



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

September 17, 1986

Ronald Bohannon
Tierra West Development
4127 Carlisle Blvd., NE
Albuquerque, New Mexico 87107

RE: CONCEPTUAL DRAINAGE PLAN FOR WESTVIEW BUSINESS PARK
(J-11/D1A) RECEIVED AUGUST 29, 1986

Dear Mr. Bohannon:

The above referenced plan, dated August 27, 1986, is approved for Site Development Plan.

Please review the use of 4 inch PVC pipes for storm drainage. The slopes and size of the pipe could lead to maintenance problems. The tie-in to the catch basin will require a S.O. #19 at Building Permit process.

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

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Westview Business Park ZONE ATLAS/DRNG. FILE #: J-11 / D1A
LEGAL DESCRIPTION: Tract C-A-2 CABBELL LANDS, Summary Plat B-12-178, April 26, 1977
CITY ADDRESS: _____

ENGINEERING FIRM: Tierra West Development CONTACT: Ronald R. Bohannon
Management Services
ADDRESS: 4127 Carlisle Blvd., N.E. PHONE: 883-7592

OWNER: Minato Inc. U.S.A. CONTACT: Yastuka Terada
ADDRESS: P. O. Box 2084, Alvarado-Square PHONE: 243-2222

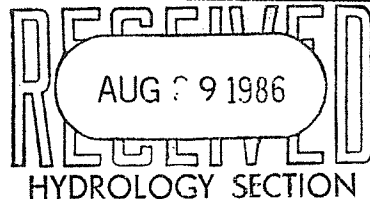
ARCHITECT: Boehning, Protz, Cook & Assoc. CONTACT: Dave Cook
ADDRESS: 110 Second St., NW PHONE: 242-4044

SURVEYOR: Lynn Surveying & Engineering CONTACT: Dennis Lynn
ADDRESS: 22 Chughole Los Lunas, NM PHONE: 869-3548

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

PRE-DESIGN MEETING:

☒ YES
☐ NO
☐ COPY OF CONFERENCE RECAP
SHEET PROVIDED



DRB NO. _____
EPC NO. _____
PROJ. NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☒ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☒ SITE DEVELOPMENT PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ ROUGH GRADING PERMIT APPROVAL
☐ GRADING/PAVING PERMIT APPROVAL
☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 8/29/86

BY: Ronald R. Bohannon



City of Albuquerque

P.O. BOX 1706 ALBUQUERQUE, NEW MEXICO 87106

J11-D13

October 30, 1981

Mr. Robert Foglesong
Andrews, Asbury & Robert, Inc.
401 San Pedro Drive N.E.
Albuquerque, New Mexico 87108

Re: Minato Townhouse/Commercial Development Drainage Report

Dear Robert:

The referenced drainage report is hereby approved based on your revised plans submitted October 29, 1981 with the contingency that a detail of the roof drain be included with the construction set that limits the discharge from the roof to the 5 year undeveloped discharge.

If I can be of further help, please call.

Sincerely,

Jim Fink
Civil Engineer/Hydrology

JF/fs

MUNICIPAL DEVELOPMENT DEPARTMENT

Richard S. Heller, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467



ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

October 28, 1981

RECEIVED

OCT 29 1981

ENGINEERING

Mr. James Fink
Civil Engineer/Hydrology
Engineering Division
City of Albuquerque
Post Office Box 1293
Albuquerque, New Mexico 87103

SUBJECT: MINATO TOWNHOUSE & COMMERCIAL DEVELOPMENT DRAINAGE REPORT

Dear Mr. Fink:

In response to your letter of October 14, 1981, on subject project, we are providing the following explanations and submittals as applicable. Items referenced below correspond to items as designated in your letter.

Item (a). Per telephone conversation of October 26, 1981, the rear yards will be depressed six (6) inches below the adjacent finished floor and will slope two (2) inches to the rear property line. The only storm runoff allowed to pond in the rear yards will be that which falls there, all other runoff, including roof tops, will be directed to the front of the units.

Item (b). The existing 24 inch RCP storm sewer in Estancia Drive slopes to the north at 0.22%. The full capacity of the storm sewer is,

$$Q = \frac{1,486}{n} R^{2/3} S^{1/2} A$$

$$\begin{aligned} \text{where } A &= 3.14 \text{ ft}^2 \\ R &= 0.50 \text{ ft} \\ n &= .015 \end{aligned}$$

$$Q = 9.17 \text{ cfs.}$$

Estancia Drive crests to the north at elevation 5,093.82 (flowline of curb and gutter). The low point of Estancia Drive is located at the existing catch basins and is at elevation 5,092.27 (top of grate). Therefore, the storm water will be 1.55 feet deep at the catch basins before flowing out of Basin "B".

Item (c). Roof canals will be located at the front of all units. Please see enclosed copy of revised - Developed Conditions, Map No.6.

RECEIVED

OCT 29 1981

Mr. James Fink
City of Albuquerque
October 28, 1981
Page Two

ENGINEERING

Item (d). Open channel emergency spillways will be constructed for ponds D-1 and D-2. See enclosed detail sheet (sheet 15 of 15).

Item (e). Ponds D-1 and D-2 will be landscaped with sod and low profile shrubs. Maintenance of the landscaping within the ponds will be the responsibility of the homeowners association. The pond outlets and overflow channels will be within dedicated rights-of-way and easements, and will be maintained by the City of Albuquerque. As discussed by you and Brian Burnett at a meeting with John Robert of our office, a covenant as necessary will be provided for the pond landscape maintenance prior to construction plan approval.

Based on the information provided herewith, your earliest approval of the drainage report is requested.

Sincerely,



ROBERT S. FOGLESONG, P.E. & L.S.
Staff Engineer

RSFmt

Enclosures: Revised Map No. 6 (2)
Sheet 15 of 15 (2)



ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

November 2, 1981

RECEIVED

NOV 03 1981

CITY ENGINEER

Mr. James Fink
Civil Engineer/ Hydrology
City of Albuquerque
Post Office Box 1293
Albuquerque, New Mexico 87103

SUBJECT: MINATO TOWNHOUSE & COMMERCIAL DEVELOPMENT

Dear Mr. Fink:

Please find enclosed the proposed canale design for the subject project together with a letter to the architect stating that the canale design shall be incorporated into the building plans for each unit.

If you have any further questions, please feel free to call us.

Very truly yours,

ROBERT S. FOGLESONG, P.E. & L.S.
Staff Engineer

RSFmt

Enclosure

cc: Yum Kee Fu, Architect (w/enclosures)



REQUIRED HEIGHT:

SAY 1.25 INCHES.

Allowable Discharge = 0.035 cfs

Assume 2 canals per unit, then

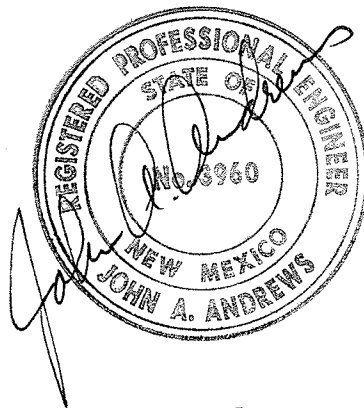
$$Q/\text{canale} = 0.0175 \text{ cfs} = \text{cL h}^{3/2}$$

$$L = \frac{0.0175}{3.1 \times 0.874}^{\frac{3}{2}} = 0.22 \text{ FT} = 2.6'' \quad \text{USE } 2\frac{1}{2}''$$

MINATO COMPANY LTD.

DRAINAGE REPORT
FOR
MINATO TOWNHOUSE
AND
COMMERCIAL DEVELOPMENT

September, 1981



Prepared By
Andrews, Asbury & Robert, Inc.
Consulting Engineers
401 San Pedro NE
Albuquerque, New Mexico
505-265-6631

Table of Contents

	<u>Page</u>
I Introduction	1
II Existing Conditions	
A. General	3
B. Off Site Drainage	4
C. On Site Drainage	6
III Developed Conditions	7
MAPS	
No. 1 Location Map	9
No. 2 Flood Hazard Map	10
No. 3 Soils Map	11
No. 4 Orthophoto Topographic Map	12
NOTICE OF DECISION, PLANNING DEPARTMENT	13
IV Drainage Analysis	14
Sheets 1 through 34	
ENCLOSURES	
Map No. 5 Existing Conditions	
Map No. 6 Developed Conditions	

I

INTRODUCTION

The Minato Company Ltd. proposes to improve a 4.113 acre tract of land located within the northwest quadrant of Albuquerque, New Mexico, and being situate in the Northwest Quarter (NW $\frac{1}{4}$) of Section 14, Township 10 North, Range 2 East, N.M.P.M. (see enclosed Location Map No. 1 - Zone Atlas Map J-11).

The development of this tract will be in phases. Phase I will consist of developing the northerly and easterly 2.7 acres as zero side setback townhouse units. Phase II construction, which will commence at a later date, will develop the remainder of the tract for light commercial use. (See Notification of Decision, Planning Division, City of Albuquerque enclosed.)

It is the intent of this report to provide an acceptable method of developing the subject property for Phase I and Phase II without appreciably effecting the present storm drainage patterns.

Guidelines for the analysis are based on the Albuquerque

Metropolitan Arroyo Flood Control Authority's Drainage Resolution
1980-15, and the City of Albuquerque's Drainage Ordinances and
Interim Drainage Guidelines.

II

EXISTING CONDITIONS

A. General

The subject property is presently undeveloped with a slope from west to east of approximately 0.6 percent. The tract is bounded on the east by Estancia Drive N.W., an improved roadway with curb and gutter and pavement. An existing apartment building bounds the property on the southeast corner. Directly to the south the property is bounded by Fortuna Road N.W., an improved roadway with curb and gutter and pavement. To the southwest the property is bounded by an existing self service gasoline station. Coors Boulevard N.W. bounds the property on the west which is an improved roadway with curb and gutter and pavement. The area directly to the north of the subject property is presently undeveloped.

Delineation of the site on Department of Housing and Urban Development, Flood Hazard Boundary Maps indicate that the proposed development is not in a flood zone. (See enclosed Map No. 2.)

An investigation of the soils groups in the area, by use of

the Soil Conservation Service Soils Maps (see enclosed Map No. 3) indicate that the soils in this area are of the Madurez-Wink Association which is classified as hydrologic soil group B.

B. Off Site

An analysis of the proposed site and surrounding areas by field visits and studies of 1" - 200' scale orthophoto topographic maps (see enclosed Map No. 4) indicates the following:

1. Grading operations have not occurred on the property in the recent past;
2. The subject property is relatively void of off site areas draining through the site.

Drainage basins to the west of Coors Boulevard are impounded in areas west of Coors by the elevated roadbed of Coors Boulevard N.W. and therefore do not present a hazard to the proposed development. A grade break in Coors Boulevard is located approximately at the southwest corner of the subject property (see Map No. 5 - Existing Conditions enclosed for top of curb elevations). North of the grade break, storm waters flow to the north and are partially intercepted by an existing storm sewer system in Coors Boulevard which has a 10 year storm design capacity. South of the grade break storm waters flow to the south.

The existing gasoline station, located to the southwest of the subject property, drains to the east; however, an existing block wall bounds the gas station on the north and east and directs storm waters to the south and into Fortuna Road N.W. Therefore, the only off site area that drains through the property is that area east of the existing block wall and designated as Drainage Area O-1 (see enclosed Map No. 5 for location).

The proposed site comprises a portion of a large drainage basin designated as Drainage Basin B on Map No. 4 enclosed. Drainage Area B is an enclosed basin and has no natural outlet. Storm waters generated by this basin flow to a depression which is located adjacent to the northeast corner of the development, in Estancia Drive N.W. At this location, storm flows are partially intercepted by an existing storm sewer system and are conveyed to the north.

The existing storm sewer does not have sufficient capacity to intercept the 100 year or 10 year storm flows from Drainage Basin B.

Eventually, as storm water increases in depth at the depression in Estancia, the storm water will flow out of the north basin

boundary on Estancia to Glen Rio and away from the site.

C. On Site

The existing drainage patterns for the on site undeveloped conditions are presented on Map No. 5 together with Drainage Area Designations.

The majority of the on site area discharges as sheet flow across the east property line and into Estancia Drive where it is intercepted by an existing storm sewer and carried north.

A small portion of land adjacent to Fortuna Road discharges to Fortuna Road as sheet flow and is carried to the east.

III

DEVELOPED CONDITIONS

In the developed state, the off site drainage area 0-1 (see Map No. 6 for drainage area locations and designations) will be allowed to discharge onto the subject property in the same manner as presently exists.

Drainage patterns and drainage area designations for the on site developed conditions are shown on Map No. 6 enclosed.

In the developed state, it is proposed to control increased storm water runoff due to development by means of rear yard ponding, roof ponding and common ponding areas.

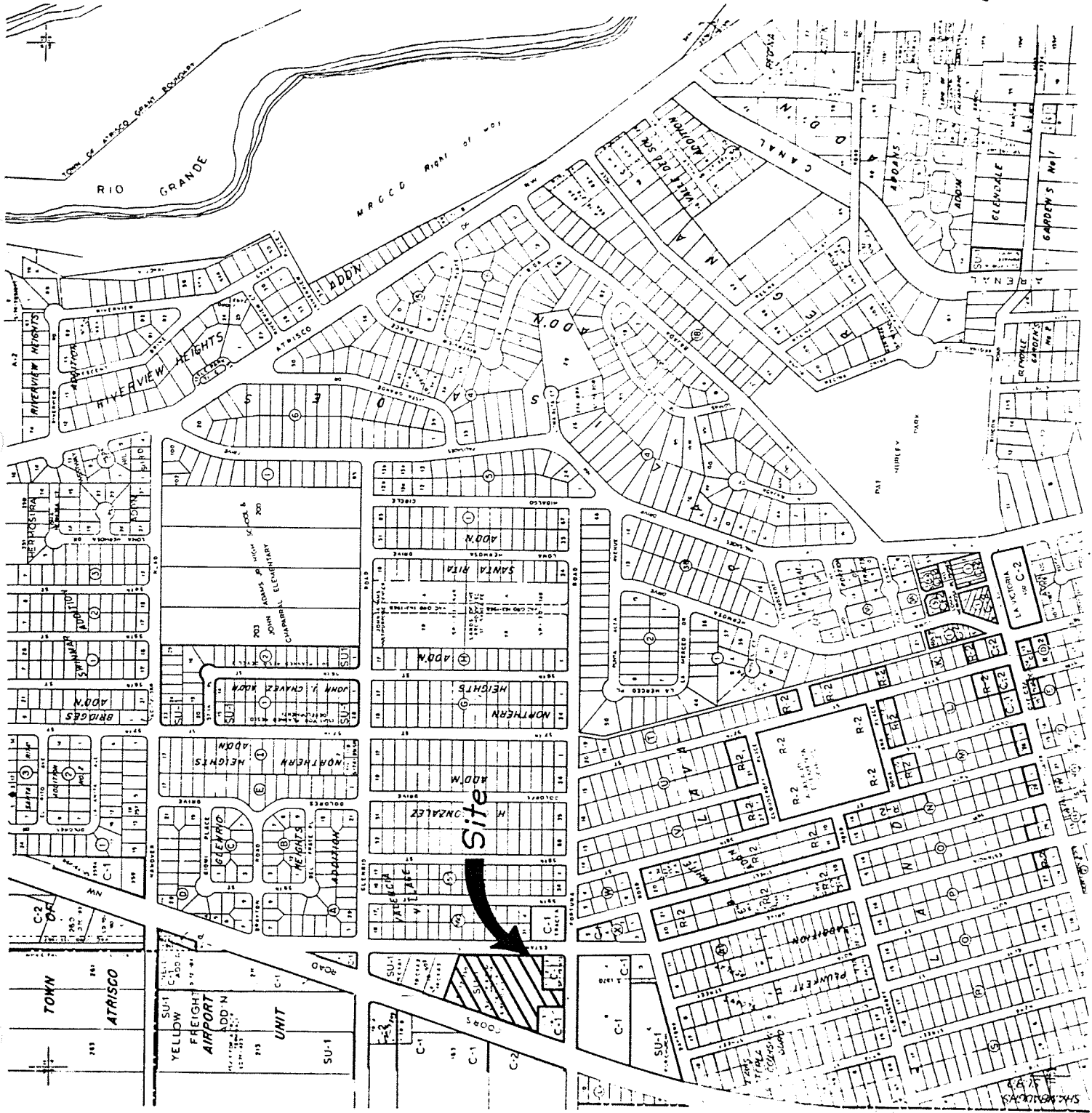
Rear yard ponding will be utilized in the townhouse portion of the development. The rear yard will be graded eight (8) inches lower than the corresponding finish floor elevation. A six (6) inch high minimum concrete curb will be constructed on the rear and side property lines to assure storm water retainage.

