

CITY OF ALBUQUERQUE



**Planning Department
Transportation Development Services Section**

April 13, 2007

Claudio A. Vigil, Registered Architect
1801 Rio Grande NW
Albuquerque, NM 89104

Re: Certification Submittal for Final Building Certificate of Occupancy for
Albuquerque Tortilla Company, [F-16 / D3A]
4300 Alexander NE
Architect's Stamp Dated 04/03/07

Dear Mr. Vigil:

P.O. Box 1293

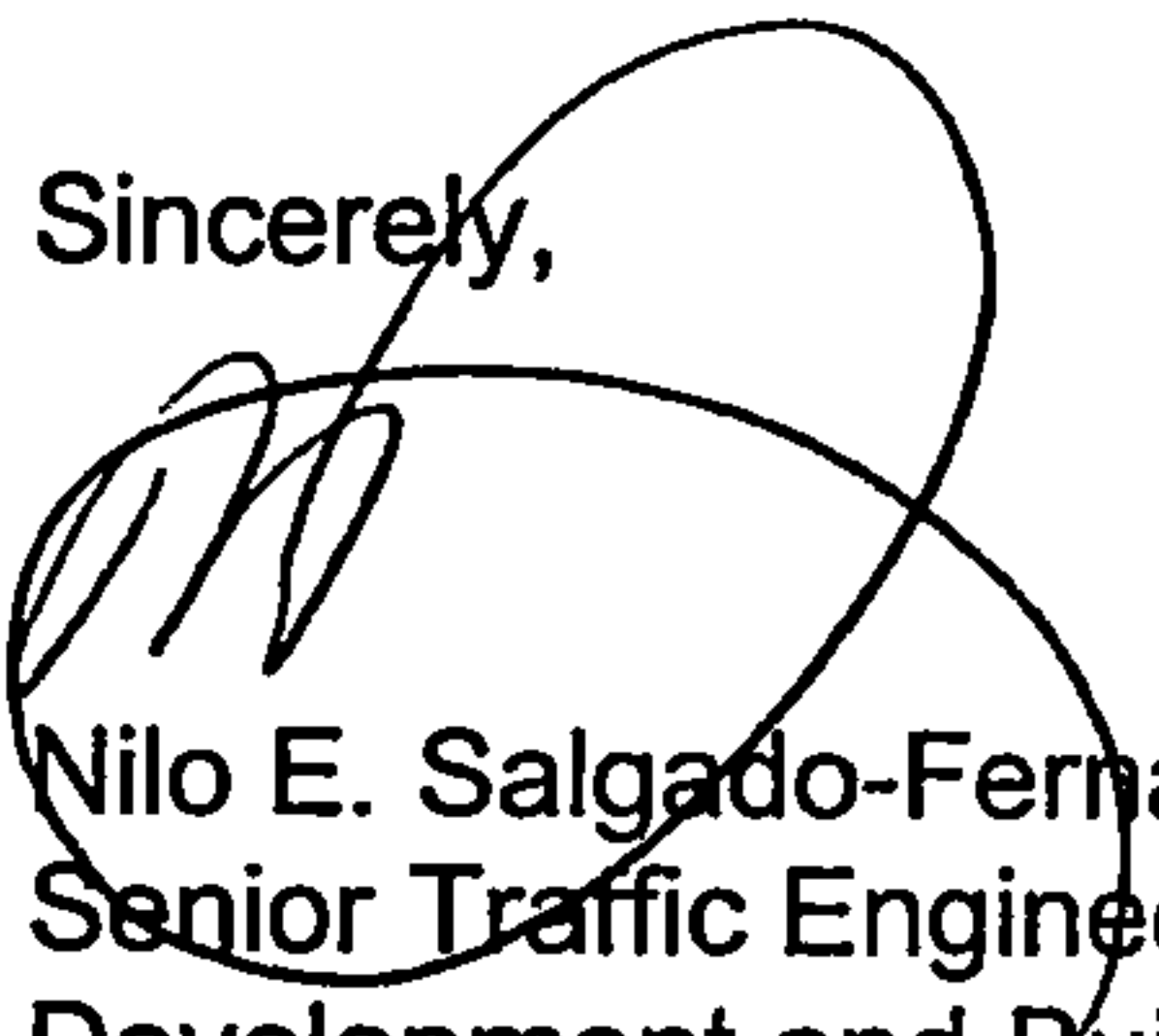
Albuquerque

New Mexico 87103

www.cabq.gov

The TCL / Letter of Certification submitted on April 13, 2007 is sufficient for acceptance by this office for final Certificate of Occupancy (C.O.). Notification has been made to the Building and Safety Section.

Sincerely,


Nilo E. Salgado-Fernandez, P.E.
Senior Traffic Engineer
Development and Building Services
Planning Department

c: Engineer
Hydrology file
CO Clerk



April 3, 2007

Traffic Engineer
Development and Building Services
600 2nd. St. N.W
Albuquerque, New Mexico

RE: TRAFFIC CERTIFICATION - Submittal
Albuquerque Tortilla Company – Production Warehouse Addition
4300 Alexander Boulevard, N.E.

To whom it may concern:

I, Claudio Vigil, NM Registered Architect 1236, of the firm Claudio Vigil Architects, hereby certify that this project is in substantial compliance with and in accordance with the design intent of TCL approved site plan and permit set. The record information documented and edited onto the approved TCL Site Plan has been obtained by Sandra Fairchild of the firm Claudio Vigil Architects. I further certify that I have personally visited the project site on February 27, 2007 and have determined by visual inspection that the survey data provided is representative of actual site conditions and is true and correct to the best of my knowledge and belief. This certification is submitted in support of a request for Certificate of Occupancy.

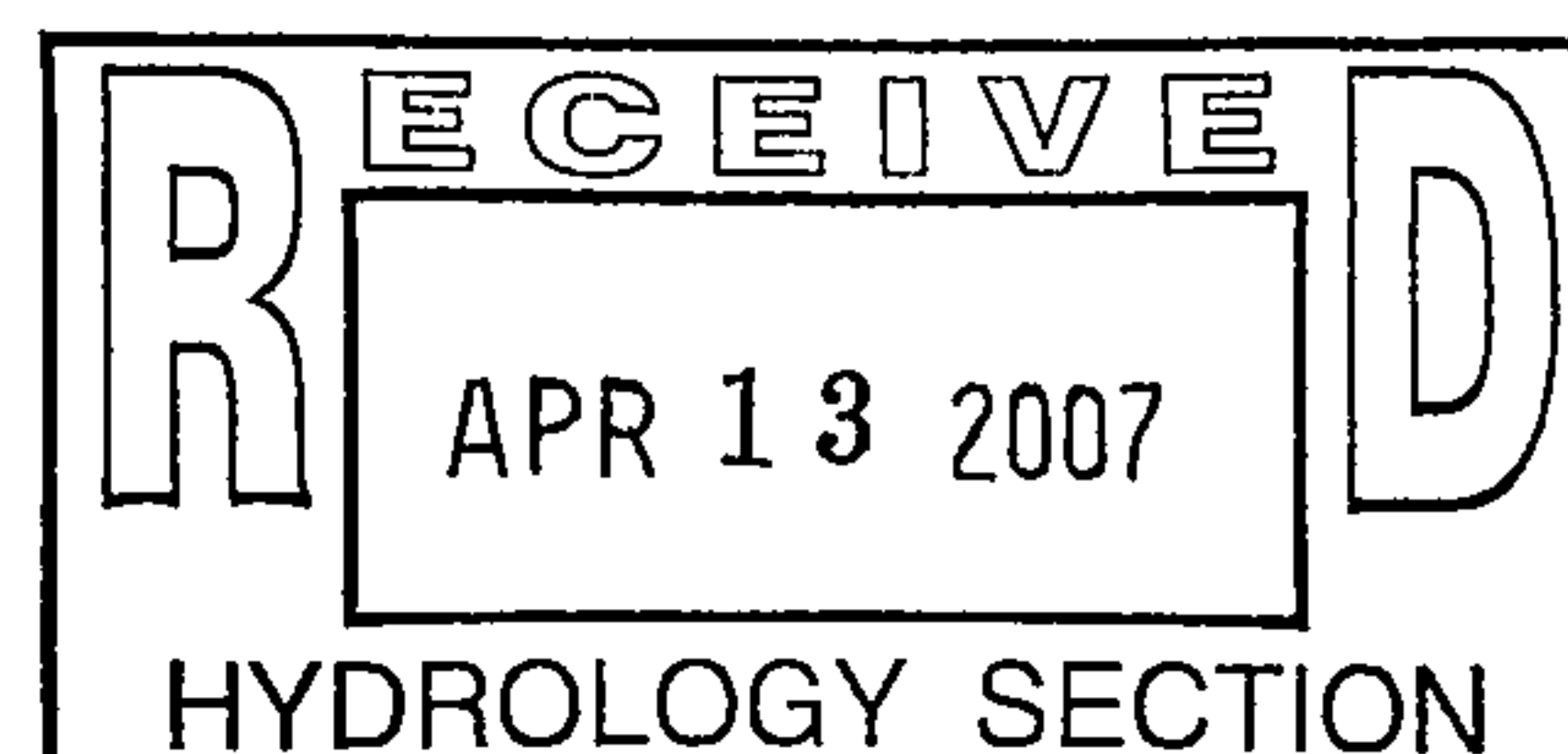
All work necessary to support the facility has been completed, and is in substantial compliance with the approved TCL.

The record information presented hereon is not necessarily complete and intended only to verify substantial compliance of the traffic aspects of this project. Those relying on the record document are advised to obtain independent verification of its accuracy before using it for any other purpose.



Signature of Architect

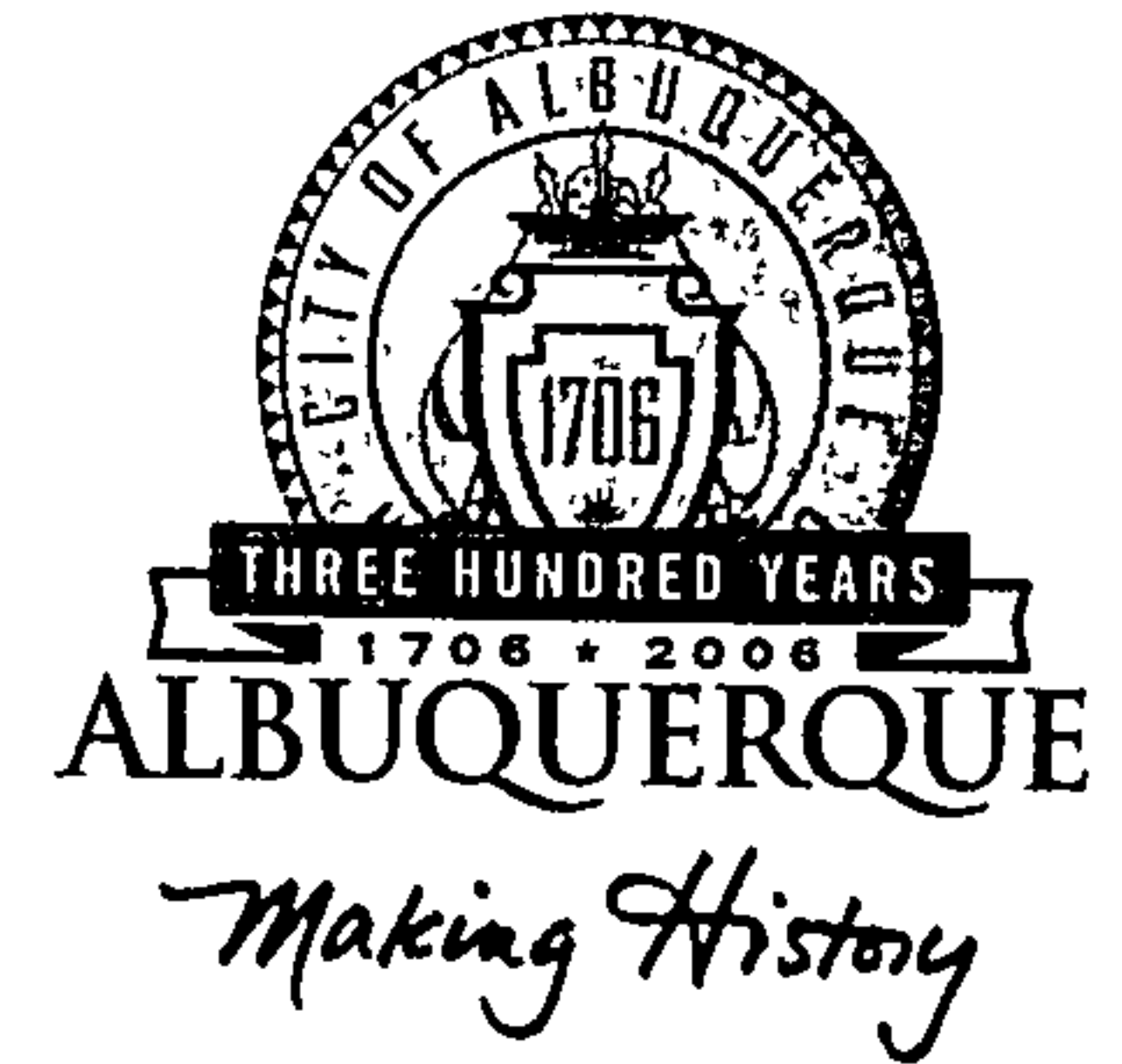
4/3/07
Date



ARCHITECT'S STAMP



CITY OF ALBUQUERQUE



June 1, 2005

Claudio Antonio Vigil, R.A.
Claudio Vigil Architects
1801 Rio Grande Blvd. NW
Albuquerque, NM 87104

Re: **Albuquerque Tortilla Company, 4300 Alexander Blvd.
Traffic Circulation Layout - Architect's Stamp dated 5-27-05 (F16-D3A)**

Dear Mr. Vigil,

The TCL submittal received 5-26-05 is approved for Building Permit. The plan is stamped and signed as approved. A copy of this plan shall be inserted into each set of the building permit plans. Please keep the original to be used for final C.O. certification of the site required by Transportation.

If a temporary CO is needed, a copy of the original TCL that was stamped as approved by the City will be needed. This plan must include a statement that identifies the outstanding items that need to be constructed or the items that have not been built in "substantial compliance," as well as the signed and dated stamp of a NM registered architect or engineer. Submit this TCL with a completed Drainage and Transportation Information Sheet to Hydrology at the Development Services Center of Plaza Del Sol Building.

