FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

March 25, 1986

Philip Clark
Espey, Huston & Associates
4801 Indian School Road, NE Suite 204
Albuquerque, New Mexico 87110

RE: DRAINAGE REPORT SUBMITTAL OF AMBER PLACE SUBDIVISION
RECEIVED MARCH 7, 1986 FOR PRELIMINARY PLAT AND GRADING
PERMIT APPROVAL (G-13/D12)

Dear Philip:

The above referenced submittal, dated March 6, 1986, is approved for Preliminary Plat, contingent upon an approved vacation action through DRB for the 16' access easement along the west property line. Prior to Final Plat sign-off by the City Engineer, an executed Subdivision Improvements Agreement is required.

Permits to construct within public right-of-ways will be required for the sidewalk culverts into Candelaria Road.

The Grading Plan for Rough Grading Permit can be approved after Preliminary Plat is approved by DRB. If desired, bring in the mylars of the Grading Plan for Hydrology's approval signature. A Topsoil Disturbance Permit will be required from Environmental Health and should be noted on drawings.

If you have any questions regarding this project, call me at 766-7644.

Cordially,

Roger A. Green, PE

Roger A. Green, P.E.
C.E./Design Hydrology

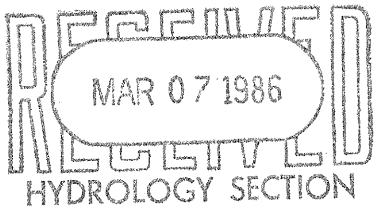
cc: Brennan Construction

RAG/bsj

ESPEY,
HUSTON &
ASSOCIATES, INC.
Engineering & Environmental Consultants

EH&A Job No. 7525

DRAINAGE REPORT FOR AMBER PLACE SUBDIVISION



Prepared for:

BRENNAN CONSTRUCTION CO., INC.
1705 CAMINO GUSTO NW
ALBUQUERQUE, NEW MEXICO 87107

January, 1986
Revised March 1986
per Hydrology Comments

4801 Indian School Rd., N.E., Suite 204 · Albuquerque, New Mexico 87110 · (505) 255-1625

TABLE OF CONTENTS

LIST OF FIGURES AND EXHIBITS

PURPOSE AND SCOPE

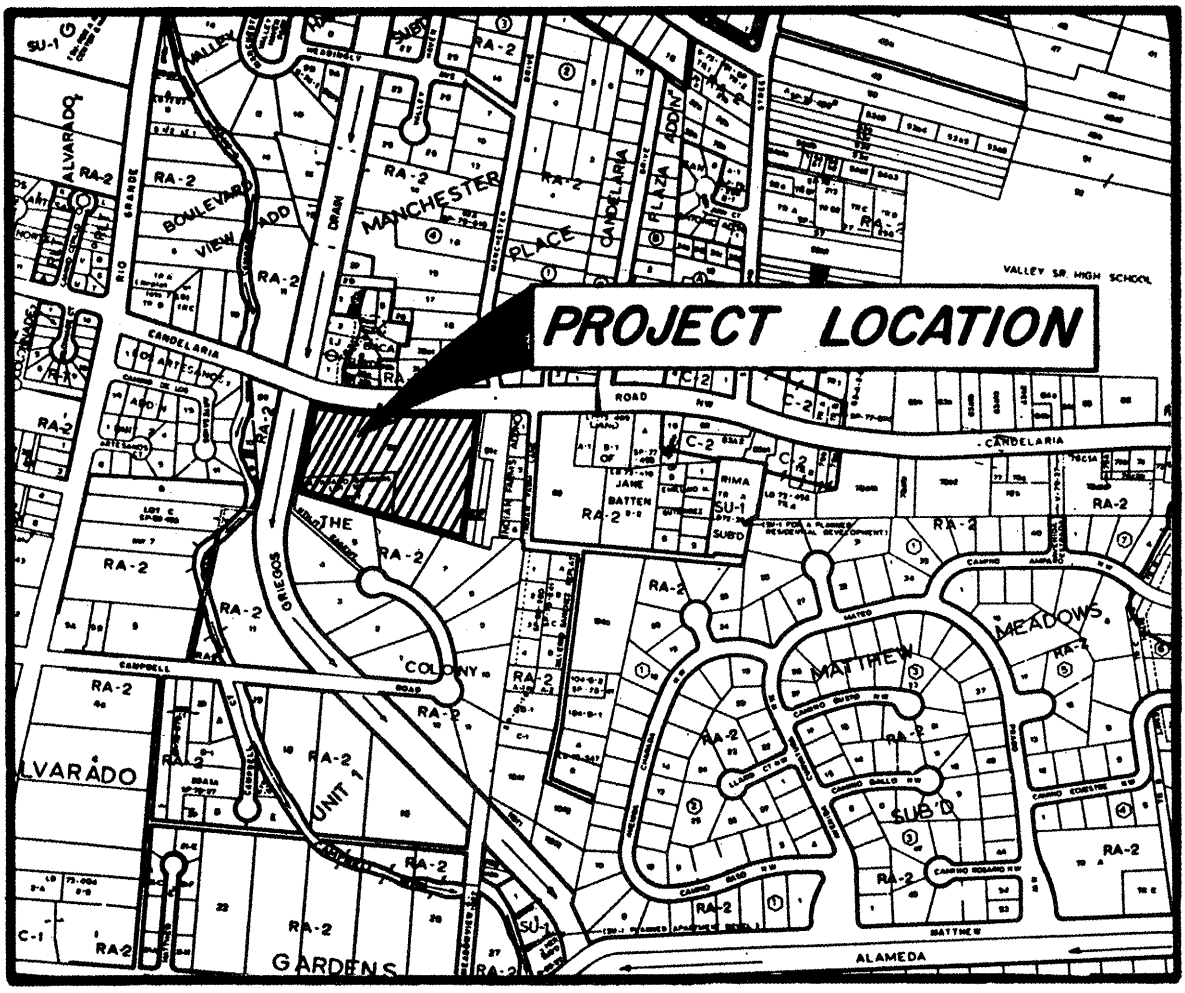
The purpose of this report is to establish the criteria for controlling surface storm run-off and to study the hydrologic affects of the proposed drainage/grading and infrastructure improvements to the project. The site is presently described as Tract 92 of the Middle Rio Grande Conservancy District. This plan determines the excess run-off resulting from the 100-year/6-hour and 10-year/6-hour frequency storms falling within the site, historic and developed conditions. This report is prepared to facilitate platting and site development plan approval by the City of Albuquerque.

The scope of the proposed plan will not increase the flooding potential to adjacent properties or downstream area. The plan is presented in a manner which is acceptable to the City of Albuquerque, using hydrologic procedures as outlined in Chapter 22 of the Development Process Manual.

LOCATION AND DESCRIPTION

The proposed Amber Place Subdivision is located in the North Valley area of Albuquerque, New Mexico, approximately 2.5 miles north of the downtown urban center. (See Figure 1, Vicinity Map, following page.) The Subdivision is proposed for 31 residential lots, minimum 6000 square foot/lot in size. A zone change from RA-2 to SU-1 zoning for a planned residential development has been approved by the Environmental Planning Commission, City of Albuquerque.

The site is 6.38 acres in size and is generally undeveloped for subdivision use. The land is essentially flat, being situated within the low lying areas of the North Valley. The major soil present on the site is the Glendale clay loam, Gm; classified as a type 'B' soil by the USDA Soil Conservation Service. (See Soils Map, Figure 2, page 4.)



VICINITY MAP

G-13

SCALE: 1" = 800' ±

FIGURE 1

SOILS MAP

SCALE: 1" = 2000'

FIGURE 2

EXISTING DRAINAGE CONDITIONS

As previously stated, the site is presently undeveloped. The project is bounded on the north by improved Candelaria Avenue NW. The site bounded on the east by Tract 91-A of the MRGCD is developed. Developed lots 5-7, of the Colony, are adjacent to the project on the south. The Griegos Drain of the MRGCD bounds the proposed development on the west. An existing on-site, 16' wide public utility easement girds the site on the south and west.