The roofs of the commercial and townhouse units will be built with constricted canals that will discharge to the front of the

units. The canales will be designed to discharge no greater than
a 5 year undeveloped storm.

how is
this controlled

Common ponding areas will be utilized to control the remainder
of the increased runoff. The common ponding areas will have con-
trolled outlets and overflow weirs.



Minato Townhouse & Commercial Deve. Drainage Analysis

1. 1/2" = 100'	2. 1/4" = 100'
3. 1/8" = 100'	4. 1/16" = 100'

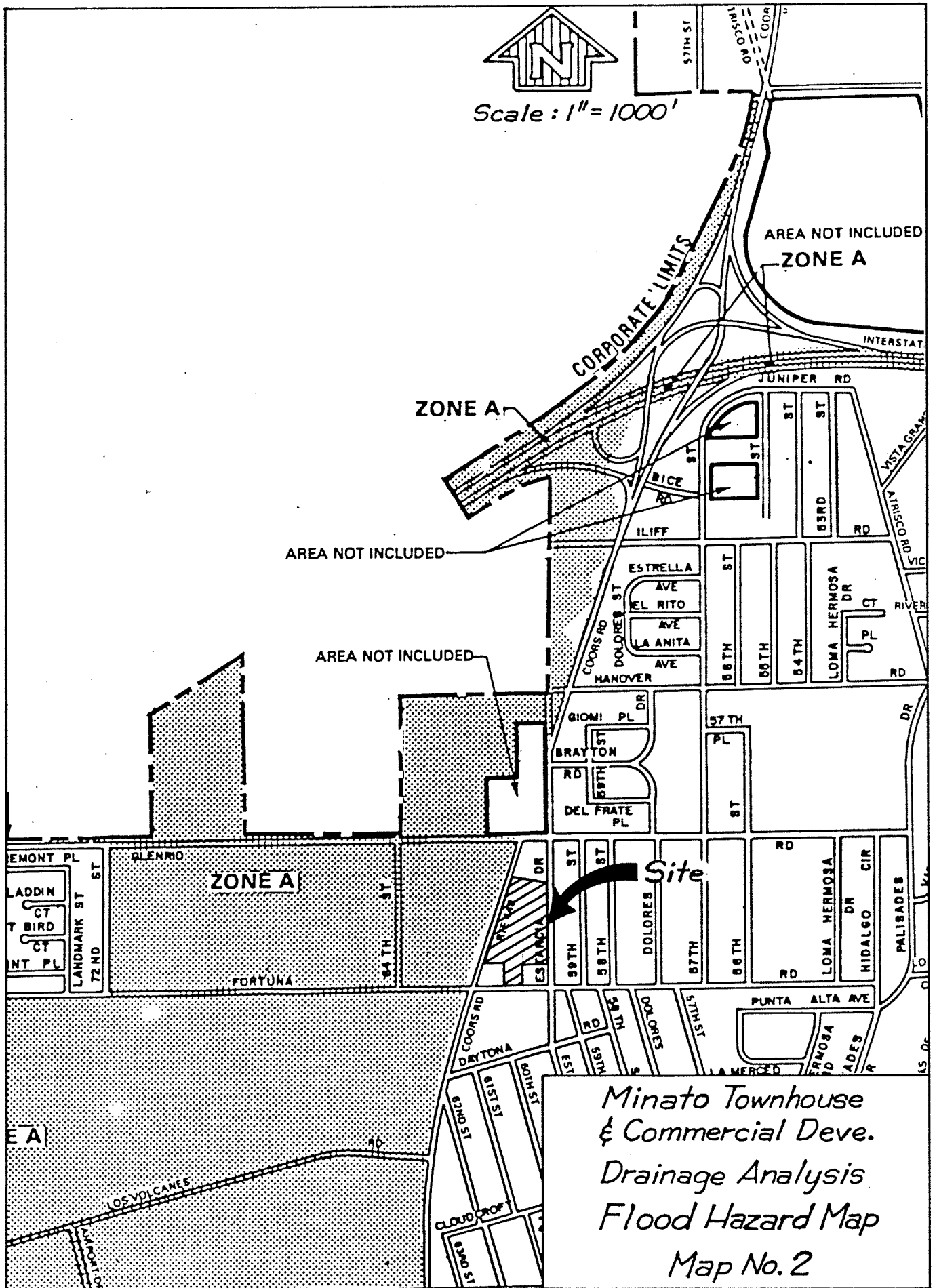
1. 1/2" = 100'	2. 1/4" = 100'
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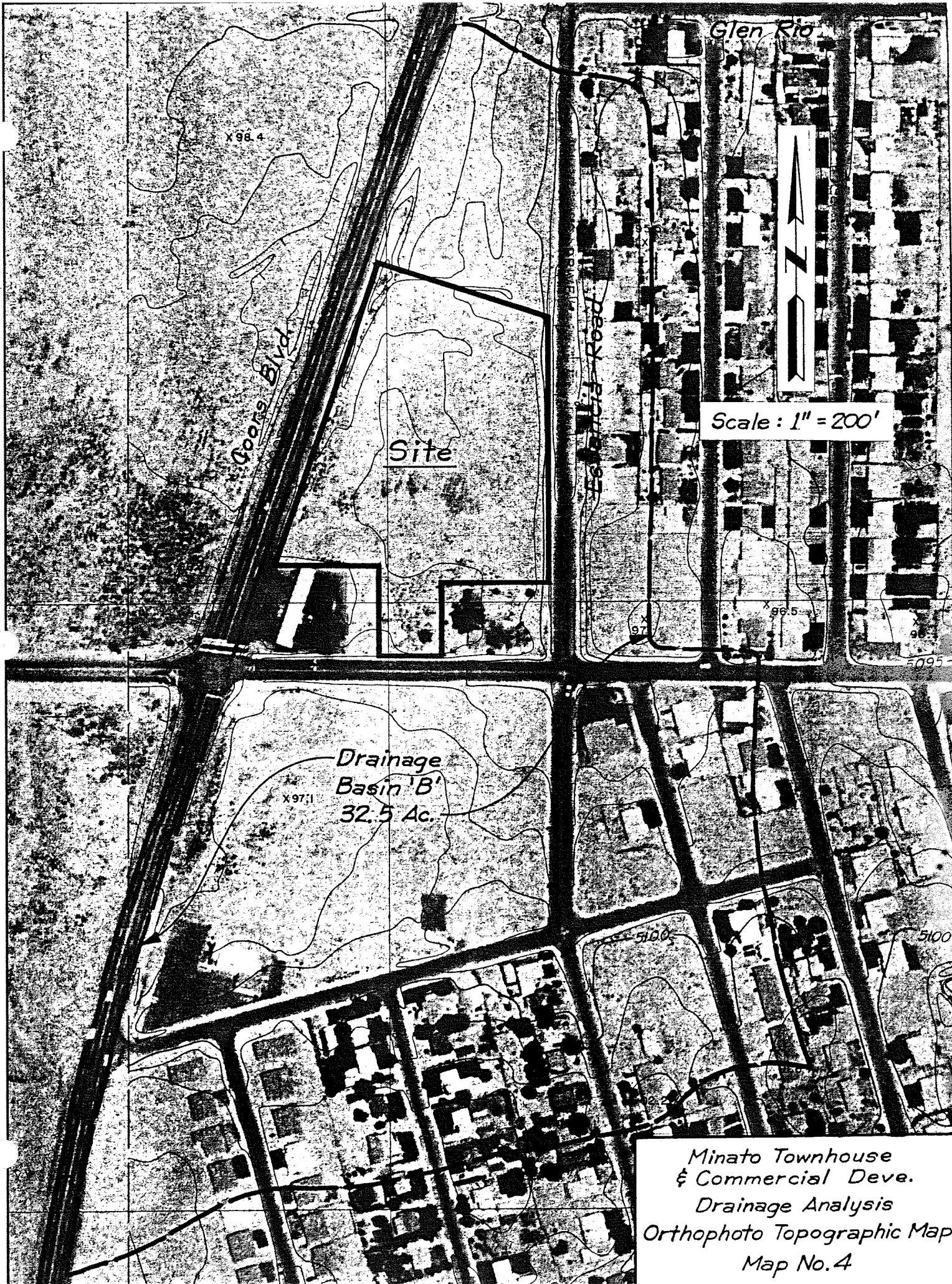
Location Map

J-11-Z

ALBANY PLANNING DEPARTMENT

Map No. 1





OFFICIAL NOTICE

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
PLANNING DIVISION
P.O. Box 1293, Albuquerque, New Mexico 87103

DATE: June 22, 1981

Minato Co., Ltd
8725 Fourth Street N.W.
Albuquerque, New Mexico 87114

NOTIFICATION OF DECISION

File: Z-76-60-2
Location: Development Plan
review for Tract C-2-A, Airport
Unit, Town of Atrisco Grant

On June 18, 1981, the Environmental Planning Commission approved the development plan for the above described area subject to the following Findings:

1. A drainage report and grading plan must be approved.

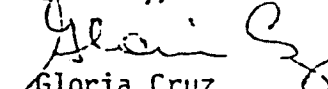
If you wish to appeal this decision, you must do so by 7-6-81 in the manner described below. A non-refundable filing fee of \$40 is required at the time the appeal is filed.

Appeal to the City Council. Any person aggrieved with any determination of the Environmental Planning Commission acting under this ordinance may file an appeal to the City Council by submitting written application on the Planning Division form to the Planning Division within 15 days of the Planning Commission's decision. The date the determination in question is issued is not included in the 15-day period for filing an appeal, and if the fifteenth day falls on a Saturday, Sunday or holiday as listed in the Merit System Ordinance, the next working day is considered as the deadline for filing the appeal. The City Council may decline to hear the appeal if it finds that all City plans, policies and ordinances have been properly followed. If it decides that all City plans, policies and ordinances have not been properly followed, it shall hear the appeal. Such appeal, if heard, shall be heard within 60 days of its filing.

You will receive notice if any other person files an appeal. If there is no appeal you can receive building permits any time after the appeal deadline quoted above provided all conditions imposed at the time of approval have been met. Successful applicants are reminded that other regulations of the City must be complied with, even after approval of the referenced application(s).

IF YOU RECEIVE APPROVAL FOR ANY REQUEST WHICH REQUIRES A SITE DEVELOPMENT PLAN, SEE ATTACHED SHEET FOR FURTHER INFORMATION.

Sincerely,


Gloria Cruz
Secretary

Letter of
Advice

cc Yum Kee Fu, 500 17th Street N.W.; 87104
L. T. James, 1019 Tramway Lane N.E.; 87122

IV

DRAINAGE ANALYSIS

Following is the Drainage Analysis (computations) for the subject property, for both Existing Conditions and Developed Conditions. The Drainage Analysis for the Developed Conditions is for the future developed state, i.e. Phase I (townhouses) and Phase II (commercial) construction. Upon approval of this report and at such time that Phase II construction is to commence, no additional drainage report will be necessary.

DRAINAGE ANALYSIS

CRITERIA

DESIGN STORM - 100 yr. frequency

AMAFCA DRAINAGE Resolution 1980-15

CITY OF ALBUQUERQUE DRAINAGE ORDINANCES
& INTERIM DRAINAGE GUIDELINES

REFERENCE MATERIAL

1. 100 YEAR - 6hr. precipitation,
RAINFALL FREQUENCY MAP, U.S. WEATHER BUR.
2. TIME OF CONCENTRATION Nomograph,
p. 2, Kirpich
3. DRAINAGE MANAGEMENT PLAN, WESTERN
ALBUQUERQUE METROPOLITAN AREA, 1975
by MATOTAN & ASSOC.

DESIGN PARAMETERS

PEAK RUNOFF RATE - RATIONAL FORMULA, $Q = CIA$

RUNOFF VOLUME = $V = \text{RUNOFF COEFFICIENT} \times \text{RAINFALL} \times \text{AREA}$

RUNOFF COEFFICIENTS

EXISTING GROUND SURFACE	= 0.40
PAVED AREAS	= 0.92
ROOF AREAS (FLAT)	= 0.875
OPEN OR LANDSCAPED AREAS	= 0.40

where are these from

REFER TO MAPS 5 & 6 FOR DRAINAGE
AREA DESIGNATIONS FOR EXISTING &
DEVELOPED CONDITIONS RESPECTIVELY.

NOTE: DUE TO THE SMALL WATERSHEDS
& LENGTHS OF TRAVEL INVOLVED A
MINIMUM TIME OF CONCENTRATION OF
10 MINUTES WAS USED FOR BOTH
EXISTING & DEVELOPED CONDITIONS
WHICH RESULTED IN AN INTENSITY
OF 5.15 IN/HR FOR THIS AREA
OF ALBUQUERQUE. (SEE INTENSITY-
DURATION-FREQUENCY CURVES, FROM
WEST MESA DRAINAGE PLAN
ENCLOSED AT END OF THIS
SECTION.)