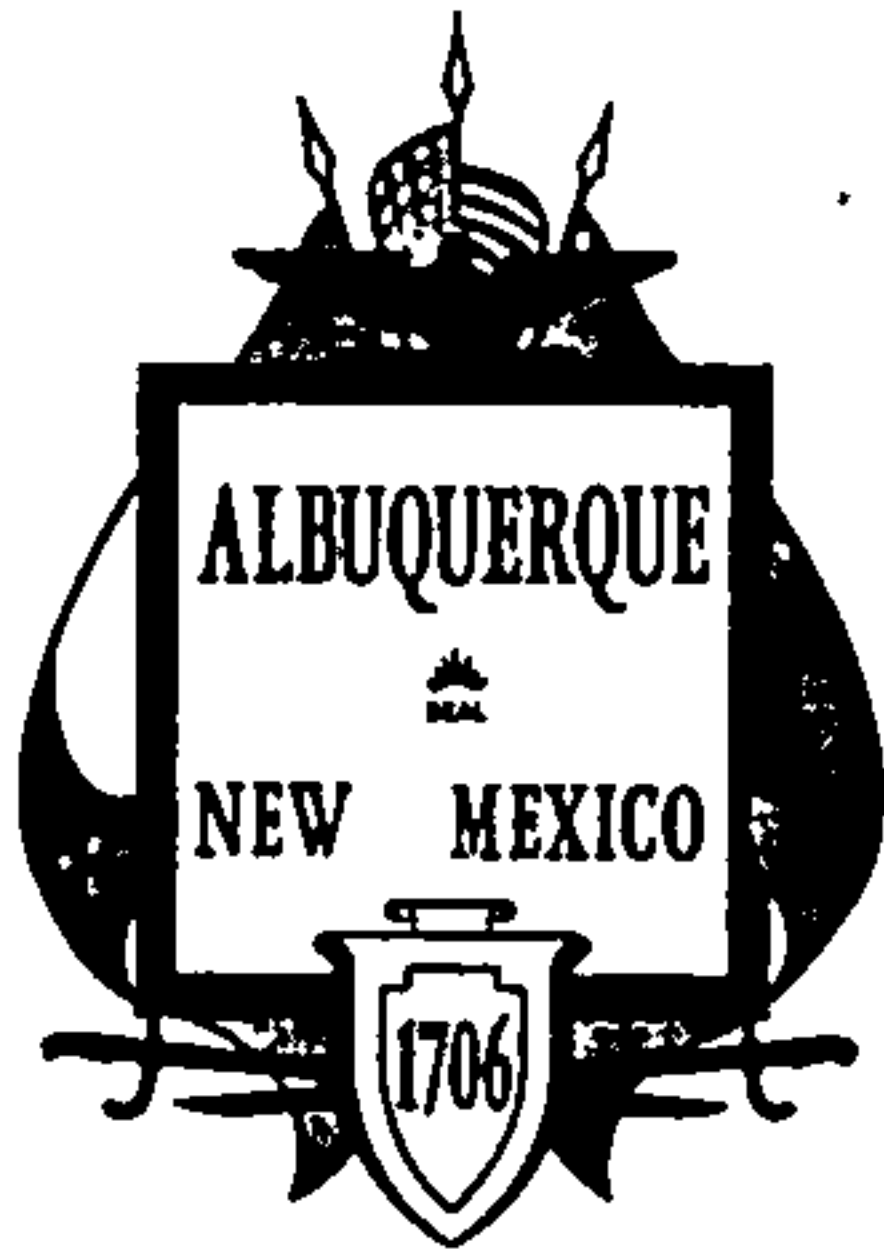
When the site is completed and a final C.O. is requested, use the original City stamped approved TCL for certification. A NM registered architect or engineer must sign, and date the certification TCL along with indicating that the development was built in "substantial compliance" with the TCL. Submit this certification TCL with a completed Drainage and Transportation Information Sheet to Hydrology at the Development Services Center of Plaza Del Sol Building.

Once verification of certification is completed and approved, notification will be made to Building Safety to issue Final C.O. To confirm that a final C.O. has been issued, call Building Safety at 924-3306.

Sincerely,

Phillip J. Lovato, E.I., C.F.M.
Engineering Associate, Planning Dept.
Development and Building Services

Cc: file



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 6, 2000

R.G. Lee, Jr., PE
BJM DEVELOPMENT CONSULTANT
4409 Karrol Rd SW
Albuquerque, NM 87103

Re: Albuquerque Tortilla Co. Grading & Paving Certification
Engineer's Stamp dated 9-5-2000 (F16/D003A)
Certification date 11/25/2000

Dear Mr. Lee:

Based upon the information provided in your submittal dated 11-29-2000, the above referenced site is approved.

Your plans appear to have some alterations, which caused additional review time. In the future, please explain any deletions or additions to plans in your summary.

If I can be of further assistance, you can contact me at 924-3986

Sincerely,

Bradley L. Bingham, PE
Hydrology Review Engineer

C: Teresa Martin
✓ file



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 7, 2000

R.G. Lee, Jr., PE
BJM Development Consultants
4409 Karrol Rd SW
Albuquerque, NM, 87103

**Re: Albuquerque Tortilla Co. Grading and Drainage Plan
Engineers Stamp 9-5-00 (F16/D3A)**

Dear Mr. Lee,

Based on information provided in your submittal dated 9-6-00, you are approved for Paving Permit for the above referenced site.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, please provide to this office a Certified As-built after completion for our files.

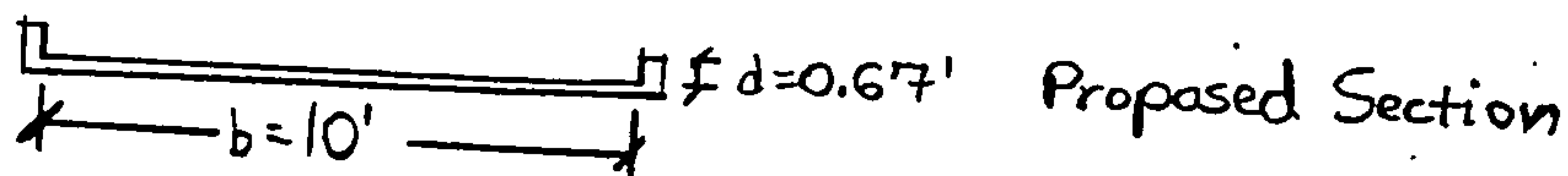
If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

PROPOSED 10' CHANNEL
CAPACITY (Midtown Place to Desert Surf Circle)
Analysis Point 1



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

$$R = A/p = \frac{bd}{b+2d} = \frac{6.70}{11.34} = 0.591$$

$$Q = 1.49/0.013 (0.591)^{0.67} (0.003)^{0.5} (6.70)$$
$$= \underline{\underline{29.57 \text{ CFS}}} > \begin{matrix} 17.10 \text{ CFS (On-site runoff allowed)} \\ + \underline{\underline{2.75 \text{ CFS}}} \text{ (Off-site - Basin 0-2)} \\ \hline \underline{\underline{19.85 \text{ CFS}}} \quad \checkmark \end{matrix}$$

OK CAPACITY

II. EXISTING CONDITIONS AND DRAINAGE PATTERN

A. On-site

1. General

The existing site is primarily undeveloped and covered with a fair amount of vegetation. The only on-site development includes the A.M.N. Spur Line which runs through the site from Alexander Boulevard to the north side of the site and then continues north along the backside of Sundt's Industrial Center. Also, a number of undesignated dirt roads cross through the site which indicate that it is partially compacted by human activity.

The site is divided into existing basins E1, E2, E3, and E4. As shown by Map No. 2, the majority of the site drains to the north by overland flow at slopes that vary between 0.5% and 1.5%. Steep slopes that form the embankment for the I-25 West Frontage Road cover the far east side of the site.

2. Discharge to Desert Surf Circle

Runoff from Basin E1 drains through Parcel D of Renaissance III to Desert Surf Circle by overland flow (See Map No. 2). This runoff will flow east and north on Desert Surf Circle until it is collected by a series of inlets on each side of the road. As indicated by the "Drainage Report for Renaissance III", these inlets were designed to handle 17.10 cfs of runoff from this on-site area in addition to downstream off-site flows. These inlets then discharge to a 42" storm drain under Desert Surf Circle which connects to an existing storm drain under Montano Road which is then extended to the

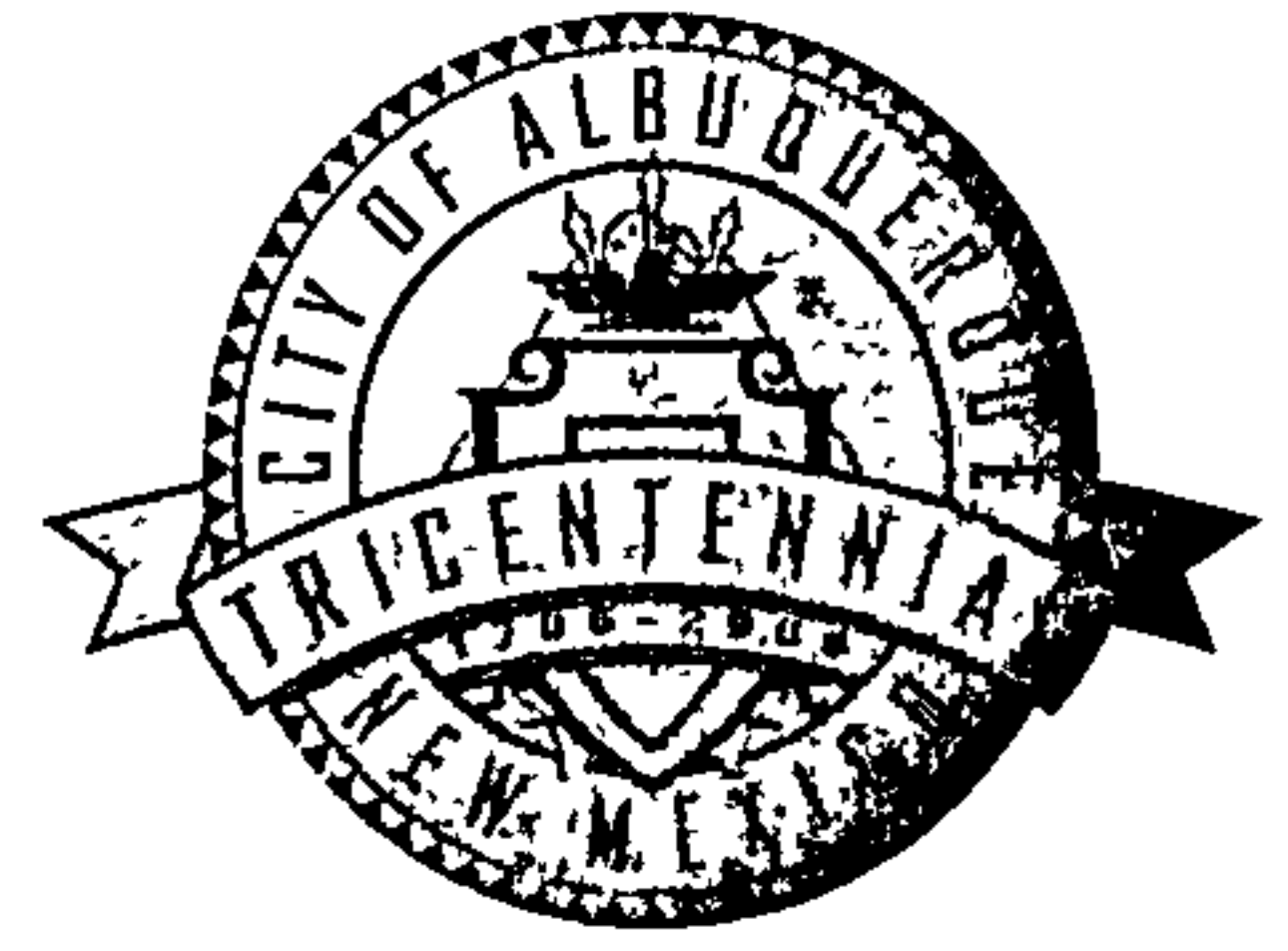
channel. This concrete channel will be constructed at a 10' width within the proposed drainage easement that extends from the cul-de-sac to the north end of the site and within the existing 20' wide drainage easement that extends from the north side of the site to Desert Surf Circle. At a proposed slope of 0.33% and a height of 8" on each side, the 10' wide channel has the capacity to convey 20.66 cfs at Analysis Point 1, and at Analysis Point 5 where the channel bends at a slope of 0.48%, it has the capacity to handle a 100-year storm runoff flow of 10.41 cfs (See Pages D-2 and D-3 of Appendix D). It is proposed to combine the drainage easement between Lots 3 and 6 with a public utility easement for installation of water and sanitary sewer lines.

Once the runoff discharges to Desert Surf Circle, it discharges east and north on Desert Surf Circle until it is collected by the series of catch basins on both sides of the street. At Analysis Point 1, a runoff amount of 16.31 cfs was calculated to flow east on Desert Surf Circle. Because the existing storm drain system east of Analysis Point 1 in Desert Surf Circle was designed to handle 17.10 cfs of on-site runoff, this runoff discharge amount is acceptable. $17.10 - 16.31 = .79 \text{ cfs}$
Increase of .45 cfs from proposed site pavings

3. Discharge to Alexander Boulevard

Proposed on-site Basin P-2 and off-site basins B-1, B-2, and B-3 will discharge to the existing Montbel Detention Basin. At Analysis Point 3 (Map No. 4) just before discharge into the basin, the street capacity of Montbel Loop at curb depth was calculated as 72 cfs (See page D-4 in Appendix D). As shown on the Master Drainage Plan for Montbel - Montano Venture (Map No.4), an existing runoff flow of 43.3 cfs was originally calculated at Analysis Point 3. Based on these calculations and

CITY OF ALBUQUERQUE



June 1, 2007

Mr. Arthur Blessen, P.E.
Claudio Vigil Architects
1801 Rio Grande Blvd. NW
Albuquerque, NM 87104

**Re: Albuquerque Tortilla Company Addition, 4300 Alexander Blvd. NE,
Approval of Permanent Certificate of Occupancy (C.O.),
Engineer's Stamp dated 08/30/05 (F-16/D003A)
Certification dated 5/07/07**

Based upon the information provided in your submittal received 5/09/07, the above referenced certification is approved for release of Permanent Certificate of Occupancy by Hydrology.

P.O. Box 1293

If you have any questions, you can contact me at 924-3982.