Sheet 1 (see pocket) illustrates the existing topography of the project. The site does not lie within a 100-year flood hazard zone as per panel 22 of the Federal Emergency Management Agency Map. Minimal off-site flows enter the site from the east. No off-site flows enter the project from either the north, south or west. Historically, the site ponds a majority of the 10 cfs generated. An existing 30" storm drain is located in Candelaria Avenue.

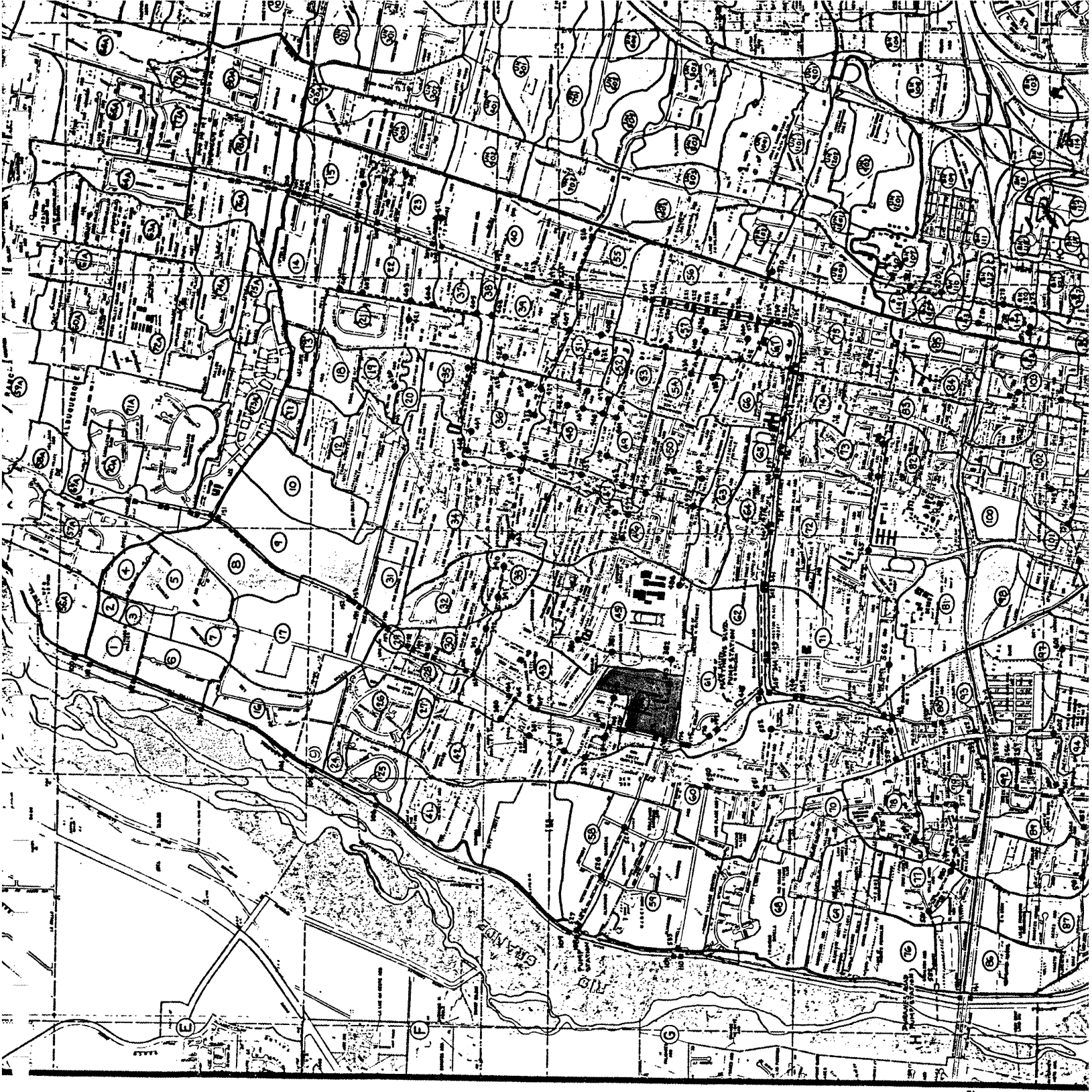
PROPOSED DRAINAGE CONDITIONS

The proposed grading and drainage plan, sheet 1, (see pocket) shows: 1.) existing and proposed spot elevations, 2.) proposed dwelling finish floor elevations, 3.) proposed private street layout, 4.) proposed grading and drainage improvements contiguous with existing adjacent development, 5.) erosion control plan during construction.

Proposed major public infrastructure improvements include an on-site fire line loop connecting to the existing water line main in Candelaria. The fire line loop is proposed to be located within a 20' public utility easement which in turn will be located within the public street scheme.

An analysis, upstream and downstream of the project indicates that free discharge of storm run-off water from the proposed development is acceptable. Basically, comparing peak time of concentrations of the site to the overall basin lent the free discharge conclusion. (Please see Cell Map, page 7; and Calculations, page 9.) In the developed state, the project will peak discharge approximately 20 cfs during the 100-year/6-hour storm and generate a 100 year volume of 34,260 cf. In order to convey the developed stormwater off-site, two 10' public drainage easements are proposed between lots 1 and 31; and lots 17 and 18.

The run-off shall be conveyed off-site via concrete rundowns directly into Candelaria Avenue. An existing drop inlet system shall convey the stormwater into the City system. Again, analysis indicates the City system to have sufficient capacity to accept the site's developed discharge.



1" = 3000' Approx.

Z5

From Master Drainage Study, by Bohannan Huston, Area I. (Cell Map)

CONCLUSIONS

1. The proposed grading and drainage improvements will not increase the flooding potential to downstream or adjacent properties.

2. Erosion control, as shown on sheet 1 (see pocket), during construction will ensure that sediments remain on site.

3. An approved infrastructure listing and an executed subdivision improvement agreement shall be required for final plat sign-off.

4. Maintenance of the proposed public drainage easements/street system will be the responsibility of the City of Albuquerque.

CALCULATIONS

I.

	AC.
575 × 2100 =	27.7
550 × 1500 =	19.0
1600 × 1000/2 =	18.4
1200 × 700/2 =	9.6
1350 × 850 =	26.3
1400 × 500/2 =	8.0
630 × 1850 =	26.8
350 × 850 =	6.8
1000 × 70 =	~~7.6~~ 7.6
	$E = 144$ AC.

Above basin determined from Master Drainage Study Cell Map Area I. Basins 44, 45 Portions of basins drain to A/P #1. (NW corner of site drop inlet storm drains.)

DPM Methods

$Q = CiA$ Type 'B' Soil 20% imp. ∴ C = .42

$P_{100\ 6hr} = 2.2$ in. $i = PC.84\ TC^{-0.51}$

% impervious = 20

$TC = .0078 \frac{L^{.77}}{S^{.385}}$ $L = 5300'$, $S = .0015$

$= 70$ min

$i_{100\ 6\text{-hr.}} = 1.72$ in/hr. $i_{10} = 1.13$ in/hr.

$Q_{100-6hr.} = (0.42)(1.72)144$

* $Q_{100} = 104$ cfs $Q_{10} = 68$ cfs

* this discharge rate is very conservative. The basin is marked with numerous depressions and it is highly unlikely that this discharge will ever come close to reaching A.P. #1.

II. Site = 6.5 ± AC.

$P_{100\text{-}6hr} = 2.2$ in

1/8 AC LOTS

$Q = CiA$

65% imp. $\Rightarrow 0.66 = C$

$VOL. = PCA$

$TC = 10$ min. $\therefore i_{100\ 6\text{-}hr.} = 4.65$ in/hr.

$Q_{100\text{-}6hr.} = 0.66(4.65)6.5$

$= 20$ cfs $\Rightarrow$ $Q_{10} = 13$ cfs

$VOL._{100\text{-}} = 2.2(.66)(6.5)\frac{43560}{12}$

$= 34,260$ C.F. $VOL_{10} = 22,500$ C.F.