EXISTING CONDITIONS - OFFSITE
PEAK FLOWS

DRAINAGE AREA 0-1

$$A = 0.077 \text{ AC.}$$

$$C = 0.40$$

$$I_{10} = 3.30 \text{ in/hr}$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{10} = 0.40 \times 3.30 \times 0.077 = 0.10 \text{ CFS}$$

$$Q_{100} = 0.40 \times 5.15 \times 0.077 = 0.16 \text{ CFS}$$

EXISTING CONDITIONS - ONSITE

PEAK FLOWS & VOLUMES

DRAINAGE AREA E-1

$$A = 1.223 \text{ AC.}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = 0.40 \times 5.15 \times 1.223 = 2.52 \text{ CFS}$$

$$V_{100} = 0.40 \times 1.223 \times 2.2''/12 = 0.090 \text{ AC-FT}$$

DISCHARGE OCCURS AS SHEET FLOW
ACROSS THE EAST BOUNDARY OF THE
PROPERTY AND IS INTERCEPTED BY
STORM SEWER IN ESTANCIA RD.

DRAINAGE AREA E-2

$$A = 2.471 \text{ AC.}$$

$$C = 0.40 \text{ AC.}$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = 0.40 \times 5.15 \times 2.471 = 5.09 \text{ CFS}$$

$$V_{100} = 0.40 \times 2.471 \times 2.2''/12 = 0.181 \text{ AC-FT}$$

DISCHARGE OCCURS AS SHEET FLOW
ACROSS THE EAST BOUNDARY OF THE
PROPERTY AND IS INTERCEPTED BY
STORM SEWER IN ESTANCIA RD.

DRAINAGE AREA E-3

$$A = 0.419 \text{ AC.}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = 0.40 \times 5.15 \times 0.419 = 0.86 \text{ CFS}$$

$$V_{100} = 0.40 \times 0.419 \times 2.2''/12 = 0.031 \text{ AC-FT.}$$

DISCHARGE OCCURS AS SHEET FLOW
ACROSS THE SOUTH BOUNDARY OF THE
PROPERTY AND IS INTERCEPTED BY
FORTUNA RD.

SUMMARY - EXISTING CONDITIONS - ONSITE

<u>DRAINAGE AREA</u>	<u>Q_{100} (CFS)</u>	<u>V_{100} (AC-FT)</u>
E-1	2.52	0.090
E-2	5.09	0.181
E-3	0.86	0.031
<u>TOTAL</u>	<u>8.47</u>	<u>0.302</u>

EXISTING CONDITIONS - DRAINAGE BASIN B

DRAINAGE BASIN B comprizes THAT AREA WHICH DRAINS TO THE EXISTING STORM SEWER IN ESTANCIA ROAD. THE AREA INVOLVED IS RELATIVELY DEVELOPED AND CONSISTS OF APARTMENTS, SINGLE FAMILY RESIDENCES, SMALL COMMERCIAL AREAS AND UNDEVELOPED AREAS. A COMPOSITE RUNOFF COEFFICIENT OF 0.65 WAS ASSUMED FOR THIS AREA. (NOTE: BASIN 'B' INCLUDES SUBJECT PROPERTY, SEE MAP No 4 FOR LOCATION)

$$A = 31.5 \text{ AC.}$$

$$C = 0.65$$

$$I_{10} = 3.30 \text{ in/hr}$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{10} = 0.65 \times 3.30 \times 31.5 = 67.6 \text{ CFS}$$

$$Q_{100} = 0.65 \times 5.15 \times 31.5 = 105.4 \text{ CFS}$$

THE 100 year & 10 year flows EXCEED THE CAPACITY OF THE EXISTING STORM SEWER. STORM WATER WILL INCREASE TO A DEPTH OF APPROXIMATELY 1.3 feet (SEE MAP 4) AT WHICH DEPTH THE STORM WATER WILL OVERFLOW A CREST IN ESTANCIA NORTH OF THE SUBJECT PROPERTY AND WILL THEN FLOW IN GLENKID TO THE EAST & AWAY FROM THE PROPERTY.

DEVELOPED CONDITIONS - OFFSITE
PEAK FLOWS

DRAINAGE AREA 0-1

SAME AS EXISTING
see sk. 2

DEVELOPED CONDITIONS - ONSITE
PEAK FLOWS & VOLUMES

GENERAL:

AS STATED IN THE NARRATIVE OF THE REPORT THE REARYARDS OF THE TOWNHOUSE UNITS WILL POND ON THEMSELVES AND WILL THEREFOR NOT CONTRIBUTE TO THE DEVELOPED RUNOFF. ALSO ROOF PONDING WILL BE UTILIZED TO DETAIN THE DEVELOPED RATE OF RUNOFF, THEREFOR THE REMAINDER OF THE AREA IS THE ONLY AREA THAT DIRECTLY CONTRIBUTES TO THE DEVELOPED RUNOFF. (SEE SK. 13 FOR ROOF PONDING REQUIREMENTS.) IN ORDER TO EVALUATE THE COMMON POND REQUIREMENTS FOR THE DEVELOPED CONDITIONS, THE PEAK RATES AND VOLUMES FOR THE UNDEVELOPED CONDITIONS ARE ALSO PRESENTED.

DRAINAGE AREA D-1

UNDEVELOPED

$$\text{TOTAL AREA} = 1.529 \text{ AC.}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = 0.40 \times 5.15 \times 1.529 = 3.15 \text{ CFS}$$

$$V_{100} = 0.40 \times 1.529 \times 2.2/12 = 0.112 \text{ AC-FT.}$$

#143 P
• 143 AC Area yards road
• 495 AC foot Areas
• 618 NON Contributing Area

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.911 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.220 \text{ AC.}$$

$$\text{PAVED AREA} = 0.691 \text{ AC.}$$

$$C = \frac{0.220 \times .40 + 0.691 \times .92}{0.911} = 0.79$$

$$Q_{100} = .79 \times 5.15 \times .911 = 3.71 \text{ CFS}$$

$$V_{100} = .79 \times .911 \times 2.2/12 = 0.132 \text{ AC-FT}$$

DRAINAGE AREA D-2

UNDEVELOPED

$$\text{TOTAL AREA} = 0.926 \text{ AC.}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = .40 \times 5.15 \times 0.926 = 1.91 \text{ CFS}$$

$$V_{100} = .40 \times 0.926 \times 2.2 \frac{\text{in}}{12} = 0.068 \text{ AC-FT}$$

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.546 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.154 \text{ AC}$$

$$\text{PAVED AREA} = 0.392 \text{ AC.}$$

$$C = \frac{0.154 \times 0.40 + 0.392 \times .92}{0.546} = 0.77$$

$$Q_{100} = .77 \times 5.15 \times 0.546 = 2.17 \text{ CFS}$$

$$V_{100} = .77 \times 0.546 \times 2.2 \frac{\text{in}}{12} = 0.077 \text{ AC-FT}$$

DRAINAGE AREA D-3

UNDEVELOPED

$$\begin{aligned}\text{TOTAL AREA} &= 0.334 \text{ AC.} \\ C &= 0.40 \\ I_{100} &= 5.15 \text{ in/hr}\end{aligned}$$

$$Q_{100} = 0.40 \times 5.15 \times 0.334 = 0.69 \text{ CFS}$$

$$V_{100} = 0.40 \times .334 \times 2.2 \frac{\text{in}}{12} = 0.024 \text{ AC-FT}$$

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.281 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.112 \text{ AC.}$$

$$\text{PAVED AREA} = 0.169 \text{ AC.}$$

$$C = \frac{0.112 \times .40 + 0.169 \times .92}{0.281} = 0.71$$

$$Q_{100} = 0.71 \times 5.15 \times 0.281 = 1.03 \text{ CFS}$$

$$V_{100} = 0.71 \times 0.281 \times 2.2 \frac{\text{in}}{12} = 0.037 \text{ AC-FT}$$

DRAINAGE AREA D-4

UNDEVELOPED

$$\text{TOTAL AREA} = 1.046 \text{ AC.}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = .40 \times 5.15 \times 1.046 = 2.16 \text{ CFS}$$

$$V_{100} = .40 \times 1.046 \times 2.2 \frac{\text{in}}{12} = 0.077 \text{ AC-FT}$$

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.816 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.256 \text{ AC.}$$

$$\text{PAVED AREA} = 0.560 \text{ AC.}$$

$$C = \frac{0.256 \times .40 + 0.560 \times .92}{0.816} = 0.76$$

$$Q_{100} = 0.76 \times 5.15 \times 0.816 = 3.19 \text{ CFS}$$

$$V_{100} = 0.76 \times 0.816 \times 2.2 \frac{\text{in}}{12} = 0.114 \text{ AC-FT.}$$

DRAINAGE AREA D-5

UNDEVELOPED

$$\text{TOTAL AREA} = 0.135 \text{ AC}$$

$$C = 0.40$$

$$I_{100} = 5.15 \text{ in/hr}$$

$$Q_{100} = 0.40 \times 5.15 \times 0.135 = 0.28 \text{ CFS}$$

$$V_{100} = 0.40 \times 0.135 \times \frac{2.2''}{12} = 0.010 \text{ AC-FT}$$

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.135 \text{ AC}$$

$$\text{LANDSCAPED AREA} = 0.052 \text{ AC.}$$

$$\text{PAVED AREA} = 0.083 \text{ AC.}$$

$$C = \frac{0.40 \times 0.052 + 0.92 \times 0.083}{0.135} = 0.72$$

$$Q_{100} = 0.72 \times 5.15 \times 0.135 = 0.50 \text{ CFS}$$

$$V_{100} = 0.72 \times 0.135 \times \frac{2.2''}{12} = 0.018 \text{ AC-FT}$$

DRAINAGE AREA D-6

UNDEVELOPED

$$\begin{aligned}\text{TOTAL AREA} &= 0.143 \text{ AC} \\ C &= 0.40 \\ I_{100} &= 5.15 \text{ in/hr}\end{aligned}$$

$$Q_{100} = .40 \times 5.15 \times 0.143 = 0.29 \text{ cfs}$$

$$V_{100} = .4 \times 0.143 \times 2.2 \frac{1}{12} = 0.010 \text{ AC-FT}$$

DEVELOPED

$$\text{TOTAL CONTRIBUTING AREA} = 0.143 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.033 \text{ AC.}$$

$$\text{PAVED AREA} = 0.110 \text{ AC.}$$

$$C = \frac{0.40 \times 0.033 + .92 \times 0.110}{0.143} = 0.80$$

$$Q_{100} = 0.80 \times 5.15 \times .143 = 0.59 \text{ cfs}$$

$$V_{100} = 0.80 \times 0.143 \times 2.2 \frac{1}{12} = 0.021 \text{ AC-FT}$$

ROOF Ponding Requirements

AS STATED IN THE NARRATIVE OF THE REPORT, ROOF ponding will be utilized TO STORE STORM WATER. THE ROOF CANALES will discharge TO THE FRONT OF THE UNITS AT A RATE NOT TO EXCEED THE 5yr. UNDEVELOPED RATE.

FOUR different floor plans ARE proposed for the TOWNHOUSE PORTION OF THE DEVELOPMENT AND TWO floor plans ARE proposed for the COMMERCIAL DEVELOPMENT.

THE tabulation ON the following SHEET shows the ROOF AREA for EACH LOT, UNDEVELOPED VOLUME OF RUNOFF, DEVELOPED VOLUME OF RUNOFF, REQUIRED STORAGE VOLUME & MAXIMUM RATE OF DISCHARGE. THE TABULATION is grouped INTO the RESPECTIVE DRAINAGE AREA TO WHICH THE ROOFS will discharge.

NOTE: $I_5 = 2.82 \text{ in/hr}$ - 100yr storm

$$C_{\text{NATURAL}} = 0.40$$

$$C_{\text{DEVELOPED}} = 0.875$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project MINATO et al. Sheet 14 of 34
DRAINAGE ANALYSIS Job No. 265
By BSF Chk'd JAD Date 9/22/81

ROOF PONDING REQUIREMENTS

LOT No.	ROOF AREA (SQ FT)	VOL. NATURAL (FT ³)	VOL. DEPOSED (FT ³)	REQUIRED STORAGE (FT ³)	RS (CFS)
1	1850	136	297	161	0.048
2	"	"	"	"	"
3	"	"	"	"	"
4	1850	136	297	161	0.048
5	1350	99	217	118	0.035
6	"	"	"	"	"
7	1350	99	217	118	0.035
8	1730	127	278	151	0.045
9	1730	127	278	151	0.045
10	1450	106	233	127	0.038
11	"	"	"	"	"
12	"	"	"	"	"
13	1450	106	233	127	0.038

DRAINAGE AREA D-1

TOTAL ALLOWABLE ROOF DISCHARGE - DRAINAGE AREA D-1 = 0.539 CFS

+3071

41,249 Total

ROOF Ponding REQUIREMENTS

LOT No.	ROOF AREA (SQ. FT.)	VOL. NATURAL (FT ³)	VOL. DISCHARGED (FT ³)	REQUIRED STORAGE (FT ³)	RS (CFS)
14	1350	99	217	118	0.035
15	"	"	"	"	"
16	"	"	"	"	"
17	"	"	"	"	"
18	"	"	"	"	"
19	1350	99	217	118	0.035
20	1450	106	233	127	0.038
21	"	"	"	"	"
22	1450	106	233	127	0.038

DRAINAGE AREA D-2

TOTAL ALLOWABLE ROOF DISCHARGE - DRAINAGE AREA D-2 = 0.324 CFS

ROOF PONDING REQUIREMENTS

LOT No.	ROOF AREA (F ²)	VOL. NATURAL (F ³)	VOL. DEWATERED (F ³)	REQUIRED STORAGE (F ³)	RS (CFS)
23	1450	106	233	127	0.038

DRAINAGE AREA D-3

TOTAL ALLOWABLE ROOF DISCHARGE - DRAINAGE AREA D-3 = 0.038 CFS

TRACT A	ROOF AREA (F ²)	VOL. NATURAL (F ³)	VOL. DEWATERED (F ³)	REQUIRED STORAGE (F ³)	RS (CFS)
TRACT A	8000	587	1283	696	0.207
TRACT A	2000	147	321	174	0.052

DRAINAGE AREA D-4

TOTAL ALLOWABLE ROOF DISCHARGE - DRAINAGE AREA D-4 = 0.259 CFS

REQUIRED POND VOLUMES

IN ORDER THAT THE PROPOSED DEVELOPMENT MAY BE CONSTRUCTED IN PHASES IT IS REQUIRED THAT PHASE I (TOWNHOUSES) ADHERE TO THE DRAINAGE REQUIREMENT PREVIOUSLY SET FORTH & PHASE II (COMMERCIAL) ALSO ADHERE TO THE DRAINAGE REQUIREMENTS & THAT THEY DO SO INDEPENDENTLY OF EACH OTHER. THEREFORE THE FOLLOWING SUMMARIES LIST THE DEVELOPED DRAINAGE AREAS, UNDEVELOPED VOLUME OF RUNOFF & DEVELOPED VOLUME OF RUNOFF FOR EACH PHASE

PHASE I (TOWNHOUSE)