Albuquerque

Sincerely,

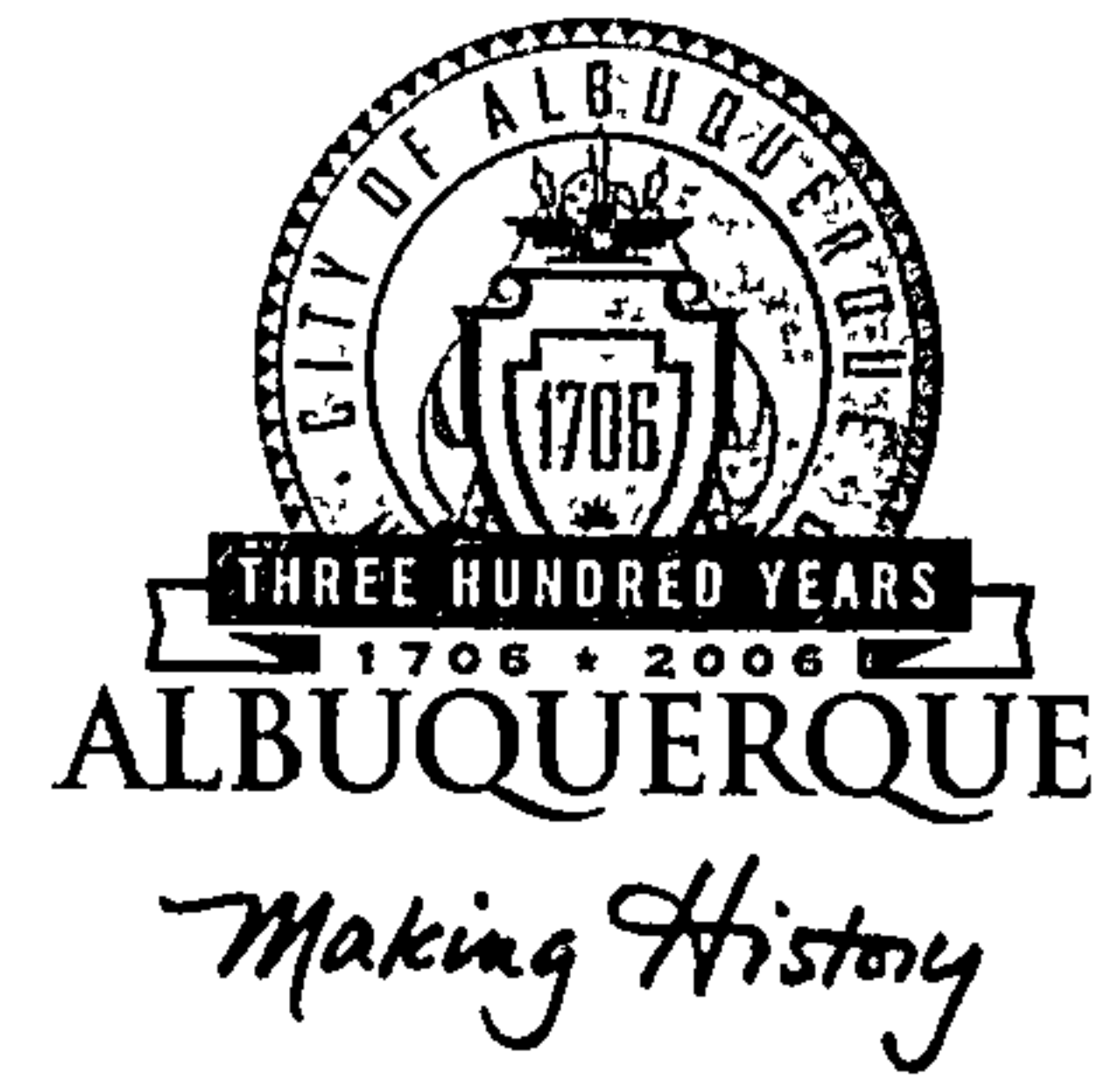
New Mexico 87103

Timothy Sims
Plan Checker - Hydrology
Development and Building Services

www.cabq.gov

C: CO Clerk-Katrina Sigala
File

CITY OF ALBUQUERQUE



June 28 , 2005

John Arthur Blessen, P.E.
Claudio Vigil Architects
1801 Rio Grande Blvd. NW
Albuquerque, NM 87104

**Re: Albuquerque Tortilla Company Addition, 4300 Alexander Blvd NE
 Drainage and Grading Plan - Engineer's Stamp dated 6-10-05 (F16-D3A)**

Dear Ms. Blessen,

Based upon the information provided in your submittal dated 6-10-05, the above referenced plan is approved for Building Permit and S019 Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology. Prior to release of the Certificate of Occupancy-an-Engineer's-Certification of the grading plan per the DPM checklist, execution of the Agreement and Covenant and acceptance of the Work Order by City of Albuquerque will be required.

P.O. Box 1293

Albuquerque

New Mexico 87103

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department Hydrology section at 768-3654 (Charles Caruso).

If you have any questions, you can contact me at 924-3990.

Sincerely,

Phillip J. Lovato, E.I., C.F.M.
Engineering Associate, Hydrology,
Development and Building Services,
Planning Department

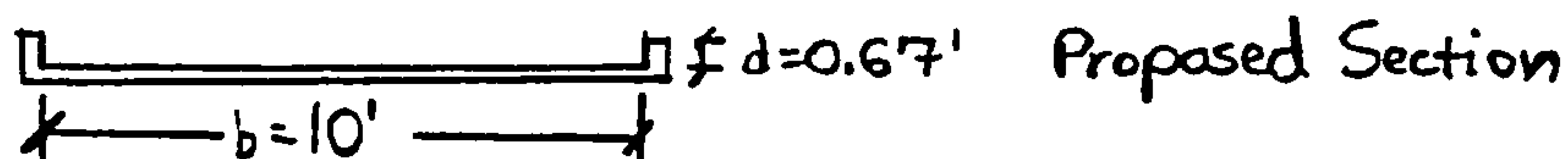
www.cabq.gov

cc: Charles Caruso, DMD
 Liz Sanchez, Excavation & Barricading
 Matt Cline, Storm Drain Maintenance
 file

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
149 Jackson, N.E., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Midtown Business Park Sheet _____ of _____
Job No. _____
By JW Chk'd _____ Date April 15, 1998

PROPOSED 10' CHANNEL
CAPACITY (Midtown Place to Desert Surf Circle)



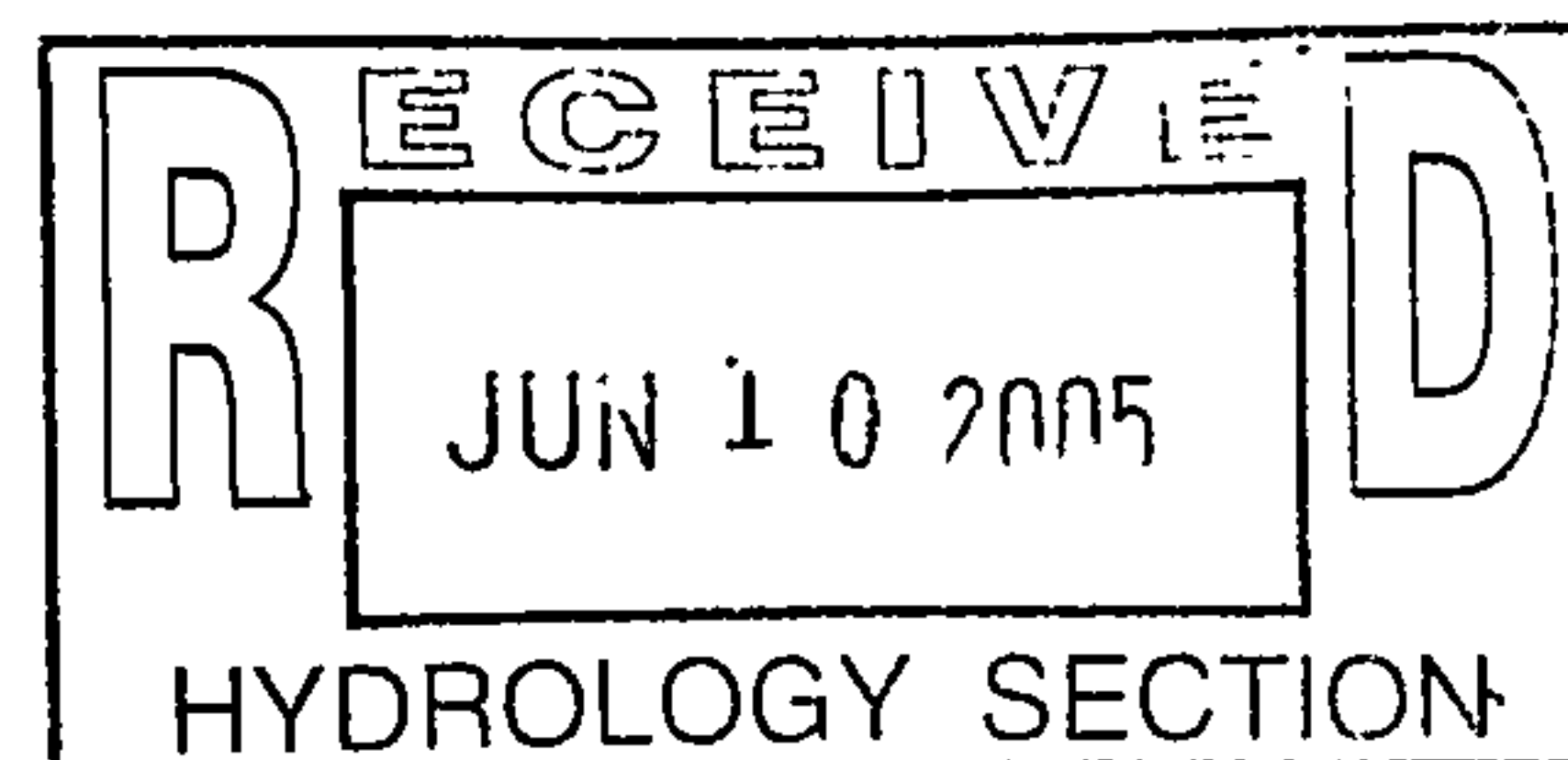
$$Q = 1.49 n R^{2/3} S^{1/2} A$$

$$R = \frac{A}{P} = \frac{bd}{b+2d} = \frac{6.70}{19.34} = 0.346$$

$$Q = 1.49 / 0.013 (0.346)^{0.67} (0.005)^{0.5} (6.70)$$

$$= 26.67 \text{ CFS} > \begin{matrix} 17.10 \text{ CFS (on-site)} \\ + 2.75 \text{ CFS (off-site - Basin 0-2)} \\ \hline 19.85 \text{ CFS } \checkmark \end{matrix}$$

OK CAPACITY



FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 11, 1989

Thomas T. Mann, P.E.
The Mann Company, Inc.
5312 Noreen Drive, NE
Albuquerque, New Mexico 87111

RE: REVISED DRAINAGE PLAN FOR AN ADDITION TO PLASTECH
(F-16/D3A) REVISION DATE OF APRIL 5, 1989

Dear Mr. Mann:

Based on the information provided on your resubmittal of May 1, 1989, the revisions as indicated are acceptable.

Please attach a copy of this plan to the construction sets prior to sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+579)

FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 21, 1989

Thomas T. Mann, P.E.
The Mann Company, Inc.
5312 Noreen Drive, NE
Albuquerque, New Mexico 87111

RE: REVISED DRAINAGE PLAN FOR AN ADDITION TO PLASTECH
(F-16/D3A) REVISION DATE OF MARCH 7, 1989

Dear Mr. Mann:

Based on the information provided on your resubmittal of March 8, 1989,
the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to
sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+579)

FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF
ADMINISTRATIVE OFFICER

GENE ROMO

DEPUTY CAO
PUBLIC SERVICES

FRANK MARTINEZ

DEPUTY CAO
PLANNING/DEVELOPMENT

BILL MUELLER

January 21, 1988

August F. Mosimann, P.E.
Engineering Associates, Inc.
532 Adams, NE
Albuquerque, New Mexico 87108

RE: GRADING/PAVING PLAN FOR PLASTECH DOCK WELL
(F-16/D3A) ENGINEER'S STAMP DATED JANUARY 4, 1988

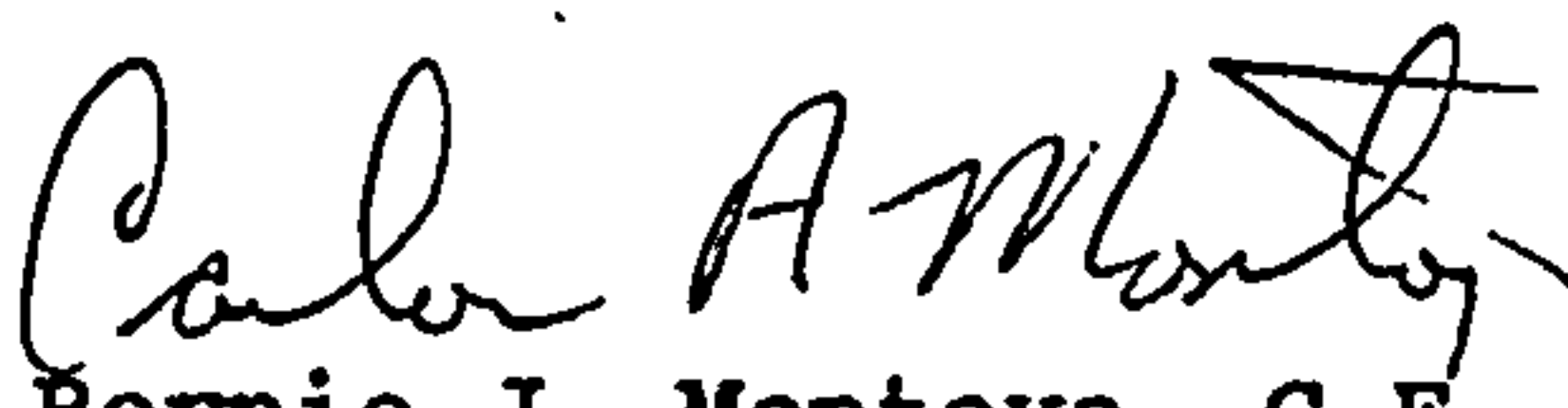
Dear Mr. Mosimann:

Based on the information provided on your submittal of January 4, 1988,
the above referenced plan is approved for Grading/Paving Permit.

Upon completion of the project, please contact Rick Duran at 764-1699
(specify file number) to request an inspection.

If I can be of further assistance, please feel free to call me at
768-2650.

Cordially,


for Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

December 12, 1985

Mr. Kent Fryer
Molzen-Corbin & Associates
2301 Yale Boulevard SE, Suite D
Albuquerque, NM 87106

REF: DRAINAGE PLAN FOR PLASTECH WAREHOUSE (F16-D4B) RECEIVED 11/13/85

Dear Kent:

The above referenced plan is approved for Building Permit dated November 12, 1985.

If you should have any further questions, please feel free to call me at 766-7644.

Sincerely,

Carlos A. Montoya
Carlos A. Montoya, PE
City/County Flood Plain Admin.

