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

April 24, 1991

Patrick J. Conley
Smith-Scheuch Engineering Company
6400 Uptown Boulevard, NE Suite 500-E
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR TSSO MAINTENANCE BUILDING/COMPRESSOR SHED (M-14/D6) ENGINEER'S STAMP DATED APRIL 16, 1991

Dear Mr. Conley:

Based on the information provided on your submittal of April 16, 1991, 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

xc: Alan Martinez

BJM/bsj
(WP+80)

PUBLIC WORKS DEPARTMENT

Walter H. Nickerson, Jr., P.E.
Assistant Director Public Works

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

S-SEC Smith-Scheuch Engineering Company

RECEIVED
APR 16 1991
HYDROLOGY DIVISION

April 12, 1991

Mr. Bernie Montoya, P.E.
City of Albuquerque
Public Works Department
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: General Electric Plant
TSSO Maintenance Building/Compressor Shed
S-SEC Project No. 89-05-07H

Dear Mr. Montoya:

Smith-Scheuch Engineering Company is making a drainage submittal for a small addition at the General Electric Plant in Albuquerque, New Mexico. In accordance with your request, we are submitting an updated Master Drainage Plan, a Building Layout Plan showing the proposed addition, and a completed Drainage Information Sheet. The site of the addition is currently asphaltic concrete and, therefore, there will not be an increase in the stormwater discharge as a result of the improvement. The 100-year, six-hour storm runoff calculations are on the Building Layout Plan.

If you have any questions, please call.

Sincerely,

Smith-Scheuch Engineering Company

Patrick J. Conley, P.E.

PJC:mew

Enclosures

montoya.coa

6400 Uptown Boulevard, N.E. Suite 500E Albuquerque, New Mexico 87110 Telephone 505/884-0700

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE PL T550 BLDG/COMP. SHED ZONE ATLAS/DRAINAGE FILE # M-14

LEGAL DESCRIPTION: LOT 17, SOUTH BROADWAY ACRES

CITY ADDRESS: 336 WOODWARD SE

ENGINEERING FIRM: S-SEC CONTACT: PAT CONLEY

ADDRESS: 6400 UPTOWN BLVD. NE PHONE: 884-0700

OWNER: GENERAL ELECTRIC CONTACT: JOHN JOHNSON

ADDRESS: 336 WOODWARD SE PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

___ YES

X NO (PHONE CALL 4/9/91)

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJECT NO. _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

X DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAIN PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SECTOR PLAN APPROVAL

___ 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

___ OTHER _____ (SPECIFY)

APR 16 1991
HYDROLOGY DIVISION

DATE SUBMITTED: 4/16/91

BY: _____

REV. 10/85

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

November 10, 1988

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: ADDITIONAL INFORMATION FOR CONNECTIONS INTO THE SAN JOSE DRAIN (M-14/D6) RECEIVED NOVEMBER 3, 1988

Dear Ms. Balogh:

I am in receipt of the additional information pertaining to permission granted by the Middle Rio Grande Conservancy District for the connections into the san Jose DRain.

Our file is now complete for in case any questions should arise for work being done within the Conservancy's right-of-way.

I thank you for your assistance in providing the information.

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+856)

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

1661-7013.31-88

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

November 1, 1988

Bernie Montoya
Engineering Asst.
Hydrology Section - PWD
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: DRAINAGE PLAN FOR ADDITIONAL LANDSCAPING AND
PAVING FOR G.E. PLANT (~~M-16~~/D6) REVISION
DATED AUGUST 30, 1988 M-14/D6)

Copies of correspondence approving two connections to the San Jose Drain near Wesmeco Road are enclosed. We are submitting this documentation per your September 16 request.

Please call if you need additional information.

Suzi Balogh

SUZI BALOGH, P.E.

bz

cc: Lou Hererra, G.E.

