PUBLIC WORKS/HYDROLOGY

G16/D8

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G16/D8

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LEEDSHILL-HERKENHOFF, INC.
500 Copper Avenue N.W.
P. O. Box 1217
Albuquerque, New Mexico 87103
(505) 247-0294

1566-8033.22-89

RECEIVED
OCT 31 1989
HYDROLOGY SECTION

October 17, 1989

Mr. Bernie Montoya
Hydrology Department - PWD
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

SUBJECT: DRAINAGE CALCULATION UPDATE FOR PLAINS ELECTRIC FACILITY

This letter is in response to our telephone conversation of October 4, 1989. A previous telephone memorandum in the above subject file contained information concerning the design storm precipitation duration. The memo noted that the City of Albuquerque (COA) intended for Leedshill-Herkenhoff (LH) to use a 24-hour storm duration for the analysis of the pre- and post- development drainage and existing retention facilities.

Using the Rational Method for estimating excess rainfall runoff requires a Time of Concentration (Tc) versus Rainfall intensity (I) curve for each specific rainfall duration. The COA standards show a Tc vs. I curve for only the standard 6-hour duration event. The 6-hour intensity curve cannot be used with the 24-hour precipitation values found in the NOAA Atlas. This dilemma lead to the aforementioned telephone call to your office for assistance.

After explaining the situation to you over the phone, our mutual confusion became evident. You stated that we should use the COA standard 6-hour duration for our calculations. The miscommunication stated in the previous telephone memo concerning the 24-hour storm stemmed from the requirements for draining the proposed detention facilities located on the site. As stated in COA standards, all detention facilities must not pond water for a period greater than 24-hours. This seems to be the most reasonable explanation of the previous confusion.

The enclosed drainage calculations for the property are intended to establish the amount of excess rainfall runoff produced by constructing a 3,212-square foot (0.074 acre) building addition on the existing site. Since the addition exceeds 500 square feet, drainage calculations showing the increased rainfall runoff and approval of the revisions by the Hydrology Department are required. As noted in the calculations, less than a one cfs increase in peak discharge will be generated by the 6-hour, 100-year storm due to the additional impervious area created by the proposed addition. An increase on this order can be considered negligible and would not pose a hazard or erosional threat when compared to

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LEEDSHILL - HERKENHOFF, INC.

existing historic flows. This quantity of rainfall will only produce approximately 680 cubic feet of excess runoff volume. This will increase the existing quantity from 17,190 c.f. to 17,870 c.f.. The total capacity of the existing retention ponds (19,500 c.f.) is more than adequate to accommodate the additional runoff produced.

The addition to the building will not increase the offsite outfall conditions. The original approved drainage plan utilized onsite retention facilities to store 100 percent of the runoff generated on the project site. Under the previous drainage ordinance, the onsite retention facilities were approved and accepted as a viable means to control the storm runoff. The negligible increase in runoff does not change the historic drainage paths or increase offsite runoff quantities or velocities. Therefore, no change in onsite facilities is warranted.

Thank you for your time and your assistance concerning this matter. If you have any questions or need additional data, please feel free to call me at 247-0294.

Mark Burak

MARK BURAK, P.E.

bz

Enc.

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LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN DIEGO SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT: Plains Electric - Bldg Add.			SHEET NUMBER 1 OF 2
	COMPUTED BY: DRS/SUB	CHECKED BY:	JOB NUMBER 8033.22	DATE: 7-24-89

SIZE = 44' x 73' 3,212 ft³ = 0.074 Ac.

USE: C Exist = .35 (PER GARDNER ENGINEERING Report)
C Developed (Roof) = .95

FROM COA DPM - (6-HR 100 yr RAIN) = 2.2"
I = (6 HR. RAIN) 6.84 ^-.51 = 4.650
USE Tc = 10 MIN ← Min per DPM
I = (2.2")(6.84)(10)^-.51 = 4.650"

RECEIVED OCT 31 1989 HYDROLOGY SECTION

USING Q = CIA

EXIST. Q = (.35)(4.650")(0.074) = .120 cfs
DEVELOPED Q = .95 (4.650)(0.074) = .330 cfs
} ΔQ = 0.210 cfs.

Bldg Addition Increases Q = .21 cfs = Negligible
- MUST File SINCE Addition is > 500 ft², but flows ARE Negligible -

- Drain WATER AWAY from Building into N&S ditch emptying into PARKING Lot. Swale in PARKING LOT will be FORCE WATER TOWARDS LARGE retention BASIN
Requires Grading sufficient to form ditch and intercept SE to NW Trending site flows from surrounding AREA.

