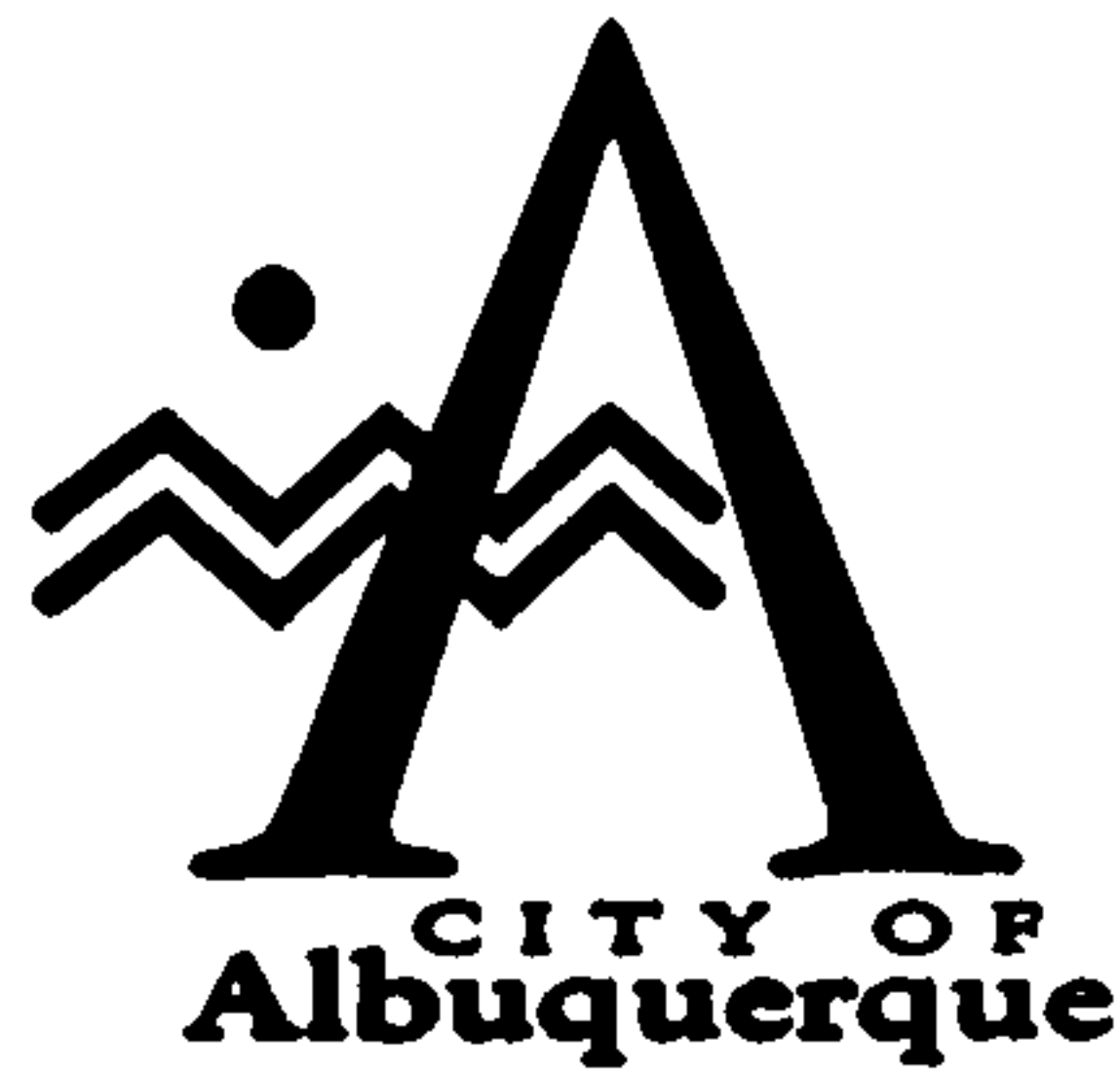




September 2, 1998

Dennis A. Lorenz, P.E.
Brasher & Lorenz, Inc.
2201 San Pedro NE, Bldg. 1, Suite 210
Albuquerque, New Mexico 87110

***RE: Pond Reclamation Study for Tracts 1-A1 & 1-B, C.C. & F. Properties, (K21/D1B),
Engineer's Stamp Dated 8/19/98.***

Dear Mr. Lorenz:

The above referenced report is based on the Drainage Master Plan for Market Centre East, which was done before the "New Hydrology." Prior to conceptual approval for the pond reclamation, a revised master plan, with a better basin analysis, must be submitted to and approved by City Hydrology.

It is unclear whether street flows can be accommodated in Hotel Circle without a storm drain extension. It appears that the proposed 60" storm drain in the east side of Hotel Circle was not built. The updated master plan must look at the street hydraulics, especially at the bend on the south part of the loop road.

A site specific grading and drainage plan will also be required prior to building permit release for any construction within the pond area.

If you have any questions, please call me at 924-3982.

Sincerely,

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

c: ☐ File

Good for You, Albuquerque!



DRAINAGE INFORMATION SHEET

PROJECT TITLE: _____ ZONE ATLAS/DRNG. FILE #: K21 1B
 DRB #: NA EPC #: NA WORK ORDER #: NA
 LEGAL DESCRIPTION: TR 1-A1 + 1-B CC + F PROPERTIES OF ALBQ
 CITY ADDRESS: 11200 LOMAS BLVD NE

ENGINEERING FIRM: Brasher & Lorenz, Inc. CONTACT: Dennis A. Lorenz
 ADDRESS: 2201 San Pedro NE Bldg. 1 Suite 210
Albuquerque, New Mexico 87110 PHONE: 888-6088

OWNER: JOHN HENDERSON, AGENT CONTACT: J. HENDERSON
 ADDRESS: 2340 MENAUL NE 87107 PHONE: _____

ARCHITECT: NA CONTACT: _____
 ADDRESS: _____ PHONE: _____

SURVEYOR: NA CONTACT: _____
 ADDRESS: _____ PHONE: _____

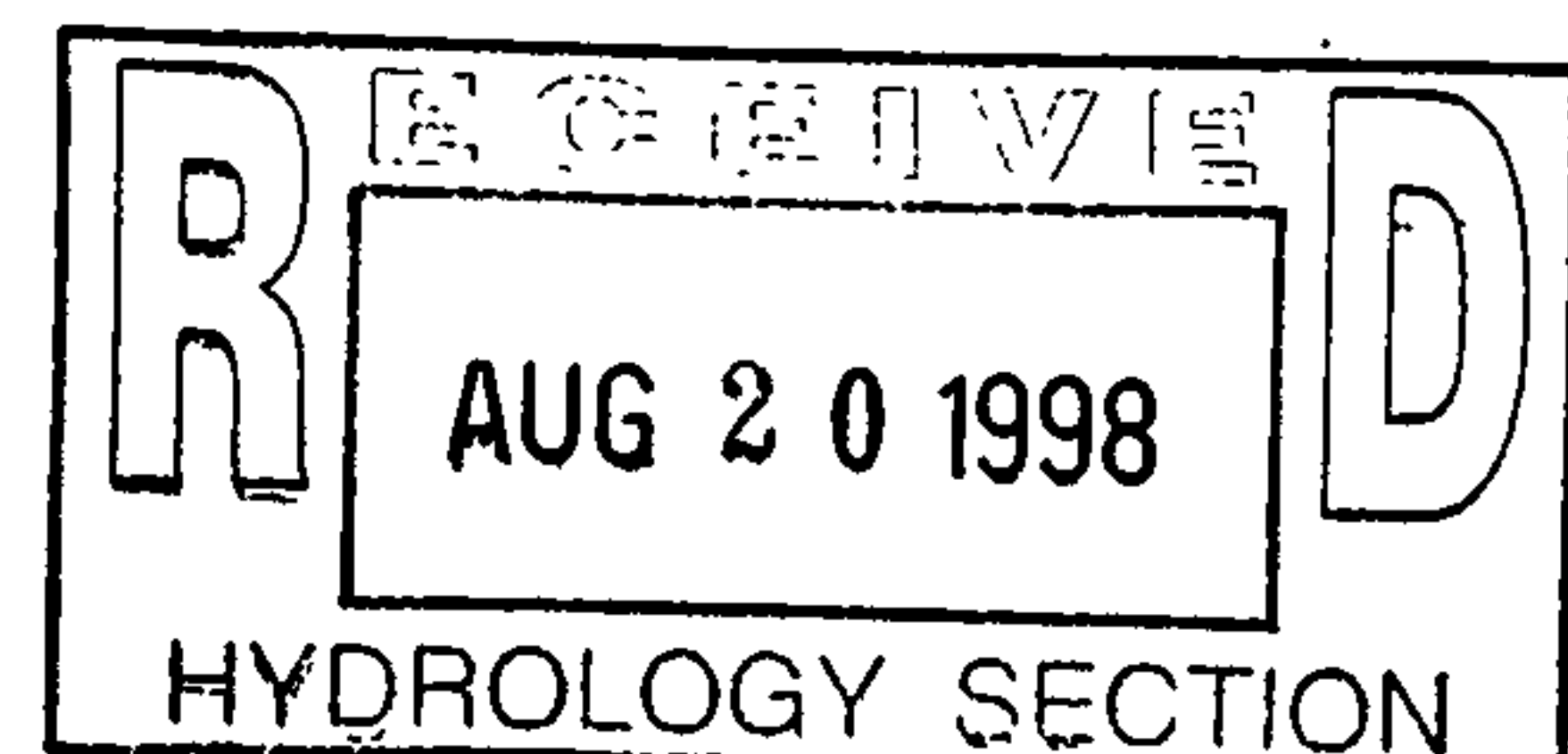
CONTRACTOR: NA CONTACT: _____
 ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:
 _____ DRAINAGE REPORT
 _____ DRAINAGE PLAN
 _____ CONCEPTUAL GRADING & DRAINAGE PLAN
 _____ GRADING PLAN
 _____ EROSION CONTROL PLAN
 _____ ENGINEER'S CERTIFICATION
X OTHER POND RECLAMATION

PRE-DESIGN MEETING:
 _____ YES
X NO
 _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
 _____ SKETCH PLAT APPROVAL
 _____ PRELIMINARY PLAT APPROVAL
 _____ S. DEV. PLAN FOR SUB'D. APPROVAL
 _____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
 _____ SECTOR PLAN APPROVAL
 _____ FINAL PLAT APPROVAL
 _____ FOUNDATION PERMIT APPROVAL
 _____ BUILDING PERMIT APPROVAL
 _____ CERTIFICATE OF OCCUPANCY APPROVAL
 _____ GRADING PERMIT APPROVAL
 _____ PAVING PERMIT APPROVAL
 _____ S.A.D. DRAINAGE REPORT
 _____ DRAINAGE REQUIREMENTS
X OTHER POND RECLAIM (SPECIFY)
APPROVAL