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

September 16, 1988

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR ADDITIONAL LANDSCAPING & PAVING
FOR G.E. PLANT (M-16/D6) REVISION DATED AUGUST 30, 1988

Dear Mr. Dodge:

Based on the information provided on your submittal of September 1, 1988, revisions as indicated are acceptable. At your convenience, please provide me with any type of correspondence that you have on file pertaining to approval by the M.R.G.C.D. for the construction involving release into the San Jose Drain. If no such documentation exists, I recommend that you call them for their review and approval prior to any further approval by the City of Albuquerque Hydrology Section.

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+856)

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14/D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: Sam Williams

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
SEP 01 1988
HYDROLOGY SECTION

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

_X_ DRAINAGE REPORT SUPPLEMENT

____ 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

_X_ OTHER Landscaping Requirements (SPECIFY)
REQUIRED BY REDEVELOPMENT
(AMENDMENTS to the APPROVED
DRAINAGE REPORT to ACCOMODATE LANDSCAPING

DATE SUBMITTED: September 1, 1988

BY: _____

These go w/ GE Sector Development Landscape Plans sent over by Zoning.

Nothing has been sent over by Zoning as of 9/7/88 ff.

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO PUBLIC SERVICES
DAN WEAKS

July 29, 1988

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR YF120 ADDITION
(M-14/D6) REVISION DATE OF JULY 14, 1988

Dear Mr. Dodge:

Based on the information provided on your submittal of July 15, 1988, 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

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO PUBLIC SERVICES
DAN WEAKS

July 29, 1988

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR YF120 ADDITION
(M-14/D6) REVISION DATE OF JULY 14, 1988

Dear Mr. Dodge:

Based on the information provided on your submittal of July 15, 1988, 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

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

December 10, 1987

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: PAVING PLAN SUBMITTAL OF GE - AIRCRAFT ENGINE PLANT
RECEIVED NOVEMBER 24, 1987 FOR GRADING/PAVING PERMIT (M-14/D6)

Dear Suzi:

The above referenced submittals dated November 20, 1987 are approved for Grading and Paving Permit. The contractor is approved to proceed with construction in accordance with these plans.

If you have any questions, please call me at 768-2650.

Cordially,

Roger A. Green, PE

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

RAG/bsj

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: DENNIS MARTIN

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

RECEIVED
NOV 24 1987
HYDROLOGY SECTION

TYPE OF SUBMITTAL:

_X_ DRAINAGE REPORT SUPPLEMENT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ 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

_X_ GRADING/PAVING PERMIT APPROVAL

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: _____

BY:

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

November 16, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR THE AUTO CLAVES 5 & 6
(M-16/D4) REVISION DATED NOVEMBER 1, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of November 5, 1987, the above referenced plan is approved for Foundation 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

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: Dennis Martin

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

RECEIVED
NOV 05 1987
HYDROLOGY SECTION

PRE-DESIGN MEETING:

___ YES

_X_ NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. ___

EPC NO. ___

PROJ. NO. ___

TYPE OF SUBMITTAL:

_X_ DRAINAGE REPORT SUPPLEMENT

___ 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

_X_ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

___ OTHER ___ (SPECIFY)

DATE SUBMITTED: ___

BY: ___

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

April 8, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: GRADING PLAN FOR REFRIGERATED TRAILER SITE (M-14/D6)
ENGINEERS STAMP DATED MARCH 4, 1987 & SUPPLEMENTAL INFORMATION
RECEIVED APRIL 6, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of March 9 and April 6, 1987, the above referenced plan is approved for Grading Permit.

Please advise your client that upon completion of construction, they will need to call Rick Duran at 764-1699 for an inspection.

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

cc: Rick Duran

BJM/bsj

RECEIVED
APR 06 1987
HYDROLOGY SECTION

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: John Rose

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT SUPPLEMENT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN + Additional Information Requested

____ 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

X GRADING/PAVING PERMIT APPROVAL

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: _____

BY: Suzi Balogh

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

March 16, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: GRADING PLAN FOR REFRIGERATED TRAILER SITE
(M-14/D6) RECEIVED MARCH 9, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of March 9, 1987, the above referenced drainage plan cannot be approved at this time until:

1. Please locate the referenced trailer site within the proposed Drainage Improvement Plan submitted on November 4, 1986.