<u>DRAINAGE AREA</u>	<u>UNDEVELOPED VOL (AC.FT)</u>	<u>DEVELOPED VOL (AC.FT)</u>
D-1 (see sk. 7)	0.112	0.132
D-2 (see sk. 8)	0.068	0.077
D-3 (see sk. 9)	<u>0.024</u>	<u>0.037</u>
TOTAL	0.204	0.246

REQUIRED COMMON AREA

$$\text{STORAGE} = 0.246 - 0.204 = 0.042 \text{ AC.FT}$$

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Project MIDATO et al Sheet 18 of 34
DRAINAGE ANALYSIS Job No. 265
By RSF Chk'd JAA Date 9/22/81

PHASE II (COMMERCIAL)

<u>DRAINAGE AREA</u>	<u>UNDEVELOPED VOL (AC. FT.)</u>	<u>DEVELOPED VOL (AC. FT.)</u>
D-4 (see sk. 10)	0.077	0.114
D-5 (see sk. 11)	0.010	0.018
D-6 (see sk. 12)	<u>0.010</u>	<u>0.021</u>
TOTAL	0.097	0.153

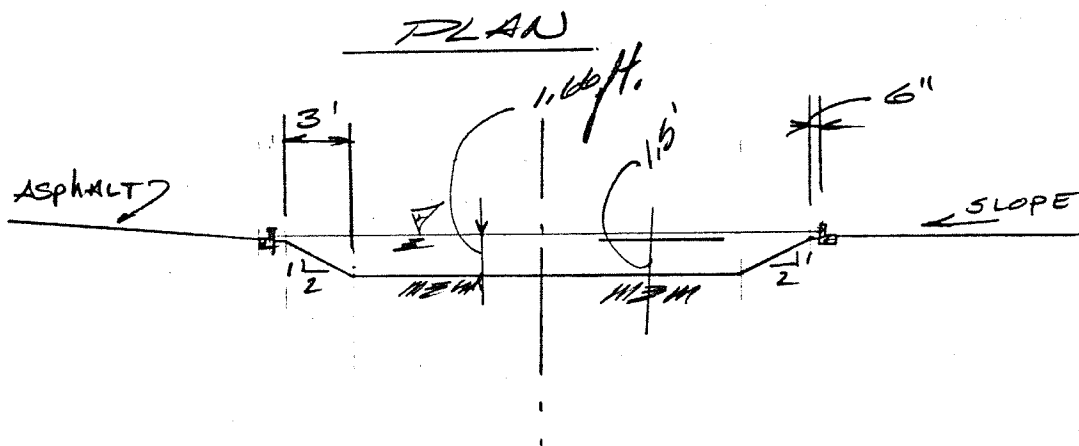
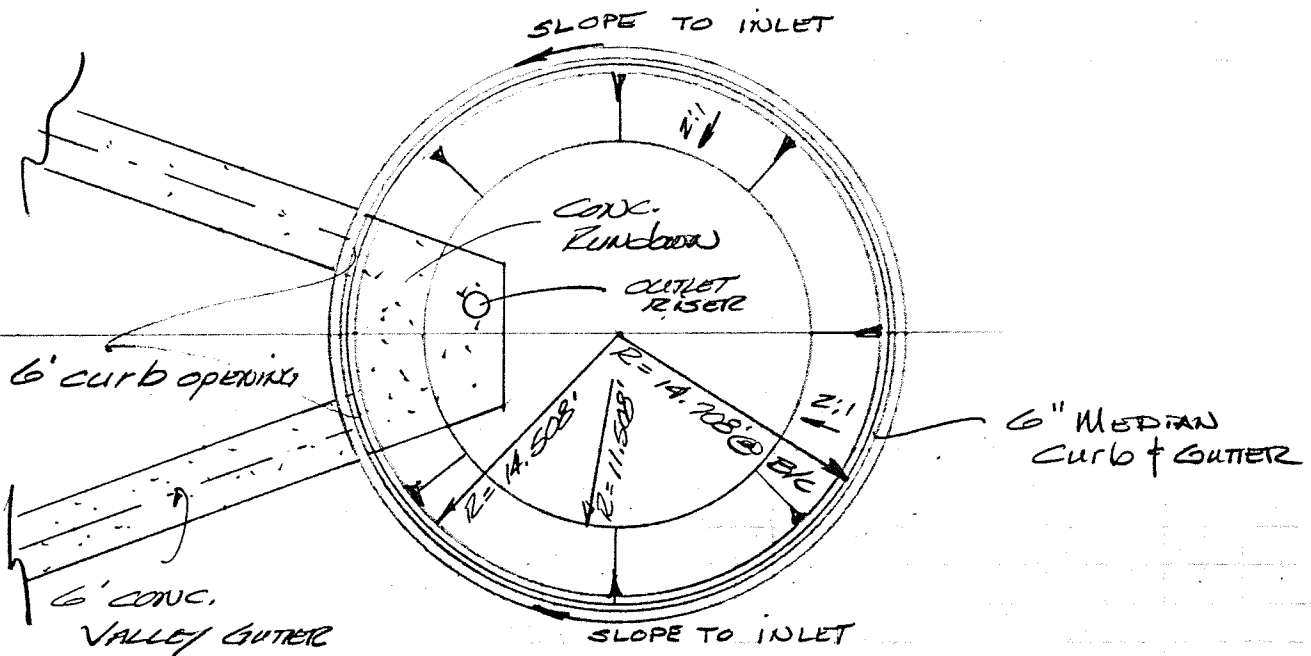
Required Common Area

$$\text{STORAGE} = 0.153 - 0.097 = 0.056 \text{ AC. FT.}$$

2,439.36 ft³

Common Pond Design - Phase I (Townhouse)

IN ORDER TO ATTAIN THE REMAINING
REQUIRED STORAGE FOR PHASE I,
THE AREA IN THE CENTER OF EACH
CUL DE SAC WILL BE UTILIZED.
BOTH PONDS WILL HAVE THE
SAME CONFIGURATION AS SHOWN IN
PLAN & SECTION BELOW



VOLUME OF POND PER EACH:

$$\text{Bottom Area} = 11.508^2 \times \pi = 416.05 \text{ ft}^2$$

$$\text{Top Area} = 14.508^2 \times \pi = 661.25 \text{ ft}^2$$

$$\text{Area A BACK of Curb} = 14.708^2 \times \pi = 679.61 \text{ ft}^2$$

$\therefore$ VOLUME of Pond

$$= \frac{416.05 + 661.25}{2} \times 1.5 + 679.61 \times .16$$

$$= 307.98 + 108.74$$

$$= 916.72 \text{ ft}^3 / \text{pond}$$

908.172

THEREFORE CAPACITY OF TWO

$$\text{PONDS} = 916.72 \times 2 = 1833.44 \text{ ft}^3$$

$$= 0.042 \text{ AC} \cdot \text{FT}$$

$$\text{Require STORAGE} = 0.042 \text{ AC} \cdot \text{FT}$$

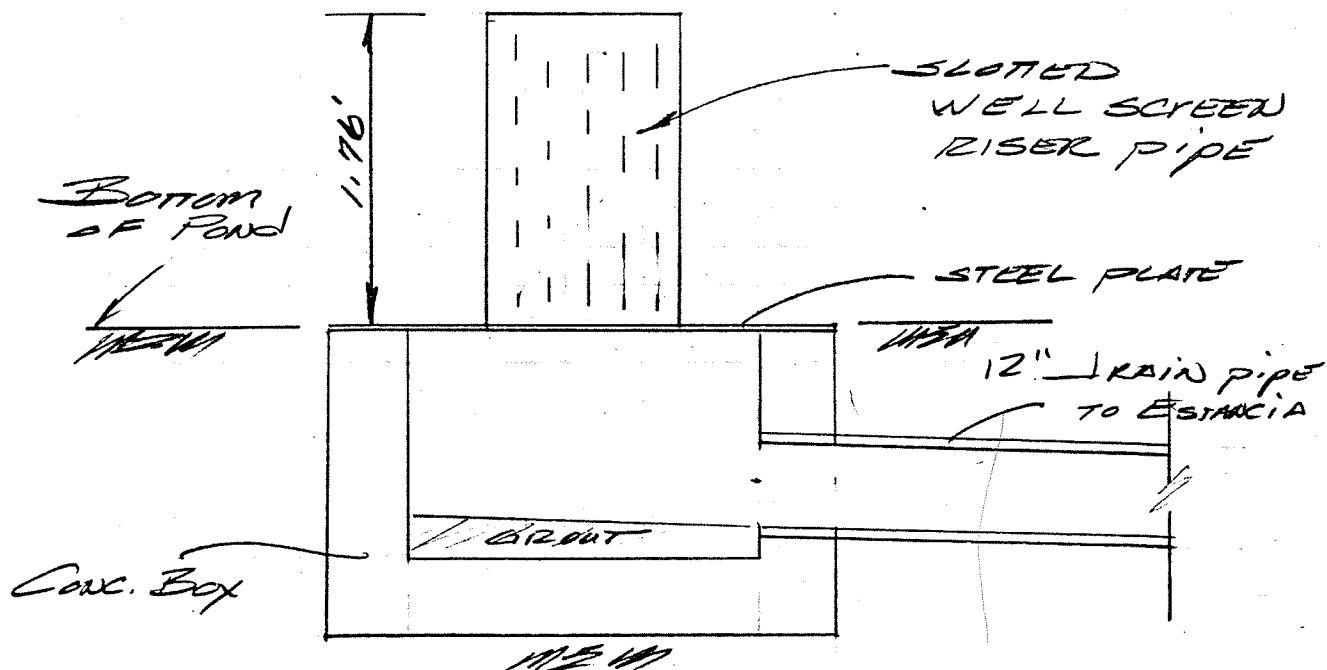
see sh. 17

OK OK

CONTROLLED OUTLET DESIGN - PHASE I

THE CONTROLLED OUTLETS FOR THE PONDS WILL BE DESIGNED TO DISCHARGE @ A RATE EQUAL TO THE 5 YEAR UNDEVELOPED DISCHARGE FOR THE DRAINAGE AREA DRAINING TO THE POND.

THE CONTROLLED OUTLETS WILL CONSIST OF A RISER PIPE MOUNTED ON A CONCRETE BOX. THE CONCRETE BOX WILL DISCHARGE TO AN EXISTING CATCH BASIN IN ESTANCIA (SEE MAP NO 6 FOR LOCATION)



Pond D-1

Pond D-1 is located within
DRAINAGE AREA D-1 @ THE CENTER
OF THE CULDESAC of MINATO
CIRCLE N.W.

$$\text{TOTAL AREA} = 1.529 \text{ AC. (see sk. 7)}$$

$$C = 0.40$$

$$I_5 = 2.82 \text{ in/hr}$$

$$Q_5 = .4 \times 2.82 \times 1.529 = 1.73 \text{ CFS}$$

then

$$Q = C a \sqrt{2gh}$$

$$h = \frac{1.76}{2} = .88$$

$$C = .6$$

$$Q = 1.73 \text{ CFS}$$

$$\therefore a = \frac{1.73}{.6 \sqrt{2g \times .88}} = 0.383 \text{ FT}^2$$

$$= 55.15 \text{ in}^2$$

THEREFORE NET OPEN AREA OF
SLOTTED WELL SCREEN = 55.15 in²

Provide WELL SCREEN WITH 31.33 in²
OF OPEN AREA PER FOOT.

DETERMINE MIN. SLOPE of 12" RCP
DRAIN PIPE FROM CONCRETE BOX
TO DRAIN 1.73 CFS

$$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$$

$$n = 0.015$$

$$Q = 1.73 \text{ CFS}$$

$$A = 0.785 \text{ FT}^2$$

$$p = 3.142 \text{ FT}$$

$$R = 0.25 \text{ FT}$$

$$\therefore S^{1/2} = \frac{Q n}{1.486 R^{2/3} A}$$

$$= \frac{1.73 \times 0.015}{1.486 \times 0.395 \times 0.785}$$

$$= 0.056$$

$$S = 0.0032 \text{ FT/FT}$$

THEREFORE MIN SLOPE = 0.32%

POND D-2

POND D-2 IS LOCATED WITHIN
DRAINAGE AREA D-2 @ THE CENTER
OF THE CUL-DE-SAC OF
MINATO PLACE N.W.

$$\text{TOTAL AREA} = 0.926 \text{ AC (SEE SL. 8)}$$

$$C = .4$$

$$I_5 = 2.82 \text{ in/hr}$$

$$Q_5 = .4 \times 2.82 \times 0.926 = 1.04 \text{ CFS}$$

then

$$Q = C a \sqrt{2g h}$$

$$h = \frac{1.76}{2} = .88 \text{ FT}$$

$$C = 0.6$$

$$Q = 1.04 \text{ CFS}$$

$$\therefore a = \frac{1.04}{.6 \sqrt{2g \cdot .88}} = 0.230 \text{ FT}^2$$

$$= 33.16 \text{ in}^2$$

THEREFORE NET OPEN AREA OF
SLOTTED WELL SCREEN = 33.16 in²

PROVIDE WELL SCREEN WITH
18.84 in² OF OPEN AREA PER FOOT.

DETERMINE min slope of 12" RCP
drain pipe from concrete box
to drain 1.04 cfs

$\therefore$ from sk. 23

$$S^{1/2} = \frac{1.04 \times 0.015}{1.486 \times 0.395 \times 0.785}$$

$$= 0.0338$$

$$S = 0.0012 \text{ ft/ft}$$

THEREFORE min slope = 0.12%

POND OVERFLOW DESIGN - PHASE I

THE RIM OF THE SLOTTED WELL SCREEN RISER PIPE IN Ponds D-1 & D-2 WILL ACT AS THE OVERFLOW WEIR FOR THE Ponds. THE OVERFLOW WEIR WILL BE DESIGNED TO DISCHARGE THE DEVELOPED 100 YR RATE.