DATE SUBMITTED: 8-20-98
 BY: Dennis A. Lorenz

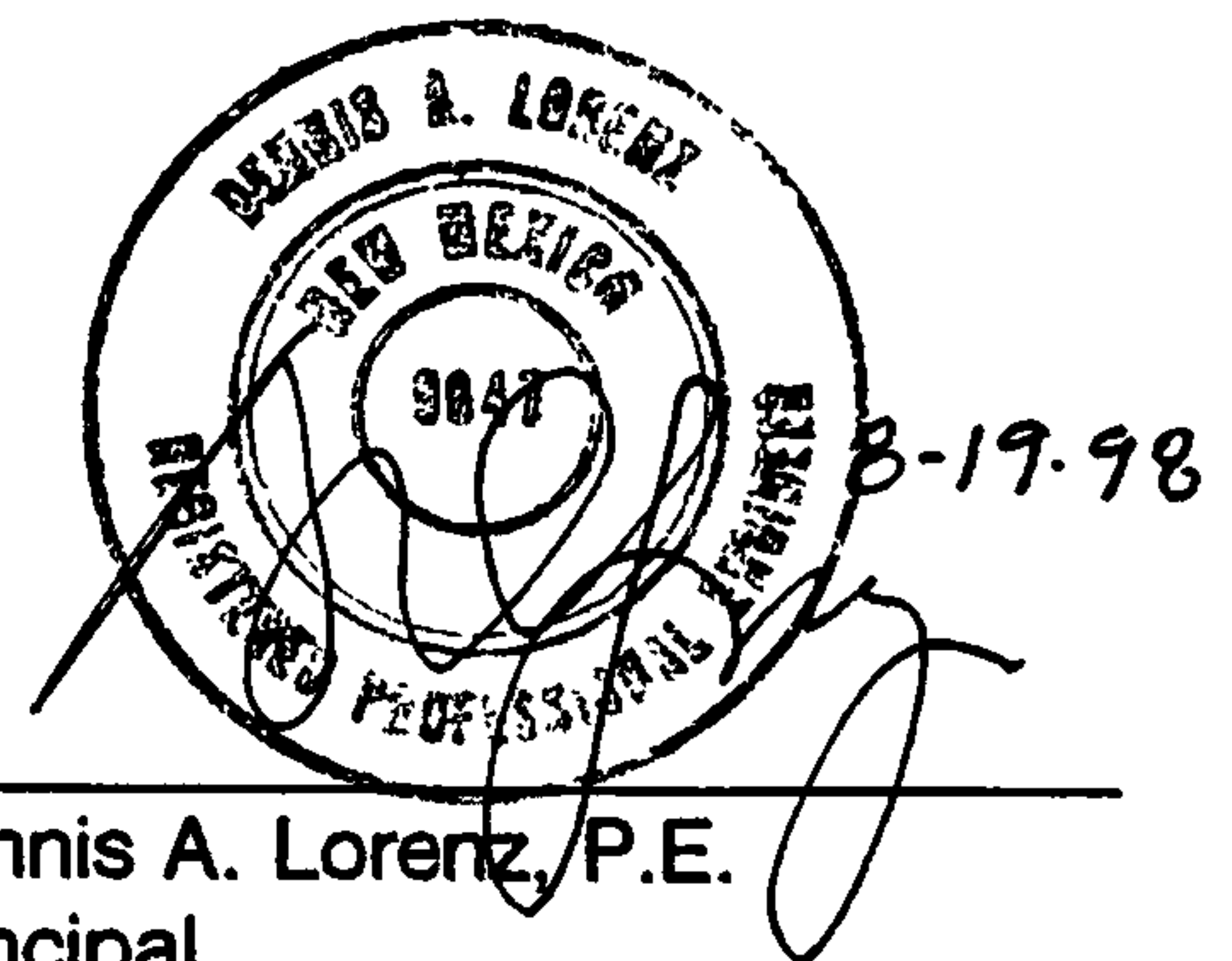
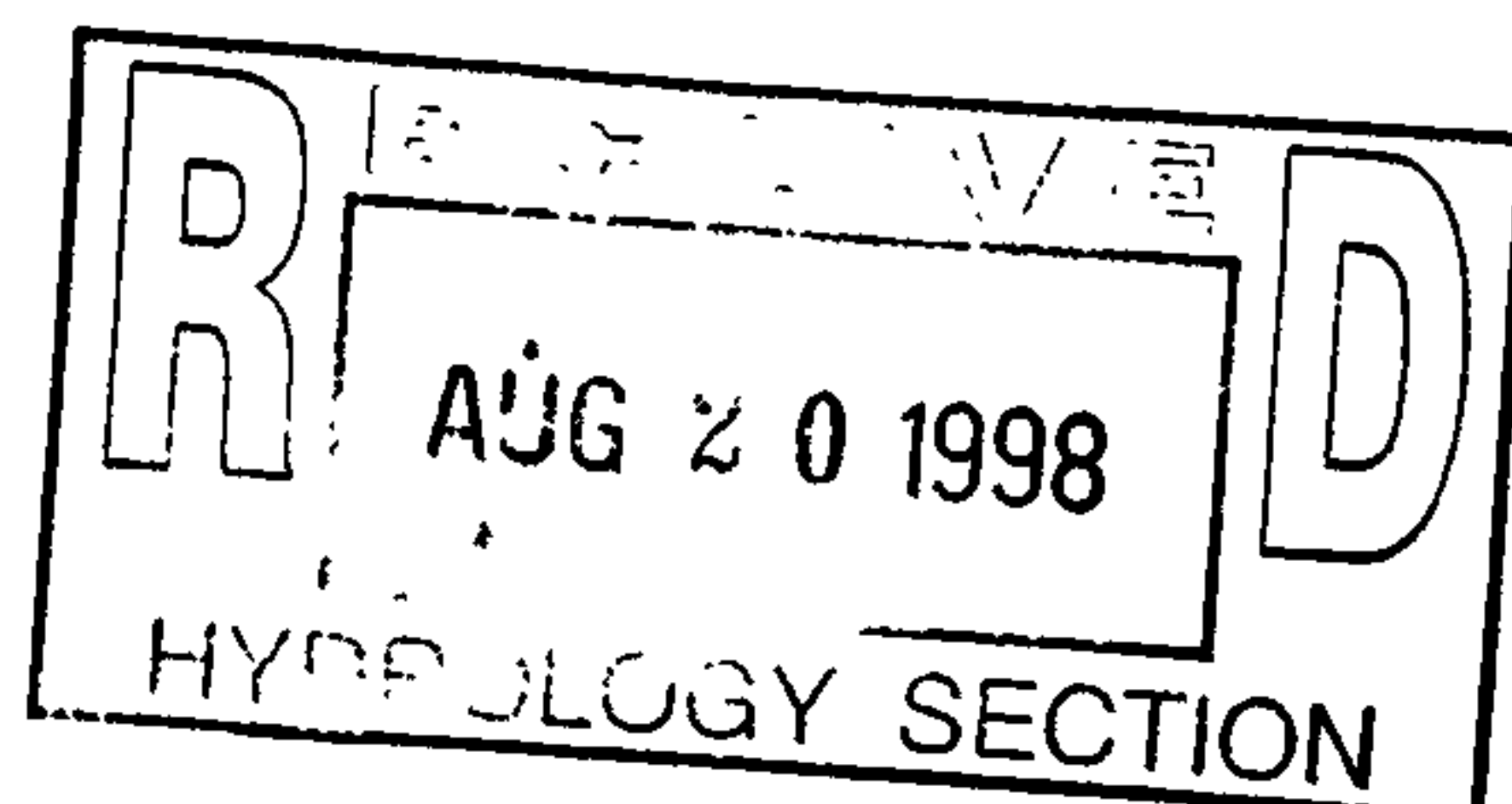


POND RECLAMATION STUDY
FOR
TRACTS 1-A1 & 1-B, C.C.& F. PROPERTIES OF ALBUQUERQUE, INC.
Albuquerque, New Mexico

Prepared by:

BRASHER & LORENZ, INC.
Consulting Engineers
2201 San Pedro NE Building 1, Suite 210
Albuquerque, New Mexico 87110

August 1998



Dennis A. Lorenz, P.E.
Principal

PURPOSE AND SCOPE

The purpose of this study is to examine the downstream storm drainage capacity available to the project site and determine if the existing on-site temporary retention pond can be reclaimed for future development. The scope of the study is to research existing records, which include approved drainage reports and drainage masterplans, and review as-built drawings to examine downstream capacity for the contributing drainage basins. This information will be utilized to determine whether the existing temporary retention pond may be reclaimed.

This study is provided to gain approval for reclamation of the existing retention pond located on the subject site. A detailed site specific grading and drainage plan must be submitted to the City of Albuquerque, Hydrology Section, for construction permit approval.

SITE DESCRIPTION

The site is located on Lomas Blvd NE at the southeast corner of Hotel Circle NE. The site contains 2.66 acres and is particularly described as Tracts 1-A1 and 1-B, CC & F Properties of Albuquerque, Inc. Presently the site is partially developed. An office building is located on Tract 1-A1, with parking and landscaping improvements. A temporary retention pond is located on Tract 1-A1 which provides storage for all runoff generated by the site. Tract 1-B is partially developed with parking and landscaping on the north one-half of the parcel. The south one-half is unimproved.

APPROVED DRAINAGE MASTERPLANS

The approved Drainage Masterplan for the site is the **"Conceptual Grading & Drainage Plan for Market Centre East"**, which included the **"Market Centre East Downstream Analysis"**, prepared by Espey, Huston & Associates, dated January 5, 1987. The Plan determined downstream capacity for the entire Market Centre East project (106 acres), and made storm drainage improvement recommendations. Improvements were subsequently constructed by City project No. 3402 (1987).

The **"Grading and Drainage plan for Brokerage Services"**, prepared by Tom Mann & Associates, dated 2-18-86, outlined the criteria for development of the subject site prior to the approval of the Masterplan for Market Centre East. Since no downstream facilities were available at the time, a temporary retention pond was constructed on Tract 1-A1 to manage all runoff from the development.

Both Plans are provided in the back of this report for review by the reader.

EXISTING CONDITIONS

The DMP identifies the subject site as being a portion of Basin "F". By the DMP Basin "F" is allowed a discharge into Hotel Circle of 30.9 cfs. Presently the site retains all

excess runoff in a temporary retention pond located at the southwest corner of the property. The remaining portion of Basin "F" consists of Tract 2 and Block B located immediately east of the subject site. These parcels are fully developed and route all runoff through a detention pond located at the south end of Tract 2. The detention pond drains by a 8 inch pipe which outfalls into Hotel Circle at the southwest corner of Tract 1-A1 (the subject site). The calculated flow from the 8 inch pond drain line is approximately 1.7 cfs (see calculations). Therefore, the total flow from Basin "F" is currently 1.7 cfs (see Figure 2 for Basin "F" detail).

PROPOSED CONDITIONS

It is proposed to reclaim the temporary retention pond on the subject site to allow for further development of the property. Per the approved DMP, Basin "F" is allowed to discharge 30.9 cfs into Hotel Circle. As shown by the calculations, assuming the basin develops to a land treatment "D" percentage of 85%, which is typical for office developments in the community, the estimated 100 year, 6 hour flowrate is 30.4 cfs, which meets the limit established by the DMP. According to this criteria, all ponding within the basin could be reclaimed, provided the impervious surfaces do not exceed 85% of the gross basin area.

This proposal includes reclamation of the temporary retention pond on Tracts 1-A1 and 1-B. The estimated flowrate to be discharged from the site is 13.2 cfs, and from the existing detention pond on Tract 2 and Block B, is 1.7 cfs, for a total of 14.9 cfs.

Assuming the existing detention pond on Tract 2 and Block B is not reclaimed, the resulting discharge into Hotel Circle will be 16.0 cfs below the limit allowed by the DMP.