2. Identify which system will be taking care of the developed runoff.

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

DRAINAGE INFORMATION SHEET

PROJECT TITLE: General Electric Plant: Freezer Trailer Parking ZONE ATLAS/DRNG. FILE #: M14-D6

LEGAL DESCRIPTION: _____

CITY ADDRESS: 336 Woodward Road SE.

ENGINEERING FIRM: Leedshill-Herkenhoff, Inc. CONTACT: Suzi Balogh, Dumas Slade

ADDRESS: P.O. Box 1217 PHONE: 247-0294

OWNER: General Electric Corp. - Jet Engine Group CONTACT: John Rose

ADDRESS: 336 Woodward Road SE. PHONE: 765-9300

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
MAR 09 1987
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

1 copy

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: _____

BY: _____

Hydrology:
4th ~~floor~~ old bldg.
Fred Aguirre
Carlos Montoya
766-7644

Old city Hall
on 4th floor

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

LETTER OF TRANSMITTAL

PROJECT:
(name, address)

TO:

ATTN:

RECEIVED
MAR 09 1987
HYDROLOGY SECTION

LEEDSHILL – HERKENHOFF, INC.
PROJECT NO: 7717 11

DATE: Feb. 23, 1987

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 _____
( ) in accordance with your request _____

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

THE FOLLOWING:
(✓) Drawings ( ) Shop Drawings
( ) Specifications ( ) Estimates
( ) Contract Documents ( ) _____
( ) Change Orders

COPIES	DATE	REV.NO.	DESCRIPTION	ACTION CODE
2	2-23-87		GE Defoe ported Trailer parking Drainage Plan	E

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 Drainage information sheet attached.

COPIES TO: (with enclosures)

BY: [illegible]

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

November 12, 1986

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE REPORT REIVSION OF GENERAL ELECTRIC AIRCRAFT ENGINE PLANT, RECEIVED NOVEMBER 4, 1986 FOR BUILDING PERMIT APPROVAL OF MAINTENANCE TRAINING BUILDING (M-14/D6)

Dear Suzi:

The above referenced submittal, drawing Exhibit No. 2 revised November 4, 1986, is approved for Building Permit. If the building permit has already been issued, it is your responsibility to see that the contractor has the revised approved plan.

If you have any questions, call me at 768-2650.

Cordially,

Roger A Green, PE

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

RAG/bsj

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE-Aircraft Eng. Plant Maintenance Building ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 336 Woodward Road S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff, Inc. CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: Lou Herrera

ADDRESS: 336 Woodward Road S.E. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
NOV 04 1986
HYDROLOGY SECTION

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

_X_ DRAINAGE REPORT SUPPLEMENT*

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

*Revision 7 on Attachment

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

_X_ BUILDING PERMIT ~~APPROVAL~~ Revision

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

_X_ OTHER _____ (SPECIFY)

DATE SUBMITTED: Nov. 4, 1986

BY: Suzi Balogh

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

August 8, 1986

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE REPORT REIVSION OF GENERAL ELECTRIC AIRCRAFT ENGINE PLANT, RECEIVED AUGUST 7, 1986 FOR BUILDING PERMIT APPROVAL OF BUILDING 14B AND ADDITION TO BUILDING 3 (M-14/D6)

Dear Suzi:

The above referenced submittal, drawing Exhibit No. 2 revised July 25, 1986, is approved for Building Permit. Construction of the new 30' R.C.P. between A.P. 106 and 107 is a required improvement before final acceptance of Building 14B.

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

Cordially,

Roger A. Green, PE

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

RAG/bsj

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE- Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: John Rose

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

RECEIVED
AUG 07 ~~JUL 17~~ 1986
HYDROLOGY SECTION

PRE-DESIGN MEETING:

X YES

___ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED IN EARLIER SUBMITTAL

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

X DRAINAGE REPORT SUPPLEMENT*

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

*Revision 5 on Attachment.