$\frac{6.5\ AC}{144.0\ AC} = 4.5\%$ of watershed

II.B Proposed Hydrology - on site

Basin 'A' = 3.03
Basin 'B' = 1.15 AC.
Basin 'C' = 2.2 AC.
6.38 — TOTAL

.65 x .90 = 0.59
.35 x .25 = 0.09
"C" = 0.68
w/ weighted values.

Basin 'A' $Q = CiA$, data from sheet 2/3
$= .66(4.65)3.03$
Q_{100} = 9 cfs Q_{10} = 6.1 cfs

Basin 'B' $Q_{100} = .66(4.65)1.15$
Q_{100} = 3.5 cfs Q_{10} = 2.3 cfs

Basin 'C' $Q_{100} = .66(4.65)2.2$
Q_{100} = 6.8 cfs Q_{10} = 4.4 cfs

✓ Street Capacity in Candelaria @ Proposed Entrance

$Q_{100} = Q_{\text{Basin B\&C}} = 3.5 + 6.8 = 10.3$ cfs
Q_{10} = 6.8 cfs.

USE D.P.M. Plate 22.3 D-3, use full street flows (no run-off to cross to North-side of street)

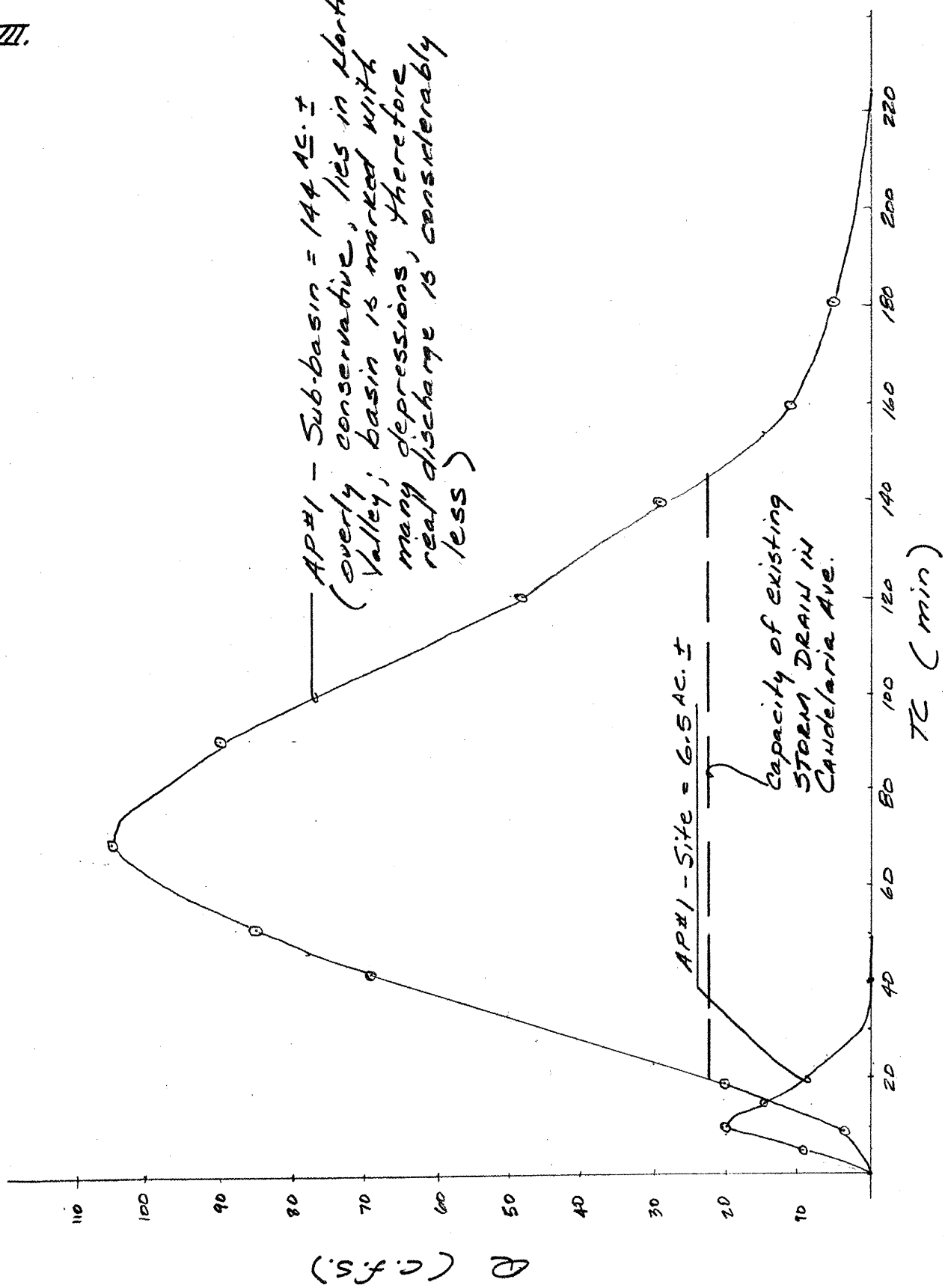
$S = 0.003$'/ft. $\Rightarrow d_{100} = 0.54$, $d_{10} = 0.48$'

ok per ordinance 7.1A.

Candelaria is Minor Arterial street, therefor must have 12' free driving lane in each direction.

Hydrographs

III.



HYDROGRAPH COMPUTATION WORKSHEET

DATE 12/14/85
COMPUTED BY RDC
CHECK BY DL

PROJECT ALVARADO GARDENS

LOCATION GRIEGOS DRAIN/CANDEL.

ANALYSIS POINT # AP #1

(DR. AREA) A = 144 ± ACRES

T_c 70 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = _____ FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = ____ IN. FROM PLATE 22.2 C-4

COMPUTED T_p = _____ MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = _____ CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 104 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

$Q_{peak} = CiA$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	7	.03	3
3	.2	14	.10	10
4	.3	21	.190	20
5	.4	28	.310	32
6	.5	35	.470	49
7	.6	42	.660	69
8	.7	49	.820	85
9	.8	56	.930	97
10	.9	63	.990	103
11	1.0	70	1.00	104
12	1.1	77	.990	103
13	1.2	84	.930	97
14	1.3	91	.860	89
15	1.4	98	.780	81
16	1.5	105	.680	71
17	1.6	112	.560	58
18	1.7	119	.460	48
19	1.8	126	.390	41
20	1.9	133	.330	34
21	2.0	140	.280	29
22	2.2	147	.207	22
23	2.4	154	.147	15
24	2.6	161	.107	11
25	2.8	168	.077	8
26	3.0	175	.055	6
27	3.2	182	.040	4
28	3.4	189	.029	3
29	3.6	196	.021	2
30	3.8	203	.015	1.5
31	4.0	210	.011	1
32	4.5	217	.005	0.5
33	5.0	224	.000	-0-

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 12/16/85
COMPUTED BY PWC
CHECK BY DL

PROJECT ALVARADO GARDENS

LOCATION GRIEGOS DRAIN/CANDEL.