THE OVERFLOW WEIR FOR BOTH Ponds WILL BE SIZED FOR THE DISCHARGE FROM DRAINAGE AREA D-1 AS THIS IS THE WORST CASE.

$$\text{TOTAL AREA D-1} = 1.529 \text{ AC. (see d. 7)}$$

$$\text{ROOF AREA} = 0.475 \text{ AC.}$$

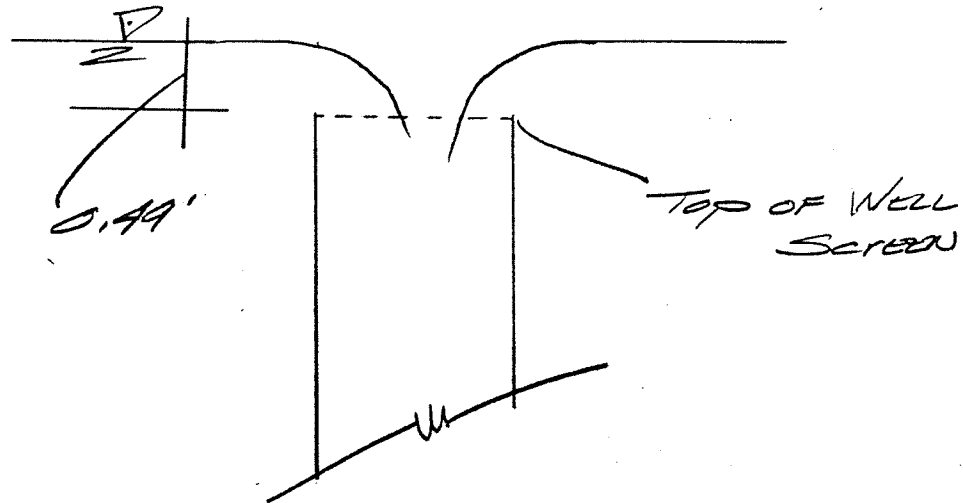
$$\text{PAVED AREA} = 0.691 \text{ AC.}$$

$$\text{LANDSCAPED AREA} = 0.363 \text{ AC}$$

$$C = \frac{0.875 \times 0.475 + 0.691 \times .92 + 0.4 \times 0.363}{1.529} = 0.78$$

$$Q_{100} = 0.78 \times 5.15 \times 1.529 = 6.14 \text{ CFS}$$

$\therefore$ ASSUME WATER WILL RISE 0.49
ft ABOVE TOP OF WELL SCREEN



Then

$$Q = CLH^{3/2}$$

$$H = 0.49'$$

$$Q = 6.14 \text{ ft.}$$

$$C = 2.92$$

$$L = \frac{Q}{CH^{3/2}}$$

$$= \frac{6.14}{2.92 \times .49^{3/2}} = 6.13 \text{ FT}$$

$$\text{DIA} = \frac{L}{\pi} = \frac{6.13}{\pi} = 1.95 \text{ FT}$$

THEREFORE PROVIDE 24" DIA WELL SCREEN.

DEPTH OF FLOW IN STREET - PHASE I

THE CRITICALLY LOCATION FOR MAXIMUM DEPTH OF FLOW IN THE STREET IS DESIGNATED AS POINT A ON MAP N^o 6. AT THIS POINT THE STREET AS A MIN. SLOPE OF 0.40%

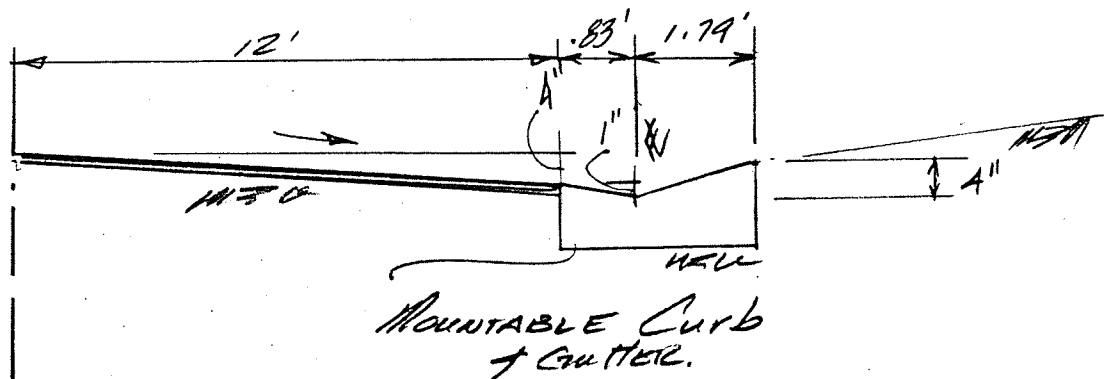
TOTAL AREA CONTRIBUTING TO FLOW = 0.325 AC.

ROOF AREA = 0.133 AC
PAVED AREA = 0.135 AC
LANDSCAPED AREA = 0.057 AC

$$C = \frac{0.133 \times .875 + 0.135 \times .92 + 0.054 \times .4}{0.325}$$

$$= 0.81$$

$$Q_{100} = 0.81 \times 5.15 \times 0.325 = 1.36 \text{ CFS}$$



IDEALIZED STREET CROSS SECTION

$$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$$

$$n = 0.015$$

$$S = 0.4\%$$

FOR 100 yr FLOW - $Q = 1.36 \text{ CFS}$

by TRIAL & ERROR:

$$d = \text{DEPTH ABOVE FLOWLINE} = 2.4''$$

$$A = 1.08 \text{ FT}^2$$

$$p = 9.55 \text{ FT}$$

$$R^{2/3} = 0.232$$

$$Q = \frac{1.486}{.015} \times 0.232 \times .0632 \times 1.08$$

$$= 1.57 \text{ CFS OK}$$

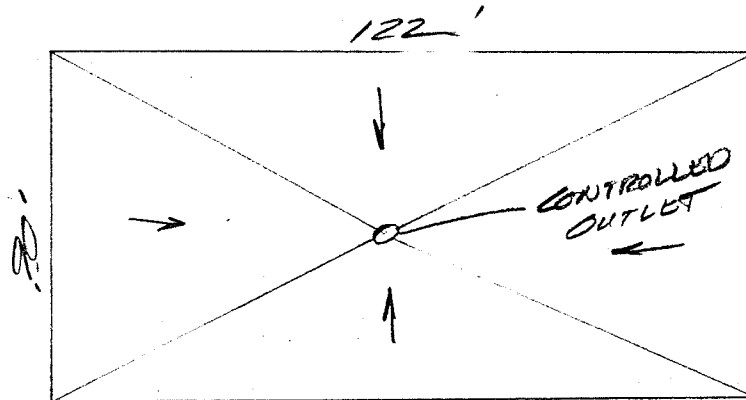
$$V = \frac{Q}{A} = 1.45 \text{ FT/SEC}$$

Common Pond Design - Phase II (Commercial)

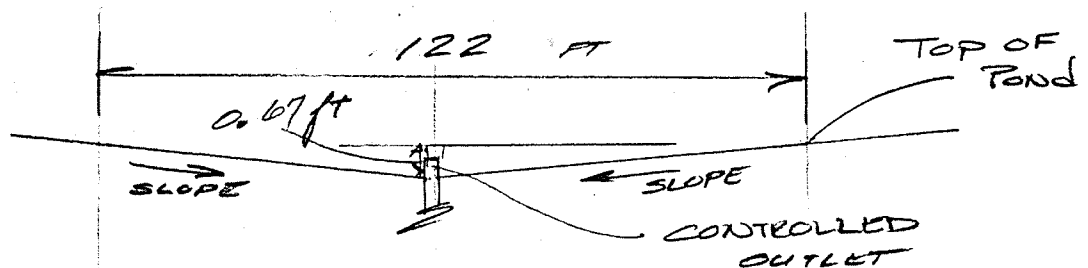
IN ORDER TO ATTAIN THE REMAINING
REQUIRED STORAGE FOR PHASE II
(SEE SK. 18) THE PARKING AREA
WITHIN DRAINAGE AREA D-4 WILL BE
DEPRESSED.

REQUIRED VOL of ADDITIONAL

$$\begin{aligned}\text{STORAGE} &= 0.056 \text{ AC} \cdot \text{FT} \\ &= 2439 \text{ FT}^3\end{aligned}$$



PLAN



SECTION

VOLUME OF POND

$$= \frac{1}{3} h A$$

$$= \frac{1}{3} \times 0.67 (90 \times 122)$$

$$= 2452 \text{ FT}^3 \quad \text{OK}$$

CONTROLLED OUTLET - PHASE II

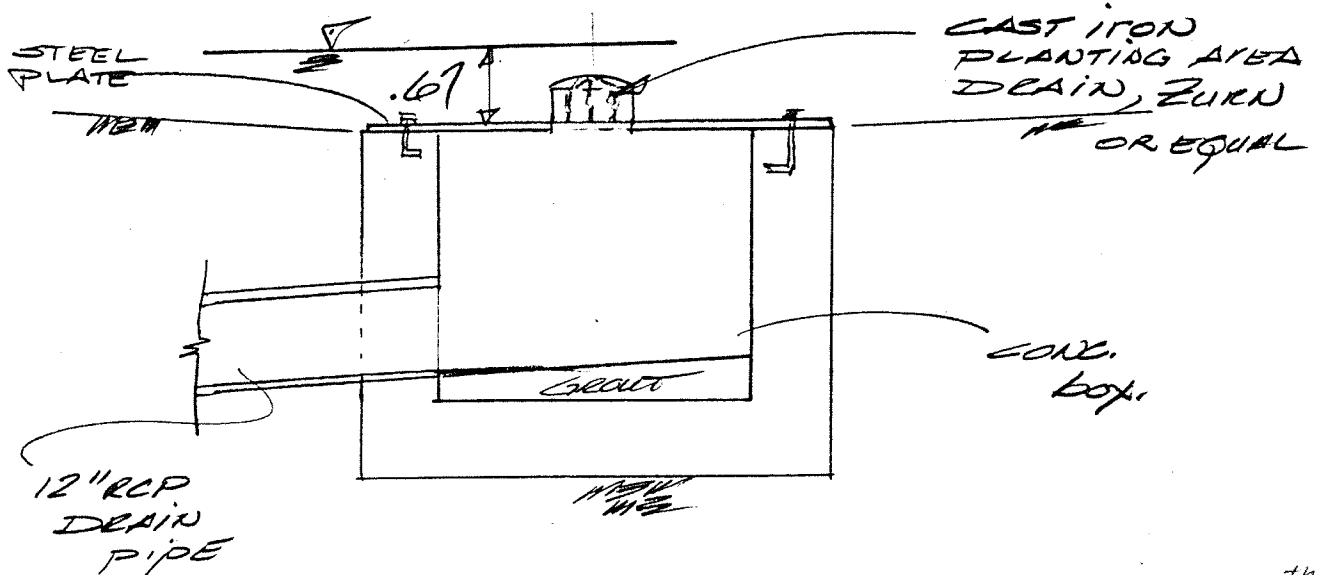
IT IS REQUIRED TO DRAIN THE POND AT A CONTROLLED RATE NO GREATER THAN THE 5yr. UNDEVELOPED RATE, THEREFORE

$$A = 1.046 \text{ AC (DRAINAGE AREA 4)} \\ \text{SEE SK 10}$$

$$C = 0.40$$

$$I_5 = 2.82 \text{ in/hr}$$

$$Q_5 = 0.40 \times 2.82 \times 1.046 = 1.18 \text{ cfs}$$



$$Q = c a \sqrt{2gh}$$

Average depth
 $h = \frac{.67}{2} = 0.33'$

$$c = .6$$

$$Q = 1.046 \text{ cfs}$$

$$a = \frac{Q}{c \sqrt{2gh}}$$

$$a = \frac{1.046}{0.60 \sqrt{2g \cdot 0.33}} = 0.38 \text{ ft}^2$$

$$= 54.72 \text{ in}^2 \text{ MAX.}$$

∴ Specify CAST IRON PLANTING AREA
DRAIN w/ 30 in² NET OPEN AREA, TURN OR
EQUAL

Overflow Design - Phase II

THE OVERFLOW FROM THE POND AREA WILL UTILIZE SIDEWALK DRAINS WITH STEEL COVER PLATES AS SPECIFIED BY THE CITY OF ALBUQUERQUE, (SEE CITY STANDARD DRAWING K-16) AND WILL BE DESIGNED TO DISCHARGE THE 100 YR DEVELOPED RATE.

$$\therefore \text{TOTAL AREA} = 1.046 \text{ AC.}$$

$$\text{ROOF AREA} = 0.230 \text{ AC.}$$

$$\text{PAVED AREA} = 0.560 \text{ AC.}$$

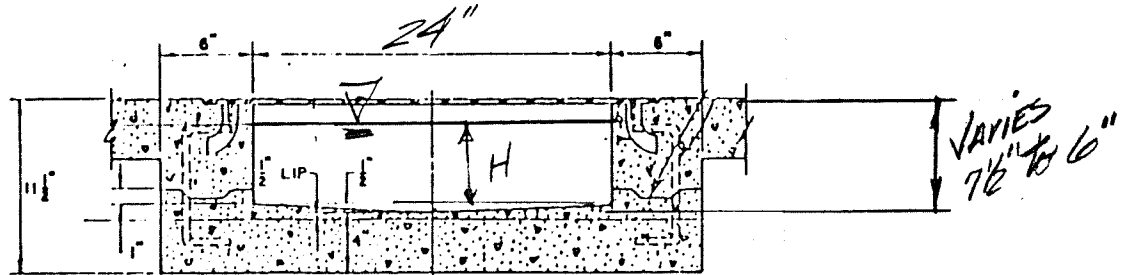
$$\text{LANDSCAPED AREA} = 0.256 \text{ AC.}$$

$$C = \frac{0.23 \times 0.875 + 0.560 \times 0.92 + 0.256 \times 0.40}{1.046}$$

$$= 0.78$$

$$Q_{100} = 0.78 \times 5.15 \times 1.046 = 4.20 \text{ CFS}$$

therefore overflow must discharge
AT 4.2 CFS minimum.