ENTIRE Drainage AREA = (30)(97) + (4)(10) + (100)(150) + ½(9)(20) + (9)(13) = 18,157 ft²
0.42 AC
CALC Total Qp

18,157 - 3,212 = 14,945 ft² ≅ 0.34 Ac.
Q = (.35)(4.650)(.34) > 0.55 cfs

TOTAL Qp = .55 + ~~.287~~ .33 = ~~0.84~~ 0.88 cfs [NEW Bldg., rest Left LANDSCAPED]

CALC. Volume to Exist. BASIN

ASSUME Ia = 0.25 then Q = (P-.25)² / (P+.85) AN S = 1000/CN - 10
(P = 2.2)

USE CN = 61 for Orchard → S = 6.39 → Q = .12
CN = 90 for Bldg. → S = 0.20 → Q = 1.90

Volume = (.12"/12)(~~15341~~ 14945) + (1.90"/12)(3,212 ft²) = ~~683~~ 530 ft²

NEW TOTAL Volume IN BASIN = 17187 + ~~683~~ 530 = ~~17,870~~ 17,717 ft² < 19,500 ft² Available

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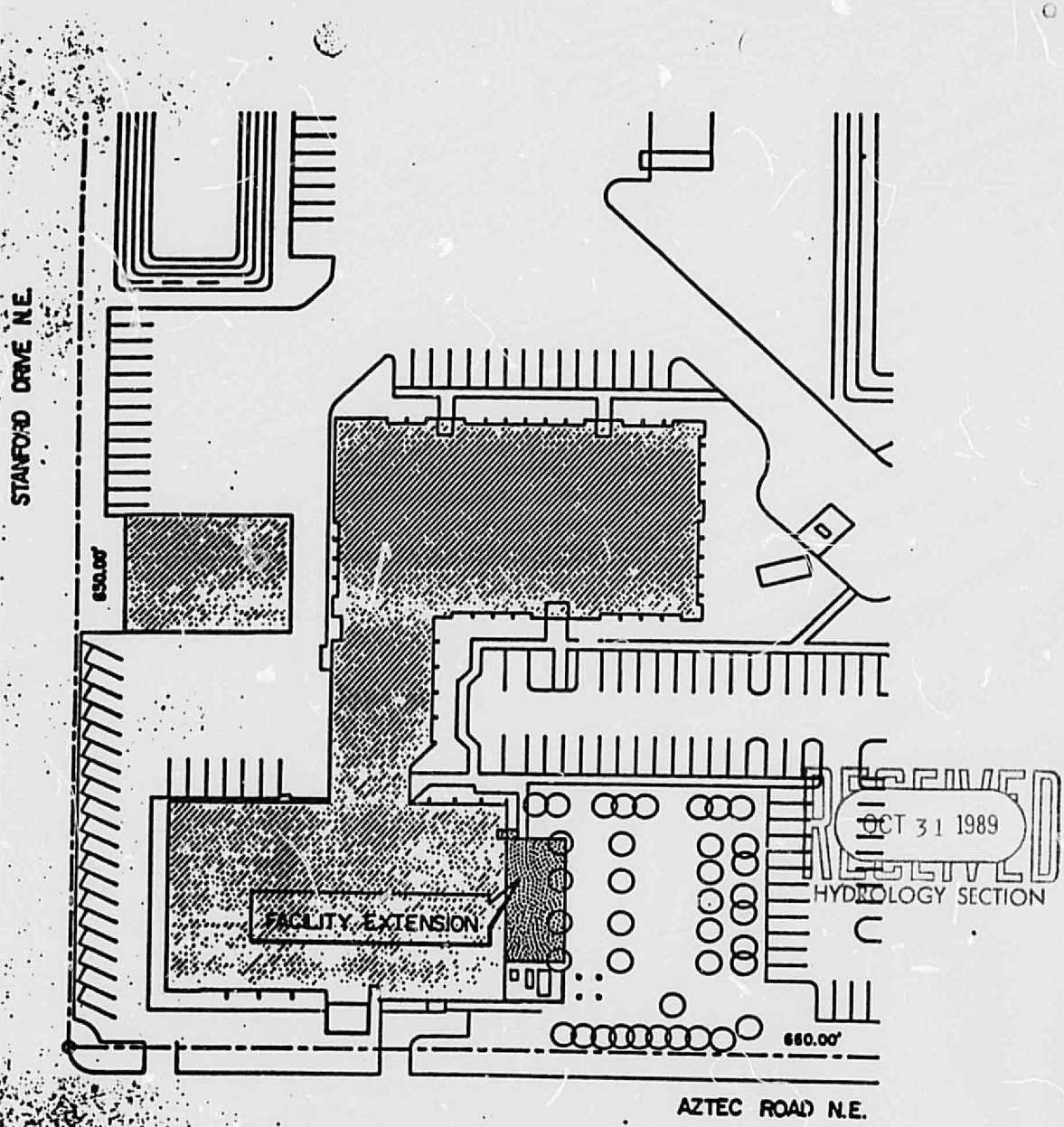