ANALYSIS POINT # AP#1

(DR. AREA) A = 6.5± ACRES

T_c 10 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = _____ FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = ____ IN. FROM PLATE 22.2 C-4

COMPUTED T_p = _____ MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = _____ CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 20 CFS

$t(COLUMN) = (t/T_p)$ $t = T_p(t/T_p)$

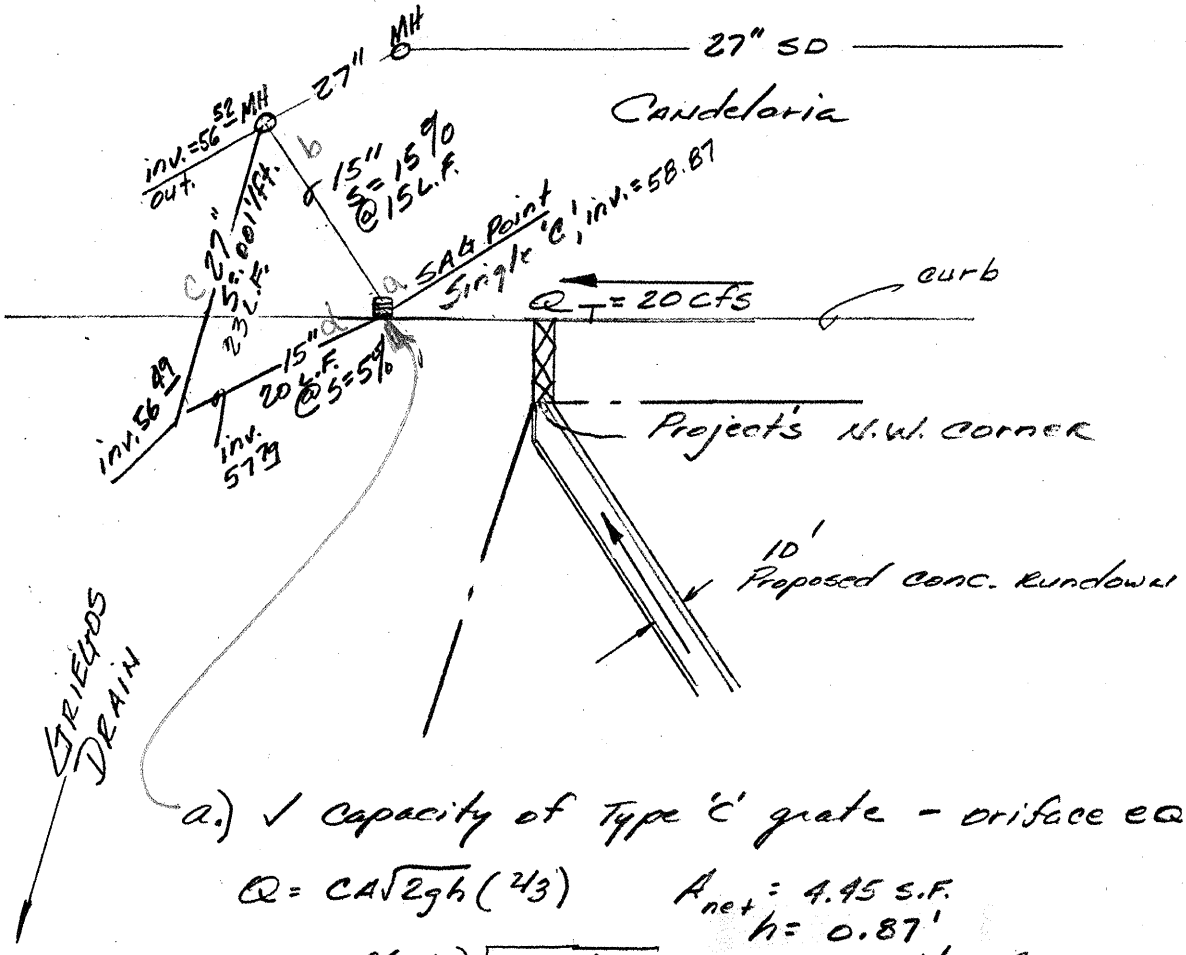
$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

$Q_{peak} = CiA$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1	.03	.6
3	.2	2	.10	2
4	.3	3	.190	4
5	.4	4	.310	6
6	.5	5	.470	9
7	.6	6	.660	13
8	.7	7	.820	16
9	.8	8	.930	19
10	.9	9	.990	20
11	1.0	10	1.00	20
12	1.1	11	.990	20
13	1.2	12	.930	19
14	1.3	13	.860	17
15	1.4	14	.780	16
16	1.5	15	.680	14
17	1.6	16	.560	11
18	1.7	17	.460	9
19	1.8	18	.390	8
20	1.9	19	.330	7
21	2.0	20	.280	5
22	2.2	22	.207	4
23	2.4	24	.147	3
24	2.6	26	.107	2
25	2.8	28	.077	1.5
26	3.0	30	.055	1.1
27	3.2	32	.040	0.8
28	3.4	34	.029	0.6
29	3.6	36	.021	0.4
30	3.8	38	.015	0.3
31	4.0	40	.011	0.2
32	4.5	45	.005	0.1
33	5.0	50	.000	-0-

PLATE 22.2 F-1

IV. ✓ Capacity of Existing Storm Drain System in Candelaria.



a.) ✓ Capacity of Type 'C' grate - orifice eq.

$Q = CA\sqrt{2gh}\,(2/3)$ $\quad A_{net} = 4.45$ S.F.

$= \frac{0.8(4.45)\sqrt{2(32.2)(.87)}}{3/2}$ $\quad h = 0.87'$

$g = 32.2'/sec.^2$

$C = 0.8$

$= 18$ cfs $\quad$ 2/3 clogging factor

Also See N.M.S.H.D. "Homograph for Capacity of curb opening @ Low Points"

$H = 0.67'$ & $h = 0.5'$ $\Rightarrow \frac{H}{h} = \frac{.67}{.5} = 1.34$

$\Rightarrow \frac{Q}{L} = 1.5$ $\quad$ & $L = \frac{40''}{12} = 3.33'$

$Q = 3.33(1.5) = 5$ cfs.

$Q_{cap.\ of\ Type\ 'C'} = 18 + 5 = 23$ cfs, ok

b.) ✓ capacity of drop inlet outlet pipe to M.H.

$S = 15\%$, $n = 0.013$, 15"ϕ

$Q_{cap.} = 25$ cfs. ..... Manning's

$25 > 20$ cfs

c.) ✓ capacity of 27" pipe from M.H. to Drain.

$S = 0.0013'/ft$, 27", $n = 0.013$

$Q_{cap.} = 11$ cfs .... Manning's

d.) ✓ cap. of 15"ϕ pipe from inlet to Drain

$S = 0.054'/ft.$ $n = 0.013$

$Q_{cap.} = 15$ cfs .... Mannings

Therefore $Q_{c+d} = 11 + 15 = 26 > 20$ cfs

Capacity exists downstream

ESPEY, HUSTON & ASSOCIATES INC.
Engineering & Environmental Consultants

SUBJECT Amber Place

Hydraulics

SHEET 7 OF 7 BY PWC
DATE 2/18/86 CK BY

I. Design 10' Conc. Channels n = 0.013, S = 0.5%

Q_{100} = 9 cfs .... basin 'A'

Q_{100} = 7 cfs .... basin 'C'

(SEE Print-out)

AMBER PLACE 2/18/86

RECTANGULAR SECTION

BOTTOM WIDTH = 10 FT
DEPTH = .3 FT
AREA = 3 SF
HYDRAULIC RADIUS = .28302 FT
SLOPE = .005 FT/FT
n = .013 (Poured conc.)
Q = 10.481 CFS > 9.0 c.f.s. ok
VELOCITY = 3.4937 FPS

$\therefore d_{100}$ = 0.3 ft.

Use 1.0' depth
∴ 0.7' freeboard

Size/Design Sidewalk Culverts (USE WEIR EQ.)