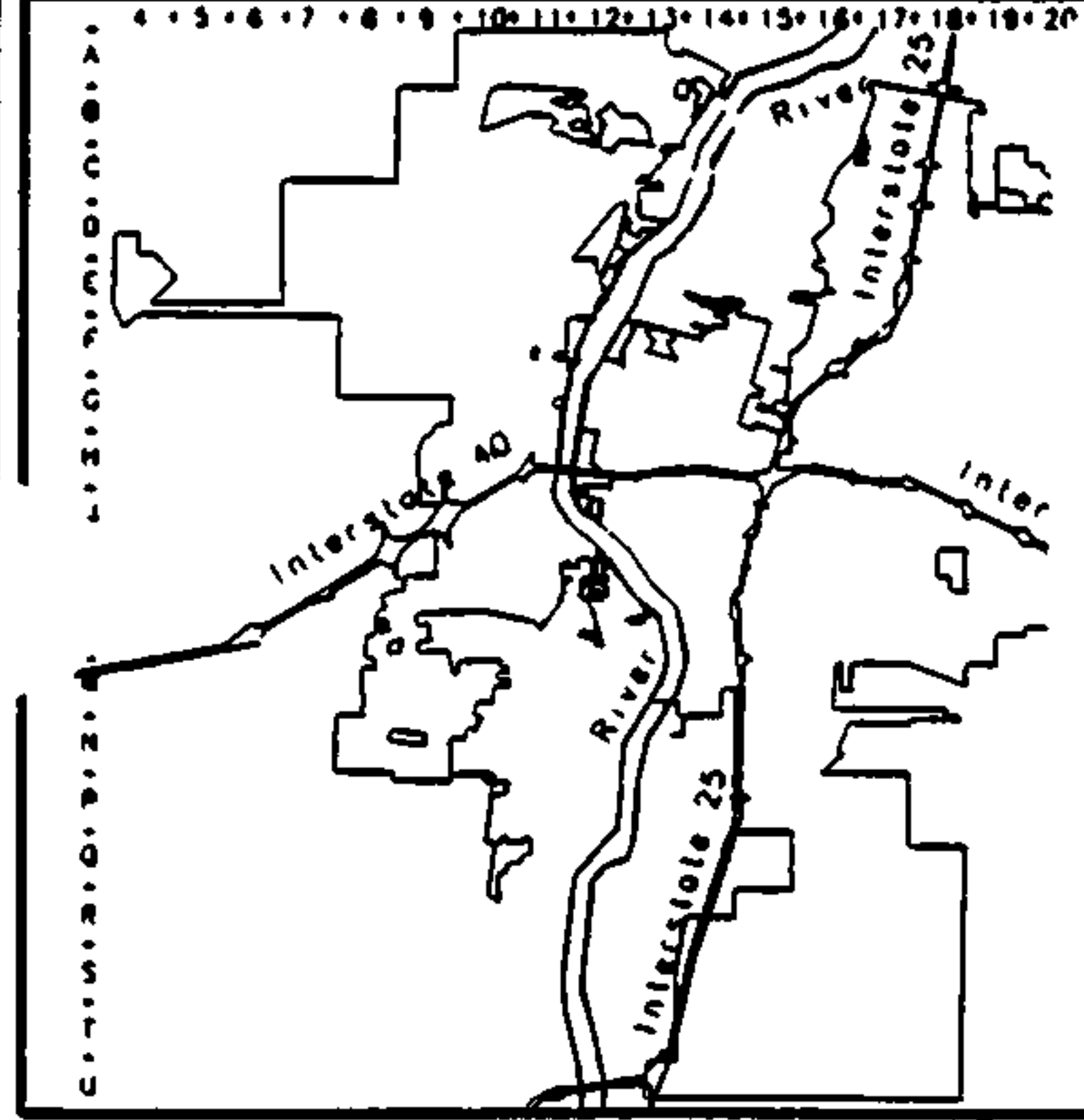
1
1
1
1
1
1

MAPS

1

1
1
1
1

1
1
1
1



LOCATION MAP

FIG 1.

LEGAL DESCRIPTION
 T10N
 R4E
 SEC 21
 UNIFORM PROPERTY CODE
 1-021-057

K-21-Z

CHB=S 11° 13' 14" W (S 12° 08' 44" W)
CH=122.05 (122.10')

PORTION OF PRIVATE COMMON ACCESS
AND DRAINAGE, 20' PRIVATE SANITARY
SEWER, 15' UTILITY AND DRAINAGE
EASEMENTS TO BE VACATED BY
THIS PLAT.

LINE

SHEET 3

HOTEL
CIRCLE N.E.

S 02° 09' 36" W

672.17'

642.16'

317.93'

10' PNM AND MOUNTAIN BELL
EASEMENT

EXISTING RETENTION
POND TO BE
RECLAIMED

15' UTILITY & DRAINAGE
EASEMENT

20' PRIVATE SANITARY
SEWER EASEMENT
(TO SERVE TRACT 1-B)

EXISTING 8" SD
TO REMAIN

SOUTH 1/2 TRACT 3
6.2372 ACRES

5' WIDE ANCHOR EASEMENT

EXISTING DET
POND TO REMAIN

10' PNM AND
MOUNTAIN STATES TELEPHONE
& TELEGRAPH EASEMENT

NOTE: TRACT 2 AND BLOCK B
SHOWN FOR INFORMATION ONLY;
NOT A PART OF THIS PLAT.

BLOCK B

2.3028 ACRES
C.C. & F. PROPERTIES OF ALBUQUERQUE
FILED 2-8-78

5' UTILITY EASEMENT

CLEAR SIGHT
EASEMENT

TRACT 1-A1

1.5795 ACRES

SITE

TRACT 1-B

1.0812 ACRES

TRACT 2

1.1741 ACRES

C.C. & F. PROPERTIES OF ALBUQUERQUE
FILED 1-21-81

N 02° 10' 05" E

347.71'

1969.96'
(1970.51')

S 87° 49' 55" E
(S 86° 51' 30" E)

SEE DETAIL "C" SHEET 5 OF 8
FOR CONTROL STATION TIE

LOMAS BLVD. N.E.

NTS.

N 87° 51' 45" W
(N 86° 51' 57" W)

S 00° 12' 20" W
(S 01° 11' 03" W)

TOMASIT

BASIN 'F' - DETAIL

FIG 2

EY. HUSTON & ASSOC. INC.

Engineers • Planners • Surveyors

CALCULATIONS

- ① MASTERPLAN
PER DMP FOR MARKET CENTRE EAST
FOR BASIN (F):

$$A = 6.5 \text{ AC}$$

$$Q_{100} = 30.9 \text{ CFS}$$

DOWNSTREAM SD DESIGNED FOR
153 CFS. $Q_{100} = 147 \text{ CFS}$ PER DMP.

ALL SD CAPACITIES + STREET
DEPTHS VERIFIED BY DMP.

- ② EXISTING CONDITIONS

BASIN (F) CONSIST OF 4 PARCELS:

TRACTS 1-A1 + 1-B (SITE)

TRACT 2 AND BLOCK B

- (A) THE SITE PRESENTLY RETAINS ALL RUNOFF
IN A TEMP RET POND. POND VOL = 9800 CF
PER PLAN BY TMA,

- (B) TRACT 2 AND BLOCK B ROUT ALL
RUNOFF TO A DETENTION POND
LOCATED ON TRACT 2. POND DRAINS
BY 8" SD TO HOTEL CIRCLE
POND VOL = 18,800 CF $\pm$.

POND DRAINS AT CONTROLLED RATE
AS FOLLOWS:

SEWER PIPES

Enter up to 10 pipes.

Enter <Return> only for flowrate and diameter to end.

FLOWRATE (CFS)	DIAMETER (IN)	FRICTION (FT ^{1/6})	SLOPE (%)	VELOCITY (FPS)
1.71	8.00	0.0130	2.00	4.90

CURRENTLY, TOTAL Q FROM BASIN (F)
Q = 1.7 CFS

③ PROPOSED CONDITIONS

MASTERPLAN IMPROVEMENTS ALLOW A
FREE DISCHARGE FROM BASIN OF 30.9 CFS

ALLOW BASIN TO RECLAIM PONDS. LIMIT
% D TO 85%, WHICH IS CURRENT
STANDARD FOR OFFICE DEVELOPMENT:

① FOR BASIN (F): USING AHYMO

A = 6.13 AC
ACTUAL AREA

PRECIP ZONE 4
P₃₆₀ = 2.90"

LAND TRMT

AREA	A	B	C	D	Ew	Q ₁₀₀	V
6.13	0	0.43	0.49	5.21	2.44	<u>30.4</u>	1.25 AF

⇒ AT %D = 85, ENTIRE BASIN (F) MAY RECLAIM PONDS IF DESIRED.

(B) SITE HYDROLOGY

AREA	A	B	C	D	Ew	Q ₁₀₀	V
2.66	0	0.19	0.21	2.26	2.44	<u>13.2</u>	0.54 AF

⇒ AT %D = 85, TOTAL Q FROM BASIN (F) IS AS FOLLOWS:

$$Q_{\text{SITE}} = 13.2$$

$$Q_{\text{TR2}} = 1.7$$

BLKB

$$Q_{\text{TOT}} = \underline{\underline{14.9 \text{ CFS}}}$$

APPROVED DRAINAGE MASTERPLAN



ESPEY,
HUSTON &
ASSOCIATES, INC.

Engineering & Environmental Consultants
4801 Indian School Rd., N.E., Suite 204 • Albuquerque, New Mexico 87110

DRAINAGE REPORT
AND
DOWNSTREAM ANALYSIS
FOR
MARKET CENTRE EAST
JULY 1986

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION/DESIGN HYDROLOGY SECTION

CONFERENCE RECAP

DRAINAGE FILE/ZONE ATLAS PAGE NO.: K-21 DATE: 11/13/85 @ 9:0
PLANNING DIVISION NOS: EPC: * DRB: _____
SUBJECT: MARKET CENTRE EAST
STREET ADDRESS (IF KNOWN): _____
SUBDIVISION NAME: TRACTS 1-C, 2, 4-A4, 4-C, SLY 423, HOME DEV. ADD
* Submitting for SDP approval.
APPROVAL REQUESTED:

_____ PRELIMINARY PLAT	_____ FINAL PLAT
<u>*</u> SITE DEVELOPMENT PLAN	_____ BUILDING PERMIT
_____ OTHER	_____ ROUGH GRADING

WHO	REPRESENTING
ATTENDANCE: <u>Dennis Lorenz</u>	<u>Espey, Huston & Assoc. Inc.</u>
<u>Billy Goolsby</u>	<u>City / Design Hydrology</u>

FINDINGS:

- ① Minimum requirement will be an approved Conceptual Plan that is of sufficient detail for design of the required infrastructures.
- ② A subdivision improvements agreement may be appropriate for final Site Development Plan sign-off.
- ③ Discharge to be determined by analysis of downstream capacity. On-site control may be required if discharge is direct to public street or surface discharge.
- ④ An erosion control plan for the period of construction will be required to ensure that sediments remain on-site.

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Billy G. Goolsby
TITLE: CE/Design Hydrology
DATE: 11/13/85

SIGNED: Don A. Fry
TITLE: STAFF ENG
DATE: 11-13-85

MARKET CENTRE EAST
DOWNSTREAM ANALYSIS

The following analysis outlines the proposed drainage criteria for the Market Centre East development and contributing drainage areas. The attached calculations are presented in accordance with the Development Process Manual, Volume II, Chapter 22.

The following narrative outlines the condition at each analysis point and lists the required improvements:

1. Analysis Point #1

Analysis Point #1 is located near the southeast corner of the Market Centre East project, at the I-40 channel. At this point, the I-40 channel is located along the north right-of-way of the Interstate. In the existing state, Basin "A" drains into the I-40 right-of-way, then west to an existing 42" RCP which drains to the I-40 channel.

It is proposed to build a berm along the west property line of the APS property to prohibit any discharge from Basin "A" onto the project site. Also, a sedimentation pond shall be constructed to prevent the transport of sediment downstream. The sedimentation pond will drain by means of a 30-inch standpipe into an existing 83" x 53" elliptical storm drain which outfalls at the I-40 channel.

2. Analysis Point #2

Analysis Point #2 is located at an existing 42-inch culvert within the I-40 right-of-way near the westbound Eubank exit. The 42-inch culvert presently drains Basins "A", "B" and "I" to the I-40 channel. In the developed condition, the culvert will continue to drain Basins "B" and "I". A storm drain will be constructed to convey flows from Basin "B" to the existing culvert. Also, an area drain will be placed within the I-40 right-of-way to drain Basin "I".

3. Analysis Point #3

Analysis Point #3 is located at the existing 54-inch culvert which drains to Los Altos Park and eventually to the I-40 channel. The 54-inch culvert presently drains Basins "C", "D" and "F". In the developed condition, Basins "C", "D" and "F" will continue to drain to AP #3. Basin "D" will continue to contribute overland flow to an existing ponding site located within the east right-of-way of Eubank, at the inlet of the 54-inch pipe. Basins "C" and "F" will drain to a proposed 48" storm drain which will outfall at the pond site.

The existing pond site will require additional grading, fencing and erosion control.

4. Analysis Point #4

Analysis Point #4 is located at the low point of Hotel Circle Road. Presently, at AP #4, Basins "C" and "F" drain through a rundown to the above mentioned pond at AP #3. A 48-inch storm drain with a transverse inlet is proposed to be constructed to drain developed flows from Basins "C" and "F" to the pond site.

5. Analysis Point #5

Analysis Point #5 is located at the terminus of the existing swale (at Los Altos Park) at an existing 54-inch culvert which drains to the I-40 channel. The 54-inch culvert presently drains Basins "C", "D", "H", "F" and the NMSHD 24" storm drain at Eubank. As shown by the calculations, the 54-inch pipe and swale have capacity to drain the developed flows from these areas. Some additional erosion protection may be required at the 54-inch inlet.