SECTION - SIDEWALK DRAIN

then for SINGLE SIDEWALK DRAIN:

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

$$C = 2.92$$

$$L = 2'$$

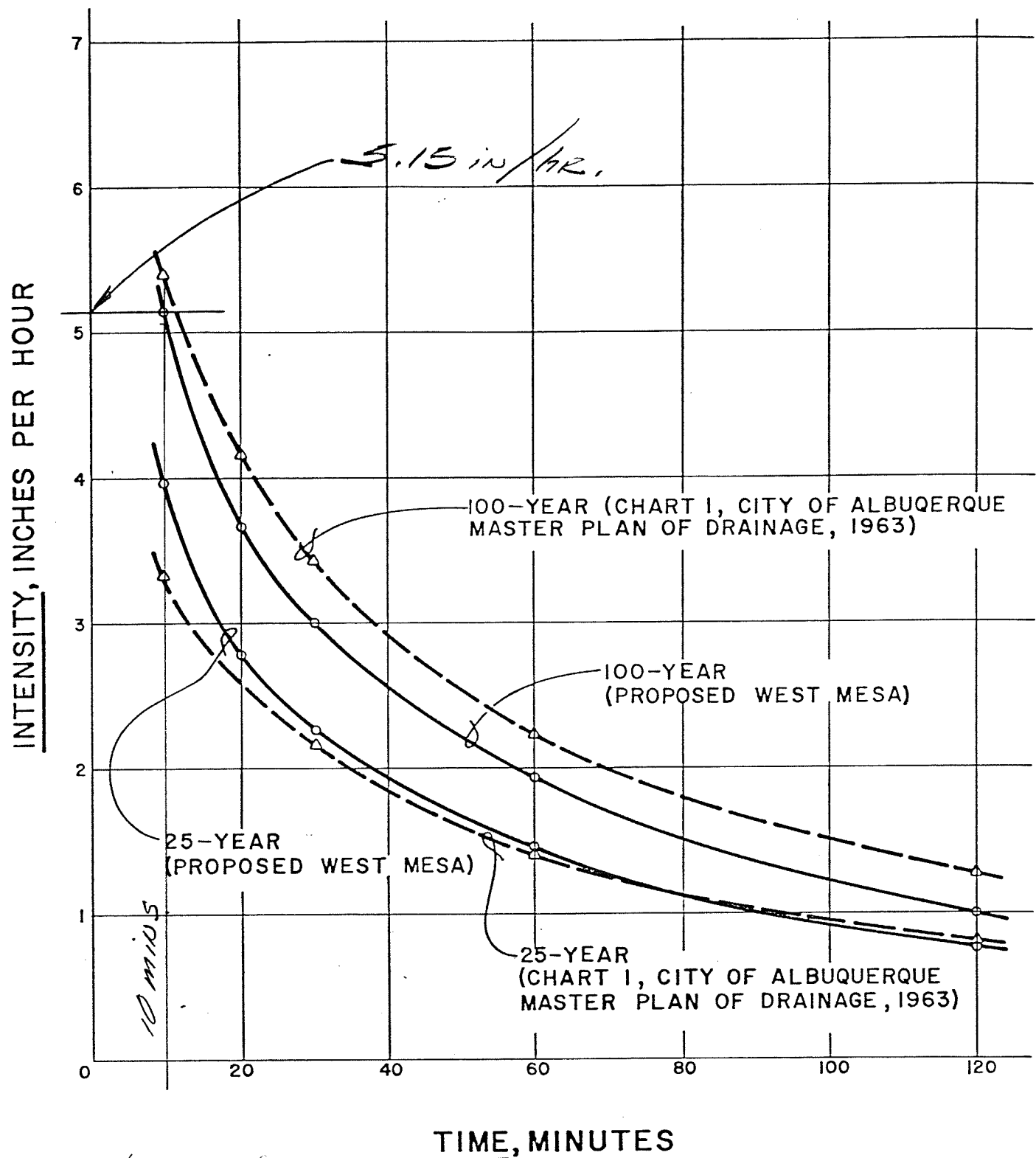
ASSUME $H = 5''$
 $= .42'$

$$Q_{\text{PER DRAIN}} = 2.92 \times 2 \times 0.42^{3/2} = 1.59 \text{ cfs}$$

$$Q_{\text{minimum}} = 4.20 \text{ cfs}$$

$$\text{No. of DRAINS} = \frac{4.2}{1.59} = 2.64 \text{ drains required}$$

∴ Provide 3 sidewalk drains - 24" wide each

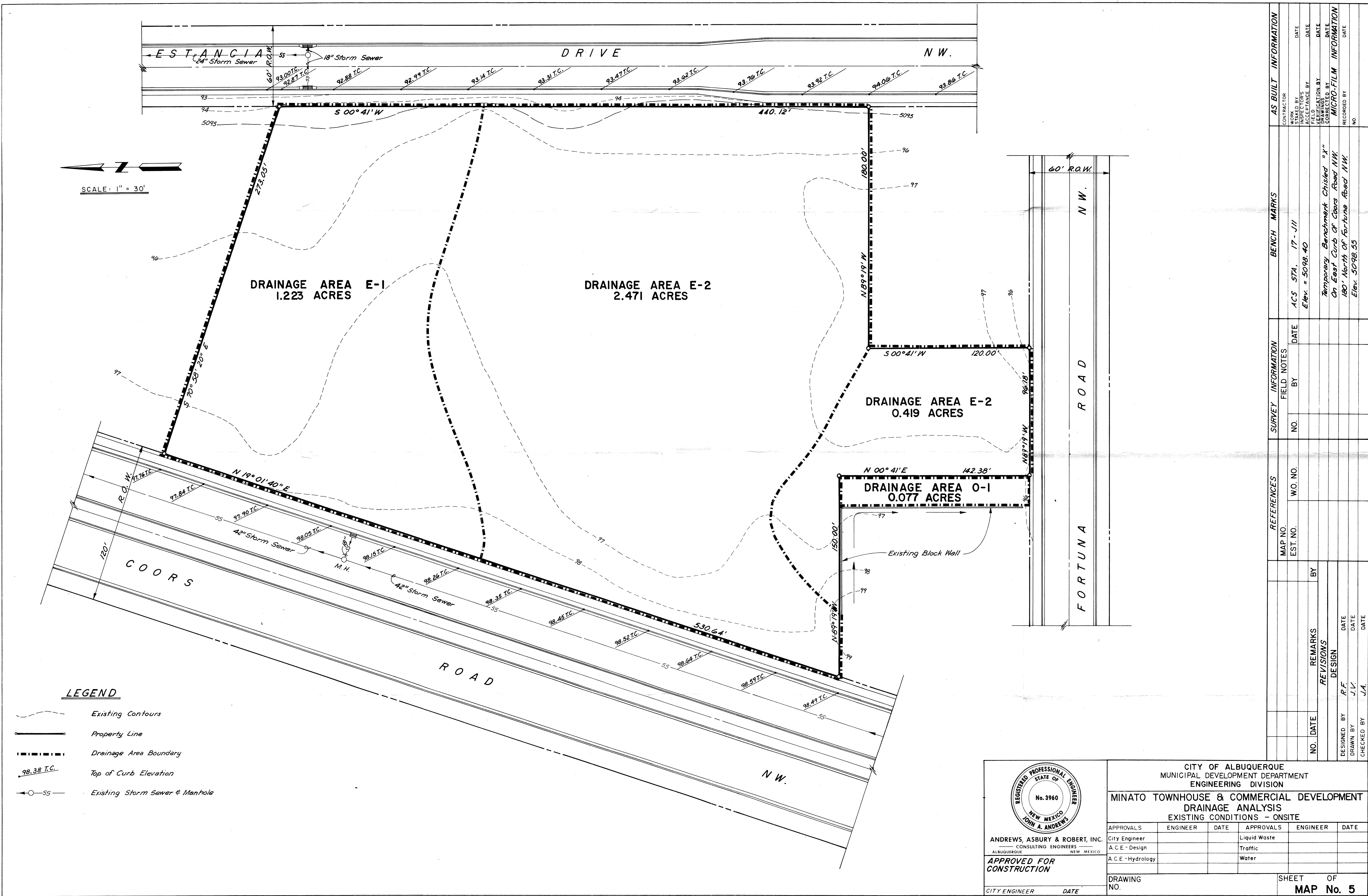


* NOTE: from
WEST MESA DRAINAGE MANAGEMENT PLAN,
MATOTAN.

INTENSITY-DURATION-FREQUENCY CURVES

WEST MESA, ALBUQUERQUE

(SOURCE: WEATHER BUREAU ISOPLUVIALS, 1967 AND
EXTRAPOLATION FOR ONE HOUR RAINFALL VALUES)



REFERENCES			SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
MAP NO.	EST. NO.	W.O. NO.	NO.	BY	DATE	CONTRACTOR	WORK	DATE
						ACS STA. 17-J11	STAKED BY	DATE
						Elev. = 5098.40	ACCEPTANCE BY	DATE
						Temporary Benchmark Chisled "X"	FIELD	DATE
						On East Curb of Coors Road NW	DRAWINGS	DATE
						180' North of Fortuna Road NW	CORRECTED BY	DATE
						Elev. 5098.55	RECORDED BY	DATE
							NO	

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE, NEW MEXICO

APPROVED FOR CONSTRUCTION

CITY ENGINEER DATE

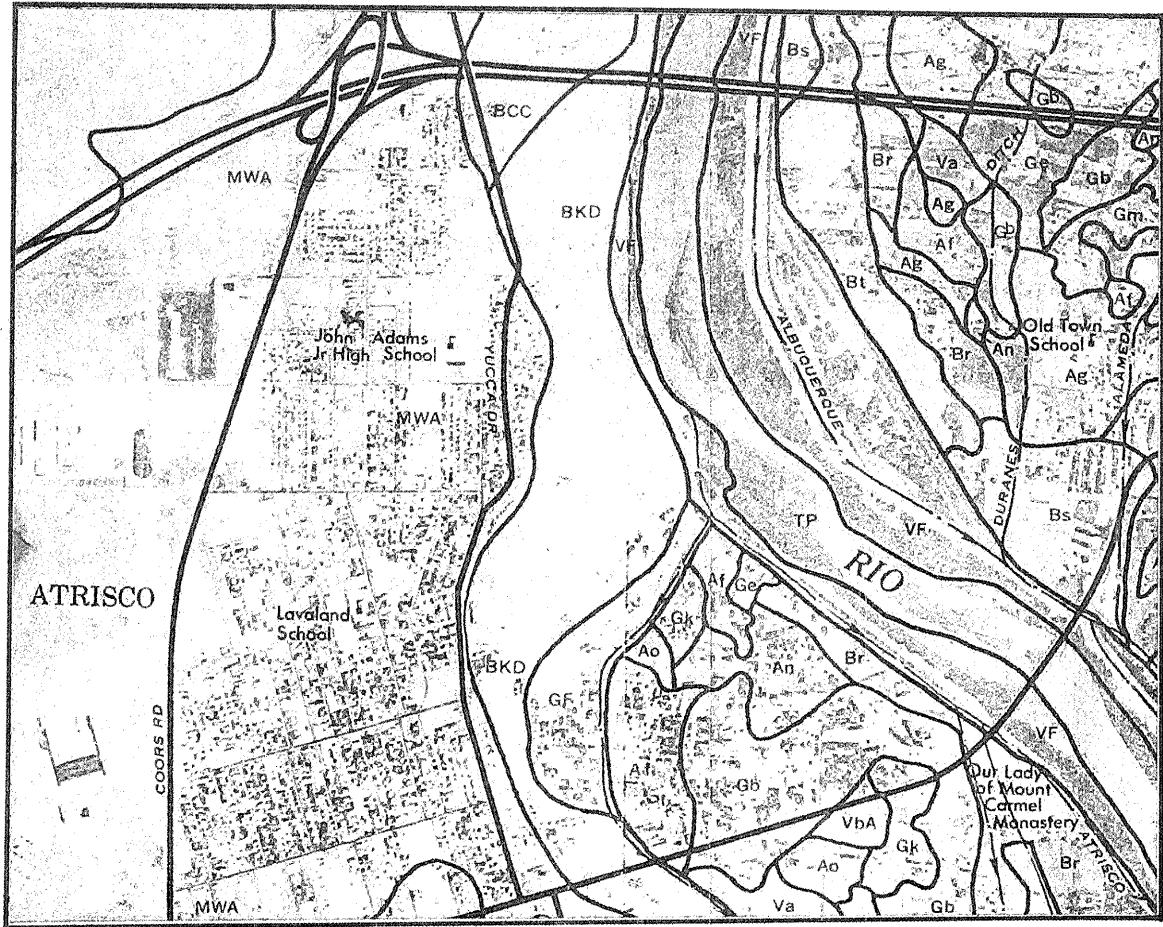
CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

MINATO TOWNHOUSE & COMMERCIAL DEVELOPMENT
DRAINAGE ANALYSIS
EXISTING CONDITIONS - ONSITE

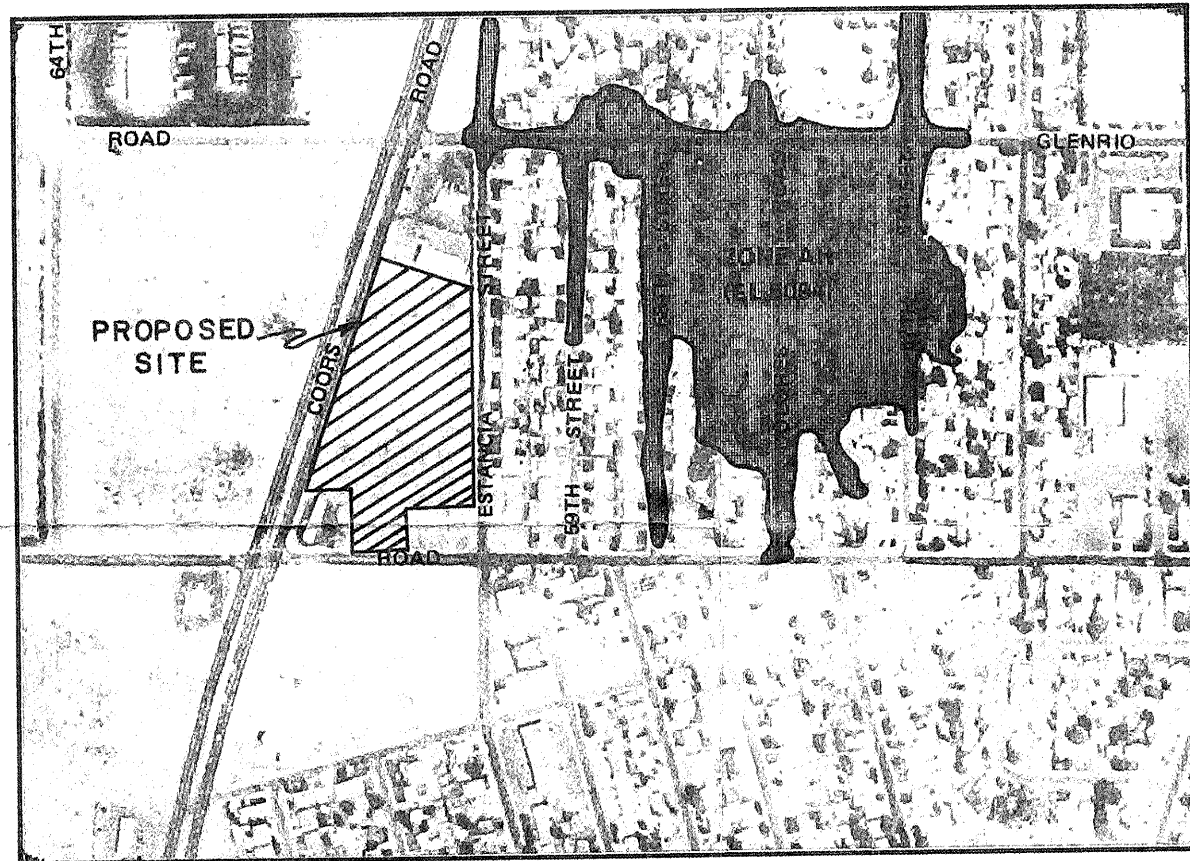
APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E. - Design			Traffic		
A.C.E. - Hydrology			Water		

DRAWING NO. SHEET OF MAP No. 5

 ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS ALBUQUERQUE NEW MEXICO APPROVED FOR CONSTRUCTION CITY ENGINEER DATE	CITY OF ALBUQUERQUE MUNICIPAL DEVELOPMENT DEPARTMENT ENGINEERING DIVISION					
	MINATO TOWNHOUSE & COMMERCIAL DEVELOPMENT GRADING PLAN					
	APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
	City Engineer			Liquid Waste		
A.C.E. Design			Traffic			
A.C.E. Hydrology			Water			
DRAWING NO				SHEET OF		
3				14		



SOILS MAP



FLOOD HAZARD MAP

FLOOD HAZARD MAP

The site is located on Panel 27 of 50 of the Flood Insurance Rate Maps. The site lies outside any 100 year flood boundary as shown on this sheet. The site lies in the Isleta Drainage Study and currently flooding occurs downstream in the basin.