CAM:mrk

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

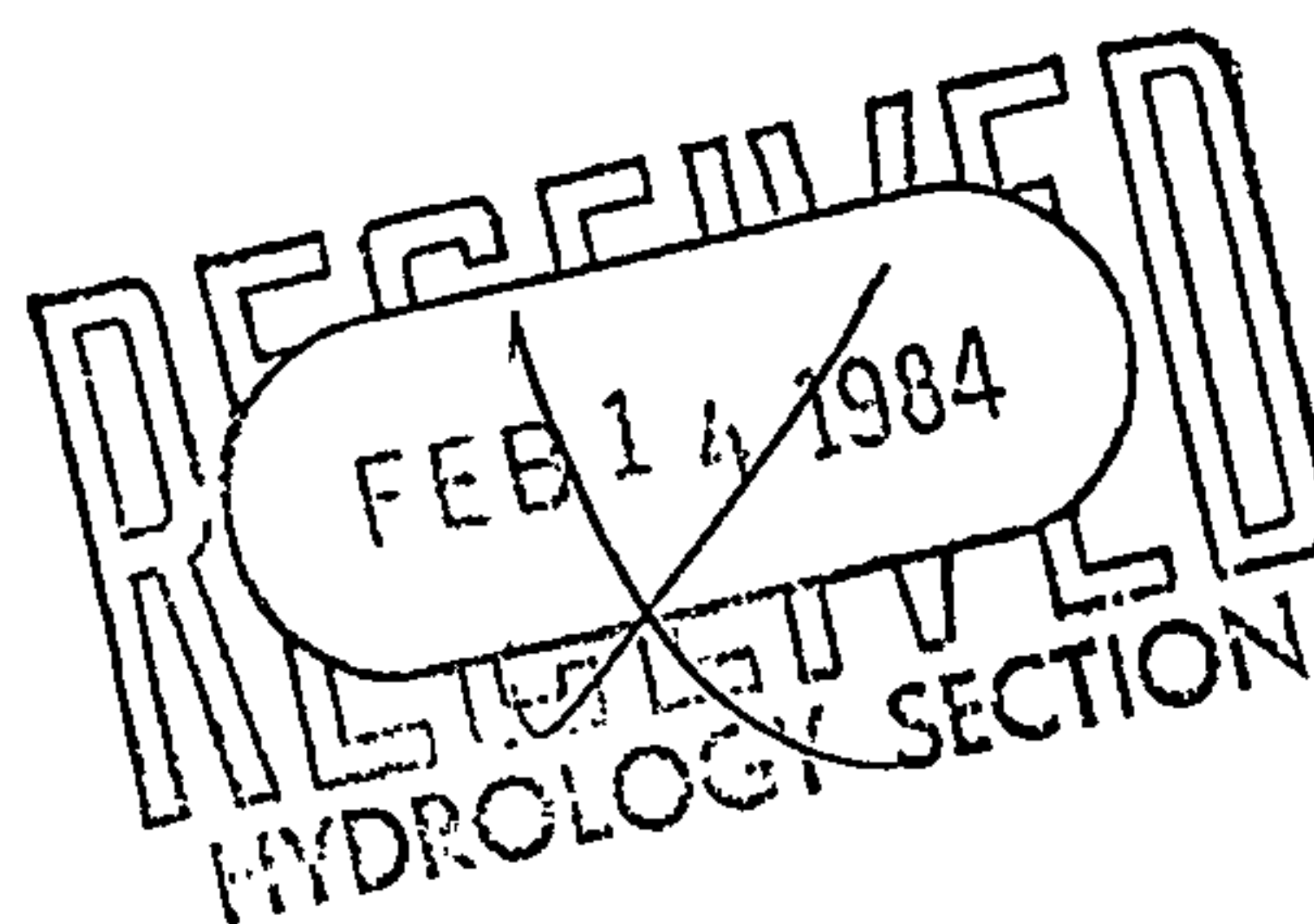
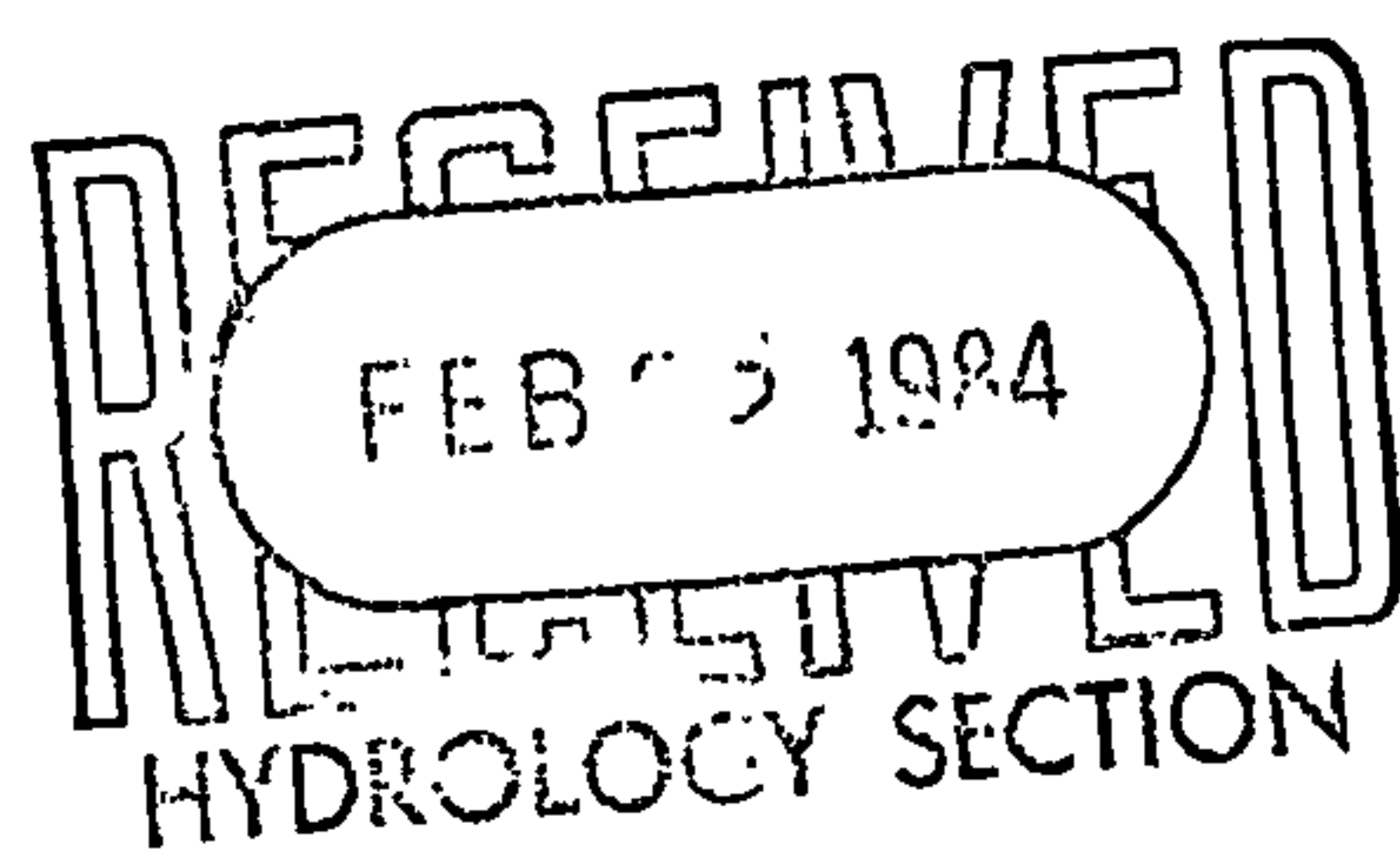
Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER

DRAINAGE REPORT

for

PLASTECH



MOLZEN-CORBIN & ASSOCIATES

CONSULTING ENGINEERS

ALBUQUERQUE, NEW MEXICO



I. INTRODUCTION

This report provides the drainage plan, as shown on Plate 1, and the corresponding calculations for the proposed Plastech plant located at the corner of Alexander Boulevard N.E. and Montbel Loop N.E. in Albuquerque, New Mexico. It lies within the guidelines specified in the approved "Master Plan of Drainage for Albuquerque Gravel Products Co., Montbel, Inc., and Montano Venture" provided by Andrews, Asbury, and Robert, Inc. in December 1981. This drainage plan is in fact more conservative than that allowed in the "Master Plan of Drainage." The Vicinity Map on page 5, shows that Alexander Boulevard N.E. borders the site on the west and dead-ends near the southern end of the property border, while an A.M.N. railroad spur runs along the eastern end of the property line.

The legal description found on Plate 2, shows the drainage area consisting of 4.2675 acres. It has been determined from the floodway map shown on Plate 3 that this site does not lie within any designated flood-hazard area.

II. EXISTING CONDITIONS

The proposed site has previously been excavated and mined of its gravel resources. The soil, which now consists of man-made fill described as mostly silty-clayey SAND is sparsely covered with native vegetation. This soil has hydrologic characteristics between Type A and Type B soils under the S.C.S. hydrologic soils group.

Both offsite and onsite runoff generally flow in a northern direction along an average 0.7% slope. Offsite flows, received from 0.2 acres of Parcel 1 of Realty Montbel AGP Lands (see Plate 2), are at a minimum flow rate and velocity. All other offsite flows are diverted around the site along the railroad spur or a street, as shown on Plate 1.

Alexander Boulevard is constructed to a point approximately 350 ft. south of Montbel Loop, as shown on plate 2. Montbel Loop, from the east R.O.W. of Alexander Boulevard, west of the site detention basin, is complete and in place. All major drainage provisions as specified in the "Master Plan of Drainage," including the 2+ acre detention area with permanent inlet and outlet facilities, have been constructed. Onsite flows are defined as sheet flow and it is felt that with the large detention basin downstream, the undeveloped 10-year peak and smaller design storm is allowed for the maximum runoff.

III. DEVELOPED CONDITIONS

The drainage area of 4.2675 acres has been separated into 4 basins, Area A, Area B, Area C, and Area D (see Plate 1-drainage plan - Plastech Site). Rainfall runoff from each area will flow into its associated ponding area, Pond A, Pond B, Pond C, or Pond D. Ponds B, C, and D will subsequently discharge into Pond A, which will discharge into Valley-type gutter provided by the development at a controlled flow rate. A developed 100 year peak design storm is used for inflow, while the 10 year peak design storm is allowed for the discharge from Pond A. The drainage ponds are graded such that they will retain onsite nuisance flows resulting from landscape watering.

Future development includes the expansion of the Plastech building along with addition of three storage buildings as shown on Plate 1. Drainage provisions for their addition is provided and no additional ponding storage capacity is necessary. Undeveloped offsite flows are expected to be minimal, and drainage provisions have been provided through the property. Developed offsite flows are also expected to be minimal, with most offsite flows being either detained or diverted to Alexander Boulevard.

IV. EROSION CONTROL

Special consideration has been given to the possibility of excess erosion due to both offsite flows and onsite flows. The original area has been excavated and replaced with man-made fill. As a result, the S.C.S. Bernalillo County Soil Survey Maps do not apply at this site. For the purposes of this report, the soil has been classified between the S.C.S. Type A and Type B soil, based on the silty-clayey course to fine grained SAND description of the man-made fill, given by a certified testing lab.

Offsite flows combined with onsite flows reach a maximum of 12.61 cfs (see sheet 15/34) based on the 100-year peak design storm. This flow will be sheet flow type and only a 0.90 ft/sec velocity will result from this flow rate over Area D (see Plate 1). A minimal site gradient, as shown on Plate 1, will accommodate the rough grading, construction, and permanent phase development to provide minimum erosion problems. Construction shall be phased to provide rough grading of the ponding areas prior to any other grading. These ponding areas will be used as desilting basins for interim erosion control during the construction phase.

VI. DRAINAGE ANALYSIS

The following drainage computations are the results based on the City of Albuquerque Development Process Manual Vol. 2.

CALCULATED BY J. PAZ DATE 2-17-84
CHECKED BY _____ DATE _____
SHEET NO. 1 OF 34

CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

I. INDEX

I. DRAINAGE PROVISIONS REQUIRED BY SHEETS 2 thru 4
"MASTER PLAN OF DRAINAGE"

II. DRAINAGE ANALYSIS SHEETS 5 thru 33

A.) OFFSITE CONDITIONS SHEETS 6 thru 8

B.) ONSITE CONDITIONS SHEETS 9 thru 25

1.) TOTAL SITE SHEETS 9 thru 15

2.) SITE SPLIT UP INTO
SUB-BASINS SHEETS 16 thru 25

C.) POND CALCULATIONS SHEETS 26 thru 33

1.) POND CAPACITIES SHEETS 26 thru 29

2.) INLETS & OUTLETS
FROM PONDS SHEETS 29 thru 33

D.) SUMMARY OF RESULTS SHEET 34

MOLZEN-CORBIN & ASSOCIATES

Albuquerque • New Mexico • Carlsbad

(505) 242-5700

(505) 887-7581



CALCULATED BY J. PAZ DATE 2-17-84
CHECKED BY _____ DATE _____
SHEET NO. 2 OF 34

CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

I. DRAINAGE PROVISIONS REQUIRED BY "MASTER
PLAN OF DRAINAGE"

ACCORDING TO THE APPROVED "MASTER PLAN OF DRAINAGE FOR
ALBUQUERQUE GRAVEL PRODUCTS CO., MONTBEL, INC.,
AND MONTANO VENTURE", PROVIDED BY ANDREWS, ASBURY,
AND ROBERT, INC. IN DECEMBER 1981, THE FOLLOWING
CONDITIONS ARE REQUIRED FOR THE DRAINAGE ANALYSIS:

- 1.) A $2\pm$ ACRE DETENTION FACILITY (CURRENTLY IN PLACE)
WILL AID THE DISCHARGE ALLOWED BY EACH PARCEL
TO BE DEVELOPED.
- 2.) THE DETENTION AREA IS DESIGNED TO DETAIN
THE 50-YEAR UNDEVELOPED STORM
- 3.) THE COEFFICIENT OF RUNOFF ALLOWED IS 0.40
- 4.) ALL FLOWRATES AND VOLUMES RELEASED MUST NOT
EXCEED THE CONDITIONS STATED IN # 2 & # 3.