6. **Analysis Point #6**

Analysis Point #6 is located on Eubank Boulevard just south of Hotel Circle Drive. This analysis point is impacted by Basin "E" and the excess overland flow from Basin "G". AMDS Hydrographs are included for Basin "G" and resultant excess street flow. Eubank Boulevard is presently located within a 100-year flood hazard zone. It is required that Basin "E" not further impact the FHZ. Hydrographs were plotted for Basin "E", excess street flow, and the NMSHD 24-inch storm drain (not included in AMDS Analysis). As shown by the hydrographs, approximately 60 percent of Basin "E" drains via the 24-inch storm drain prior to the occurrence of excess street flow. Free discharge of Basin "E" does increase the peak discharge at AP #6 by 7 cfs; however, it appears that free discharge is preferred over ponding due to the separation of peaks. The recent grading and drainage plan for the Owl Cafe utilized this criteria and free discharge was granted with approval of the plan.



ESPEY, HUSTON & ASSOCIATES, INC.

CALCULATIONS

I. DESIGN CRITERIA

A. Rainfall

$$P_{100} = 2.45 \text{ in.} \quad P_{10} = 1.61 \text{ in.}$$

B. Soils

TgB - Tijeras - Soil Group "B"

C. Rational "C" Factor

Existing undeveloped soil $C = 0.34$

Developed areas @ 95% impervious $C = 0.92$

D. Time of Concentration

$$t_c = 0.0078 (L)^{0.77} / (s)^{0.385}$$

E. Rainfall Intensity

$$i = P^{6.84} t_c^{-0.51}$$

F. Runoff - Peak rate

$$Q = CIA$$

G. Volume

$$V = PCA$$

$$V = \text{direct runoff} \times \text{Area}$$

h

ESPEY, HUSTON & ASSOCIATES INC.

Engineering & Environmental Consultants

SUBJECT _____

MARKET CLINTON EAST.

SHEET 1 OF 22 BY DL
DATE 9-11-84 CK BY _____

HYDROLOGIC CALCULATIONS

EXISTING

AP#	Basin	Area	L	H	tc	%imp	C'	Lim	Lir	Q _{un}	Q _{un}	V _{in}	CM
1	A	22.1	1900	24	14	18	0.42	4.35	2.82	40.4	26.6	52,145	20,055 75
2	B	18.4	1700	40	13	0	0.34	5.14	2.33	32.2	21.1	30,055	10,020 70
4	C	37.0	2700	47	16	13	0.40	4.04	2.65	57.8	22.2	73,870	26,860 73
3	D	12.3	1250	25	10	75	0.72	5.12	3.10	12.6	32.5	84,835	49,115 95
6	E	9.5	1000	14	10	21	0.43	5.18	3.11	21.2	13.9	22,415	10,345 76
—	F	4.0	250	20	10	50	0.58	5.12	3.11	12.0	7.9	12,340	5,080 79
2102	*G	380±			24					27.3			—
5	H	10.0	1150	20	10	22	0.44	5.18	3.40	22.8	15.0	16,335	3,630 68
2	I	2.3	1400	34	10	40	0.52	5.18	3.40	6.2	4.1	7515	2920 81
2	A+B	40.5	2700	42	15	10	0.38	4.02	2.64	61.7	40.7	80,860	29,405 73
2	A+B+I	42.8	2700	42	15	11	0.39	4.02	2.64	67.1	44.1	85,450	31,075 73
3	C+D+F	53.3	2700	47	16	33	0.50	4.04	2.65	107.7	70.8	164,455	67,720 79
5	C,D,F+H	63.3	3750	44	20	32	0.48	3.62	2.33	110.0	72.3	183,825	80,425 77
6	*C+D+H +F+24"SD	—	—	—	20	—	—	—	—	131	—	—	—

* SEE ATTACHED HYDROGRAPH'S FOR DETERMINATION OF QP.



ESPEY, HUSTON & ASSOCIATES INC.
Engineering & Environmental Consultants

SUBJECT _____

MAINTENANCE EAST

SHEET 2 OF 22 BY DL
DATE 3-11-86 CK BY _____

TABLE - 2

HYDROLOGIC CALCULATIONS
DEVELOPED -

AP#	Basin	Area	L	H	tc	%imp	C'	U ₁₀₀	U ₁₀	Q ₁₀₀	Q ₁₀	V ₁₀₀	V ₁₀	CN
1	A	22.1	1700	24	14	18	0.47	4.35	2.85	40.4	26.6	52,145	20,055	75
2	B	18.4	1900	30	13	95	0.72	4.55	2.77	77.0	50.6	126,905	73,470	95
4	C	37.0	2700	47	16	95	0.92	4.65	2.77	157.5	100.5	255,190	147,740	95
3	D	12.3	1250	25	10	95	0.72	5.18	3.20	58.6	32.5	84,835	49,115	95
6	E	7.5	1000	14	10	95	0.92	5.15	3.40	45.3	29.7	65,520	37,934	95
-	F	6.5	850	12	10	95	0.72	5.10	3.20	30.5	20.3	12,340	5,080	79
2102	* G	58.0	-	-	54	-	-	-	-	-	-	-	-	-
5	H	10.0	1150	20	10	22	0.44	5.18	3.40	22.8	15.0	16,335	3630	68
2	I	2.3	1400	34	10	40	0.52	5.18	3.40	6.2	4.1	7515	2920	81
2	B+I	20.7	1900	30	13	87	0.55	4.55	2.97	80.0	52.6	127,740	82,655	93
3	C+D+F	53.3	2700	47	16	75	0.89	4.04	2.65	191.6	125.9	348,260	212,825	94
5	C+D+H + F	63.3	3950	34	20	83	0.79	3.62	2.38	181.0	118.9	367,645	229,780	92
4	C+F	41.0	2700	47	16	91	0.89	4.03	2.65	147.0	96.6	267,895	163,715	94
6	* E+G	-	-	-	24	-	-	-	-	77.0	-	-	-	-
5	* C+D+H + F+24" SD	-	-	-	20	-	-	-	-	200	-	-	-	-

* SEE ATTACHED HYDROGRAPHS FOR DETERMINATION OF R_P.

eh

ESPEY, HUSTON & ASSOCIATES INC.
Engineering & Environmental Consultants

SUBJECT _____

MARKET CENTER EAST

SHEET 3 OF 22 BY DL
DATE 3-11-80 CK BY _____

CALCULATIONS

I. ANALYSIS POINT #1:

CONTRIBUTING BASIN = BASIN "A"

$$Q_{100} = 40.4 \text{ CFS}$$

$$V_{100} = 82,550 \text{ CF } 52,145$$

$$Q_{10} = 26.6 \text{ CFS}$$

$$V_{10} = 54,235 \text{ CF } 20,055$$

- SIZE SEDIMENTATION POND - ALLOW Q_{10} TO PASS.

BY SOLVING HYDROGRAPH POND VOL = 9650 CF

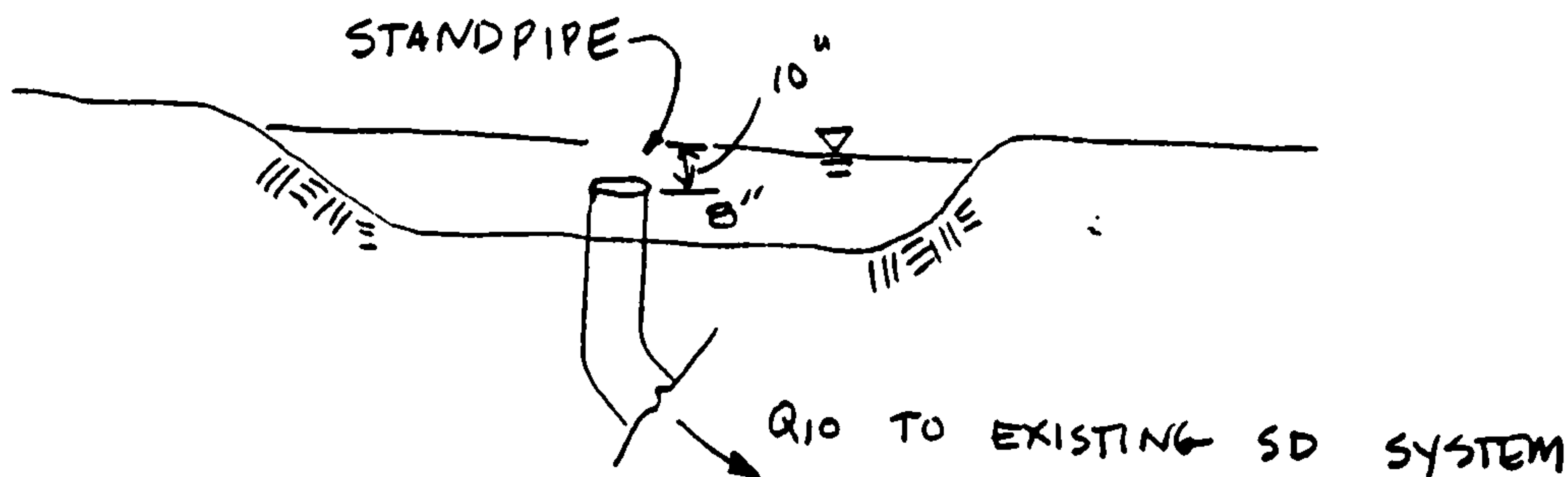
LIMIT DEPTH TO 18" MAX

POND SIZE = 80' x 80' x 1.5'

resize w/ revised volumes.
Requires APS ap
and Maintenance
Covenant

- SIZE OUTFALL STRUCTURE

USE VERTICAL STANDPIPE 8" ± HIGHER THAN
POND BOTTOM TO LIMIT SEDIMENT TRANSPORT



BY ORIFACE:

$$A = Q / C \sqrt{2gh}$$

$$A = 5.1 \text{ SF } (30" \text{ PIPE})$$

$$h = 8" \text{ } 10"$$

$$C = 0.8$$

$$Q = 26.6 \text{ CFS}$$

eh

ESPEY, HUSTON & ASSOCIATES INC.
Engineering & Environmental Consultants

SUBJECT _____

MARKET CENTER EAST

SHEET 4 OF 22

BY DL

DATE 3-11-86

CK BY _____

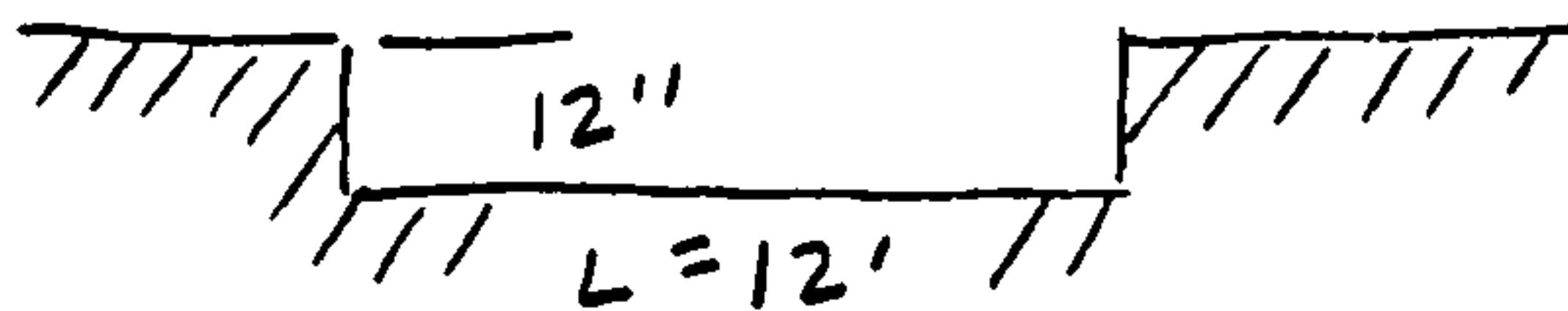
- PROVIDE SPILLWAY FOR EMERGENCY CONDITION:

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

USE $H = 12"$

$L = 12'$

$Q = 40.4 \text{ CFS}$



II ANALYSIS POINT # 2

CONTRIBUTING BASINS B + I

- SIZE SD SYSTEM FOR Q_{100}

BASIN B (ON-SITE SYSTEM)

$Q_{100} = 77.0 \text{ CFS}$

$V_{100} = 150,550 \text{ CF}$

126,905

1. INLETS - USE TYPE DBL "D"

ALLOW $D = 6" \text{ MAX}$

$K = 0.75$ (CLOGG

OPEN GRATE AREA = 5.59 SF

$C = 0.8$

BY ORIFACE:

$$Q / \text{DBL} = K C A (2) \sqrt{2gh}$$

$Q = 38 \text{ CFS}$

$\# \text{ INLETS} = 77.0 / 38 = 2$

eh

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MARKET CENTRE EAST

SHEET 5 OF 22 BY DL
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2. SIZE PIPES

- AFTER 1ST INLET $Q = 38$ CFS
USE 30" ✓ RCP @ 1% min.
- AFTER 2ND INLET $Q = 77$ CFS
USE 42" ✓ RCP @ 1% min.