SITE DATA

The site consists of three buildings totaling 45,375 square feet situated on 4.113 acres. The site will be landscaped using sod, trees and no controlled indigenous material consisting of 50,485 square feet. The remainder of the site will be paved surface parking lot and walks to service the buildings.

LEGAL DESCRIPTION

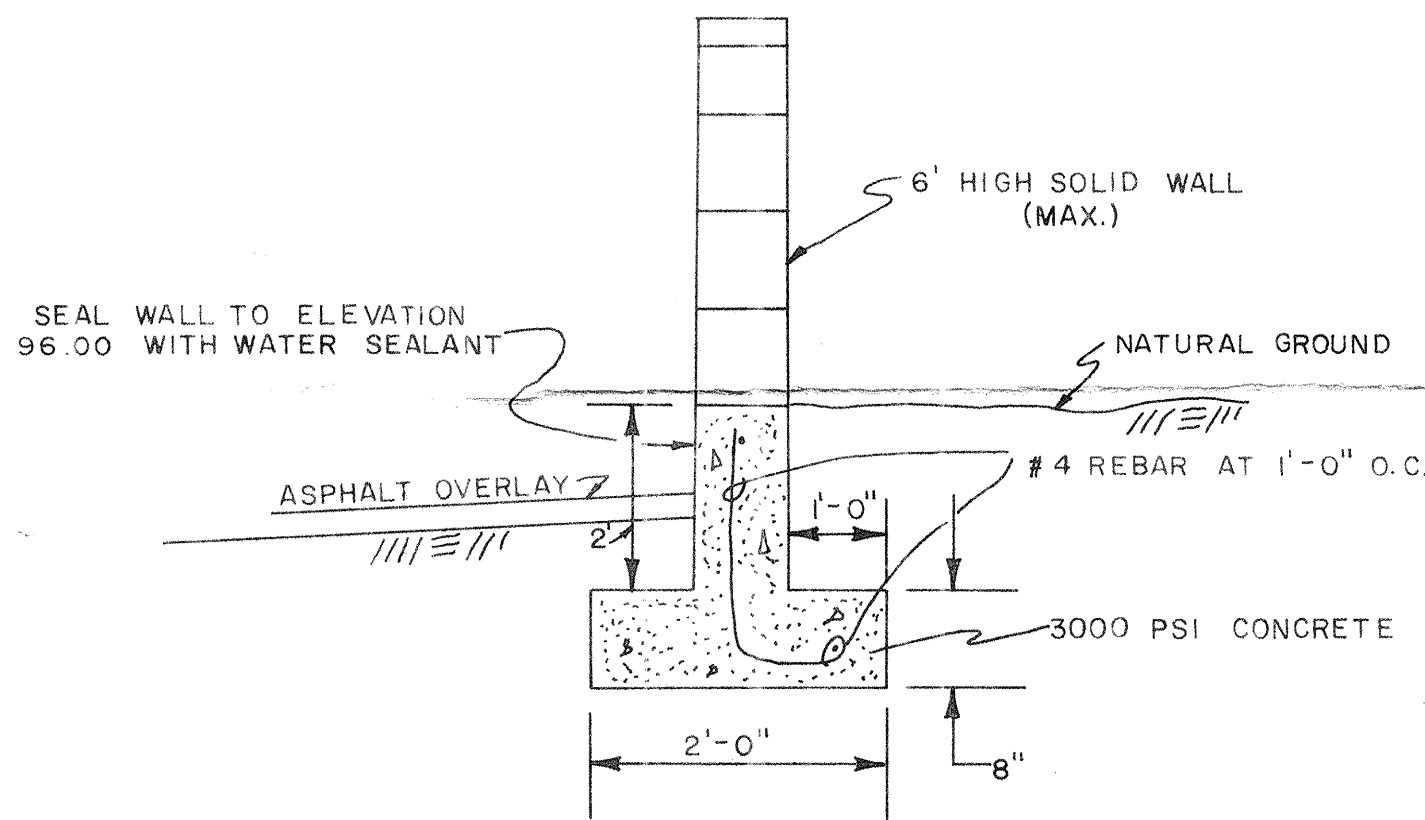
Tract C-2-A Campbell Lands Summary Plat in book B-12 page 178, filed April 26, 1977 in the office of the County Clerk, Bernalillo, New Mexico.

GROUND COVER

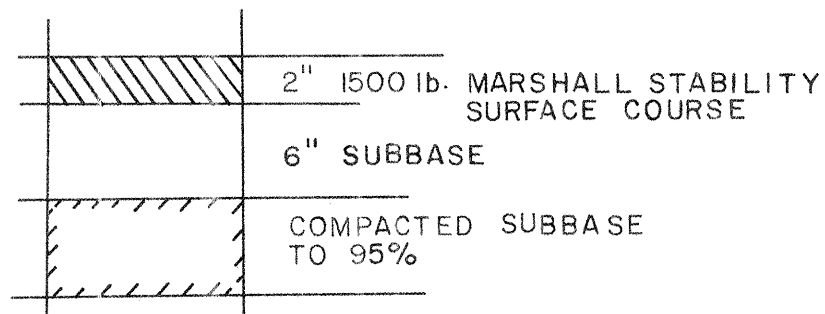
The soil is Madurez Wink Association (MWA) as shown in SCS Bernalillo County Soil Survey on map 30 and is a Hydrologic Soil Group B. The site is uniform and slopes to the east with slow runoff, and the hazard of soil blowing is moderate to severe.

BENCH MARK

The bench mark is located in the NE quadrant of the intersection of Coors and Glenrio Road. Station is a standard ACS brass cap set flush with the sidewalk and stamped "18-J11". Elevation is 5096.741 mean sea level, a TBM was established on the East bonnet bolt of the fire hydrant located on Coors with an elevation of 5100.43.



RETAINING WALL & SEALANT DETAIL
(NO SCALE)



PAVING DETAIL

RATIONAL FORMULA

Discharge $Q = CIA$
 $R(6) = 2.2$ inches (DPM Plate 22-2D-1)
 $A = 4.14$ Acres = 180,338 SF
 $I = R(6)(6.84) T_c^{0.51} = 4.65$ inches/hour
 $T_c = 10$ minutes (minimum)
 $C =$ Varies

EXISTING DRAINAGE CONDITIONS

Total Area = 4.14 Ac
 $A(imp) =$ Impervious Area = 0%
 $C = 0.40$
 $Q(100) = (0.40)(4.65)(4.14) = 7.70$ cfs
 $V(100) = (0.40)(2.2)(0.0833)(179,162) = 13,133$ cf

DEVELOPED DRAINAGE CONDITIONS

Total Area = 179,162 SF
 Weighted C Factor
 Roofs 45,375 * 0.90 = 40,837.5
 Drives & Walks 83,302 * 0.95 = 79,136.9
 Landscape 50,485 * 0.25 = 12,621.25
 Total 179,162 132,595.65

$C = 132,595.65 / 179,162 = 0.74$
 $Q(100) = (0.74)(4.65)(4.14) = 14.25$ cfs
 $V(100) = (0.74)(2.2)(0.0833)(179,162) = 24,296$ cf

Pond Volume Provided

41.6 CF per linear foot of parking lot pond at 702 feet of parking surface used for the pond equals 29,203 CF. Available discharge from the site is 0.5 cfs/acre * 4.113 Acres = 2.06 cfs.

Slope of discharge pipe $Q=VA$ and using Manning Equation for velocity of pipes flowing full. Using a six inch pipe compute the maximum slope for available discharge

$A = PI \cdot R^{0.75} ; V = 0.590 / n \cdot d^{0.487} \cdot s^{0.54} \cdot (1/2)$

Area = .19% ; Velocity = 10.49 fps; Max Slope = .08 ft/ft

EXISTING CONDITIONS

The site is in a undeveloped state and sheet flows towards the East to Estancia Drive. Estancia Drive drains north towards several catch basins located within Estancia Drive. A 24 inch storm drain collects surface flow in Estancia and directs the flow towards Glenrio. From Glenrio the storm sewer flows East in a 36 inch RCP line down Glenrio to Plaisades which flows into a 48 inch RCP. The 48 inch pipe flows north to Hanover and connects into the Riverview Drain line. The lines located in Glenrio and Plaisades does not have capacity to handle the developed runoff from the site.

PROPOSED CONDITIONS

The site is being graded to surface drain towards the northeast corner to a catch basin. The catch basin will tie directly into the existing catch basin in Estancia via a 4 inch pipe at a 1 percent grade. The pipe will limit the discharge from the site to .5 cfs per acre or approximately 2.07 cfs. Reducing the discharge to this rate will improve the downstream conditions and provide complete discharge of the developed storm waters within 24 hours. The resulting retention ponding will be located totally within the parking surface of the project insuring complete drainage.

RECEIVED
AUG 29 1986
HYDROLOGY SECTION

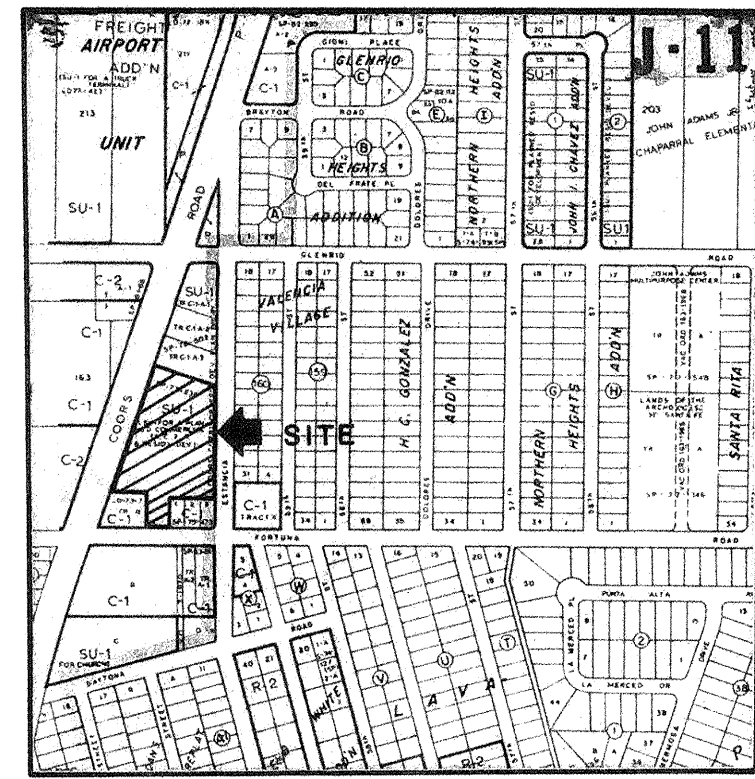
PREPARED BY:
TIERRA WEST DEVELOPMENT
MANAGEMENT SERVICES
4127 CARLISLE N.E., ALB., N.M. 87107
505-883-7592

DATE SUBMITTED 8/29/86

ENGINEERS SEAL		TITLE: CONCEPTUAL GRADING & DRAINAGE PLAN WEST VIEW BUSINESS PARK 5 OF 5					
APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE		
CITY ENGR.							
A.C.E. DESIGN							
A.C.E. HYD.							
A.M.A.F.C.A.							
DRAWING NO.		MAP NO.		SHEET		OF	
		J-11		2		2	

JOB NO 860081

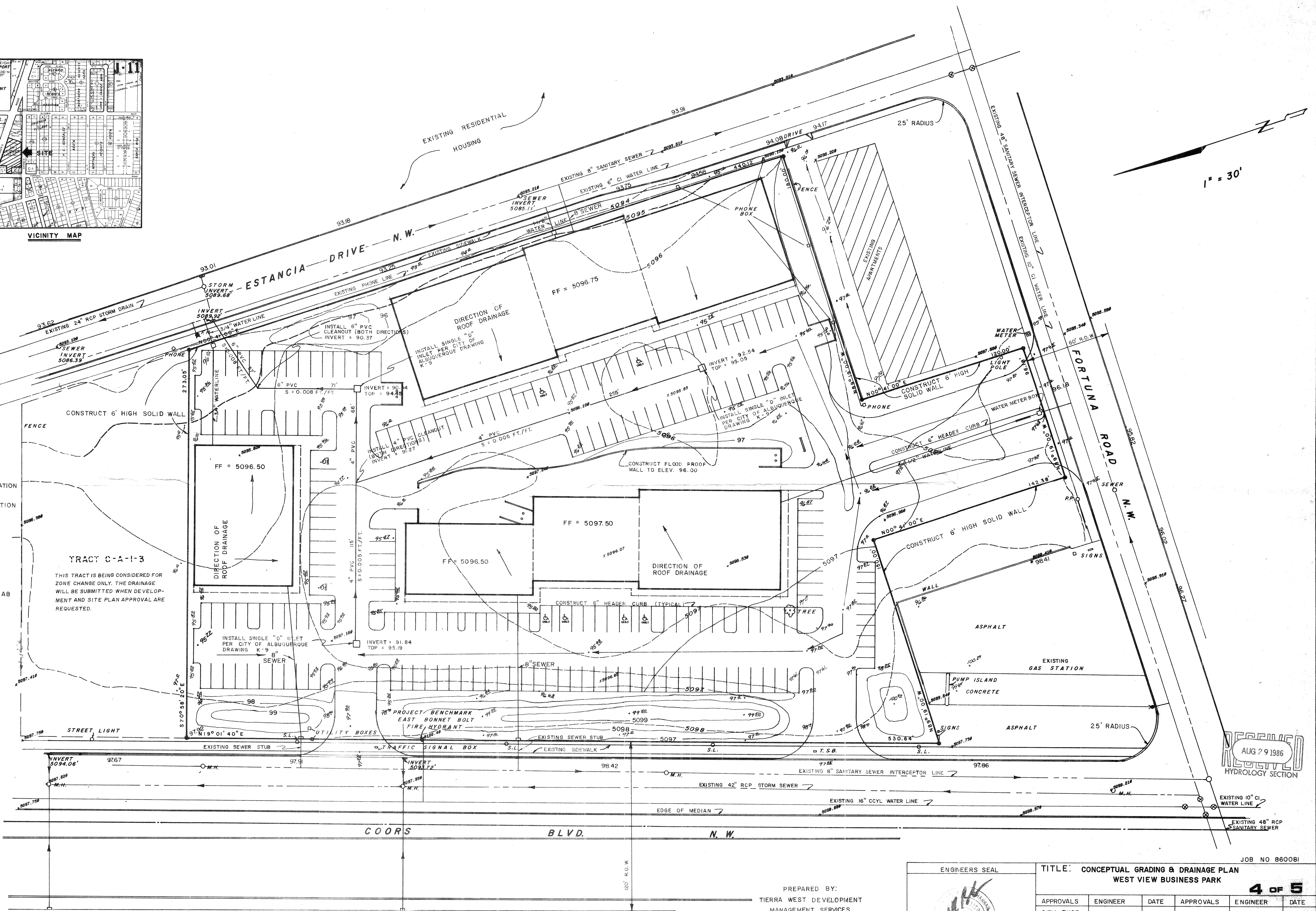
8/29/86



VICINITY MAP

LEGEND

- X 5095.82# EXISTING SPOT ELEVATION
- 50.96 EXISTING CONTOUR ELEVATION
- 97.32 PROPOSED SPOT ELEVATION
- FF = BUILDING PAD & FINISH FLOOR ELEVATION
- EXISTING BUILDING
- PROPERTY LINE
- FIRE HYDRANT W/CONC. SLAB
- FOUND MONUMENT REBAR
- WATER VALVE
- STORM SEWER
- WATER LINE
- 95 PROPOSED CONTOUR LINE
- SANITARY SEWER

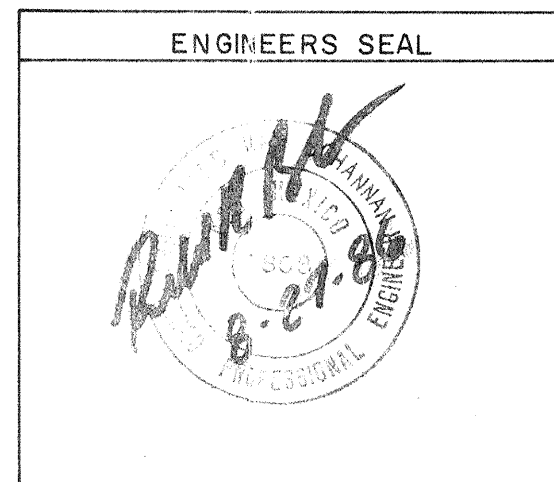


TRACT C-A-1-3
THIS TRACT IS BEING CONSIDERED FOR ZONE CHANGE ONLY. THE DRAINAGE WILL BE SUBMITTED WHEN DEVELOPMENT AND SITE PLAN APPROVAL ARE REQUESTED.