$Q = 3.33 L H^{3/2}$

$9 = 3.33(L)(.63)^{3/2}$

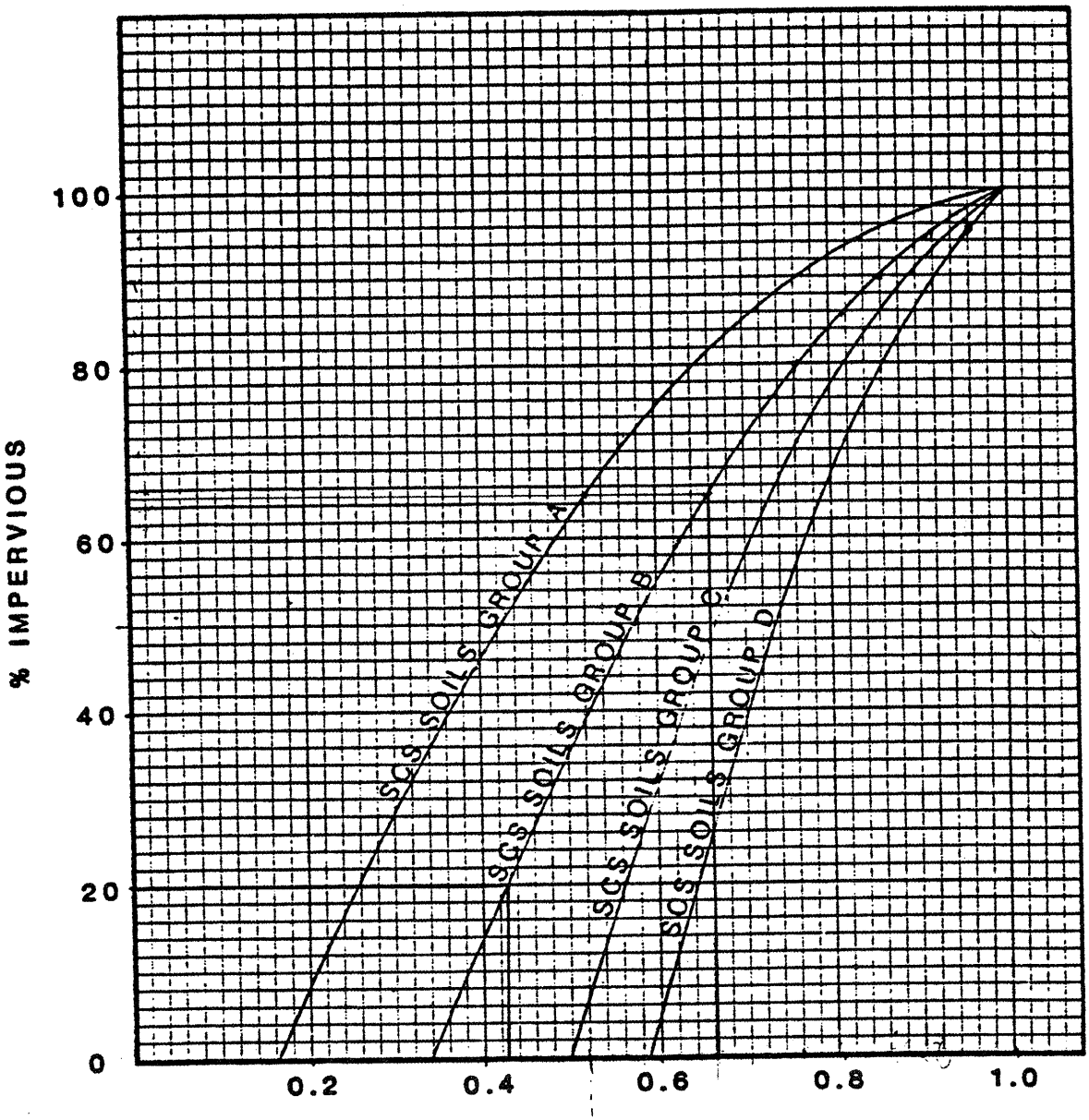
Q = 9 cfs
$H = \frac{7\frac{1}{2}"}{12} = 0.63'$

L = 5.4' — build (3) double S.W. culverts @ outfall of basin 'A'

Q = 6.8 => build (2) double S.W. culverts @ outfall of Basin 'C'