MOLZEN-CORBIN & ASSOCIATES

Albuquerque • New Mexico • Carlsbad

(505) 242-5700

(505) 887-7581



CALCULATED BY J. PAZ DATE 2-17-84
CHECKED BY _____ DATE _____
SHEET NO. 3 OF 34

CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

GENERAL INFORMATION

$$\text{AREA} = 4.2675 \text{ AC} = 185,892 \text{ ft}^2$$

$$\text{LENGTH OF DRAINAGE (L)} = 540 \text{ ft}$$

$$\text{ELEVATION DIFFERENCE } (\Delta H) = 3 \text{ ft}$$

$$\text{SLOPE (S)} = \frac{\Delta H}{L} = \frac{3'}{540'} = 0.0056$$

$$\begin{aligned} \text{TIME OF CONCENTRATION (T.C)} &= 0.0078 \frac{L^{0.77}}{S^{0.385}} \quad (\text{Pg. 22.2 - 3}) \\ &\quad (\text{ALBUQ. DPM, VOL. 2}) \\ &= 0.0078 \frac{(540)^{0.77}}{(0.0056)^{0.385}} = 7.29 \text{ min} \\ &= \text{USE } 10 \text{ min} \end{aligned}$$

HYDROLOGIC SOILS GROUP: TYPE A to TYPE B

$$6 \text{ hr } 5 \text{ yr STORM} = 2.20 \text{ in } (0.92) = 2.024 \text{ in } (\text{PL 22.2, D-1})$$

$$\begin{aligned} \text{RAINFALL INTENSITY, } I_{50} &= (6 \text{ hr storm}) 6.84 t_c^{-0.51} (\text{PL 22.2, D-2}) \\ &= (2.024) 6.84 (10)^{-0.51} \\ &= 4.28 \text{ in/hr} \end{aligned}$$

$$\text{RUNOFF COEFFICIENT, } C = 0.40 \text{ (FROM "MASTER PLAN")}$$

$$\text{SCS CN} = 85 (\text{PL 22.2, C-2})$$

$$\text{DIRECT RUNOFF} = 0.9 \text{ in } (\text{PL 22.2, C-4})$$

MOLZEN-CORBIN & ASSOCIATES

Albuquerque • New Mexico • Carlsbad

(505) 242-5700

(505) 887-7581



CALCULATED BY J. PAZ DATE 2-17-84
CHECKED BY _____ DATE _____
SHEET NO. 4 OF 34

CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

ALLOWABLE DISCHARGE FLOWRATE

$$Q_{ALLOW} = C I_{50} A$$

WHERE : $C = 0.40$
 $I_{50} = 4.28 \text{ in/hr}$
 $A = 4.2675 \text{ Ac}$

$$\begin{aligned} Q_{ALLOW} &= 0.40 (4.28 \text{ in/hr}) (4.2675 \text{ Ac}) \\ &= \underline{\underline{7.30 \text{ cfs}}} \end{aligned}$$

ALLOWABLE VOLUME RUNOFF

$$VOLUME = (DIRECT RUNOFF)(AREA)$$

WHERE : $DIRECT RUNOFF = 0.8 \text{ in}$
 $AREA = 185,892 \text{ ft}^2$

$$\begin{aligned} VOLUME &= (0.8 \text{ in} / 12 \text{ in/ft}) (185,892 \text{ ft}^2) \\ &= \underline{\underline{13,942 \text{ ft}^3}} \end{aligned}$$

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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

III. DRAINAGE ANALYSIS

THE DRAINAGE ANALYSIS WILL SATISFY
THE FOLLOWING:

- 1.) ACTUAL DISCHARGE FLOWRATE, & VOLUME
OF RUNOFF WILL BE LESS THAN
THE ALLOWABLE.
- 2.) THE 10-YEAR DESIGN STORM IS
USED AS A GUIDE TO ALLOWABLE
RUNOFF.
- 3.) PROVISIONS ARE MADE FOR OFFSITE
FLOWS TO PASS THROUGH THE
PROPERTY.
- 4.) PONDS ARE SIZED TO RESTRICT THE
100-YEAR MAXIMUM RUNOFF VOLUME.
- 5.) PONDS ARE GRADED TO DETAIN
NUISANCE FLOWS

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CLIENT CAVA PROJECT-NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

A.) OFFSITE CONDITIONS

UTILIZES THE CITY OF ALBUQUERQUE DPM Vol. 2

OFFSITE WATERSHED AREA = 0.2 Acres (0% Impervious, Mon-made fill)
= 8,712 ft²

LENGTH OF DRAINAGE, L = 150 ft

ELEVATION DIFFERENCE, ΔH = 0.50 ft

SLOPE, S = $\frac{\Delta H}{L} = \frac{0.511}{150.4} = 0.0033$ ft/ft

TIME OF CONCENTRATION = $0.0078 \frac{L^{0.77}}{S^{0.385}}$ (22.2, 3)
= $0.0078 \frac{(150)^{0.77}}{(0.0033)^{0.385}} = 3.33 \text{ min} < 10 \text{ min}$
= USE 10 min

HYDROLOGIC SOILS GROUP: TYPE A to TYPE B

6 Hr, 100 YEAR STORM = 2.20 in (Pl 22.2, D-1)

RAINFALL INTENSITY, I_{100} = (6 hr storm) $6.84 L^{-0.51}$ (Pl 22.2, D-2)
= $(2.20) 6.84 (10)^{-0.51}$
= 4.65 in/hr

SCS CN = 85 (Pl 22.2, C-2)

DIRECT RUNOFF = 1.0 in (Pl 22.2, C-4)

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PROJECT PLASTECH
SUBJECT DRAINAGE

OFFSITE FLOWRATE ONTO PLASTECH SITE

$$Q_{\text{offsite}} = C I_{100} A$$

WHERE: $C = 0.30$ (Pl 22.2, C-1)

$$I_{100} = 4.65 \text{ in/hr}$$

$$A = 0.20 A_c$$

$$\begin{aligned} Q_{\text{offsite}} &= 0.30 (4.65 \text{ in/hr}) (0.20 A_c) \\ &= 0.28 \text{ cfs} \end{aligned}$$

VOLUME OF OFFSITE RUNOFF ONTO PLASTECH SITE

$$\text{VOLUME} = (\text{DIRECT RUNOFF})(\text{AREA})$$

WHERE: DIRECT RUNOFF = 1.0 in

$$\text{AREA} = 8,712 \text{ ft}^2$$

$$\begin{aligned} \text{VOLUME} &= (1.0 \text{ in} / 12 \text{ in/ft}) (8,712 \text{ ft}^2) \\ &= 726 \text{ ft}^3 \end{aligned}$$

VELOCITY OF OFFSITE RUNOFF ONTO PLASTECH SITE

$$\text{AVERAGE VELOCITY, } V_c = \frac{L}{T_c \times 60} \quad (22.2, 3)$$

WHERE: $L = 150 \text{ ft}$

$$T_c = 10 \text{ min}$$

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SUBJECT DRAINAGE

VELOCITY (CONT.)

$$V = \frac{150 \text{ ft}}{10' \text{ min} \times 60}$$

$$\text{VELOCITY} = 0.25 \text{ ft/sec}$$

CHECK AGAINST PL 22.2, B1

$$\text{Slope} = 0.0033 \text{ ft/ft}$$

$$\text{VELOCITY} = 0.35 \text{ ft/sec} > 0.25 \therefore \text{OK}$$

DURATION OF FLOW ONTO PLASTEC SITE

$$T = \frac{2V}{Q \times 60} \quad (\text{PL 22.2, E-1})$$

WHERE: VOLUME, $V = 726 \text{ ft}^3$
FLOWRATE, $Q = 0.28 \text{ cfs}$

$$T = \frac{2(726 \text{ ft}^3)}{(0.28 \text{ cfs})(60)} \\ = 8.6 \text{ minutes}$$

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PROJECT PLASTECH
SUBJECT DRAINAGE

B) ON-SITE CONDITIONS

1.) TOTAL SITE

$$\begin{aligned}\text{TOTAL AREA} &= 4.2675 A_c = (4.2675 A_c) (43560 \text{ ft}^2 / A_c) \\ &= \underline{185,892 \text{ ft}^2}\end{aligned}$$

IMPERVIOUS AREA

$$\text{PLASTECH BUILDING: } 143.67' \times 177.0' = 25,430 \text{ ft}^2$$

$$\text{FUTURE ADDITION TO PLASTECH: } 143.67' \times 112' = 16,090 \text{ ft}^2$$

$$\text{PARKING LOT: } 60' \times (110.5' + 212.5') = 19,380 \text{ ft}^2$$

$$\text{DRIVEWAY, RAMP, DOCK: } (30' \times 230') + (135' \times 55') = 14,325 \text{ ft}^2$$

$$\text{TRUCK TURNAROUND, DOCK: } (75' \times 90') + (40' \times 20') = 7,550 \text{ ft}^2$$

$$\text{SILO PAD: } 35' \times 35' = 1,225 \text{ ft}^2$$

$$\text{STORAGE BUILDING: } 60' \times 200' = 12,000 \text{ ft}^2$$

$$\text{FUTURE STORAGE BUILDING: } 60' \times (180' + 150' + 120') = 27,000 \text{ ft}^2$$

$$\Sigma = \underline{\text{TOTAL IMPERVIOUS AREA (A}_i\text{)}} = \underline{123,000 \text{ ft}^2}$$

PERVIOUS AREA

$$\begin{aligned}\text{TOTAL PERVIOUS AREA (A}_p\text{)} &= 185,892 - 123,000 \\ &= \underline{62,892 \text{ ft}^2}\end{aligned}$$

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PROJECT PLASTECH
SUBJECT DRAINAGE

GENERAL INFORMATION ~ CITY OF ALBUQUERQUE DPM Vol. 2, Chap 22.2

- TOTAL AREA = $4.2675 \text{ Ac} = 185,892 \text{ ft}^2$

- LENGTH OF DRAINAGE (L) = 540 ft

- ELEVATION DIFFERENCE (ΔH) = $5048 - 5045 = 3 \text{ ft}$

- SLOPE (S) = $\frac{\Delta H}{L} = \frac{3'}{540'} = 0.0056$

- $T_c = \frac{0.0078 \cdot L^{0.77}}{S^{0.385}} \quad (\text{22.2 - Pg 3})$
 $= \frac{0.0078 \cdot 540^{(0.77)}}{0.0056^{(0.385)}} = 7.29 \text{ min} < 10 \text{ min}$

USE $T_c = 10 \text{ min}$

- HYDROLOGIC SOILS GROUP: TYPE A - TYPE B

- 6 Hr. - 100 Yr. STORM = $2.2''$ (Pl 22.2 D-1, Pg 13)

- 6 Hr. - 10 Yr. STORM = $0.657(2.2) = 1.45 \text{ in}$

- $I_{100} = 2.2(6.84)(10)^{-0.51} = 4.65 \text{ in/hr}$

- AVERAGE VELOCITY = $\frac{L}{T_c \times 60} = \frac{540}{10 \times 60} = 0.9 \text{ ft/sec}$

$V(\text{PAVED AREA}) = 1 \text{ ft/sec} \quad (\text{Pl 22.2, B-1})$

$V(\text{Grass, Gravel, Ground}) = 0.41 \text{ ft/sec} \quad (\text{Pl 22.2, B-1})$

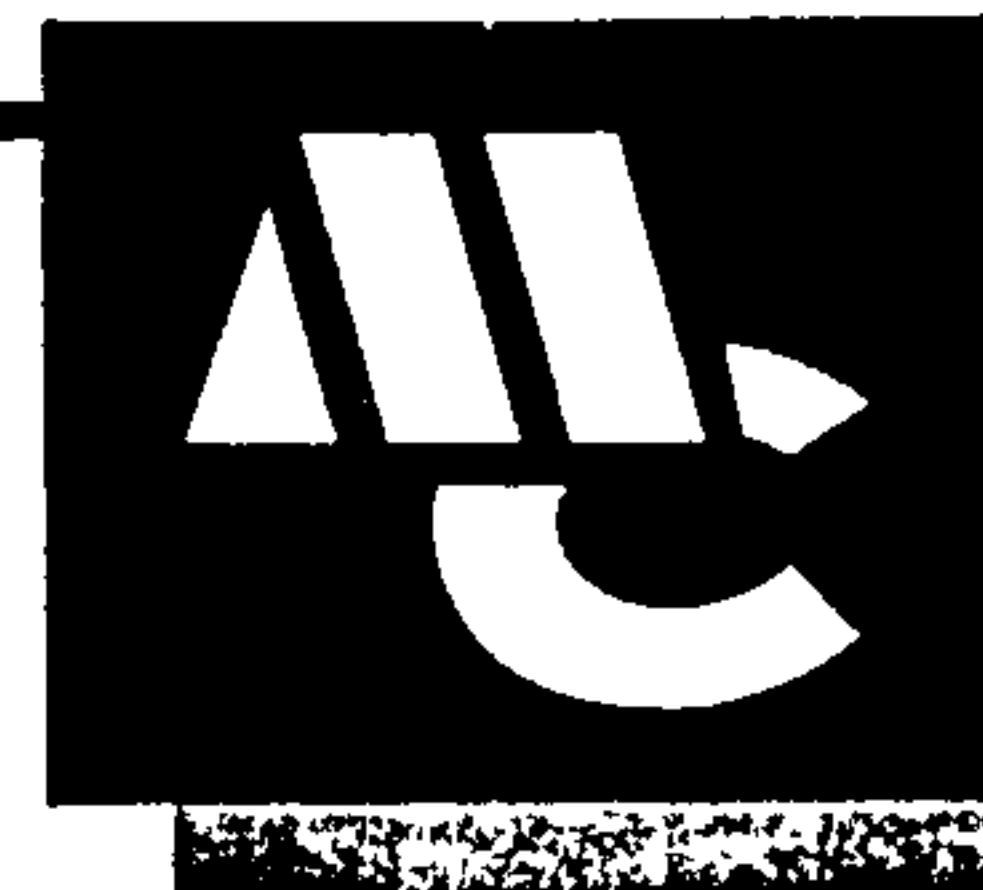
$V(\text{STREET}) = 1.9 \text{ ft/sec} \quad (\text{Pl 22.2, B-2})$

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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

ONSITE FLOWRATE (BASED ON 100 YR STORM)

$$P_0 \text{ IMPERVIOUS} = (123,000 \text{ ft}^2 / 185,892 \text{ ft}^2) = 0.66 \\ = \text{USE } 70\% \text{ (for sidewalks...)}$$

$$Q_{\text{onsite}} = C I_{100} A$$

$$\text{WHERE: } C = 0.62 \text{ (Pl. 22.2, } C=1)$$

$$I_{100} = 4.65 \text{ in/hr}$$

$$A = 4.2675 \text{ Ac}$$

$$Q_{\text{onsite}} = 0.62 (4.65 \text{ in/hr}) (4.2675 \text{ Ac}) \\ = 12.33 \text{ cfs}$$

$$Q_{\text{TOTAL}} = Q_{\text{onsite}} + Q_{\text{offsite}} \\ = 12.33 \text{ cfs} + 0.28 \text{ cfs}$$

$$\underline{\underline{Q_{\text{TOTAL}} = 12.61 \text{ cfs}}}$$

* NOTE: A Maximum Runoff Flowrate allowed is 7.3 cfs. The remainder will have to be detained.