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

___ OTHER _____ (SPECIFY)

DATE SUBMITTED:

BY:

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE - Aircraft Eng. Plant Maintenance Building ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 336 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff, Inc. CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: Lou Herrera

ADDRESS: 336 Woodward Rd. S.E. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED AUG 07 1986 HYDROLOGY SECTION

PRE-DESIGN MEETING:

____ YES

X NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT SUPPLEMENT*

____ 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

X FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

____ OTHER _____ (SPECIFY)

*Revision 6 on Attachment.

DATE SUBMITTED: _____

BY: _____

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

August 5, 1986

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE REPORT FOR GENERAL ELECTRIC AIRCRAFT ENGINE PLANT, RECEIVED AUGUST 4, 1986 FOR VERIFICATION OF FLOOD HAZARD AREA REMOVAL (M-14/D6)

Dear Suzi:

The storm drain calculations transmitted with Bobbi Miller's letter dated July 29, 1986, are acceptable. Her previous letter of June 30, 1986 is therefore concurred with.

In regards to your submittal for Building Permit approval, received on July 17, 1986, a resubmittal is required as previously discussed with you between myself and Fred Aguirre.

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

Cordially,

Roger A. Green, PE

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

RAG/bsj

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

1120-5185.11-86

July 29, 1986

Roger Green, P.E.
Hydrology Division
Public Works Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
AUG 04 1986
HYDROLOGY SECTION

RE: RESUBMITTAL SUPPLEMENT TO M-14 D-6
GENERAL ELECTRIC AIRCRAFT ENGINE PLAN DRAINAGE REPORT
DRAINAGE AREA 100

In response to our telephone conversation of July 17, 1986, the attached printout reflect the following modifications:

1. The beginning hydraulic grade line elevation has been raised to the soffit elevation of the outfall pipe.

2. The number of manholes for the various reaches have been corrected. An additional manhole is necessary between Manholes 106-107 to connect a single double 'D' catch basin to the existing system.

3. The coefficient of friction has been revised since the existing system is ductile iron rather than reinforced concrete. (n = 0.011 for smooth iron pipe and n = 0.012 for ordinary iron pipe according to Introduction to Fluid Mechanics and Heat Transfer, by Parker, Boggs, and Blick.) Note that for the new parallel pipe n = 0.013 has been used because the new 30" pipe will be RCP.

4. No additional losses due to laterals have been included as they are not significant. See the sample calculation included.

5. The stationing of the analysis points and lengths have been revised to reflect field survey data. The earlier values were scaled off a 1" = 100' drawing.

Thank you for your thorough analysis and bringing to my attention the oversights. Should you have any additional comments or questions, please contact Suzi Balogh or me at 247-0294.

Sincerely,

Roberta F. Miller

ROBERTA F. "BOBBI" MILLER
bz
Attachments

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: John Rose

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
AUG 04 1986
HYDROLOGY SECTION

PRE-DESIGN MEETING:

X YES

___ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT SUPPLEMENT

___ 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

X OTHER VERIFICATION (SPECIFY)
THAT FHA DOESN'T EXIST

DATE SUBMITTED: 7-29-86

BY: Roberta J. Miller

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE -Aircraft Eng. Plant ZONE ATLAS/DRNG. FILE #: M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: John Rose

ADDRESS: 336 Woodward Rd. S.W. PHONE: 765-9200

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

RECEIVED
JUL 01 1986
HYDROLOGY SECTION

PRE-DESIGN MEETING:

X YES

____ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO.

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

X DRAINAGE REPORT SUPPLEMENT

____ 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

X OTHER VERIFICATION (SPECIFY)
THAT FHA DOESN'T EXIST

DATE SUBMITTED: 6-30-86

BY: Roberta F. Miller

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

976-5185.11-86

June 30, 1986

Fred Aquiree
City Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: SUPPLEMENT TO (M-14 D-6)
GENERAL ELECTRIC AIRCRAFT ENGINE PLANT DRAINAGE REPORT
DRAINAGE AREA 100

This letter is written to provide justification that the 100 year flood hazard area (FHA) in the vicinity of the General Electric Plant (Zone Atlas Map M-14) as shown on the Albuquerque Master Drainage Study (AMDS) does not or will not exist after storm drainage improvements. The improvements recommended are the same as in the original report; however, the FHA has now being thoroughly addressed. Also, the original calculations have been expanded and reverified.