BASIN "I" (OFFSITE)

ADD BASIN "I" TO BASIN "B"

$Q_{100} = 80.0$ CFS ✓

$V_{100} = 150,480$ CF 127,740

1. PIPE SIZING

USE 42" RCP @ 1% $Q_{PIPE\ MAX} = 101$ CFS $> Q_{100}$

2. INLET

Q_{100} (BASIN "I") = 6.2 CFS

ONE SINGLE 'D' INLET OR NMSHD AREA
TYPE INLET WILL WORK WITH 24" CONN.
PIPE.

- BUILD BERM OR DEPRESSION AT INLET
TO CAPTURE ALL FLOW.
- CHECK EXISTING 42" RCP TO I-40 CHANNEL.
BY INSPECTION THE PIPE HAS $S > 1\%$,
AS SHOWN ABOVE $Q_{PIPE} = 101$ CFS $> Q_{100}$ (80

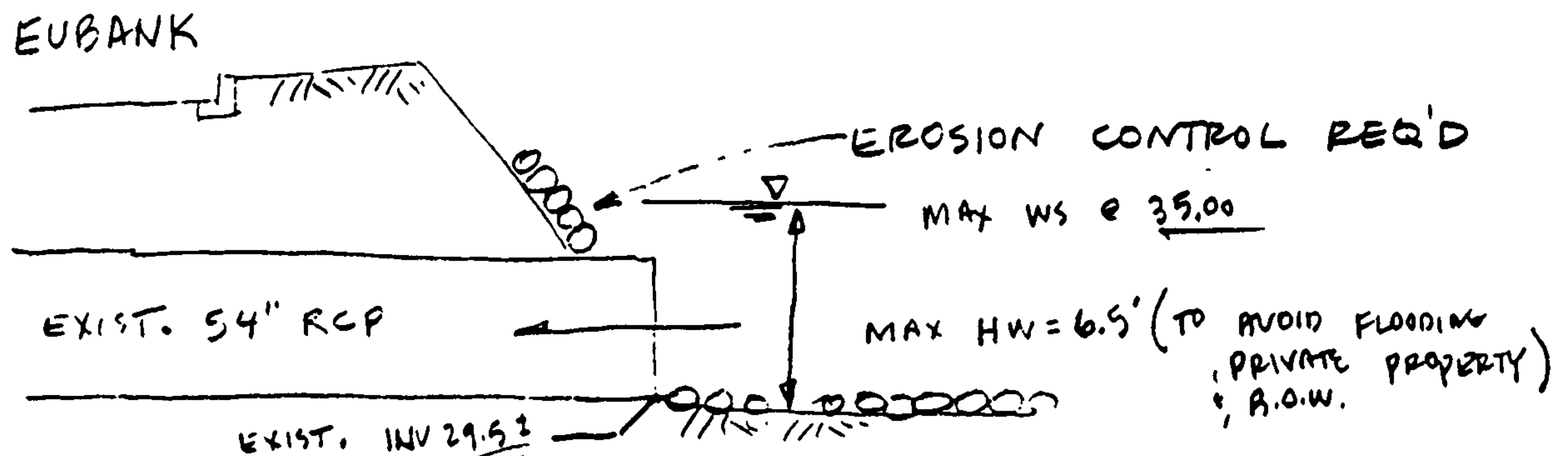


III ANALYSIS POINT # 3

CONTRIBUTING BASINS = BASINS "C+D+F"

$$Q_{100} = 191.6 \text{ cfs} \checkmark \quad V_{100} = 348,260 \text{ cf} \checkmark$$

- CHECK EXISTING 54" RCP @ EUBANK



CHECK INLET CONTROL USING B.P.R. FIG 309.4H

$$\frac{HW}{D} = 1.44 \quad ; \quad \text{ENTRANCE TYPE (3)}$$

$$Q_{54"} = 160 \text{ cfs} < Q_{100} (191.6 \text{ cfs})$$

THIS LIMITS DISCHARGE FROM BASINS C, D, F TO 160 cfs. (OUTLET CONTROL OF 54" RCP IS NOT A FACTOR. THIS IS PROVEN LATER). BASIN "D" IS FULLY DEVELOPED, SO, REQUIRE BASINS "C" & "F" TO POND EXCESS RUNOFF, OR INSPECT PONDING AREA ALONG EUBANK TO DETERMINE IF ADEQUATE PONDING VOLUME EXISTS.



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AS SHOWN BY THE TRIANGULAR HYDROGRAPH (SEE SHEET 17) THE PONDING REQUIREMENT IS 9480 CF. INSPECTION OF THE EXISTING PONDING AREA ALONG EUBANK (AT ENTRANCE TO 54" RCP) INDICATES AN AVAILABLE PONDING VOLUME OF APPROXIMATELY 35,000 CF. ALSO, A PORTION OF BASIN 'F' (TRACT 2, BLK A, CC & F PROPERTIES) PRESENTLY POUNDS 18,800 CF WITH A CONTROLLED DISCHARGE. THEREFORE, NO ONSITE PONDING IS REQUIRED FOR BASINS C, D OR F. HOWEVER, THE DEVELOPER SHOULD BE REQUIRED TO IMPROVE THE EXISTING POND SITE (I.E. EROSION CONTROL). — will need pond details to DRC or Build permits

IV ANALYSIS POINT #4

CONTRIBUTING BASINS C & F

$$Q_{100} = 147 \text{ CFS } \checkmark \quad V_{100} = 267,895 \text{ CF } \checkmark$$

AS DEMONSTRATED IN SECTION III, BASINS C & F MAY FREE DISCHARGE TO AP #3. THE COLLECTION POINT IS AT THE EXISTING SUB POINT OF HOTEL CIRCLE.

- DESIGN INLET / PIPE NETWORK TO DRAIN AP #4 TO AP #3 (54" SD):



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MARKET CENTRE EAST

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BY RV

CK BY _____

1. DETERMINE PIPE DIAMETER BY
MANNINGS EQN:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

DUE TO OBSTRUCTIONS (EXISTING UTILITIES)
CRITICAL SLOPE MAY REACH 0.01

$$\Rightarrow Q_{36"} = 66.9 \text{ CFS}$$

$$Q_{42"} = 100.9 \text{ CFS}$$

$$Q_{48"} = 144.0 \text{ CFS} \Rightarrow \text{CLOSE USE } 48" \text{ RCP}$$

MINOR SLOPE ADJUSTMENT
WILL INCREASE CAPACITY

2. CHECK HEAD REQUIRED AT ENTRANCE
USING B.P.R. FIGURE 309.44:

$$Q = 147 \text{ CFS} \quad D = 48" \quad \text{TYPE (1)}$$

$$\Rightarrow \frac{HW}{D} = 2.15 \quad H = 8.6 \text{ FT}$$

STREET GRADE @ 50.0' ± — THIS PLACES
INVERT OF INLET @ 41.9' ± WITH
RESULTANT PIPE SLOPE @ 0.018' ±

PROJECT NAME

MARKET CENTRE EAST

01

SUBJECT

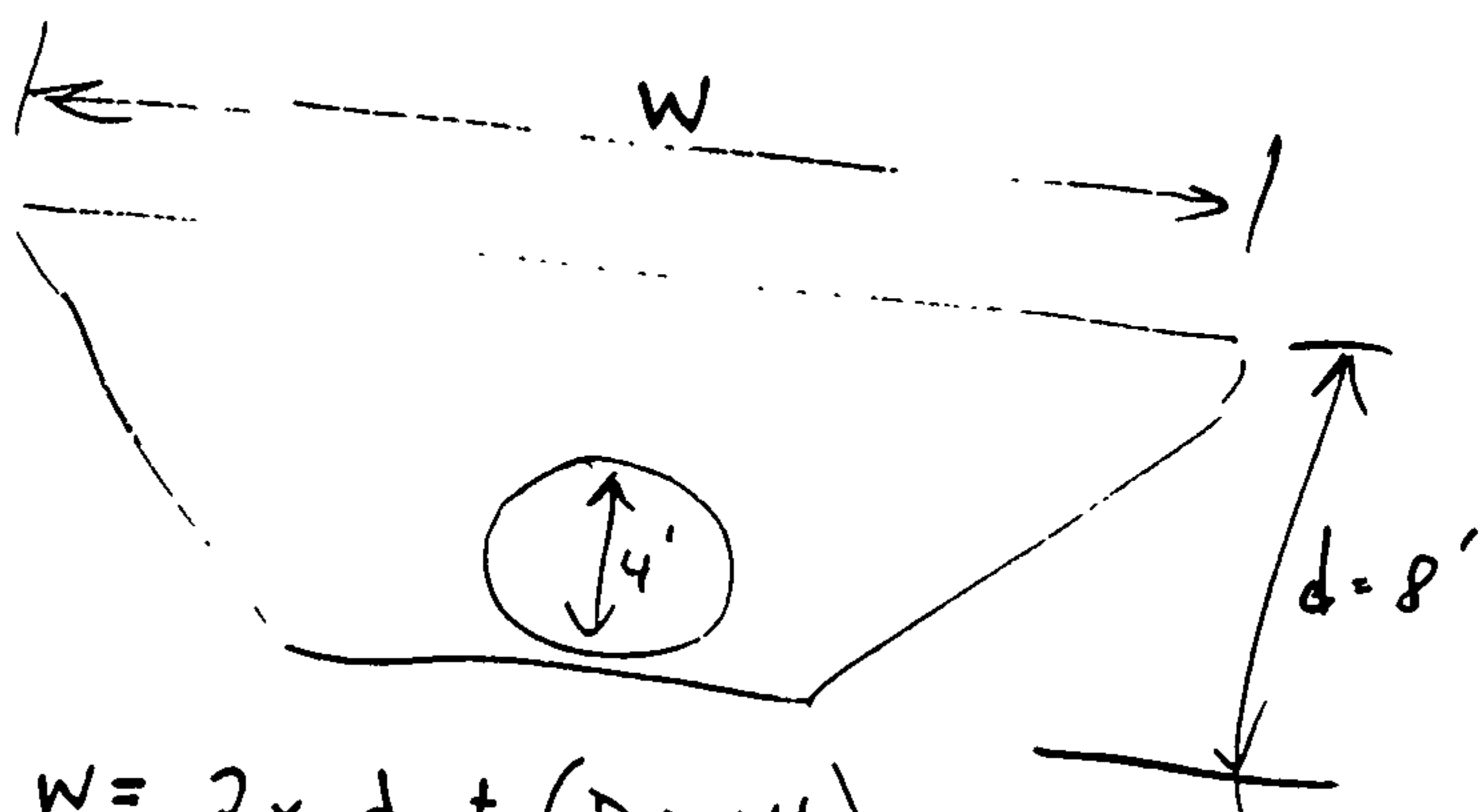
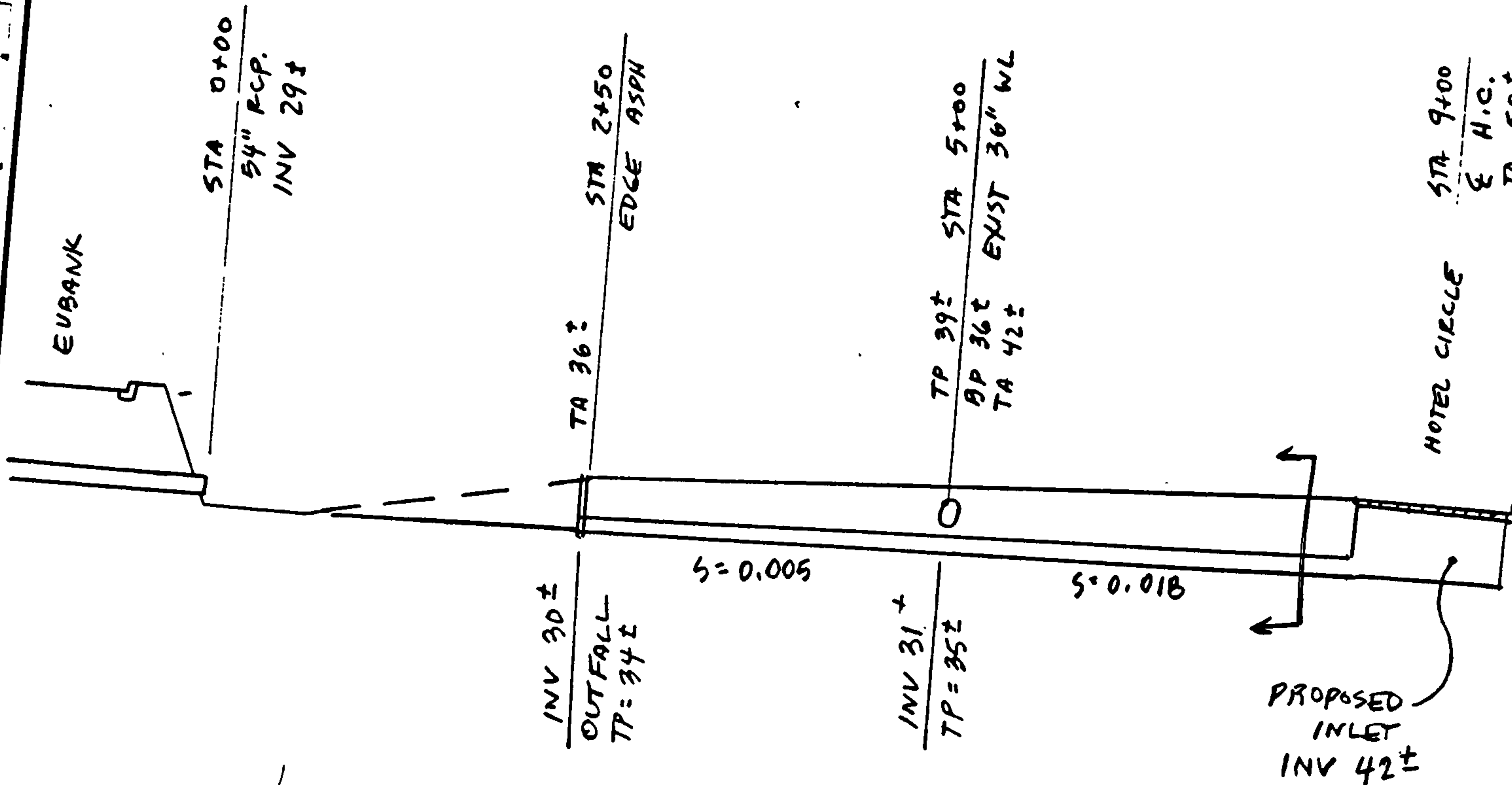
BY WV