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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

ONSITE VOLUME OF WATER (BASED ON 100 YR STORM)

SCS CN = 9.2 (PL 22.2, C-3)

VOLUME = (DIRECT RUNOFF) (AREA)

WHERE: DIRECT RUNOFF = 1.4 in (PL 22.2, C-3)
AREA = 185,892 ft²

$$\begin{aligned}\text{VOLUME} &= (1.4 \text{ in} / 12 \text{ in/ft}) (185,892 \text{ ft}^2) \\ &= \underline{21,687 \text{ ft}^3}\end{aligned}$$

$$\begin{aligned}\text{VOLUME (TOTAL)} &= V_{\text{onsite}} + V_{\text{off-site}} \\ &= 21,687 \text{ ft}^3 + 726 \text{ ft}^3 \\ &= \underline{22,413 \text{ ft}^3}\end{aligned}$$

* NOTE: A maximum of 13,942 ft³ is allowed to be discharged from the site. THUS:

$$22,413 \text{ ft}^3 - 13,942 \text{ ft}^3 = 8,471 \text{ ft}^3$$

of water must be ponded on the site.

DURATION OF FLOW

$$T = \frac{2.47}{Q \times 60} = \frac{2(22,413 \text{ ft}^3)}{12.61 \text{ cfs}(60)} = 5.9 \text{ minutes}$$

USE T = 60 minutes

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PROJECT PLASTECH
SUBJECT DRAINAGE

THE ACTUAL DISCHARGE FLOWRATE
WILL BE AT THE 10-YEAR, UNDEVELOPED CONDITION.
THIS IS DONE IN AN ATTEMPT TO SATISFY
BOTH THE ALLOWABLE DISCHARGE FLOWRATE, AND
THE ALLOWABLE VOLUME OF RUNOFF ESTABLISHED
IN THE "MASTER PLAN OF DRAINAGE".

GENERAL INFORMATION

10-YEAR UNDEVELOPED STORM

9% IMPERVIOUS = 0% (ASSUMED)

HYDROLOGIC SOILS GROUP: TYPE A & TYPE B

COEFFICIENT OF RUNOFF, $C = 0.34$ (PL 22.2, C-1)

AREA = 42675 A_c

6-HR., 10 YEAR STORM = 0.657 (2.2") = 1.45 in.

RAINFALL INTENSITY; $I_{10} = (6 \text{ hr. storm}) 6.84 T_c^{-0.51}$
 $= (1.45) 6.84 (10)^{-0.51}$
 $= 3.07 \text{ in/hr}$

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PROJECT PLASTECH
SUBJECT DRAINAGE

ACTUAL DISCHARGE FLOWRATE

$$Q_{10} = C I A$$

$$\text{WHERE } C = 0.34$$

$$I = 3.07 \text{ in/hr}$$

$$A = 4.2675 \text{ Ac}$$

$$\begin{aligned} Q_{10} &= 0.34 (3.07 \text{ in/hr} \times 4.2675 \text{ Ac}) \\ &= 4.46 \text{ cfs} \end{aligned}$$

$$Q_{\text{ACTUAL}} = 4.12 \text{ cfs} \quad (\text{Sheet } 33/34)$$

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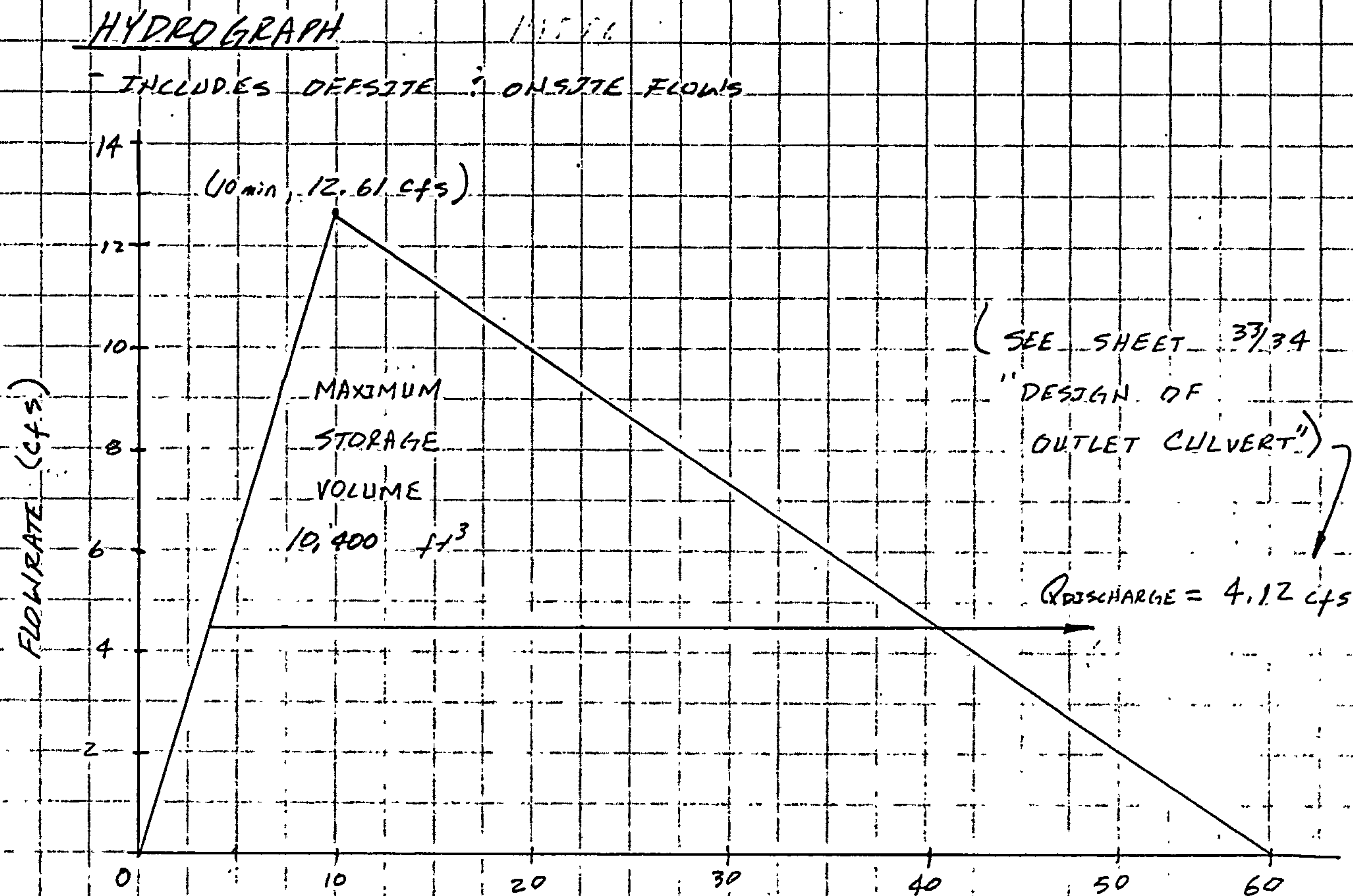
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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE



* ACTUAL STORAGE VOLUME = $10,400 \text{ ft}^3$

* ACTUAL VOLUME OF RUNOFF = $12,015 \text{ ft}^3$

* ACTUAL STORAGE VOLUME, $10,400 \text{ ft}^3 >$ REQUIRED STORAGE VOLUME, $8,471 \text{ ft}^3$

* ACTUAL DISCHARGE FLOWRATE, $4.12 \text{ cfs} <$ REQUIRED STORAGE VOLUME, 7.30 cfs

* 10 YEAR STORM

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CLIENT CAVA PROJECT NO. 836711
PROJECT PIASTECH
SUBJECT DRAINAGE

B.) ONSITE CONDITIONS (cont....)

1.) SITE SPLIT UP INTO SUB-BASINS

GENERAL INFORMATION - FOR SUB-BASIN
LAYOUT, REFER TO PLATE 1 - DRAINAGE PLAN

AREA A

$$\text{IMPERVIOUS AREA} = 17,105 \text{ ft}^2$$

$$\text{PERVIOUS AREA} = 6,170 \text{ ft}^2$$

$$\Sigma = \text{TOTAL AREA} = 23,275 \text{ ft}^2 = 0.5343 \text{ Ac}$$

$$\text{LENGTH OF DRAINAGE, } L = 250'$$

$$\text{ELEVATION DIFFERENCE, } \Delta H = 1.5'$$

$$\text{SLOPE} = \Delta H/L = 0.0060 \text{ ft/ft}$$

$$\text{TIME OF CONCENTRATION, } T_c = 0.0078 \frac{L^{0.77}}{S^{0.385}} = \frac{0.0078 (250)^{0.77}}{(0.0060)^{0.385}}$$

$$= 3.93 \text{ min} < 10 \text{ min} \therefore \text{USE } T_c = 10 \text{ min}$$

AREA B

$$\text{IMPERVIOUS AREA} = 21,140 \text{ ft}^2$$

$$\text{PERVIOUS AREA} = 14,635 \text{ ft}^2$$

$$\Sigma = \text{TOTAL AREA} = 35,775 \text{ ft}^2 = 0.8213 \text{ Ac}$$

$$L = 260'$$

$$\Delta H = 2'$$

$$S = 2/260 = 0.0077 \text{ ft/ft}$$

$$T_c = 0.0078 \frac{(260)^{0.77}}{(0.0077)^{0.385}} = 3.67 \text{ min} < 10 \text{ min} \Rightarrow \text{USE } T_c = 10 \text{ min}$$

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PROJECT WASTECH
SUBJECT DRAINAGE

AREA C

$$\text{IMPERVIOUS AREA} = 20,832 \text{ ft}^2$$

$$\text{PERVIOUS AREA} = 8,143 \text{ ft}^2$$

$$\Sigma = \text{TOTAL AREA} = 28,975 \text{ ft}^2 = 0.6652 \text{ Ac}$$

$$L = 300'$$

$$\Delta H = 0.5'$$

$$S = 0.5/300 = 0.0017 \text{ ft/ft}$$

$$T_c = 0.0078 \frac{(300)^{0.77}}{(0.0017)^{0.385}} = 7.34 \text{ min} < 10 \text{ min} \Rightarrow \text{USE } 10 \text{ min}$$

AREA D

$$\text{IMPERVIOUS AREA} = 63,923 \text{ ft}^2$$

$$\text{PERVIOUS AREA} = 33,944 \text{ ft}^2$$

$$\Sigma = \text{TOTAL AREA} = 97,867 \text{ ft}^2 = 2.2467 \text{ Ac}$$

$$L = 340'$$

$$\Delta H = 2'$$

$$S = 2/340 = 0.0059 \text{ ft/ft}$$

$$T_c = 0.0078 \frac{(340)^{0.77}}{(0.0059)^{0.385}} = 5.01 \text{ min} < 10 \text{ min} \Rightarrow \text{USE } 10 \text{ min}$$

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PROJECT PLASTELH
SUBJECT DRAINAGE

HYDROGRAPH CALCULATIONS - FOR EACH SUB-BASIN

AREA A

$$P_{\text{IMPERVIOUS}} = \left(\frac{17,105}{23,275} \right) = 0.73 \Rightarrow \text{USE } 75\%$$

$$\text{FLOWRATE, } Q_{100} = C I_{100} A$$

$$\text{WHERE } C = 0.066 \text{ (P. 22.2, C-1)}$$

$$I_{100} = 4.65 \text{ in/hr (Sheet 10/34)}$$

$$A = 0.5343 \text{ Ac}$$

$$Q_{100} = 0.66 (4.65 \text{ in/hr}) (0.5343 \text{ Ac}) = \underline{1.64 \text{ cfs}}$$

$$\text{SCS CN} = 94 \text{ (P. 22.2, C-3)}$$

$$\text{VOLUME OF RUNOFF} = (\text{DIRECT RUNOFF}) (\text{AREA})$$

$$\text{DIRECT RUNOFF} = 1.5 \text{ in (P. 22.2, C-4)}$$

$$\text{AREA} = 23,275 \text{ ft}^2$$

$$V = (1.5 \text{ in.} / 12 \text{ in/ft}) (23,275 \text{ ft}^2) = \underline{2910 \text{ ft}^3}$$

$$\text{DURATION OF FLOW} = \frac{2V}{Q \times 60} = \frac{2(2910 \text{ ft}^3)}{1.64 (60)} = 59.1 \text{ min} \Rightarrow \underline{\text{USE } 60 \text{ min}}$$

$$\text{AVERAGE VELOCITY OF WATER} = \frac{L}{T_L \times 60} = \frac{250'}{10 (60)} = 0.42 \text{ ft/sec} \text{ (22.2, 3)}$$

$$\text{PARKIN LOT VELOCITY} = 1.05 \text{ ft/sec (PL 22.2, B-1)}$$

$$\text{LANDSCAPED VELOCITY} = 0.45 \text{ ft/sec (PL 22.2, B-1)}$$

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CLIENT CAVA PROJECT NO. 836711
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SUBJECT DRAINAGE

AREA B

$$\% \text{ IMPERVIOUS} = \left(\frac{21,140}{35,775} \right) = 0.59 \Rightarrow \text{USE } 60\%$$

$$\text{FLOWRATE, } Q_{100} = C I_{100} A$$

$$\text{WHERE: } C = 0.56 \text{ (PL 22.2, C-1)}$$

$$I_{100} = 4.65 \text{ in/hr (Sheet 10/34)}$$

$$A = 0.8213 \text{ Ac}$$

$$\underline{Q_{100} = (0.56)(4.65 \text{ in/hr})(0.8213 \text{ Ac}) = 2.14 \text{ cfs}}$$

$$\text{SLS CN} = 91 \text{ (PL 22.2, C-3)}$$

$$\text{VOLUME OF RUNOFF} = (\text{DIRECT RUNOFF})(\text{AREA})$$

$$\text{WHERE: DIRECT RUNOFF} = 1.3 \text{ in}$$

$$\text{AREA} = 35,775 \text{ ft}^2$$

$$\underline{V = (1.3 \text{ in} / 12 \text{ in/ft})(35,775 \text{ ft}^2) = 3,875 \text{ ft}^3}$$

$$\text{DURATION OF FLOW} = \frac{V}{Q \times 60} = \frac{3,875}{(2.14)(60)} = 60.4 \text{ min} \Rightarrow \text{USE } 60 \text{ min}$$

$$\text{AVERAGE VELOCITY} = \frac{L}{T \times 60} = \frac{260'}{(10)(60)} = 0.43 \text{ ft/sec}$$

$$\text{PAVED AREA VELOCITY} = 1.2 \text{ ft/sec}$$

$$\text{GRASS, GRAVEL, GROUND VELOCITY} = 0.5 \text{ ft/sec}$$

} (PL 22.2, B-1)