PROJECT BENCHMARK
EAST BONNET BOLT
FIRE HYDRANT

PREPARED BY:
TIERRA WEST DEVELOPMENT
MANAGEMENT SERVICES
4127 CARLISLE N.E., ALB., N.M. 87107
505-883-7592

DATE SUBMITTED 8-29-86



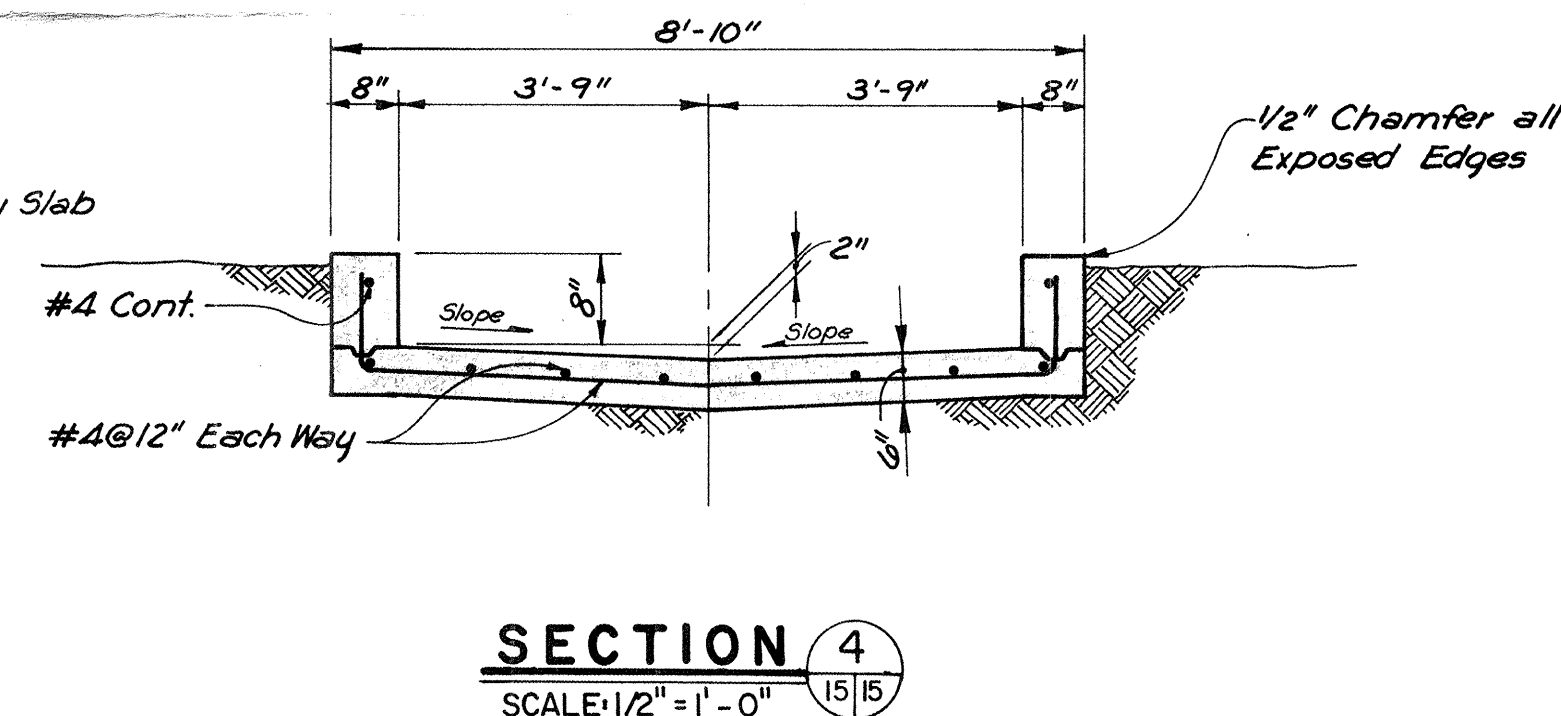
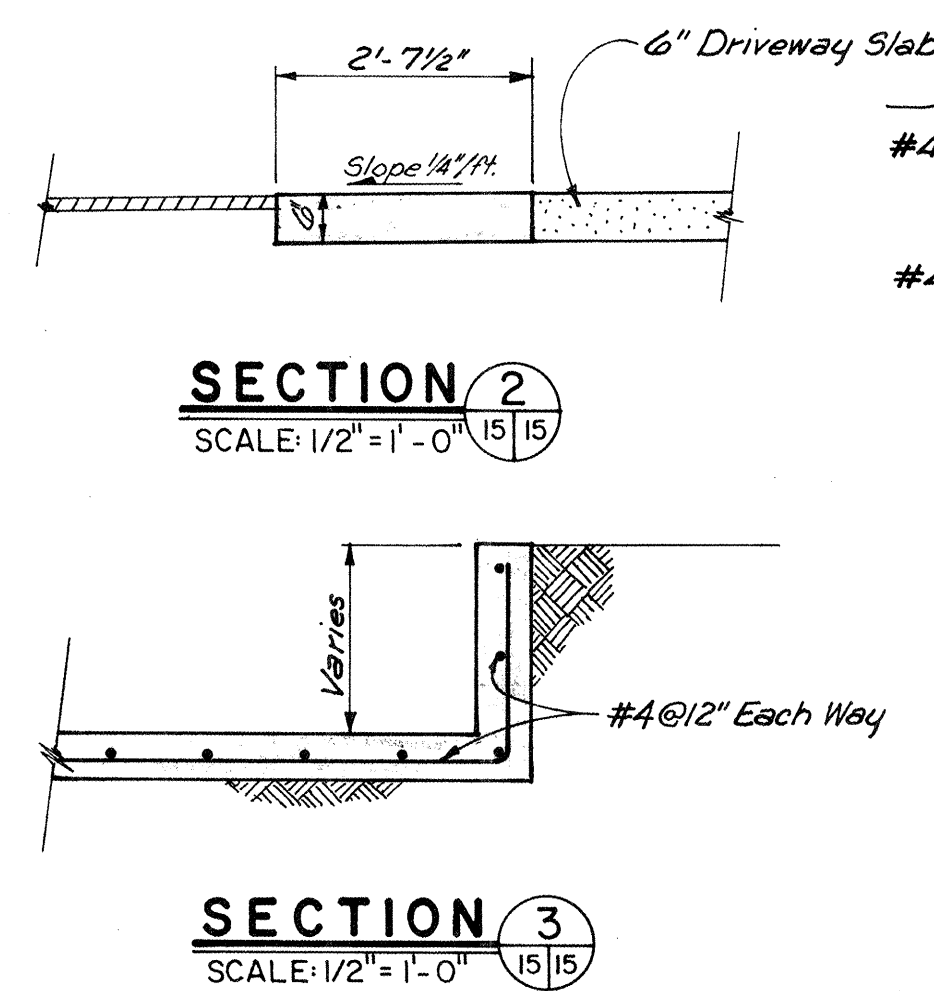
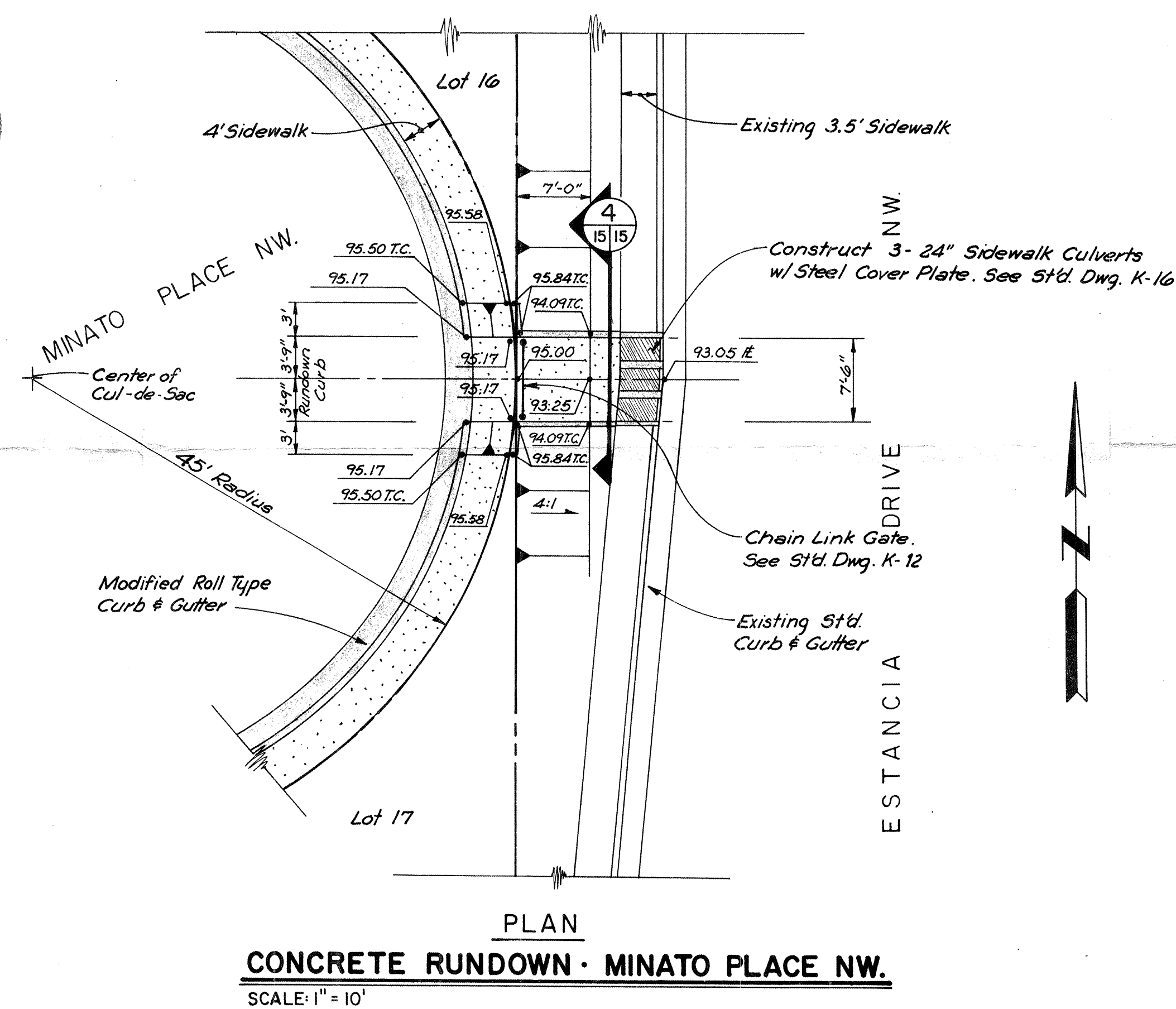
TITLE: CONCEPTUAL GRADING & DRAINAGE PLAN WEST VIEW BUSINESS PARK					
APPROVALS			APPROVALS		
CITY ENGR.	ENGINEER	DATE	CITY ENGR.	ENGINEER	DATE
A.C.E. DESIGN					
A.C.E. HYD.					
A.M.A.F.C.A.					
DRAWING NO	MAP NO		SHEET		OF
	J - 11		1		2

APPROVED
AUG 29 1986
HYDROLOGY SECTION

JOB NO 860081

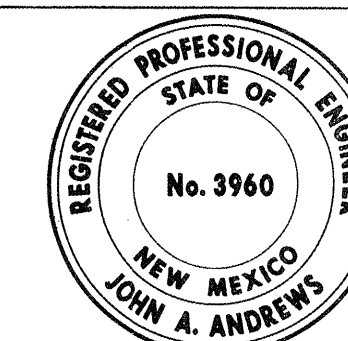
4 OF 5

8/29/86



		REFERENCES		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
		MAP NO. J-11		FIELD NOTES				CONTRACTOR	
		EST. NO.		W.O. NO.		NO. BY DATE		WORKED BY DATE	
								INSPECTOR'S DATE	
								ACCEPTANCE BY DATE	
								VERIFICATION BY DATE	
								DRAWINGS CORRECTED BY DATE	
								MICRO-FILM INFORMATION	
								RECORDED BY DATE	
								NO.	
NO. DATE	REMARKS	BY							
REVISIONS									
DESIGN									
DESIGNED BY	R.S.F.	DATE							
DRAWN BY	J.F.V.	DATE							
CHECKED BY	J.A.	DATE							

RECEIVED
OCT 29 1981
ENGINEERING



ANDREWS, ASBURY & ROBERT, INC.
— CONSULTING ENGINEERS —
ALBUQUERQUE NEW MEXICO

APPROVED FOR
CONSTRUCTION

CITY ENGINEER DATE

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

MINATO TOWNHOUSE & COMMERCIAL DEVELOPMENT

DRAINAGE DETAILS

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

DRAWING NO.	SHEET 15	OF 15
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