49	7.96
12.00	1.25	10.08	8.06
12.50	1.31	10.66	8.14
13.00	1.37	11.21	8.20
13.50	1.42	11.73	8.25
14.00	1.47	12.22	8.28
14.50	1.53	12.66	8.30
15.00	**1.57**	**13.05**	**8.29**
15.50	**1.62**	**13.38**	**8.27**
16.00	1.66	13.63	8.21
16.50	1.70	13.80	8.13
17.00	1.73	13.83	8.00
17.50	1.75	13.69	7.81
18.00	1.77	12.87	7.28

DEPTH OF WATER IN PIPE = .52"

Velocity = 7.5 FT/SEC

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36" PIPE OUT OF SUBDIVISION

$Q_{100} = 36 + 14.28$

$= 50.82$ CFS

CULVERT PROGRAM

36 INCH DIAMETER PIPE

Manning's N= .013 Increment= 1 in.SLP= .02

FLOW DEPTH INCHES	FLOW AREA SQ. FT.	DISCHARGE CFS	VELOCITY FPS.
1.00	0.06	0.13	2.33
2.00	0.15	0.57	3.67
3.00	0.28	1.34	4.77
4.00	0.43	2.46	5.72
5.00	0.59	3.91	6.58
6.00	0.77	5.70	7.36
7.00	0.97	7.80	8.07
8.00	1.17	10.22	8.73
9.00	1.38	12.92	9.35
10.00	1.60	15.90	9.92
11.00	1.83	19.14	10.46
12.00	2.06	22.61	10.96
13.00	2.30	26.30	11.43
14.00	2.54	30.18	11.87
15.00	2.79	34.24	12.28
16.00	3.04	38.43	12.66
17.00	3.28	42.75	13.02
18.00	3.53	47.16	13.34
19.00	3.78	51.64	13.65
20.00	4.03	56.15	13.92
21.00	4.28	60.67	14.17
22.00	4.53	65.16	14.40
23.00	4.77	69.60	14.60
24.00	5.01	73.94	14.77
25.00	5.24	78.15	14.92
26.00	5.47	82.19	15.04
27.00	5.69	86.01	15.13
28.00	5.90	89.58	15.18
29.00	6.10	92.82	15.21
30.00	6.29	95.69	15.20
31.00	6.47	98.10	15.15
32.00	6.64	99.97	15.06
33.00	6.79	101.15	14.90
34.00	6.91	101.44	14.67
35.00	7.01	100.37	14.31
36.00	7.07	94.33	13.34

Velocity = 13.4 ft/s

EAST SWALE\

MANNING'S N= .03 SLOPE= .02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	3	7.66	0.00			
2	0.33	0.00	4	8.00	1.00			

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.10	0.10	0.74	1.1	7.54	1.49	7.40	0.03	0.13
0.20	**0.20**	**1.48**	**3.4**	**7.75**	**2.32**	**7.46**	**0.08**	**0.28**
0.30	**0.30**	**2.23**	**6.7**	**7.96**	**3.00**	**7.53**	**0.14**	**0.44**
0.40	0.40	2.99	10.7	8.17	3.58	7.60	0.20	0.60
0.50	0.50	3.75	15.4	8.38	4.10	7.66	0.26	0.76
0.60	0.60	4.52	20.6	8.60	4.56	7.73	0.32	0.92
0.70	0.70	5.30	26.4	8.81	4.99	7.80	0.39	1.09
0.80	0.80	6.08	32.7	9.02	5.39	7.87	0.45	1.25
0.90	0.90	6.87	39.5	9.23	5.75	7.93	0.51	1.41
1.00	1.00	7.66	46.7	9.44	6.10	8.00	0.58	1.58