The supplemental calculations indicate that the FHA doesn't exist because:

1. The on-site private storm drainage facilities were not taken into consideration by the AMDS (see letter to Jim Fink attached).

2. The on-site facilities with improvements will carry the flow generated by the 100 year storm. The calculations for on-site and off-site contributing areas, pressurized flow hydraulics, and inlet capacity are attached.

   a. Improvements required include:

      1) A parallel 30" RCP from Analysis MH 106 to MH 107 that will upgrade the Outlet 101 to MH 109 system (Area 100 main line) to the 100 year level, not to the 50 year level as stated in the report.

      2) Two additional Type D catch basins along the reach 106 to 107 as recommended in the report.

   b. The maintenance improvements from MH 102 to MH 105 and for CB's 109 D, H, I & L are not required to handle the 100 year storm.

Method

The Rational Method was used to review the hydrology considering onsite areas 100% impervious and offsite areas 72% impervious. Also, 'C' factors of 1.00 and 0.7, respectively, were used. These values agree with ASCE published values. The flows are greater because of a revision in calculating offsite acreage, but the results are essentially the same.

This supplement does not fulfill the requirements of a drainage plan for a building permit, which will be submitted to you at a later date; however, we request your signature below indicating that you concur that after the improvements indicated are made, the 100 Year Flood Hazard Area will not exist, and therefore, floodproofing requirements will not be imposed.

Should you have any questions, please call me at 247-0294.

Sincerely,

Roberta F. Miller

ROBERTA F. "BOBBI" MILLER

er

Concur:

Roger A. Green, PE 8/5/86

Fred Aquiree
FOR City Hydrologist

GENERAL ELECTRIC AIRCRAFT ENGINE PLANT
DRAINABLE AREA 100 - SUPPLEMENT JUNE 30, 1986

Type of Improvement	Recommendation	Original Report	Supplement
Storm Drainage	Parelleling existing 24 inch pipe with new 30 inch between MH 106 and MH 107	Yes	Yes To be installed Will upgrade system to manage 100 year flows
Storm Drainage	2 Additional catch basins between MH 106 and MH 107	Yes	Yes To be installed Will upgrade system to manage 100 year flows
Maintenance	35 inch pipe MH 102 to MH 105	Yes	Not necessary to carry 100 year storm - to remain Priority III improvement
Maintenance	Replace pipe CB 109I and CB 109L with 12 inch pipe	Yes	To remain Priority III improvement - not needed to carry 100 year flows

H828

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

814-5185.11-86

RECEIVED
JUN 03 1986
PLANNING & PROGRAMMING
HYDROLOGY

May 29, 1986

Jim Fink
Principal Engineer Hydrology
Planning Group Division
Public Works Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: GENERAL ELECTRIC AIRCRAFT ENGINE PLANT
ADDITION TO BUILDING 14E - STORM DRAINAGE

This letter is written to summarize the discussions and conclusions of our meeting May 29, 1986.

The area for the proposed addition is located south of Woodward Road S.E., west of the San Jose Drain and on the west side of the existing plant facility (Zone Atlas Map M-14, AMDS Area 6).

It was concluded from the meeting that:

1. The 100 year storm criteria used is top of curb.

2. The Albuquerque Master Drainage Study of 1981 did not transfer any overland flows from Area 1 into Area 6.

3. The only through flows from Area 1 were the San Jose Drain and Riverside Drain.

4. The private storm drainage system located on the General Electric Plant site were not included in the AMDS modeling.

5. The determination as to whether or not the private facilities are adequate to address the 100 year flooding will be addressed as part of a Drainage Plan.

If you concur with the above statement, please sign below and return one copy to this office for our files. If corrections are required, please call.