RECEIVED
OCT 31 1989
HYDROLOGY SECTION

SITE PLAN

NOT TO SCALE

FIGURE I

PLAINS ELECTRIC
FACILITY PLANNING STUDY
LEEDSHILL HERKENHOFF, INC.

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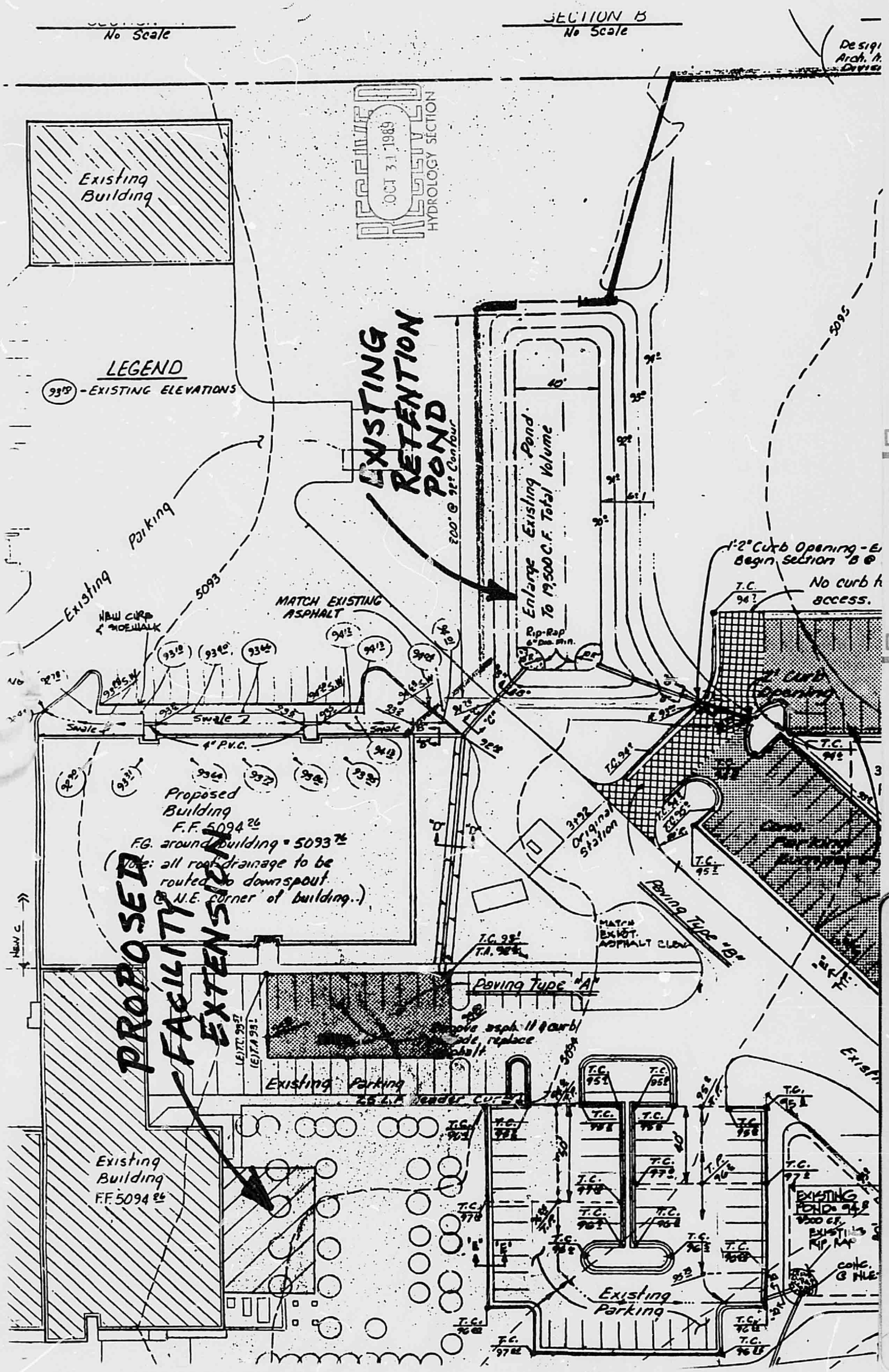
SECTION B
No Scale
No Scale
RECEIVED
OCT 31 1989
HYDROLOGY SECTION
Existing Building
LEGEND
93.0 - EXISTING ELEVATIONS
EXISTING RETENTION POND
200' @ 92' Contour
Enlarge Existing Pond To 19,500 C.F. Total Volume
Rip-Rap 6" Dia. Min.
Parking
Existing
5093
MATCH EXISTING ASPHALT
Swale 2
4" P.V.C.
Proposed Building F.F. 5094.26
F.G. around building = 5093.26
(Note: all roof drainage to be routed to downspout @ N.E. corner of building.)
PROPOSED FACILITY EXTENSION
Original Station
Paving Type "B"
Paving Type "A"
MATCH EXIST. ASPHALT CURB
Existing Parking
Existing Building F.F. 5094.26
EXISTING POND
Existing Parking
5095