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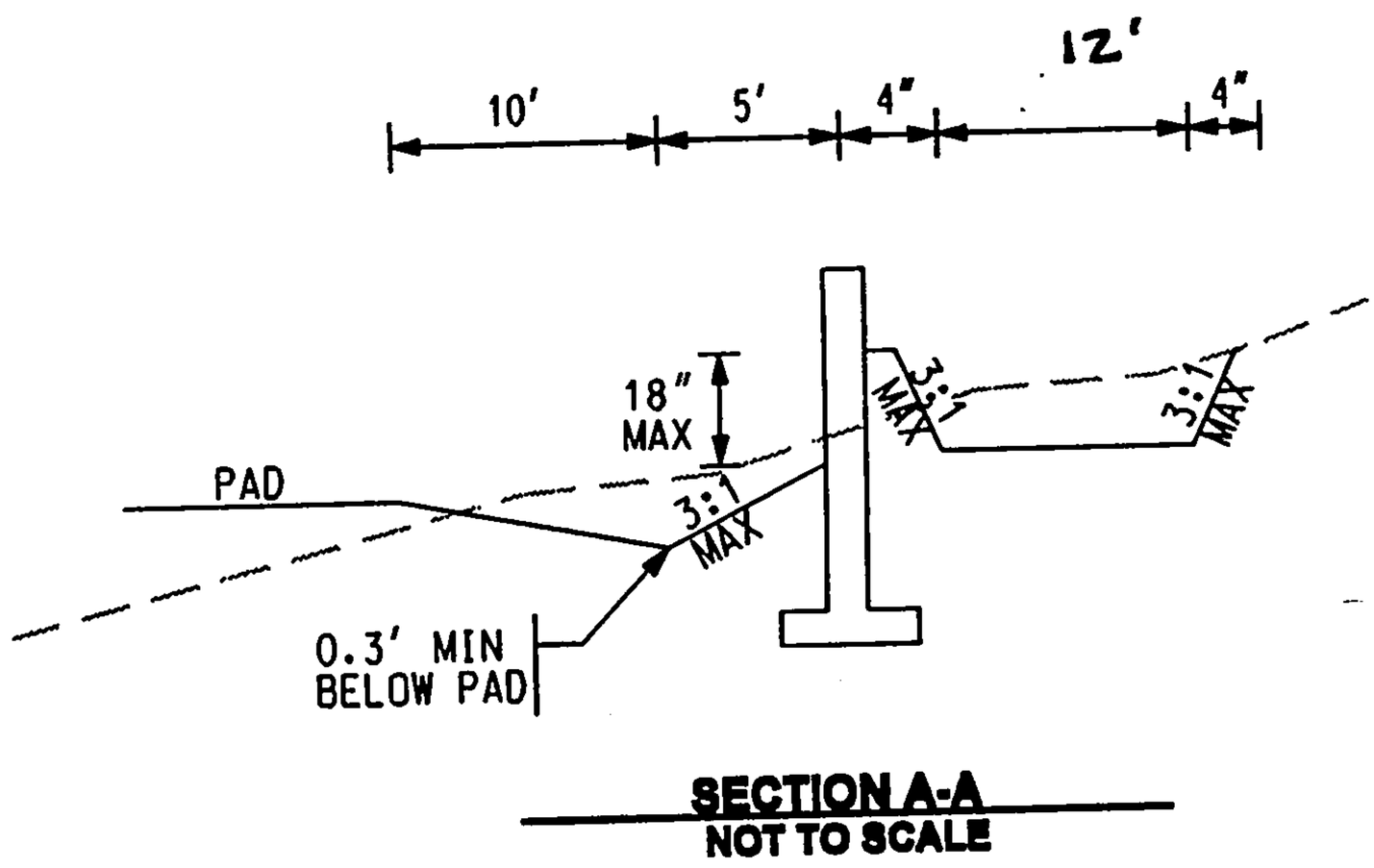
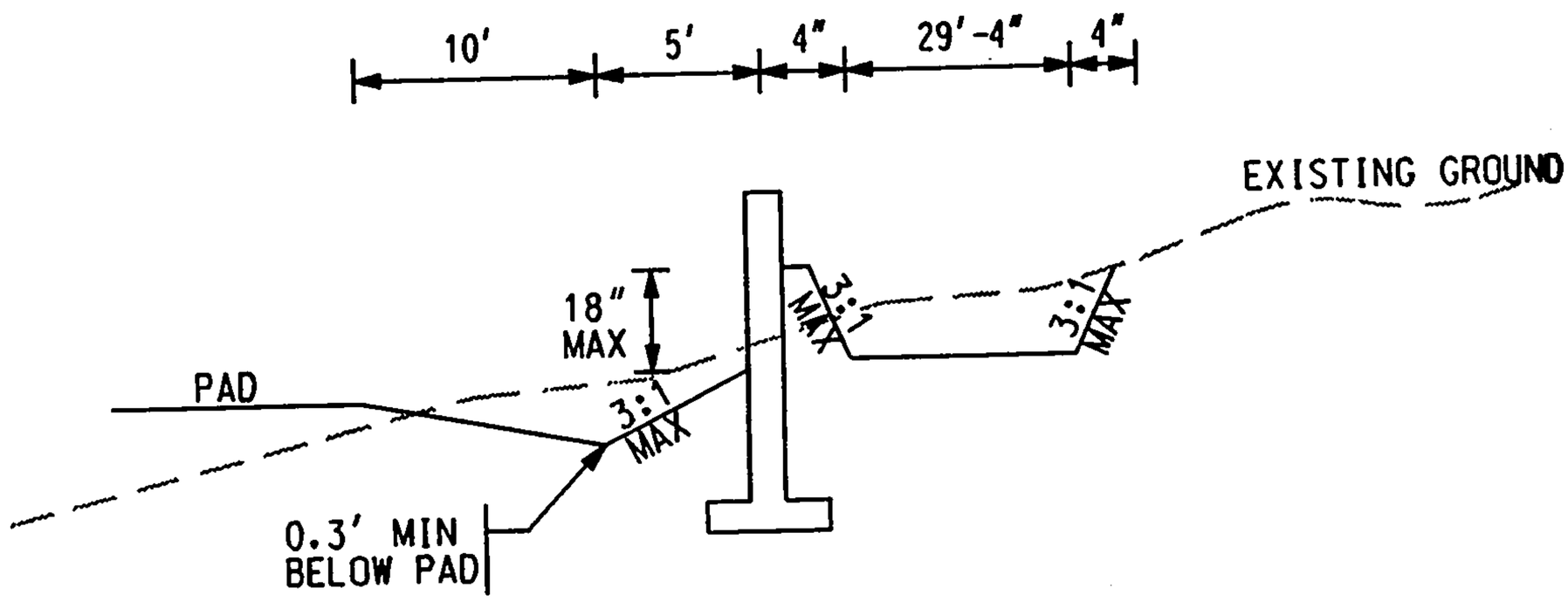