DRAINAGE CRITERIA

DETERMINATION OF RATIONAL FORMULA 'C' FACTOR

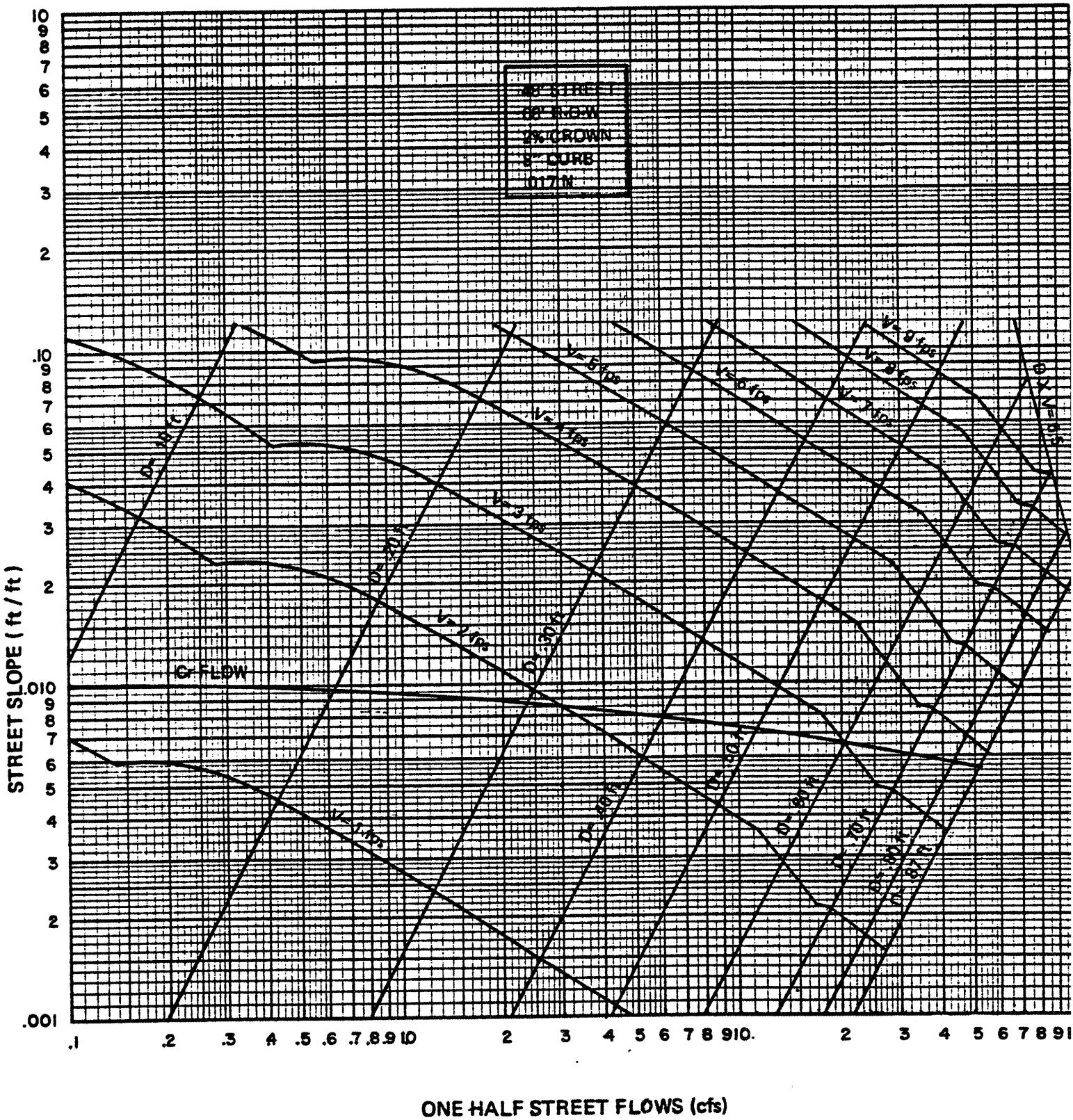


4-82

PLATE 22.2 C-1

CANDELARIA

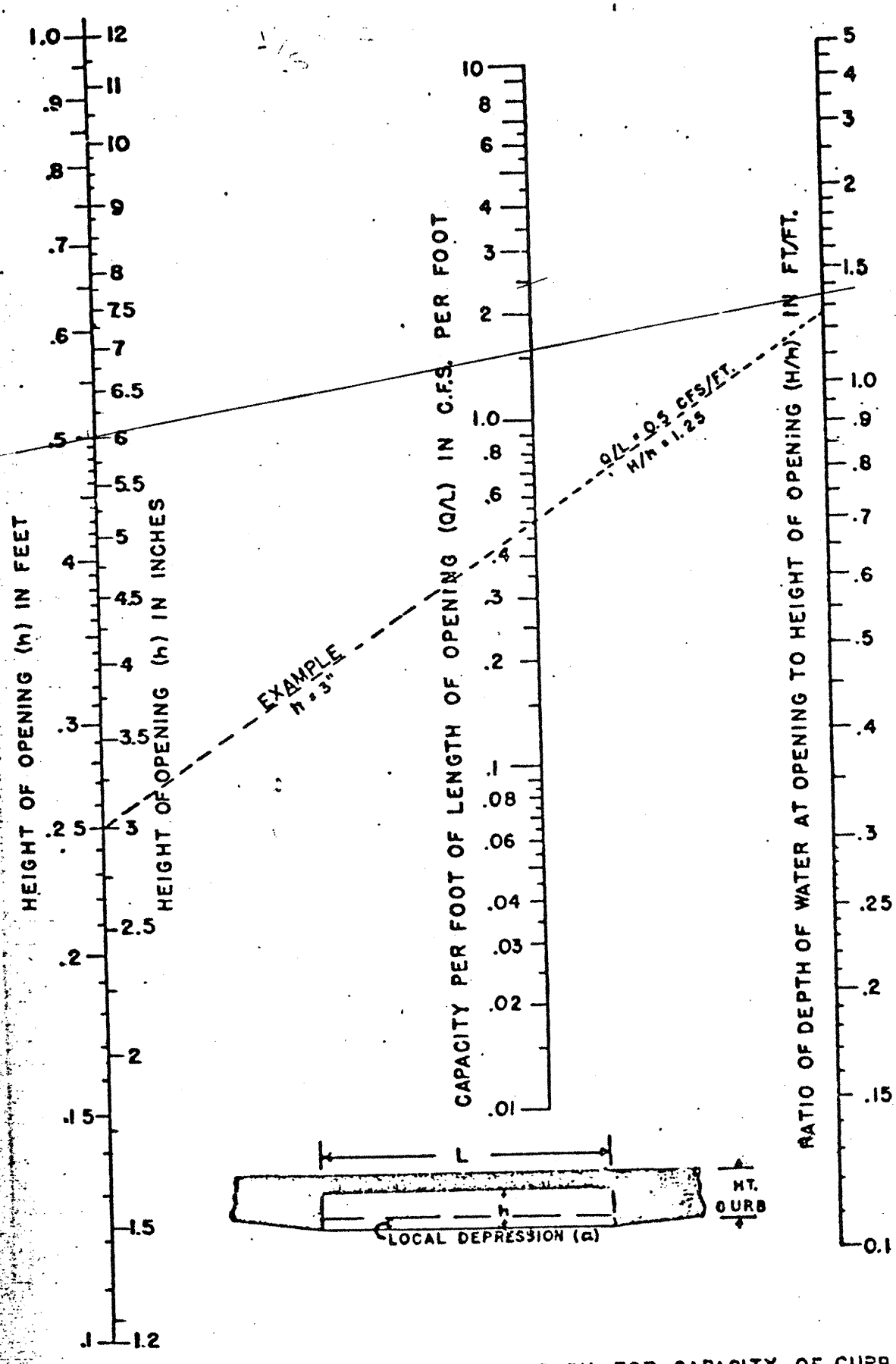
STREET CAPACITY



REV 3-83

PLATE 22.3 D-3

FIGURE 6



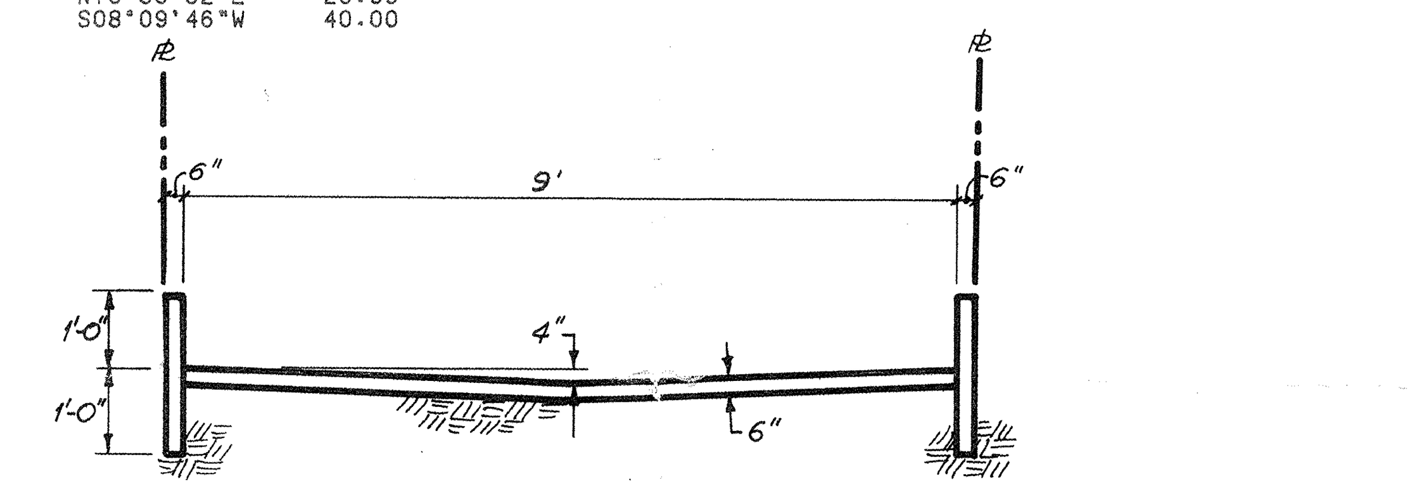
NOMOGRAPH FOR CAPACITY OF CURB OPENING INLETS AT LOW POINTS

CURVE DATA

CURVE NO.	DELTA	RADIUS	LENGTH	CHORD	TAN	CH.BEARING
1	17°45'40"	994.93	308.42	307.19	155.46	S 80°37'32"E
2	100°35'36"	46.00	80.76	70.78	55.40	N 58°27'34"E
3	85° 5'30"	46.00	68.32	62.21	42.22	N 28°41'53"W
4	17°45'40"	954.93	296.02	294.84	149.21	S 80°37'32"E

ADDITIONAL COURSES

REF. NO.	BEARING	DISTANCE
1	N63°17'17"W	13.35
2	N13°32'32"E	59.56
3	S89°40'36"W	16.89
4	N13°50'52"E	23.99
5	S08°09'46"W	40.00

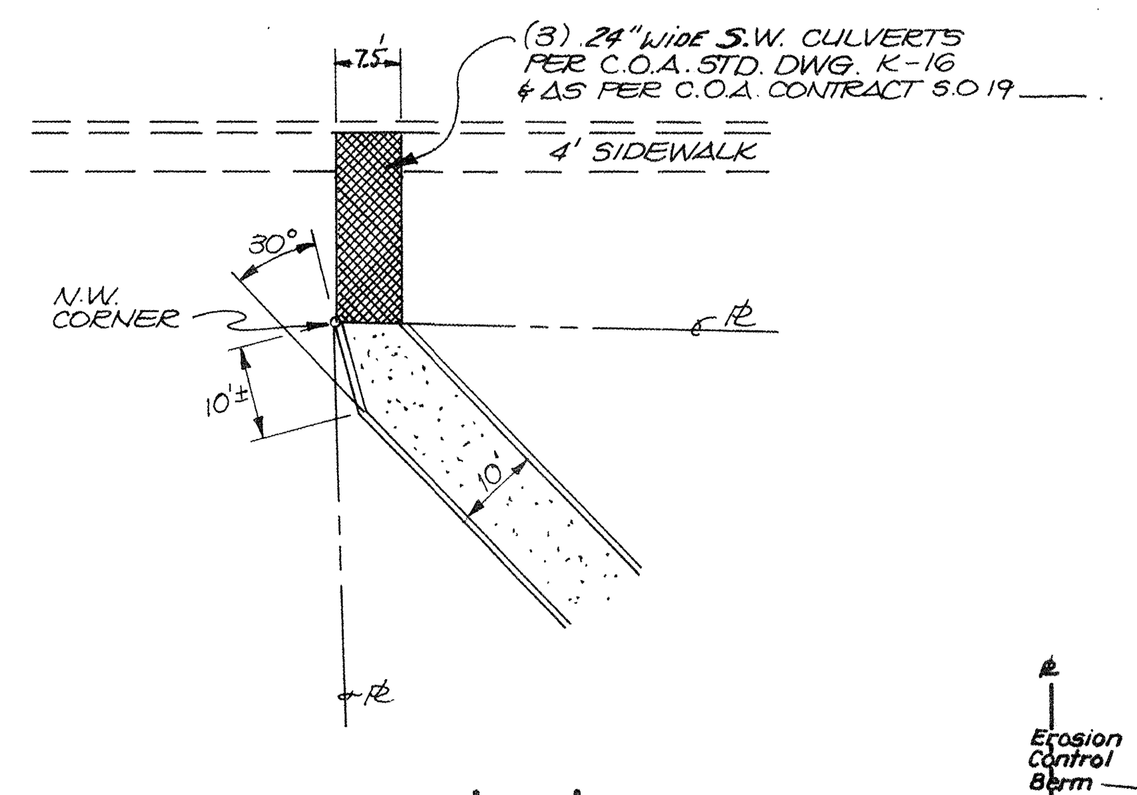


TYPE 'A'