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LEEDSHILL-HERKENHOFF, INC.
500 Copper Avenue N.W.
P. O. Box 1217
Albuquerque, New Mexico 87103
(505) 247-0294

1566-8033.22-89

ENGINEERS STAMP & NOW ALL BUILDING DRAIN TO PARKING LOT

RECEIVED OCT 1989 DRAINAGE SECTION

October 17, 1989

Mr. Bernie Montoya
Hydrology Department - PWD
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

SUBJECT: DRAINAGE CALCULATION UPDATE FOR PLAINS ELECTRIC FACILITY (G16/D8)

This letter is in response to our telephone conversation of October 4, 1989. A previous telephone memorandum in the above subject file contained information concerning the design storm precipitation duration. The memo noted that the City of Albuquerque (COA) intended for Leedshill-Herkenhoff (LH) to use a 24-hour storm duration for the analysis of the pre- and post- development drainage and existing retention facilities.

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LEEDSHILL · HERKENHOFF, INC.

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The addition to the building will not increase the offsite outfall conditions. The original approved drainage plan utilized onsite retention facilities to store 100 percent of the runoff generated on the project site. Under the previous drainage ordinance, the onsite retention facilities were approved and accepted as a viable means to control the storm runoff. The negligible increase in runoff does not change the historic drainage paths or increase offsite runoff quantities or velocities. Therefore, no change in onsite facilities is warranted.

Thank you for your time and your assistance concerning this matter. If you have any questions or need additional data, please feel free to call me at 247-0294.

Mark Burak

MARK BURAK, P.E.

bz

Enc.

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LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN DIEGO SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT: Plains Electric - Bldg Add.			SHEET NUMBER: 1 OF 2
	COMPUTED BY: DRS/SWB	CHECKED BY:	JOB NUMBER: 8033.22	DATE: (7-24-97)

SIZE = 44' X 73' 3,212 ft³ = 0.074 Ac.

USE: C Exist = .35 (PER GARDNER ENGINEERING Report)
C DEVELOPED (Roof) = .95

FROM COA DPM – (6-HR 100 yr RMIN) = 2.2"
$I = (6\ HR.\ R_{MIN})\ 6.84^{-.51} = 4.650$
USE Tc = 10 MIN ← Min per DPM
$I = (2.2")(6.84)(10)^{-.51} = 4.650"$

USING Q = CIA
EXIST. Q = (.35)(4.650")(0.074) = .120 cfs
DEVELOPED Q = .95 (4.650)(0.074) = .330 cfs.
ΔQ = 0.210 cfs.

Bldg Addition Increases Q = .21 cfs - Neglegible
- MUST File SINCE Addition is > 500 ft², but flows ARE Neglegible.

- Drain WATER Away from Building into N&S ditch emptying into PARKING Lot. Swale in PARKING LOT will be force WATER towards LARGE retention BASIN
Requires Grading sufficient to form ditch and intercept SE to NW Trending site flows from surrounding AREA.