CK. BY

APPROVED BY

DATE 3-10-86

JOB NO.

PAGE 9 OF

$$\begin{aligned}
 W &= 2 \times d + (D_{12} + 4) \\
 &= (2)(8) + (4 + 4) \\
 &= 16 + 8 = 24 \text{ min Easement Width} \\
 &\quad 17.2 \quad 25
 \end{aligned}$$

NOTES:

eh



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MARKET CENTRE EAST

SHEET 10 OF 22

BY

DATE

3-11-86

OK BY

1. SIZE INLETS

ALLOW STREET DEPTH TO REACH 0.50' MAXIMUM (6" CURB HEIGHT).

CHECK TYPICAL INLET CAPACITIES @ $d = 0.5'$ AND STREET SLOPE @ 2% (TYP).

INLET TYPE	Q max
A	8
B	13
C	8
DBLC	10

Q = 147

NOT ECONOMICAL.

ALSO DETERMINE CAPACITY OF TRANSVERSE INLET AT SAG POINT, $d_{max} = 0.5'$

INLET SIZE = 36' x 36" (40' FF)

OPEN AREA = 72 SF
BY ORIFACE (36 x 2)

$$Q = KCA \sqrt{2gh}$$

$$h = 0.5'$$

$$C = 0.8$$

$$K = 0.75 \text{ (CLOG)}$$

$$A = 72 \text{ SF}$$

$$Q_{INLET} = 245 \text{ CFS} > Q_{100} (147 \text{ CFS})$$

$$147 \text{ cfs} = Q_{100} \text{ OK}$$

⇒ USE TRANSVERSE INLET @ SAG

Jeetah
33" x 36"
is only
1.2 36 ft / L.F.
= 43.2 SF

NO



MARKET CENTRE EAST

SHEET 11 OF 22

BY

12

DATE

7-28-86

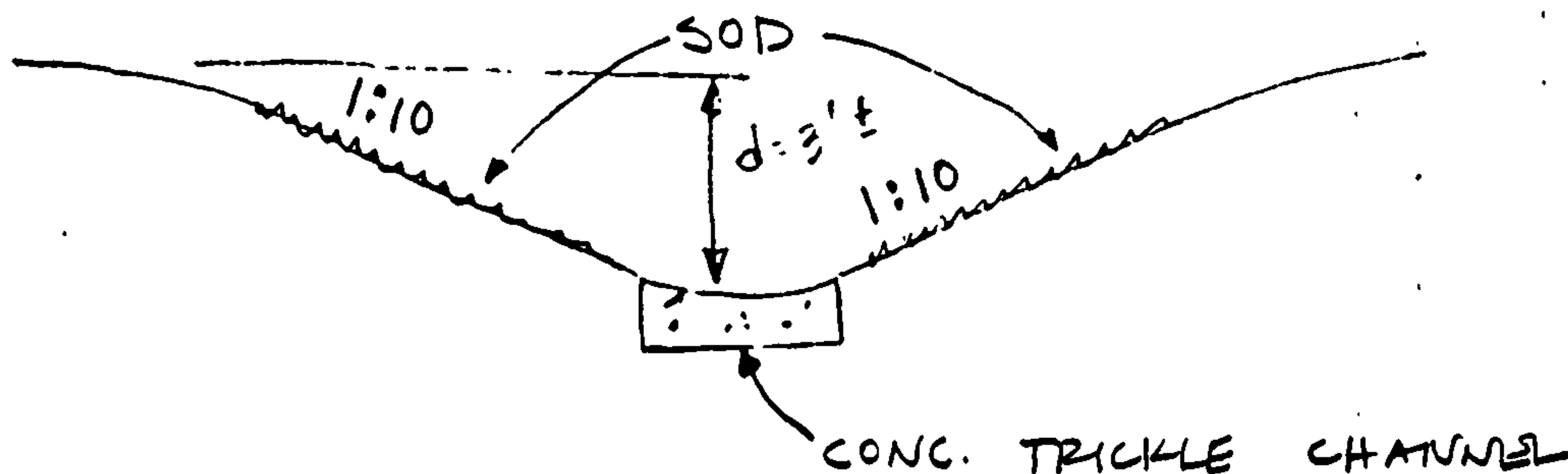
OK BY

V ANALYSIS POINT # 5

CONTRIBUTING BASINS = "C + D + F + H + NMSHD 24"

$$Q_{100} = 200 \text{ CFS} \left\{ Q_{100} = 160 \text{ CFS (AP\#3 Limit)} + 40 \text{ CFS (24" SD)} = 200 \text{ CFS} \right\}$$

- CHECK SWALE CAPACITY @ LOS ALTOS PARK



USE MANNING'S TO DETERMINE DEPTH

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

WHERE:

$$n = 0.025$$

$$S = 0.04 \pm$$

$$Q = 200 \text{ CFS}$$

SOLVING FOR d:

$$d = 1.4' \pm < 3' \text{ (AVAILABLE)}$$

CHECK VELOCITY:

$$V = \frac{Q}{A} = \frac{200}{19.6} = 10.2 \text{ FPS}$$

OK FOR
SOD
High Maintenance!