SECTION B-B

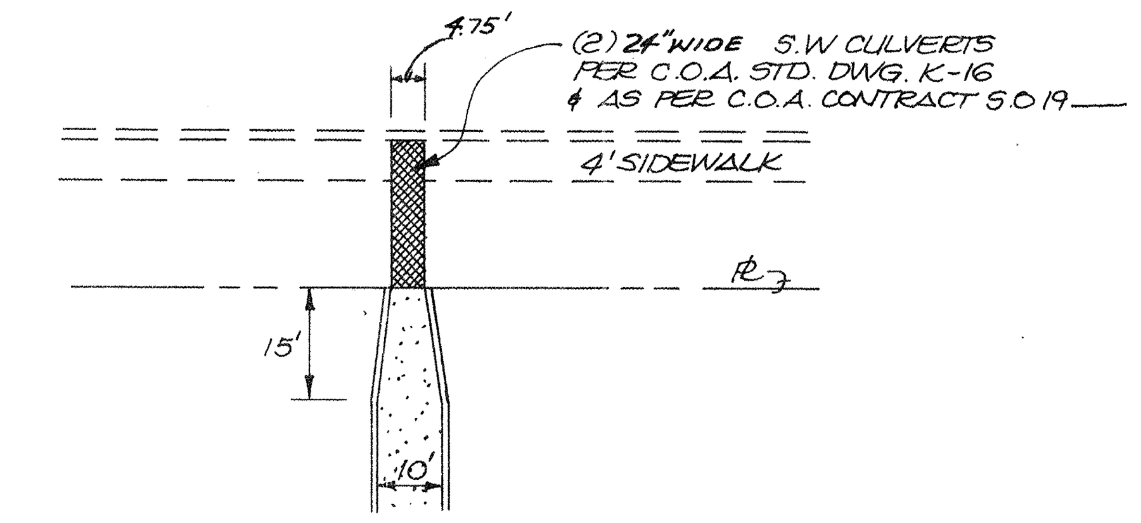
NO SCALE

NOTE:
CONSTRUCTION PER CITY OF ALBUQ. STD. DWG. K-23.



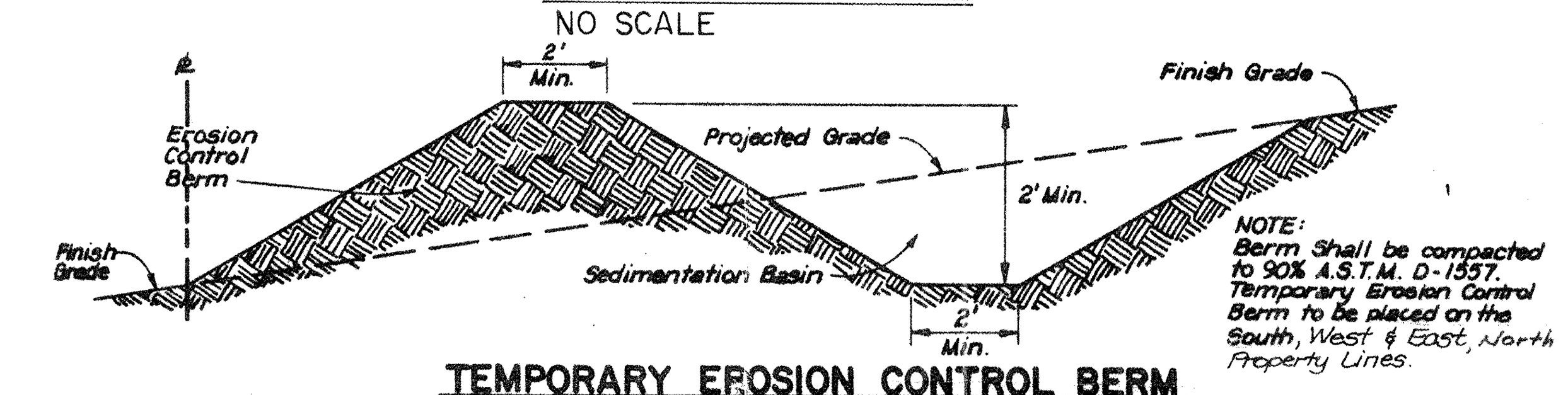
DETAIL 'A'

NO SCALE



DETAIL 'B'

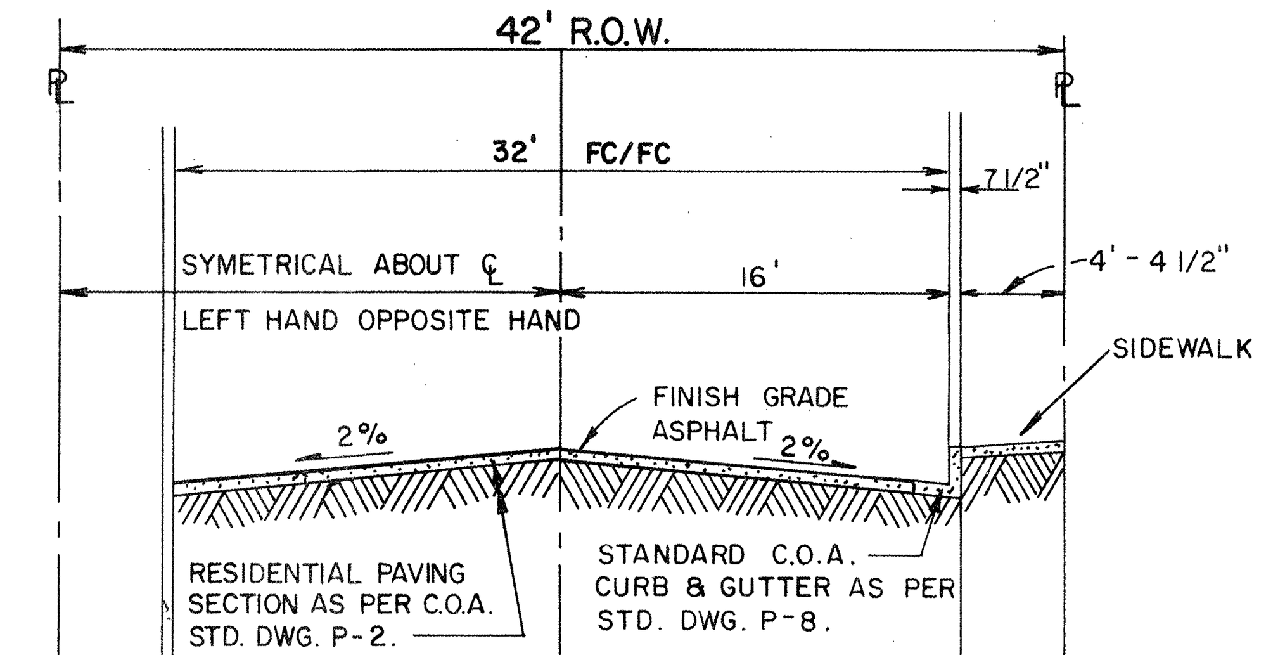
NO SCALE



NOTE:
Berm Shall be compacted to 90% A.S.T.M. D-1557. Temporary Erosion Control Berm to be placed on the South, West & East, North Property Lines.