ENTIRE Drainage AREA = (30)(97) + (4)(10) + (100)(150) + ½(9)(20) + (9)(13) = 18,157 # 0.42 Ac
CALC Total Qp
18,157 - 3,212 = 14,945 # ≈ 0.34 Ac.
Q = (.35)(4.650)(.34) > 0.55 cfs
TOTAL Qp = .55 + .33 = 0.88 cfs [NEW Bldg., rest LEFT LANDSCAPED]

CALC. Volume to Exist. BASIN

ASSUME Ia = 0.25 then $Q = \frac{(P-.25)^2}{P+.85}$ AND $S = \frac{1000}{CN} - 10$
(P = 2.2)

USE CN = 61 for Orchard → S = 6.39 → Q = .12
CN = 98 for Bldg. → S = 0.20 → Q = 1.98

Volume = $\left(\frac{.12"}{12}\right)(14945) + \left(\frac{1.98"}{12}\right)(3,212\ \#) = 530$

NEW TOTAL Volumn IN BASIN = 17187 + 530 = 17,717 # < 19,500 # Available

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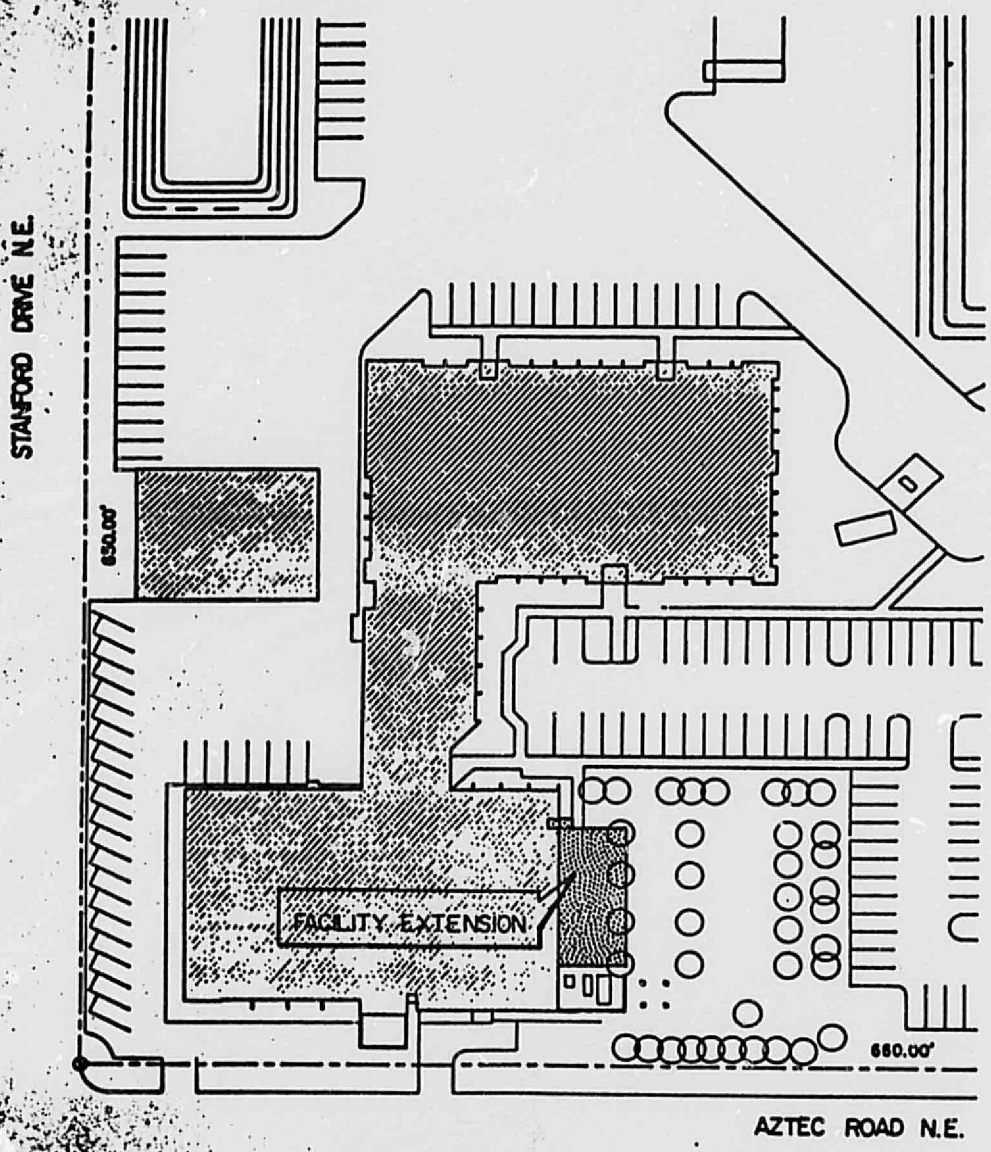

SITE PLAN

NOT TO SCALE

FIGURE I

PLAINS ELECTRIC
FACILITY PLANNING STUDY
LEEDSHILL HERKENHOFF, INC.