eh

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SUBJECT

MARKET CENTRE EAST

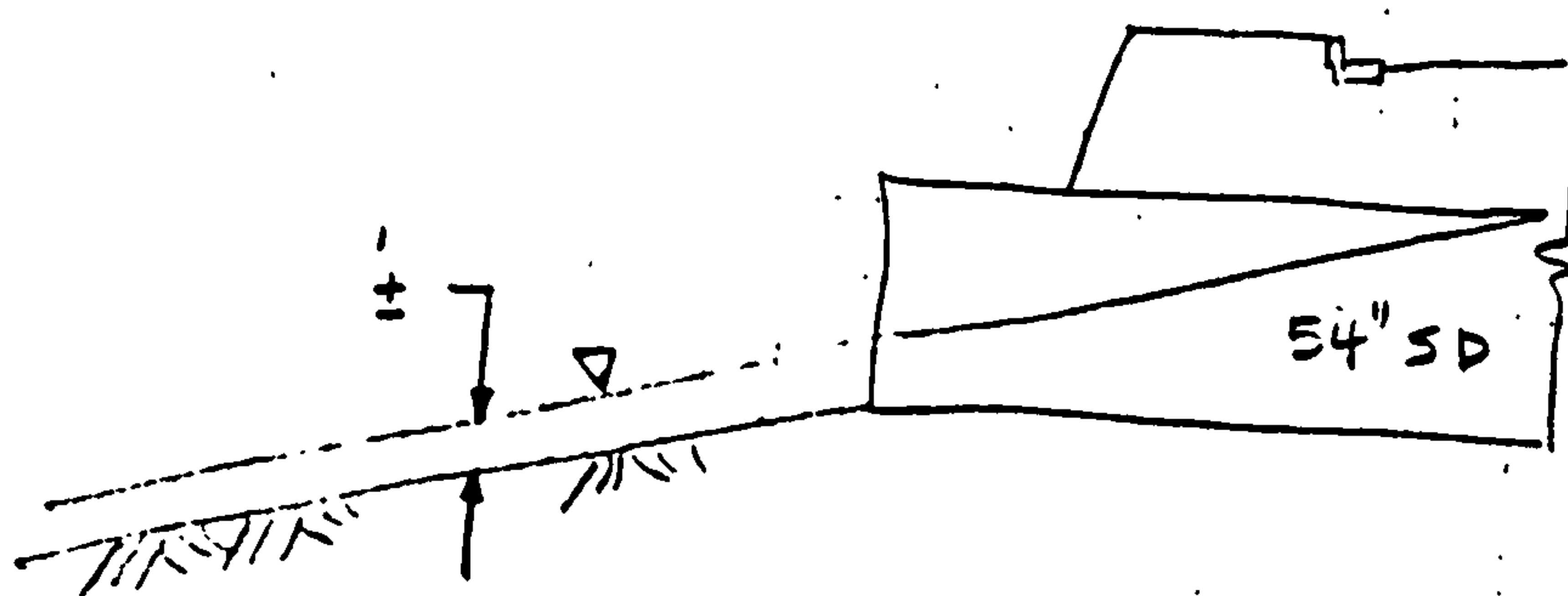
SHEET 12 OF 22

DATE 7-28-86

BY m

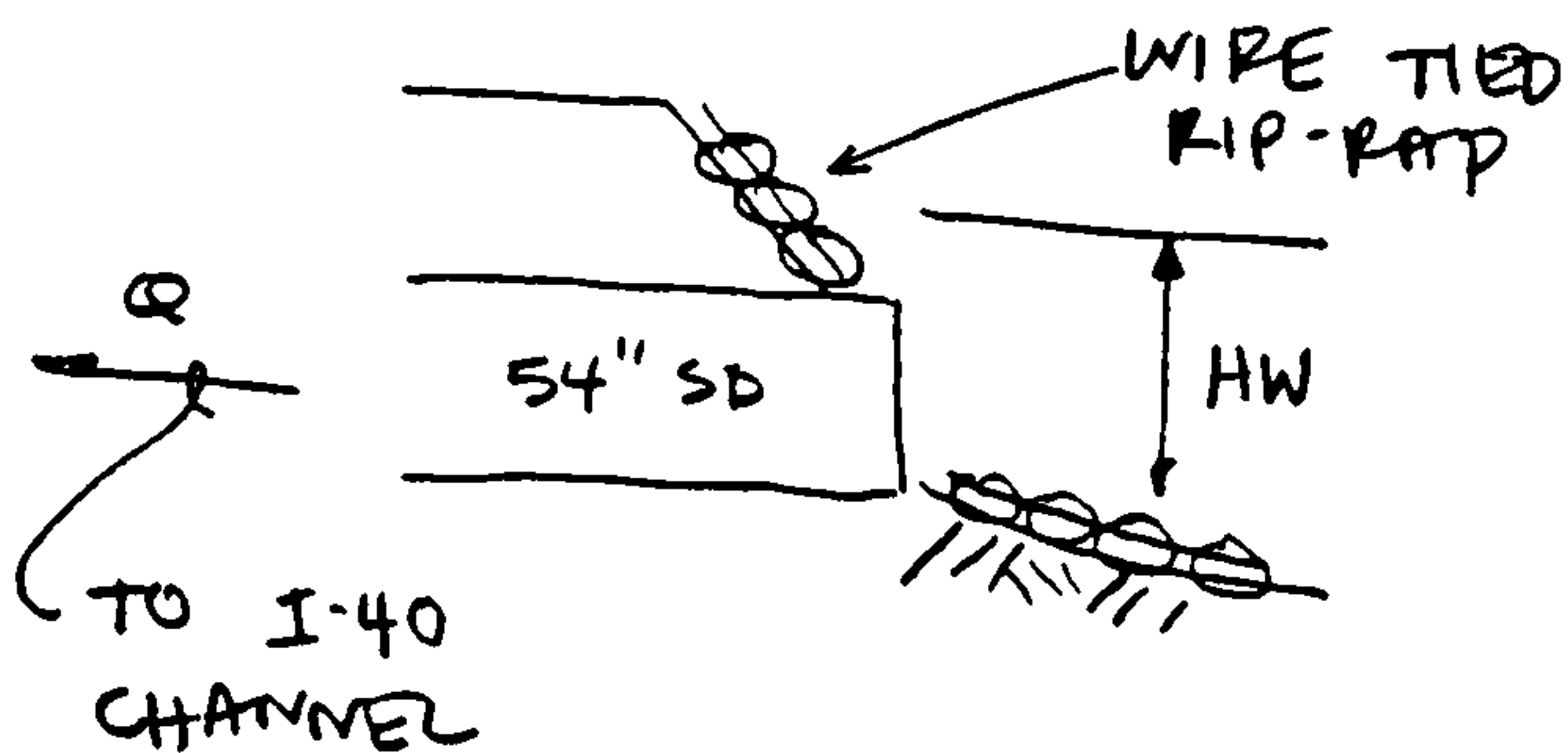
OK BY

- CHECK FOR OUTLET CONTROL @ 54" RCP (EUBANK):



SINCE TW IS MUCH LESS THAN PIPE DIAMETER IT IS APPARENT THAT OUTLET CONTROL WILL NOT DICTATE CAPACITY.

- CHECK 54" RCP @ I-40 CHANNEL FOR CAPACITY:



$$Q_{100} = 200 \text{ CFS}$$

USE B.P.R

FIGURE 30.9.4H

TO DETERMINE HEAD REQUIRED:

$$\frac{HW}{D} = 1.8 \quad ; \quad \text{TYPE (3)}$$

$$\Rightarrow HW = 8.1'$$

BY VISUAL INSPECTION THE REQUIRED HW IS AVAILABLE.



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MARKET CENTRE EAST

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BY RA

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VI ANALYSIS POINT #6

CONTRIBUTING BASINS = BASIN "E" + EXCESS
OVERLAND FLOW FROM BASIN "G"

$Q_{100} = 77$ CFS (SEE HYDROGRAPHS)

- 48" SD IN EUBANK AT CAPACITY (124 CFS)
AND OF NO REAL HELP
- AMDS IS IN ERROR IN THAT NO MENTION
IS MADE OF 24" NMSTD SD THAT DRAINS
FROM SAG POINT IN EUBANK TO LOS ALTOS
PARK AND EVENTUALLY AP #5.
- CHECK 24" SD CAPACITY
 - A. INLETS (GRATE CAPACITY)
USE ORIFACE EON @ SAG WITH $d_{MAX} = 12"$
WHICH FLOODS EUBANK TO R.
 $Q = KCA \sqrt{2gh}$ WHERE: $C = 0.8$
 $K = 0.75$ (CLOG)
 $h = 1.0$
 $A = 5.595 F$ (OPEN AREA)
 $\Rightarrow Q = 27$ CFS / INLET
2 - INLETS $\cdot Q_{INLETS} = 54$ CFS
 - B. PIPE CAPACITY
CHECK ENTRANCE BY ORIFACE:
 $Q_{24"} = 40$ CFS
WHERE: $C = 0.8$
 $A = 3.14$
 $h = 4' \pm$



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MARKET CENTRE EAST

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CHECK PIPE CAPACITY BY MANNING'S

WHERE: $n = 0.013$

$A = 3.14$

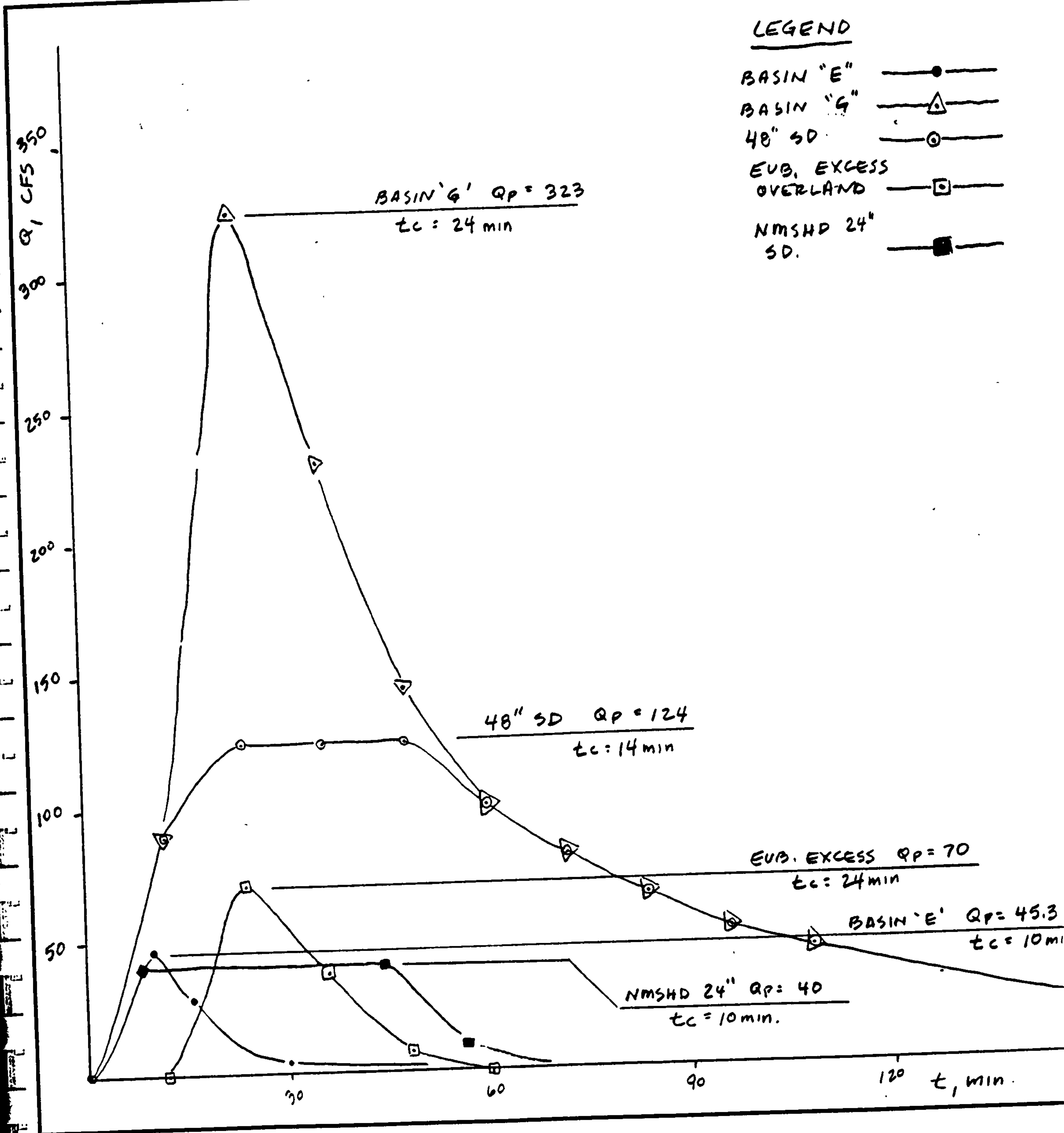
$S = 0.05 \pm$

$Q = 51 \text{ CFS}$

$\Rightarrow$ 24" ENTRANCE CONTROL LIMITS SYSTEM
CAPACITY TO 40 CFS $\pm$.

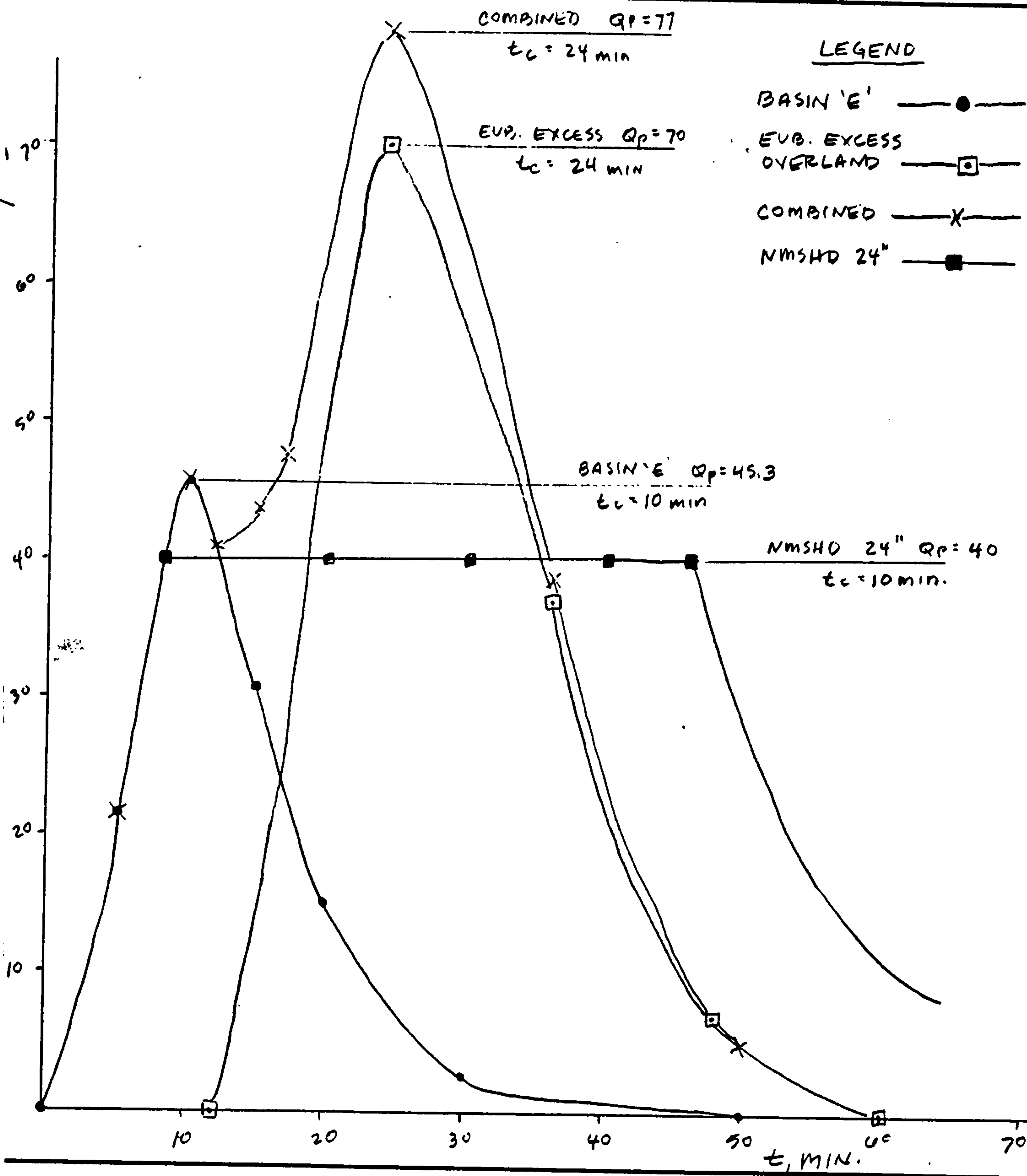
- AS SHOWN BY HYDROGRAPHS, THIS SYSTEM (24") WILL EVENTUALLY DRAIN EMBANK, ALTHOUGH THE FHZ STILL EXISTS.