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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

AREA C

$$\% \text{ IMPERVIOUS} = \left(\frac{20,832}{28,975} \right) = 0.72 \Rightarrow \text{USE } 75\%$$

FLOWRATE, $Q_{100} = C I_{100} A$

WHERE: $C = 0.66$ (PL 22.2, C-1)

$I_{100} = 4.65 \text{ in/hr}$ (Sheet 10/34)

$A = 0.6652 \text{ AC}$

$Q_{100} = (0.66)(4.65 \text{ in/hr})(0.6652 \text{ AC}) = 2.04 \text{ cfs}$

SCS CN = 94 (PL 22.2, C-3)

VOLUME OF RUNOFF = (DIRECT RUNOFF)(AREA)

WHERE: DIRECT RUNOFF = 1.5 in

AREA = 28,975 ft²

$V = (1.5 \text{ in} / 12 \text{ in/ft})(28,975 \text{ ft}^2) = 3,622 \text{ ft}^3$

DURATION OF FLOW = $\frac{2V}{Q \times 60} = \frac{2(3,622)}{2.04(60)} = 59.2 \text{ min} \Rightarrow \text{USE } 60 \text{ min}$

AVERAGE VELOCITY = $\frac{L}{T_L \times 60} = \frac{300}{10 \times 60} = 0.5 \text{ ft/sec}$

ROOF RUNOFF $\geq 2 \text{ ft/sec}$

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CLIENT CAVA PROJECT NO. 836711
PROJECT PLASTECH
SUBJECT DRAINAGE

AREA D * NOTE: OFFSITE FLOWS ENTER AREA D

$$\% \text{ IMPERVIOUS} = \left(\frac{63,923}{97,867} \right) = 0.65 \Rightarrow \text{USE } 65\%$$

$$\text{FLOWRATE, } Q = C I_{100} A$$

$$\text{WHERE } C = 0.58 \text{ (PL 22.2, C-1)}$$

$$I_{100} = 4.65 \text{ in/hr (sheet 10/34)}$$

$$A = 2.2467 \text{ Ac}$$

$$Q_{100} = 0.58 (4.65 \text{ in/hr}) (2.2467 \text{ Ac}) = \underline{6.06 \text{ cfs}}$$

$$\text{SCS CN} = 9.2 \text{ (PL 22.2, C-3)}$$

$$\text{VOLUME OF RUNOFF} = (\text{DIRECT RUNOFF})(\text{AREA})$$

$$\text{WHERE: DIRECT RUNOFF} = 1.4 \text{ in}$$

$$\text{AREA} = 97,867 \text{ ft}^2$$

$$\text{VOLUME} = (1.4 \text{ in } / 12 \text{ in/ft}) (97,867 \text{ ft}^2) = \underline{11,418 \text{ ft}^3}$$

$$\begin{aligned} \text{** } \left[\begin{aligned} \text{TOTAL FLOWRATE} &= Q_{100} + Q_{\text{offsite}} = 6.06 + 0.28 = 6.34 \text{ cfs} \\ \text{TOTAL VOLUME} &= V_{100} + V_{\text{offsite}} = 11,418 + 726 = 12,144 \text{ ft}^3 \end{aligned} \right] \end{aligned}$$

$$\text{DURATION OF FLOW} = \frac{V}{Q \times 60} = \frac{12,144}{(6.34)(60)} = 63.8 \text{ sec} \Rightarrow \text{USE } 65 \text{ min}$$

$$\text{AVERAGE VELOCITY} = \frac{L}{T \times 60} = \frac{340}{10 \times 60} = 0.57 \text{ ft/sec}$$

$$\begin{aligned} \text{PAVED VELOCITY} &= 1.05 \text{ ft/sec} \\ \text{GROUND VELOCITY} &= 0.45 \text{ ft/sec} \end{aligned} \left. \vphantom{\begin{aligned} \text{PAVED VELOCITY} &= 1.05 \text{ ft/sec} \\ \text{GROUND VELOCITY} &= 0.45 \text{ ft/sec} \end{aligned}} \right\} \text{(PL 22.2 ; B-1)}$$

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PROJECT PLASTECH
SUBJECT DRAINAGE

CALCULATIONS FOR POND A HYDROGRAPH (TAPULAR FORM)

Time (min)	Q_A	Q_B	Q_C	Q_D	$\Sigma = Q$
0	0	0	0	0	0
5	0.82	0.51	1.05	2.54	4.92
10	1.64		1.10		5.79
15	1.48				5.63
20	1.31				5.46
25	1.15				5.30
30	0.98				5.13
35	0.82				4.97
40	0.66				4.81
45	0.49				4.64
50	0.33				4.48
55	0.16				4.31
60	0.00				4.15
65		0.49	0.92		3.95
70		0.45	0.74	2.31	3.50
80		0.42	0.37	1.85	2.64
90		0.38	0.00	1.39	1.77
100		0.35		0.92	1.27
110		0.31		0.46	0.77
120		0.28		0.00	0.28
130		0.24			0.24
140		0.21			0.21
150		0.17			0.17
160		0.14			0.14

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4. STORAGE PONDS WILL BE CREATED, POND A, POND B, POND C, & THE PARKING LOT POND D.

POND A

Hand-drawn cross-section diagram of a canal with a lined bottom and side slopes. The diagram shows a canal with a bottom width of 8' (AV) and side slopes of 2:1 (AV). The bottom elevation is 42.36. The top of the side slopes is at an elevation of 44.36 (AV). The right side slope has a vertical height of 2'. The left side slope has a horizontal distance of 16' (AV) from the left edge to the bottom edge. The right side slope has a horizontal distance of 20' (AV) from the bottom edge to the right edge. The right edge is at an elevation of 45.0. The diagram is labeled "LINE SIDE SLOPES WITH IMPERVIOUS MEMBRANE (TYP)".

CROSS-SECTIONAL AREA = $(8 + 2(2.0)) 2.0 = 24.0 \text{ ft}^2$

$$\underline{\text{VOLUME CAPACITY}} = (24.0)(190') = \underline{4,560 \text{ ft}^3}$$

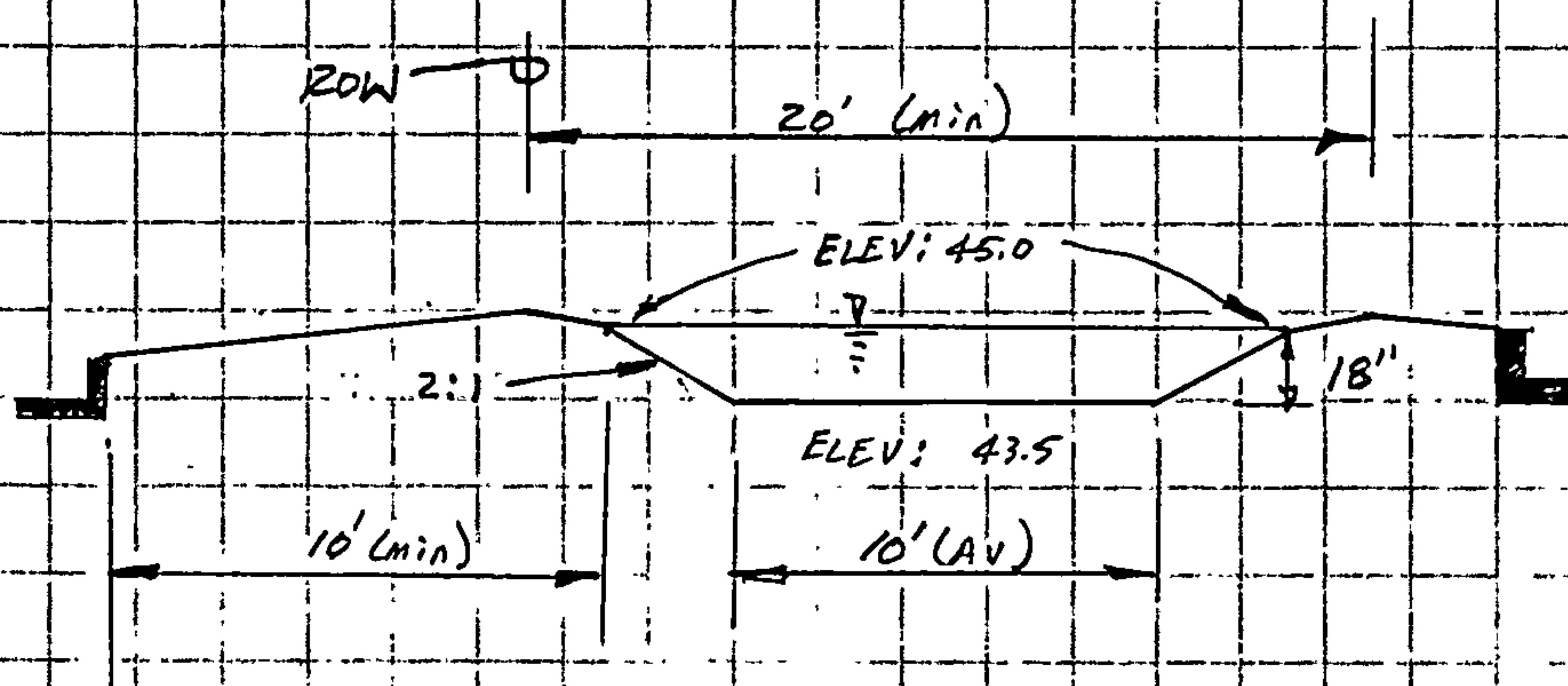


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POND B

BASIC CROSS-SECTION



LENGTH = 200 ft

CROSS SECTIONAL AREA = $(10 + 2(1.5))1.5 = 19.5 \text{ ft}^2$

VOLUME CAPACITY = $(19.5)(200) = \underline{\underline{3,900 \text{ ft}^3}}$

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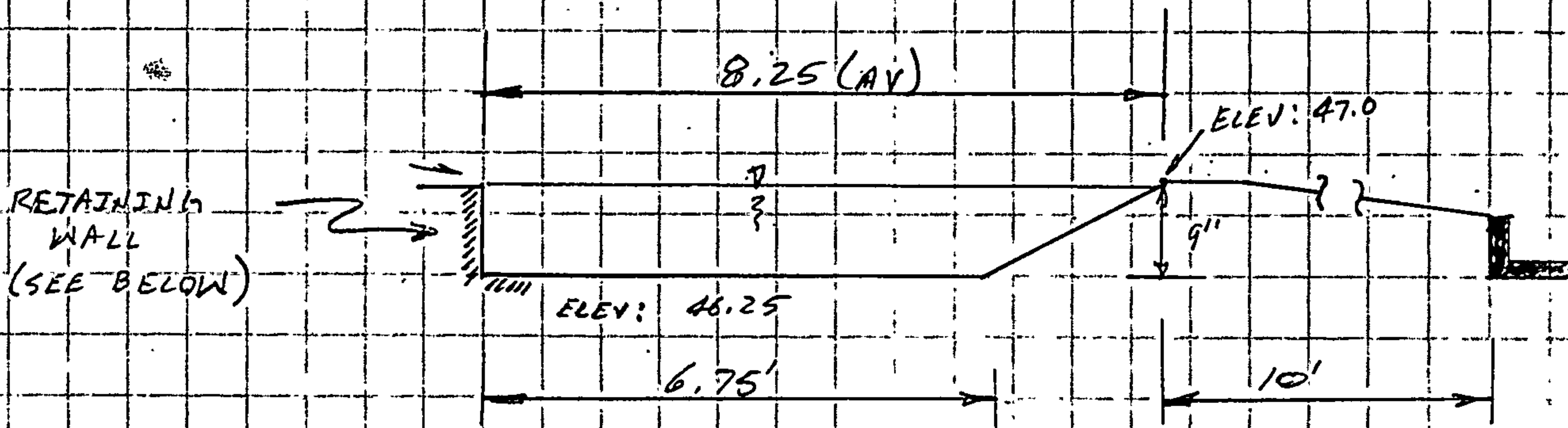
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POND C

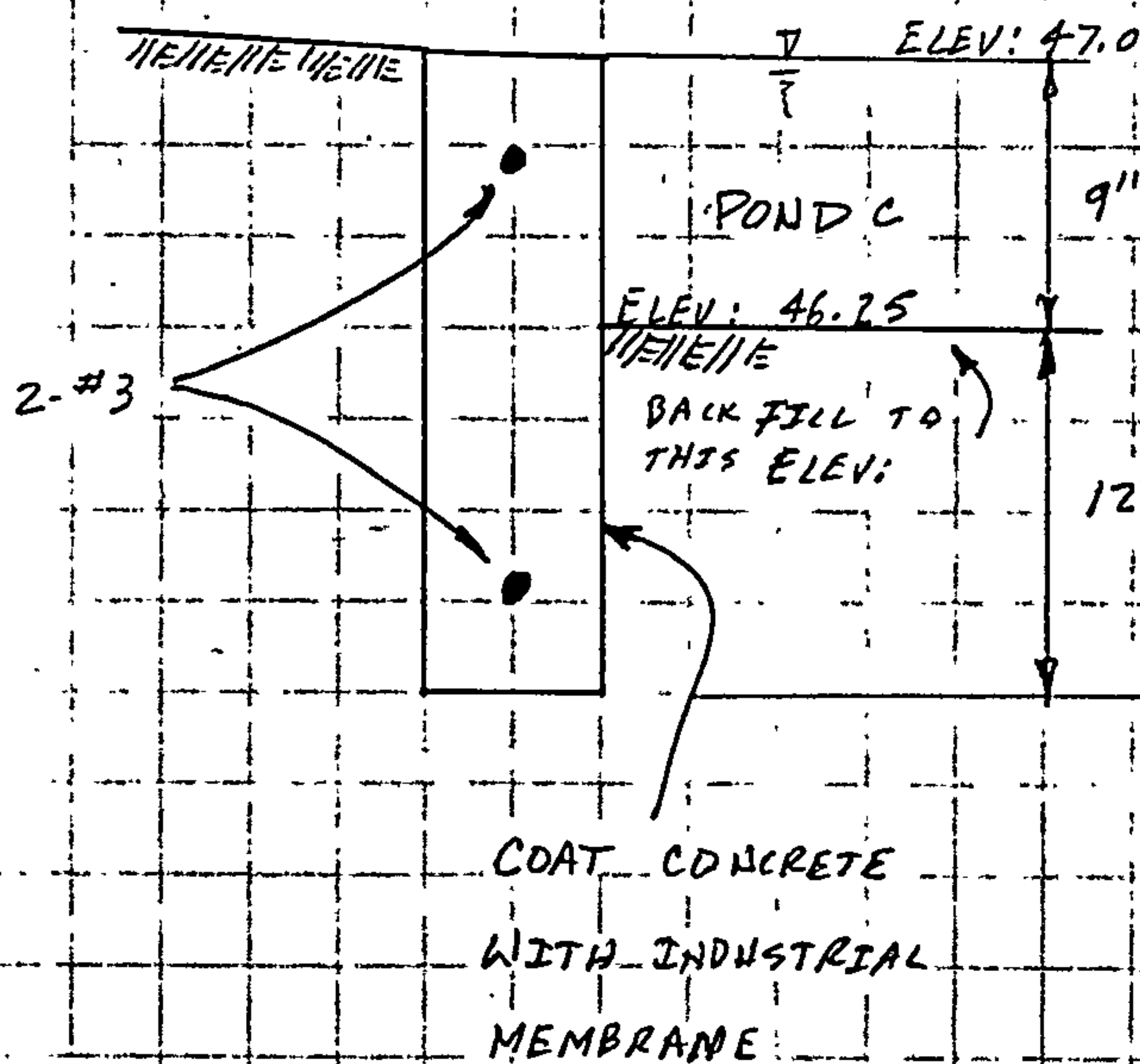


LENGTH = 175'