25×10

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FILE COPY

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

KEN SCHULTZ
MAYOR

November 6, 1989

Mark Burak
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR PLAINS ELECTRIC ADDITION
(G-16/D8) RECEIVED OCTOBER 18, 1989 FOR BUILDING PERMIT

Dear Mr. Burak:

Based on the information provided on your submittal of October 18, 1989, the above referenced plan is approved for Building Permit.

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

If you should have any questions, please do not hesitate to call me at 768-2650.

Cordially Yours,

Gilbert Aldaz, P.E. & L.S.
Civil Engineer/Hydrology

GA
(WP+1411)

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255-5060

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Plains Electric ZONE ATLAS/DRNG. FILE #: G-16-Z08

LEGAL DESCRIPTION: PARCEL "A", BLK D, Indian Acres Subdivision

CITY ADDRESS: 2401 Aztec Road, N.E

ENGINEERING FIRM: LEEDSHILL-HERKENHOFF CONTACT: DAVID KLEIN

ADDRESS: 500 COPPER, ALB NM 87103 PHONE: 247-0294

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
OCT 31 1989
HYDROLOGY SECTION

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

X BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

X OTHER ~~Drainage Approval~~ (SPECIFY)

DATE SUBMITTED: October 20, 1989

BY: Mark Burak

25 × 10

0000 0000 0811

LEEDSHILL – HERKENHOFF, INC.
Copper Square
P.O. Box 1217
Albuquerque, New Mexico 87103

LETTER OF TRANSMITTAL

PROJECT: Plains Electric Plant Exp.
(name, address)

LEEDSHILL – HERKENHOFF, INC.
PROJECT NO:

TO: Mr Bernie Montoya
Public Works Dept.
ATTN: Hydrology Dept.

RECEIVED
OCT 31 1989
HYDROLOGY SECTION

DATE: Oct 31, 1989

If enclosures are not as noted, please inform us immediately.

If checked below, please:
( ) Acknowledge receipt of enclosures.
( ) Return enclosures to us.

WE TRANSMIT:
( ) herewith ( ) under separate cover via
(X) in accordance with your request

FOR YOUR:
( ) approval ( ) distribution to parties
( ) review & comment ( ) record
(X) use ( )

THE FOLLOWING:
( ) Drawings ( ) Shop Drawings
( ) Specifications ( ) Estimates
( ) Contract Documents (X) Drainage Info Sheet (& Copy of letter)
( ) Change Orders

COPIES	DATE	REV.NO.	DESCRIPTION	ACTION CODE
1	Oct 30	—	Drainag Info. Sheet & copy of letter submitted to your office Oct 17, 1989.	

ACTION CODE
A. Action indicated on item transmitted
B. No action required
C. For signature and return to this office
D. For signature and forwarding as noted below under REMARKS
E. See REMARKS below

REMARKS Call David Sanchez - 247-0294 if you should have any questions

COPIES TO: (with enclosures)
J. English ☐
D. Klein ☐
File ☒
☐
☐
☐

BY:

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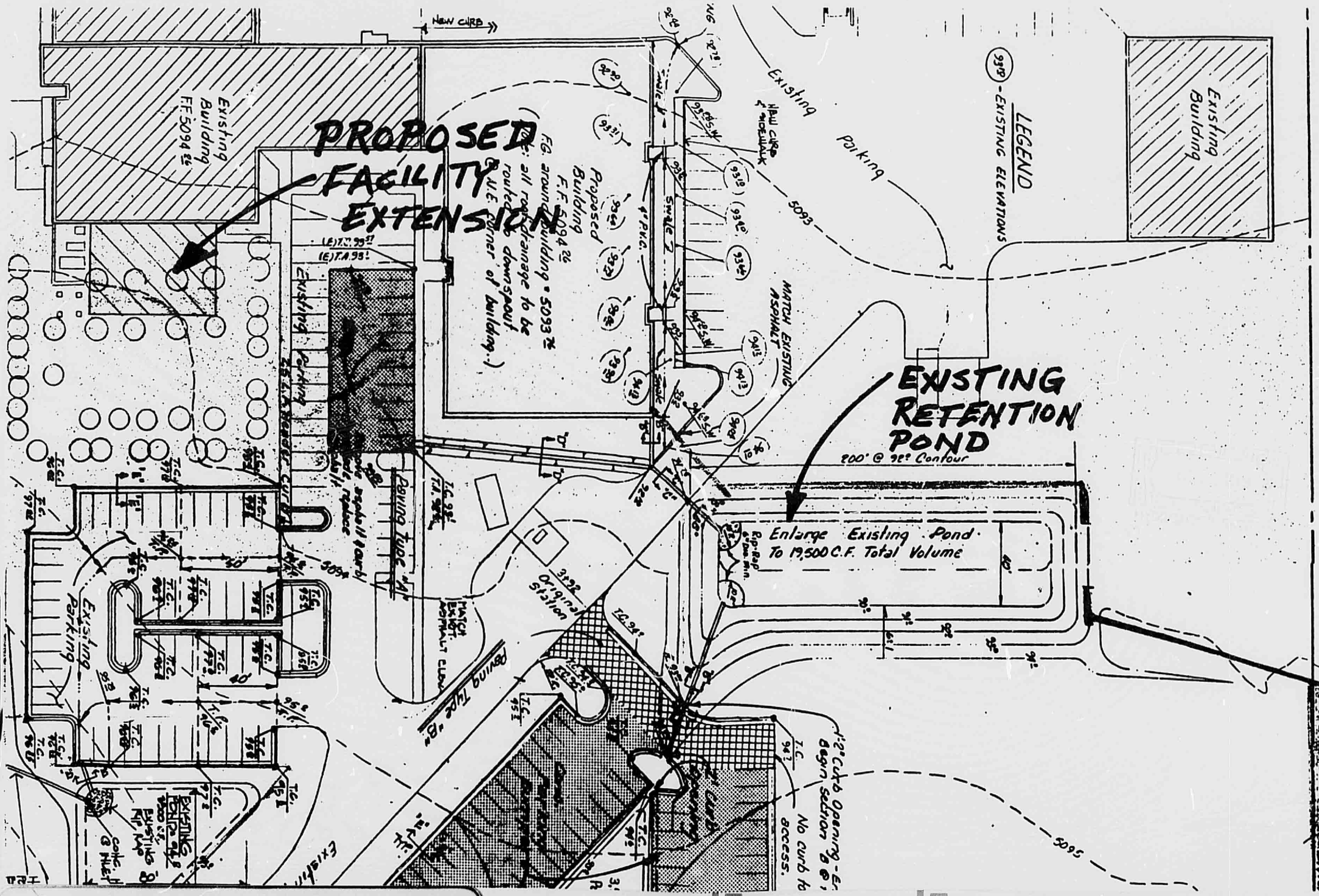
PROPOSED FACILITY EXTENSION
EXISTING RETENTION POND
Enlarge Existing Pond To 19,500 C.F. Total Volume
200' @ 92' Contour
Existing Building
Existing Building F.F. 5094
Proposed Building F.F. 5094
F.G. around building = 5093
(Note: all roof drainage to be routed to downspout @ N.E. corner of building.)
Existing Parking
Existing Parking
Existing Parking
Original Station
Paving Tube "A"
Paving Tube "B"
Paving Tube "C"
Existing Parking
Existing Parking
Existing Parking

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HYDROLOGY G16/D8 TWO PLANS

G 16/D8

2 PLANS

GARDNER ENGINEERS

—INC.—

ALBUQUERQUE NEW MEXICO

DRAINAGE STUDY

S W 1/4 BLOCK "D"

INDIAN ACRES SUBDIVISION

ALBUQUERQUE, NEW MEXICO

SEPTEMBER 1977

GARDNER ENGINEERS

CONSULTING ENGINEERS

ALBUQUERQUE, NEW MEXICO

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
NO. 5653
GILBERT D. GARDNER

266 5969

DRAINAGE STUDY
FOR
S W 1/4 BLOCK "D"
INDIAN ACRES SUBDIVISION
ALBUQUERQUE, NEW MEXICO

I. PURPOSE

The purpose of this report is to analyse the drainage characteristics of the proposed expansion of the office and warehouse facilities for the Plains Electric Generating and Transmitting Co-op, Inc. located in the southwest quarter of block D, Indian Acres Subdivision.

II. INTRODUCTION

The office and warehouse facilities of the Plains Electric Co-op are located on the westerly half of the S W 1/4 of Block "D", Indian Acres Subdivision. Proposed improvements to these facilities include the construction of an addition to the existing office building, and construction of an entrance road and additional parking areas. The developed area after completion of the project will constitute approximately 35 percent of the total site.