SOUTH SWALE

MANNING'S N= .03 SLOPE= .016

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	3	29.67	0.00			
2	0.33	0.00	4	30.00	1.00			

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.10	0.10	2.94	3.9	29.55	1.34	29.41	0.03	0.13
0.20	0.20	5.88	12.5	29.76	2.13	29.47	0.07	0.27
0.30	**0.30**	**8.83**	**24.5**	**29.97**	**2.77**	**29.54**	**0.12**	**0.42**
0.40	0.40	11.79	39.5	30.18	3.35	29.60	0.17	0.57
0.50	0.50	14.75	57.1	30.39	3.87	29.67	0.23	0.73
0.60	0.60	17.72	77.1	30.60	4.35	29.74	0.29	0.89
0.70	0.70	20.70	99.5	30.81	4.81	29.80	0.36	1.06
0.80	0.80	23.68	123.9	31.02	5.23	29.87	0.43	1.23
0.90	0.90	26.67	150.4	31.24	5.64	29.93	0.49	1.39
1.00	1.00	29.67	178.8	31.45	6.03	30.00	0.56	1.56



SECTION B-B
NOT TO SCALE

Descansado del Norte Subdivision
OFF-SITE BASIN (OS-2)
DESILTATION BASIN CALCULATIONS
6-2-99

SEDIMENT YIELD ANALYSIS FOR UPSTREAM BASINS

METHOD (UNIVERSAL SOIL LOSS EQUATION)

DESCRIPTION	VARIABLE	UNIT		AP1
Basin				1
Drainage Area	DA	Sq. Mi.		0.0203
Slope	S	Ft/Ft		0.0100
Slope Angle	THETA	Radians		0.0100
	L	Feet		230.000
Inverse Tangent of Slope				
Rainfall	R			25.000
Soil Erodability*	K			0.170
Slope Length Factor	LS			0.180
Cover*	C			0.170
Support Practice Factor	P			1.000
Sediment Yield	A	Tons/Acre		0.130
		Tons		1.690
		Cy		1.317
Estimated Soil Unit Weight	95.000 Lbs/Cf		Adjustment Factor	3
			Adjusted Sediment Yield	3.95
			Total Annual Sediment Yield (CF)	**107**

NOTES: 1. The Universal Soil Loss Equation typically underestimates the actual sediment yield by 3 times so a factor of 3 is applied to the total annual sediment yield.
2. Soil type and unit weight based on Vista del Norte Drainage Report by Parson Brinkerhoff, June 18, 1998

* Soil Erodability based on Fine Sand

A5-3

DESILTATION BASIN DESIGN

ESTIMATED ANNUAL SOIL

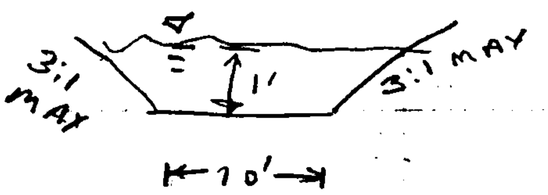
GIVEN: SETTELING VELOCITY = 0.009 ft/sec

Q_{100} (OFFSITE Z) = 24.44 CFS

POND DEPTH = 1 FT.