CROSS SECTIONAL AREA = 5.625 ft²

VOLUME CAPACITY = (5.625)(175) = 984.4 ft³

RETAINING WALL



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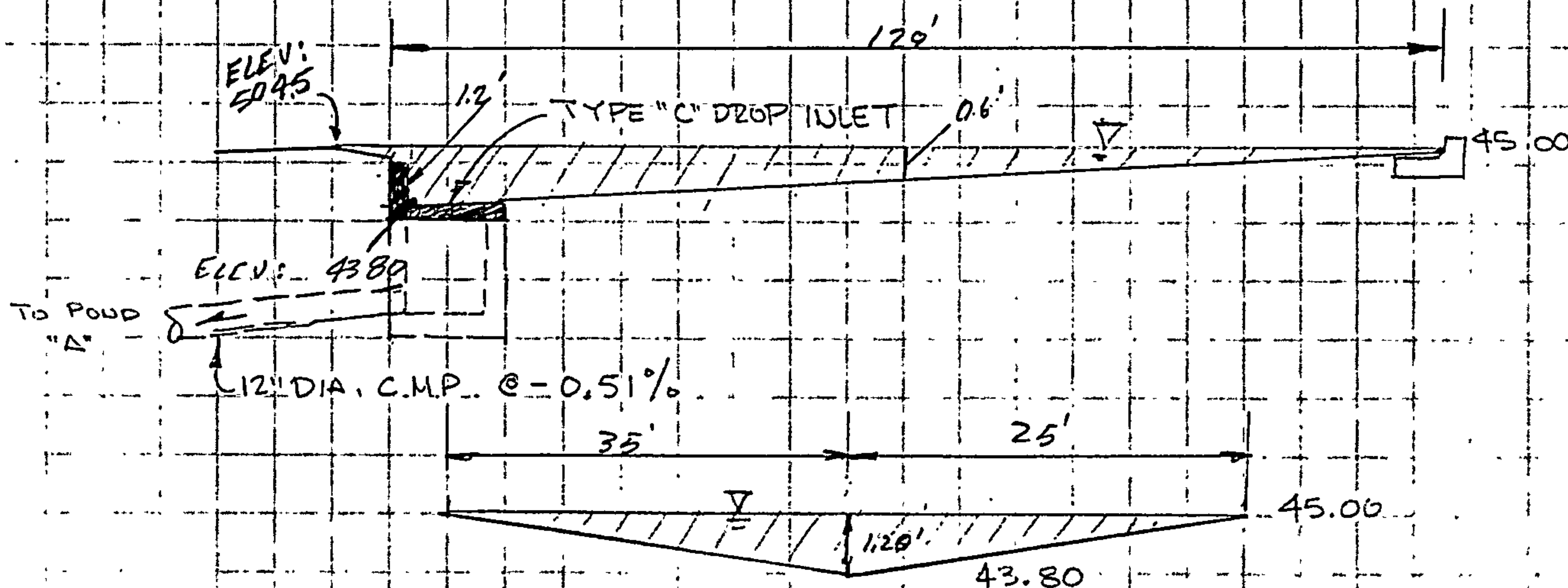
PROJECT PLASTECH

SUBJECT DRAINAGE

POND D

1) POND WILL BE LOCATED ON DRIVEWAY

2) POND IS BOUND BY THE 5045
COUNTOUR: (SEE PLATE 2 - Drainage Plan)



CROSS SECTIONAL AREA = 36 ft^2

VOLUME CAPACITY = $120 (36 \text{ ft}^2) = \underline{4,320 \text{ ft}^3}$

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C.) POND CALCULATIONS (CONT...)

2.) INLETS & OUTLETS FROM PONDS

PIPE DESIGN

$$\text{EQUATION (MANNINGS)} = Q = \frac{1.486}{n} A r^{2/3} S^{1/2}$$

WHERE: n = roughness coefficient

A = cross-sectional Area (ft^2)

r = Hydraulic radius (ft)

S = slope (ft/ft)

FOR PVC, $n = 0.009$

FOR $1\frac{1}{4}$ inch x $1\frac{1}{2}$ inch Helical CMP = 0.013 (ALUMINUM)

POND B to POND A

$$Q_{max} = 0.5 \text{ cfs}$$

$$\text{SLOPE} = (42.58 - 42.36) / 55 = 0.004 \text{ ft/ft}$$

$$\text{FOR } 6" \phi \text{ PVC } \Rightarrow A = 0.1963 \text{ ft}^2, r = 0.125 \text{ ft}$$

$$Q = \frac{1.486}{0.009} (0.1963) (0.125)^{2/3} (0.004)^{1/2} = 0.51 \text{ cfs} \approx 0.5 \text{ cfs OK}$$

USE PVC SCHEDULE 80 - 6 inch diameter PIPE

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POND C to POND A

$$Q_{max} = 1.0 \text{ cfs}$$

$$S = 0.004 \text{ ft/ft}$$

$$\text{FOR } 8" \text{ PVC } \Rightarrow A = 0.3491 \text{ ft}^2, r = 0.1667 \text{ ft}$$

$$Q = \frac{1.486}{0.009} (0.3491) (0.1667)^{0.67} (0.004)^{0.5} = 1.1 \text{ cfs} \approx 1.045 \text{ cfs OK}$$

USE SCHEDULE 40 PVC-8" diameter PIPE

POND D to POND A

$$Q_{max} = 2.5 \text{ cfs}$$

$$S = 0.0051 \text{ ft/ft}$$

$$\text{FOR } 12" \text{ } \phi \text{ CMP } \Rightarrow A = 0.7854 \text{ ft}^2, r = 0.25 \text{ ft}$$

$$Q = \frac{1.486}{0.013} (0.7854) (0.25)^{0.67} (0.0051)^{0.5} = 2.54 \text{ cfs} \approx 2.5 \text{ cfs OK}$$

USE CMP 16-GAUGE 12 inch diameter PIPE

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PROJECT PLASTECH
SUBJECT DRAINAGE

GENERAL CONDITIONS:

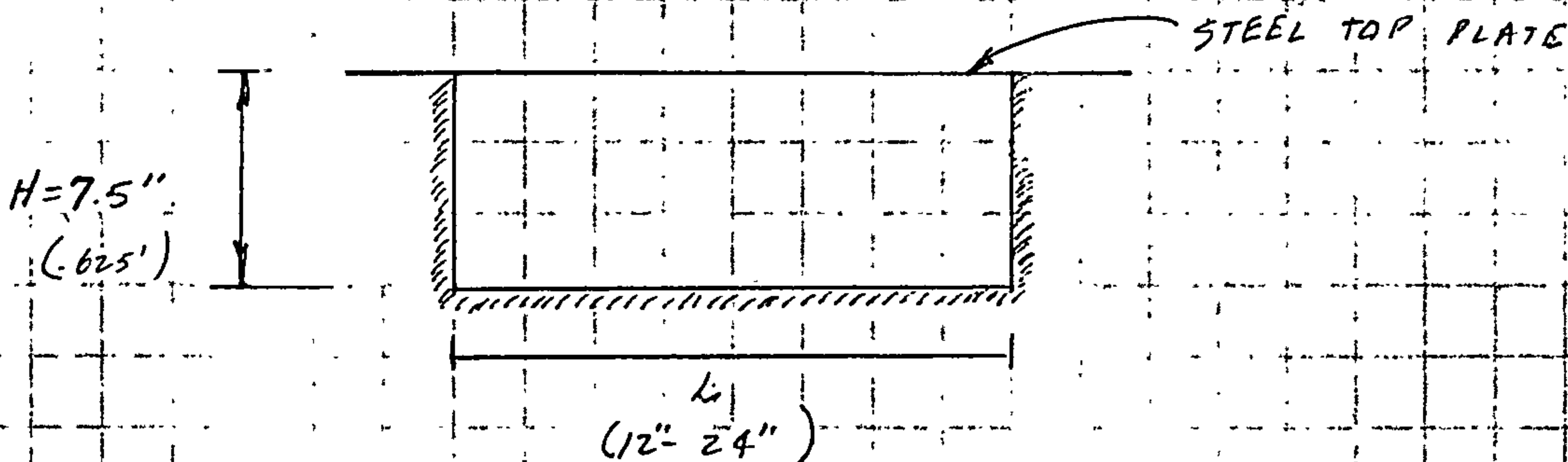
- 1.) USE DRAINAGE SIDEWALK CULVERT WITH STEEL PLATE TOP
A.) CITY OF ALBUQUERQUE; 1981 - DWG # K-16-1
- 2.) MAX FLOW = 4.46 cfs (Sheet 14/34)
- 3.) GOVERNING EQUATION ~ $Q_{max} = \frac{1.486}{n} A r^{2/3} S^{1/2}$
(MANNINGS EQ)

DESIGN OF CULVERT

$n = 0.014$ ~ CONCRETE

$S = \frac{0.20'}{20'} = 0.010$ ~ 1% SLOPE

$A = L \cdot H$; $r = A / WP$; $WP = 2L + 2H$



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DESIGN OF CULVERT (CONT...)

$$\text{TRY } L = 20' = 1.67 \text{ ft}$$

$$A = (0.625')(1.67') = 1.042 \text{ ft}^2$$

$$WP = 2(0.625) + 2(1.67') = 4.583 \text{ ft}$$

$$r = A/WP = 1.042 / 4.583 = 0.2273$$

$$Q_{out} = \frac{1.486}{0.014} ((1.042)(0.2273))^{2/3} (0.01)^{1/2} = 4.12 \text{ cfs} \leq 3.39 \text{ cfs O.K.}$$

USE: 7 1/2" X 20" CULVERT

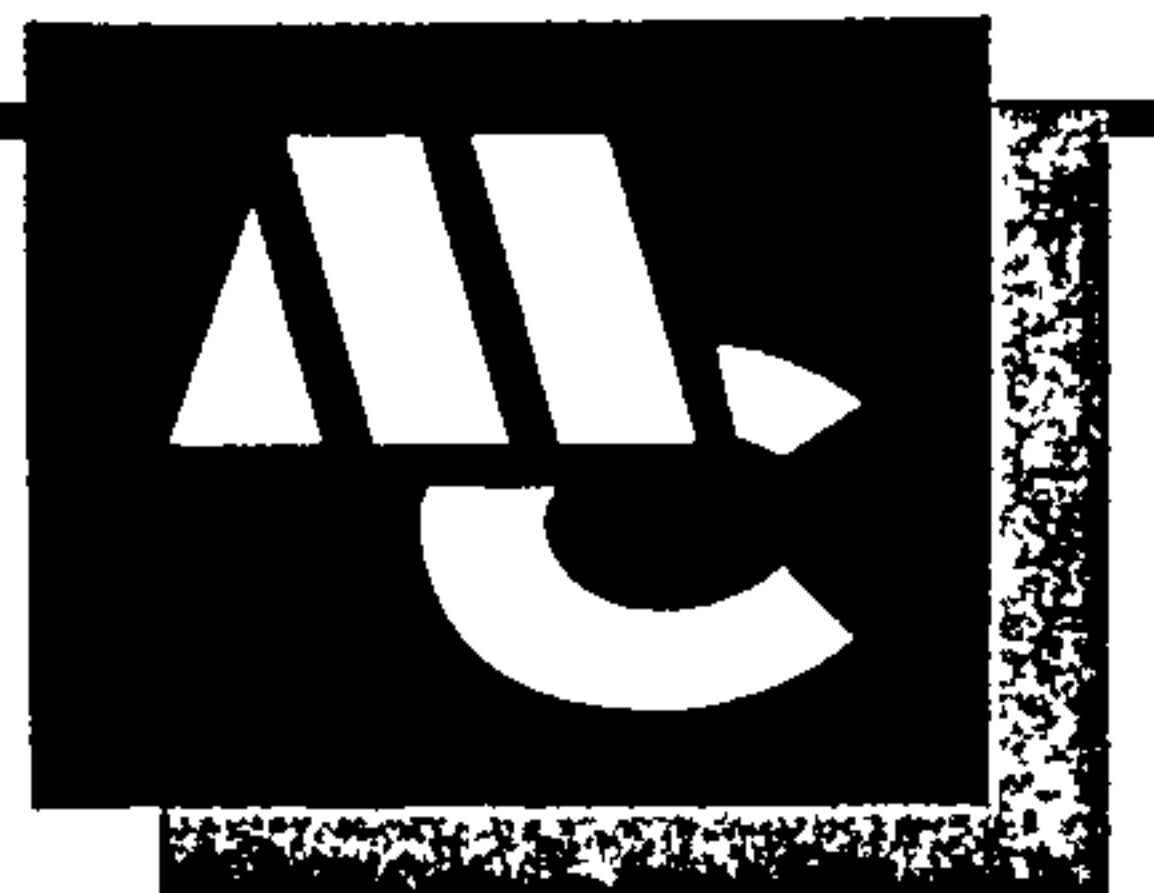
DETAILS SHOWN DWG # K-16-1 City of Albuquerque

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D.) SUMMARY OF RESULTS

ALLOWABLE DISCHARGE FLOWRATE = 7.30 cfs (sheet 4/34)

ACTUAL DISCHARGE FLOWRATE = 4.12 cfs (sheet 15/34, 33/34)

ALLOWABLE VOLUME OF RUNOFF = 13,942 ft³ (sheet 4/34)

ACTUAL VOLUME OF RUNOFF = 12,015 ft³ (sheet 15/34)

MINIMUM PONDING STORAGE VOLUME = 8,471 ft³ (sheet 12/34)

ACTUAL PONDING STORAGE VOLUME =

POND A = 2,910 ft³

POND B = 2,215 ft³

POND C = 975 ft³

POND D = 4,300 ft³

10,400 ft³

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