III. EXISTING DRAINAGE CONDITIONS

Approximately 20 percent of the site is currently developed while the remainder is in an undeveloped state with a sparse covering of grass. Drainage is generally from southeast to northwest in a sheet flow condition. No offsite drainage crosses the area since development of the property to the east and construction of Aztec Road have diverted any historical flows. The site lies approximately 1,000 feet west of the North Diversion channel.

IV. PROPOSED DRAINAGE PLANS

The location of the study area west of the North Diversion channel dictates that any increase in total runoff as well as an increase in peak runoff rate needs to be considered.

The study area carries no offsite drainage, and has ample space for permanent ponding areas, therefore it has been decided to develop a drainage plan capable of handling all flows generated on-site with the exception of a small area in the southwest corner of the parcel and a narrow strip along the west and north boundary of the property.

The proposed ponding areas will either be landscaped or used for materials storage in such a manner as to have no effect on the required capacity.

V. STORM DRAINAGE ANALYSIS

Included herein is a storm drainage analysis to determine drainage requirements for the area under study.

A. Criteria:

1. General - Resolution No. 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority.
2. Project Storm - 100 year frequency
3. Method of determining storm water runoff-Rational Formula
4. Values of constants used -

   N=0.015 - Concrete channel

   N=0.015 - Asphalt street

B. Technical References:

1. Master Plan of Drainage, City of Albuquerque, New Mexico

and Environs, 1961

2. Time of Concentration Nomograph based on study by F.Z. Kirpich published in Civil Engineering, June 1940, and also included in the USDA Soil Convservation Service, National Engineering Handbook, Section 4, Hydrology (Supplement A), as figure 3.1503.

EXISTING DRAINAGE AREA

Area	9.85	acres
Elevation difference	8.0	feet
Watershed length	925	feet
Time of concentration (TC)	9	minutes
Rainfall intensity (I)	5.56	inches/ hour
Runoff coefficient (c)	0.35	
Flow (Q)	19	cfs
Location of flow	Sheet flow to Stanford Drive NE.	
Total rainfall for 60 min. storm.	2.2	inches
Volume of runoff	0.63	acre feet

DRAINAGE AREA "A"

Area	2.70	
Time of Concentration	8	minutes
Rainfall intensity	5.76	inches/hour
Infiltration	1.0	inch/hour
Runoff coefficient	0.65	
Flow (Q)	10	cfs
Total quantity of water	0.32	acre feet

Time for complete infiltration	48	hours

Total retention of water is planned for this drainage area.

Ponding area to be 3500 square feet plus or minus.

DRAINAGE AREA "B"

Area	3.62	acres
Time of concentration	6	minutes
Rainfall Intensity	6.10	inches/hour
Runoff coefficient	0.65	
Infiltration	1.0	inches/hour
Flow (Q)	14	cfs
Total quantity of water	0.43	acre feet

Total retention of water is planned for this drainage area.

Ponding area is to be located in drainage Area "C".

DRAINAGE AREA "C"

Area	2.83	acres
Time of concentration	4	minutes
Rainfall intensity (I)	6.10	inches/hour
Runoff Coefficient (R)	0.65	
Infiltration	1.0	inch/hour
Flow (Q)	11	cfs
Total quantity of water	0.34	acre feet

Total retention of water is planned for this drainage area.

Ponding area to be 17,000 square feet plus or minus, and include the flow from drainage area "B".

DRAINAGE AREA "D"

Area	0.70	acre
Time of concentration	2	minutes
Rainfall intensity	7.00	inches/hour
Runoff coefficient	0.90	
Flow (Q)	4.	cfs
Total quantity of water	0.12	acre feet

Flows from this area to be allowed to run off site

Total Quantity of Water Undeveloped	0.63	acre feet
Peak Discharge Undeveloped	19	cfs
Total Quantity of Water Developed	1.21	acre feet
Total Quantity to remain on site	1.09	acre feet
Total Quantity to runoff - Developed	0.12	acre feet
Peak Discharge - Developed	4	cfs

VI. RECOMMENDATIONS

On the basis of this study, it is concluded that the area under consideration can be developed as proposed for townhouses within the guidelines of the City of Albuquerque and AMAFCA if the following recommendation is implemented.

A. Site grade and landscape the area to maximize infiltration of storm waters.

Provided the recommendations of this report are implemented, the tract may be satisfactorily developed without creating flood danger to surrounding properties.

Respectfully submitted,

GILBERT D. GARDNER AND ASSOCIATES

Gilbert D. Gardner, P.E.