PROJECT NAME MARKET CENTRE EAST JOB NO. 7352
 SUBJECT HYDROGRAPHS AP # 6
 BY DL CK. BY APPROVED BY DATE 3-10-86 PAGE 15 OF 22



NOTES:

eh

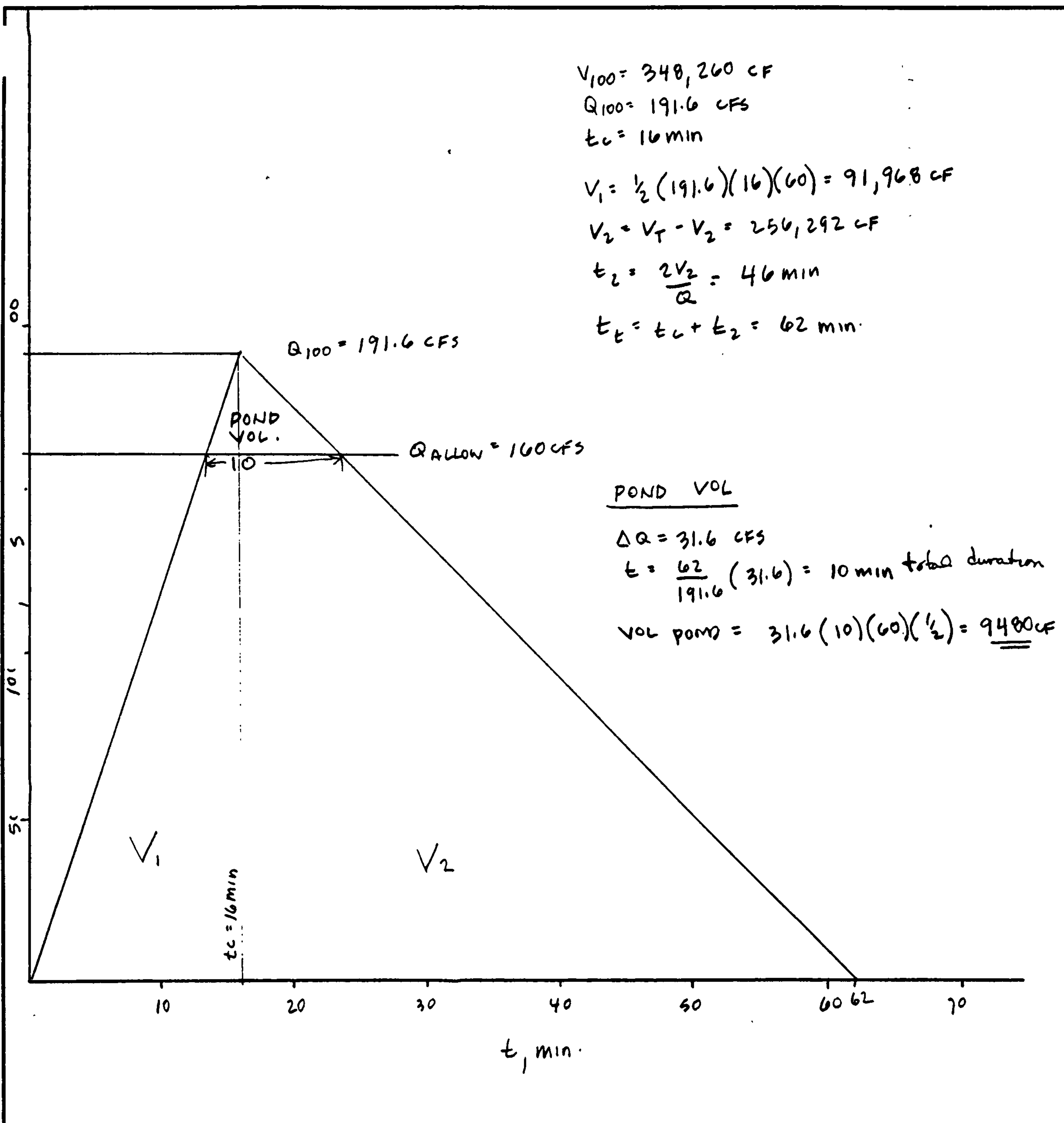


NOTES:

OBJECT NAME MARKET CENTRE EAST JOB NO. 7352

SUBJECT POND HYDROGRAPH

DL CK. BY APPROVED BY DATE 7-28-86 PAGE 17 OF 22



NOTES:

e_h

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HYDROGRAPH COMPUTATION WORKSHEET

DATE 3-10-84
 COMPUTED BY DL
 CHECK BY _____

PROJECT MARKET CENTRE EASTLOCATION EUBANK SO. OF LOMASANALYSIS POINT # 6 BASIN "E"(DR. AREA) A = 9.5 ACRES T_c 10 MINPOINT RAINFALL 2.45 IN. FROM PLATE 22.2 D-1CN = — FROM PLATES 22.2 C-2, 22.2 C-3RUNOFF VOLUME R = — IN. FROM PLATE 22.2 C-4COMPUTED T_p = — MIN. $T_p = T_c$
 (Rounded to even minute) $q_p = \frac{45.4A}{T_p} = \frac{—}{—}$ CFS./INCH OF RUNOFF $(R \times q_p) = Q_{peak} = \frac{45.3}{—}$ CFS $t(\text{COLUMN}) = (t/T_p) \quad t = T_p(t/T_p)$ $y = \frac{Q}{Q_{peak}} \quad Q = y(Q_{peak})$

Q_p DETERMINED BY RATIONAL
 METHOD. SEE TABLE - 2

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1	.03	1.4
3	.2	2	.10	4.5
4	.3	3	.190	8.6
5	.4	4	.310	14.0
6	.5	5	.470	21.3
7	.6	6	.660	29.9
8	.7	7	.820	37.1
9	.8	8	.930	42.1
10	.9	9	.990	44.8
11	1.0	10	1.00	45.3
12	1.1	11	.990	44.8
13	1.2	12	.930	42.1
14	1.3	13	.860	39.0
15	1.4	14	.780	35.3
16	1.5	15	.680	30.8
17	1.6	16	.560	25.4
18	1.7	17	.460	20.8
19	1.8	18	.390	17.7
20	1.9	19	.330	15.0
21	2.0	20	.280	12.7
22	2.2	22	.207	9.4
23	2.4	24	.147	6.7
24	2.6	26	.107	4.8
25	2.8	28	.077	3.6
26	3.0	30	.055	2.7
27	3.2	32	.040	1.8
28	3.4	34	.029	
29	3.6	36	.021	
30	3.8	38	.015	
31	4.0	40	.011	
32	4.5	45	.005	
33	5.0	50	.000	0

~~ADD HYD~~ ~~AP2102 TO ROUTED OLF FROM AP2101~~

~~ADD HYD~~ ~~ID=16~~ ~~HYD=295~~
~~ID=16~~ ~~ID=19~~
* PARTIAL OLF AT AP2102
PRINT HYD ID=16 CODE=10

HYDROGRAPH NUMBER 295

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.	2.000	26.	4.000	10.
0.200	73.	2.200	22.	4.200	9.
0.400	299.	2.400	19.	4.400	9.
0.600	204.	2.600	17.	4.600	8.
0.800	119.	2.800	15.	4.800	8.
1.000	75.	3.000	14.	5.000	8.
1.200	57.	3.200	13.	5.200	7.
1.400	45.	3.400	11.	5.400	7.
1.600	37.	3.600	11.	5.600	7.
1.800	31.	3.800	10.	5.800	7.

RUNOFF VOLUME = 19.588 ACRE-FT
PEAK DISCHARGE RATE = 299.0 CFS
PEAK OCCURRED AT 0.40 HRS.

~~ADD PARTIAL OLF AT AP2102 TO ROUTED SS FLOW FROM AP2101~~

~~ADD HYD~~ ~~ID=16~~ ~~HYD=296~~
~~ID=16~~ ~~ID=20~~
*** TOTAL FLOW AT AP2102
* 60 IN SS CONVEYS 130 CFS TO CHANNEL
PRINT HYD ID=16 CODE=10

HYDROGRAPH NUMBER 296

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.	2.000	38.	4.000	15.
0.200	89.	2.200	32.	4.200	15.
0.400	323.	2.400	28.	4.400	14.
0.600	229.	2.600	26.	4.600	13.
0.800	144.	2.800	23.	4.800	13.
1.000	100.	3.000	22.	5.000	12.
1.200	80.	3.200	20.	5.200	12.
1.400	65.	3.400	18.	5.400	11.
1.600	52.	3.600	17.	5.600	11.
1.800	44.	3.800	16.	5.800	11.

RUNOFF VOLUME = 24.812 ACRE-FT
PEAK DISCHARGE RATE = 322.9 CFS
PEAK OCCURRED AT 0.40 HRS.

1.800 0. 3.800 0. 5.800 0.

RUNOFF VOLUME = 5.566 ACRE-FT
PEAK DISCHARGE RATE = 198.9 CFS
PEAK OCCURRED AT 0.40 HRS.

* DIVIDE OLF AT EUBANK AND LOMAS (35% AND 65% RESPECTIVELY)

DIVIDE HYD ID=16 PERCENTAGE = .65

ID=19 HYD NO=296.2

ID=16 HYD NO=296.3 REMAINING ON EUBANK

*OLF ON EUBANK

PRINT HYD

ID=16 CODE=10

OUTFLOW HYDROGRAPH RESERVOIR 0.0

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.	2.000	0.	4.000	0.
0.200	0.	2.200	0.	4.200	0.
0.400	70.	2.400	0.	4.400	0.
0.600	37.	2.600	0.	4.600	0.
0.800	7.	2.800	0.	4.800	0.
1.000	0.	3.000	0.	5.000	0.
1.200	0.	3.200	0.	5.200	0.
1.400	0.	3.400	0.	5.400	0.
1.600	0.	3.600	0.	5.600	0.
1.800	0.	3.800	0.	5.800	0.

RUNOFF VOLUME = 1.948 ACRE-FT
PEAK DISCHARGE RATE = 69.6 CFS
PEAK OCCURRED AT 0.40 HRS.

***** OLF ON LOMAS

PRINT HYD

ID=19 CODE=10

* DIVIDE OUT STORM SEWER ON EUBANK
 DIVIDE HYD ID=16 CAP=124
 ID=20 HYD=296.1 SS ON EUBANK
 ID=16 HYD=296.2 OLF REMAINING
 * SS HYD IN EUBANK TO I-40 CHANNEL
 PRINT HYD ID=20 CODE=10

HYDROGRAPH NUMBER 296.1

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.	2.000	33.	4.000	15.
0.200	89.	2.200	32.	4.200	15.
0.400	124.	2.400	25.	4.400	14.
0.600	124.	2.600	26.	4.600	13.
0.800	124.	2.800	23.	4.800	13.
1.000	100.	3.000	22.	5.000	12.
1.200	80.	3.200	20.	5.200	12.
1.400	65.	3.400	18.	5.400	11.
1.600	52.	3.600	17.	5.600	11.
1.800	44.	3.800	16.	5.800	11.

RUNOFF VOLUME = 19.246 ACRE-FT
 PEAK DISCHARGE RATE = 124.0 CFS
 PEAK OCCURRED AT 0.24 HRS.

* OLF HYD AT EUBANK AND LOMAS
 PRINT HYD ID=16 CODE=10

HYDROGRAPH NUMBER 296.2

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.	2.000	0.	4.000	0.
0.200	0.	2.200	0.	4.200	0.
0.400	199.	2.400	0.	4.400	0.
0.600	105.	2.600	0.	4.600	0.
0.800	20.	2.800	0.	4.800	0.
1.000	0.	3.000	0.	5.000	0.
1.200	0.	3.200	0.	5.200	0.
1.400	0.	3.400	0.	5.400	0.
1.600	0.	3.600	0.	5.600	0.
1.800	0.	3.800	0.	5.800	0.

RUNOFF VOLUME = 5.566 ACRE-FT
 PEAK DISCHARGE RATE = 198.9 CFS
 PEAK OCCURRED AT 0.40 HRS.

FIGURE 309.4H