POND LENGTH = 200 FT (SAME INVERT ELEVATION)

DESIGN BASIN: :



AREA = 10 FT², VOLUME ≈ 2000 FT³

$$\text{VELOCITY} = \frac{Q}{A} = \frac{24.44\ \text{FT}^3/\text{SEC}}{10\ \text{FT}^2} = 2.4\ \text{FT/S}$$

$$\text{TIME TO SETTLE} = \frac{\text{LENGTH}}{\text{Velocity}} = \frac{200\ \text{FT}}{2.4\ \text{FT/SEC}} = 83\ \text{SECONDS}$$

WORST CASE - PARTICLE AT 1' ABOVE INVERT @ ENTRANCE TO BASIN

DISPLACEMENT IN Y DIRECTION = (SETTLING VELOCITY)(time)

= (0.009 ft/s)(83 SEC)

= 0.75' ↓ < OVERFLOW ELEVATION (SEE GRADING PLAN)

CONCLUSION: WATER CAN ENTER VISTA DEL NORTE DRIVE FREE OF SEDIMENT.

Bohannan ▲ Huston

PROJECT NAME TRACT 5 SHEET 1 OF

PROJECT NO. 99493A02 BY CG DATE 5/26/99

SUBJECT DESILTATION BASIN CH'D DATE

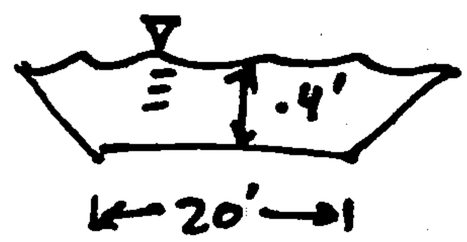
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

A5-4

DESILTATION BASIN 2 DESIGN

GIVEN: SETTLING VELOCITY = 0.009 ft/SEC
POND DEPTH = 0.4'
POND LENGH = 20'
Q_{100} = 3.34 CFS

DESIGN BASIN =



AREA = 8 FT², VOL = 160 FT³

$$\text{VELOCITY} = \frac{Q}{A} = \frac{3.34\,\text{CFS}}{8\,\text{FT}^2} = 0.42\,\text{FT/S}$$

$$\text{TIME TO SETTLE} = \frac{\text{LENGTH}}{\text{VELOCITY}} = \frac{20'}{0.42\,\text{FT/sec}} = 47.9\,\text{sec}$$

PARTICLE @ 0.4' ABOVE INVERT @ ENTRANCE:

DISPLACEMENT IN Y DIRECTION = (SETTLING VELOCITY)(TIME)
= (0.009 FT/S)(47.9 sec)
= 0.4' ≤ DESIGN DEPTH

CONCLUSION: WATER CAN ENTER VISTA DEL NORTE DRIVE UPSTREAM OF CATCH BASIN FREE OF SEDIMENT.

Bohannan ▲ Huston

PROJECT NAME _____ SHEET _____ OF _____
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

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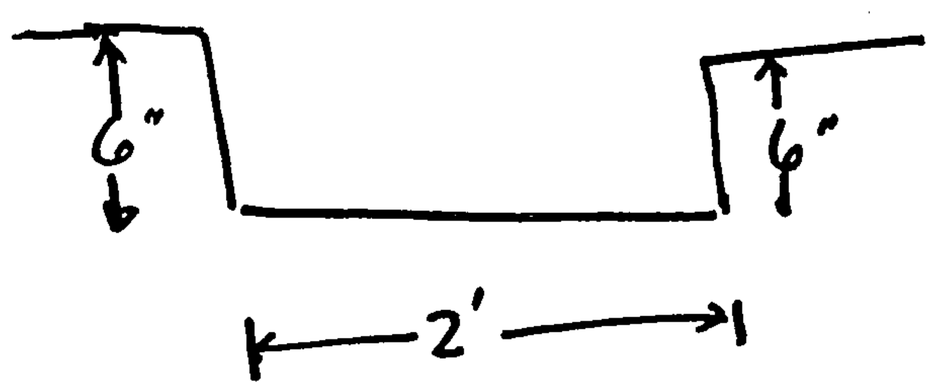
U-Ditch Sizing Calculation

MANNING'S N= .013 SLOPE= .02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	2.00	0.00			
2	0.10	0.00	4	2.10	0.50			

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.10	0.10	0.19	0.6	2.10	3.28	1.94	0.17	0.27
0.20	0.20	0.39	1.9	2.31	4.92	1.98	0.38	0.58
0.30	0.30	0.59	3.6	2.51	6.14	2.02	0.59	0.89
0.40	0.40	0.79	5.6	2.72	7.11	2.06	0.78	1.18
0.50	0.50	1.00	7.9	2.92	7.91	2.10	0.97	1.47