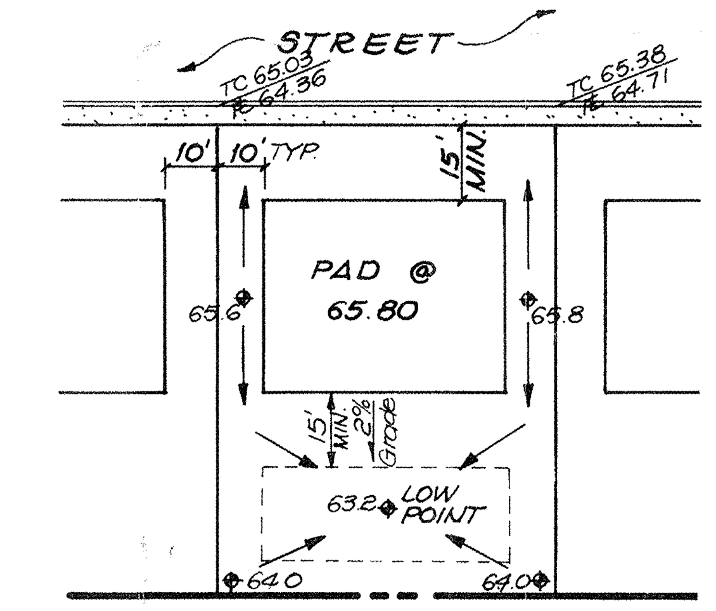
TEMPORARY EROSION CONTROL BERM

NO SCALE



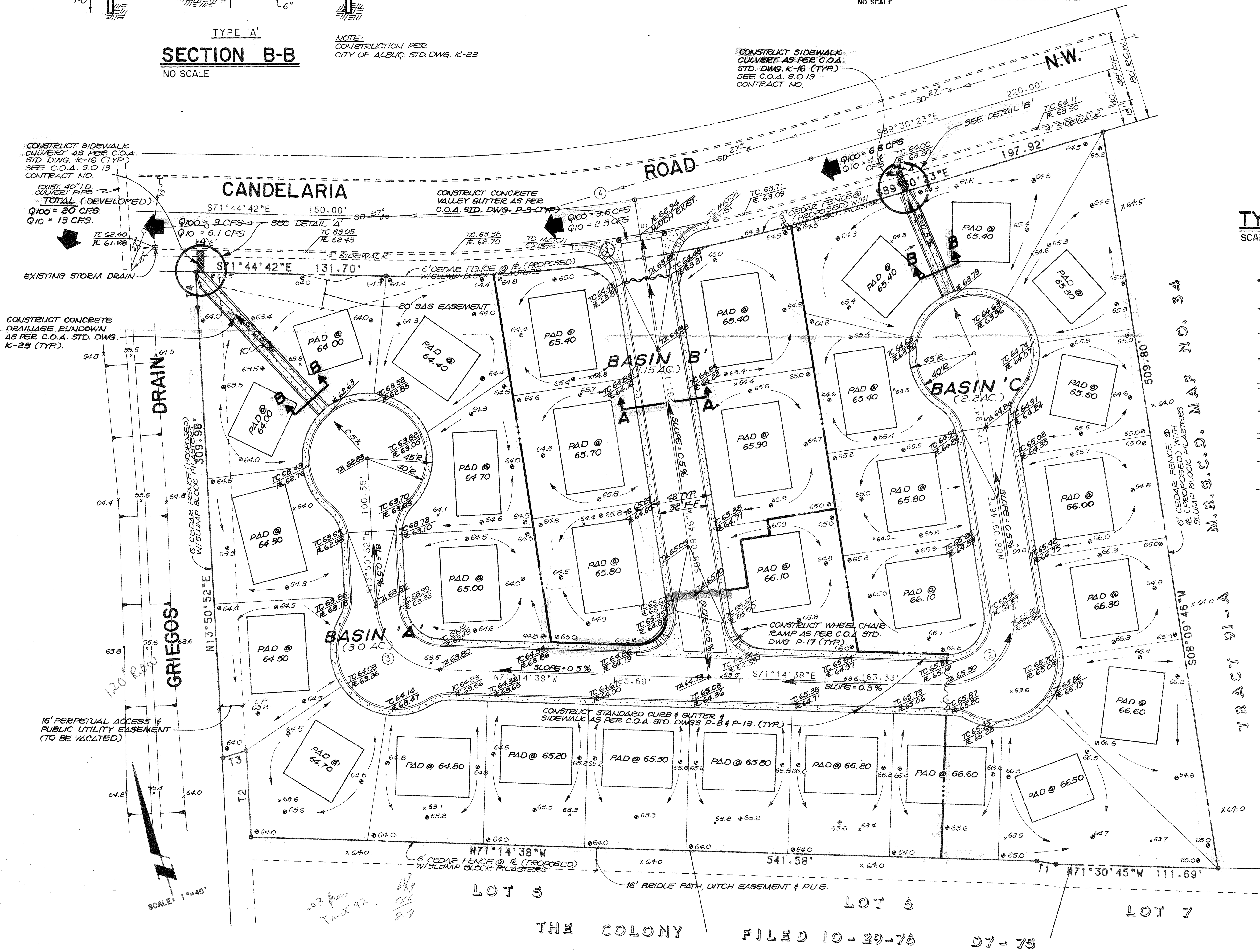
STREET SECTION A-A

SCALE: 1/8" = 1'0"



TYPICAL LOT GRADING

SCALE: 1"=40'



LEGEND

- BASIN BOUNDARY
- BOUNDARY LINE
- LOT LINE
- EXISTING CURB & GUTTER
- EXISTING SIDEWALK
- PROPOSED CURB & GUTTER
- PROPOSED SIDEWALK
- CENTERLINE OF STREET
- EASEMENT LINE
- x 53.6 — EXISTING SPOT ELEVATION
- TC 65.42 / FL 64.75 — TOP OF CURB & FLOWLINE ELEVATIONS
- • — PROPOSED SPOT ELEVATIONS
- TA 65.05 — TOP OF ASPHALT ELEVATION
- → — DIRECTION OF FLOW
- ∿∿∿ — WATER BREAK

LEGAL DESCRIPTION:

TRACT 92, M.R.G.C.D. MAP NO. 34 AND LOT 12 ALVARADO GARDENS.

PROPERTY ADDRESS:

CANDELARIA RD. N.W.

NOTE:

FOR ADDITIONAL INFORMATION REGARDING THIS PLAN SEE "DRAINAGE REPORT FOR AMBER PLACE SUBDIVISION" PREPARED BY ESPEY, HUSTON & ASSOC., INC., DECEMBER 1985. THIS REPORT IS AVAILABLE UPON REQUEST.

EXISTING TOPOGRAPHY COMPILED FROM SURVEY PERFORMED BY ESPEY-HUSTON AND ASSOCIATES, DEC. 1985.

AS BUILT INFORMATION

CONTRACTOR
WORK STAKED BY — DATE
INSPECTOR'S ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION

RECORDED BY — DATE
NO.

BENCH MARKS

THE STATION IS LOCATED 2.9 MILES NORTH OF DOWNTOWN ALBUQUERQUE, EAST OF THE INTERSECTION OF RIO GRANDE AND CANDELARIA BLVD. TO REACH THE STATION FROM THE INTERSECTION OF I-25 & CANDELARIA GO WEST 2.5 MILES TO THE STATION ON THE RIGHT. THE STATION MARK IS A STANDARD ACS BRASS TABLET STAMPED "6-G13A 1980" SET FLUSH WITH THE CURB.
ELEVATION = 4965.72 (MSLD 1929)

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

3-6-86

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN

DESIGNED BY	P.W.C.	DATE	12/26/85
DRAWN BY	R.D.	DATE	12/26/85
CHECKED BY	D.L.	DATE	3/86

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

TITLE:
AMBER PLACE SUBDIVISION
OVERALL GRADING, DRAINAGE & PAVING PLAN

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.-Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO. | MAP NO. G-13 | SHEET 1 OF 1