Roberta F. Miller
ROBERTA F. "BOBBI" MILLER

Jim Fink 6/6/86
JIM FINK Date

bz

RECEIVED
JUN 10 1986

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

CONFERENCE RECAP

DRAINAGE FILE/ZONE ATLAS PAGE NO.: M14 DATE: 5/8/86

PLANNING DIVISION NOS: EPC: _____ DRB: _____

SUBJECT: G.E. - ADDITION TO 14D

STREET ADDRESS (IF KNOWN): WOODWARD & TURNPIKE

SUBDIVISION NAME: _____

APPROVAL REQUESTED:

____	PRELIMINARY PLAT	____	FINAL PLAT
____	SITE DEVELOPMENT PLAN	X	BUILDING PERMIT
____	OTHER	____	ROUGH GRADING

	WHO	REPRESENTING
ATTENDANCE:	SUZI BALOGH	HERRENOF
	FRED J. AGUIRRE	City

FINDINGS:

1. UPDATE DRAINAGE PLAN TO REFLECT PROPOSED ADDITION: INCLUDING FINISH FLOOR OF ADDITION

2. ADDRESS FLOODPROOFING REQUIREMENTS OR PROVIDE JUSTIFICATION THAT FLOODPROOFING DOES NOT EXIST AS A RESULT OF ON SITE IMPROVEMENTS.

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

SIGNED:	[illegible]	SIGNED:	[illegible]
TITLE:		TITLE:	
DATE:	5/8/86	DATE:	

NOTE PLEASE PROVIDE A COPY OF THIS RECAP WITH THE DRAINAGE SUBMITTAL

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

February 28, 1985

Clint Dodge
Leedshill-Herkenhoff
500 Copper Avenue, NW
Albuquerque, New Mexico 87102

RE: GENERAL ELECTRIC PLANT DRAINAGE REPORT (M-14/D6)
RECEIVED JANUARY 21, 1985

Dear Mr. Dodge:

The referenced submittal is in compliance with the request of this office and is hereby approved.

Signatures on the Work Order Plans will not be withheld. Please reschedule with this office for obtaining my signature if that is all that is lacking. Or call Greg Olson's office to reschedule for DRC.

Should you have any questions or comments, please call me at 766-7644.

Cordially,

Billy J. Goolsby

Billy J. Goolsby, P.E.
Design Hydrology Section

BJG/bsj

DRAINAGE INFORMATION SHEET

Roadway/Drainage Improvements

PROJECT TITLE: General Electric Plant ZONE ATLAS/DRNG. FILE #: M14S / D6

LEGAL DESCRIPTION: MRGCD Map No. 44, 642361, 642362, 6424

CITY ADDRESS: 336 Woodward Road, S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Clint Dodge

ADDRESS: 500 Copper, N.W. PHONE: 247-0294

OWNER: General Electric Co. CONTACT: John Rose

ADDRESS: 336 Woodward Rd., S.E. PHONE: 765-9200

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

X YES

____ NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED
JAN 21 1985
HYDROLOGY SECTION

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

X 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

X GRADING/PAVING PERMIT APPROVAL

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: _____

BY: _____

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

481-1986.11-84

April 24, 1984

M14 D5 OR D6

Mr. Fred Aquirre
Chief-City Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: GENERAL ELECTRIC AIRCRAFT ENGINE PLANT - STORM DRAINAGE

This letter is written to summarize the discussions and conclusions of our meeting of April 6, 1984.

The G.E. plant is located at Broadway, S.E. and Woodward Road S.E. within the City limits. The City has no site drainage plan on file. The plant reached its current stage of development by the mid-1950's. The 35 acre site is currently over 90% impervious building and paved parking lots. Outflows are directed east to the adjacent San Jose Drain at several locations via storm drains with some overland flow. The approximate 1.3 square mile San Jose Drain upstream drainage area, west of the South Diversion Channel, is urbanized; downstream lands are predominately rural.

G.E. is engaged in a program to prevent the entry of contaminants into the drain. This, along with possible storm flow problems, will require some modifications or supplements to the existing storm drainage system and site grading. Also, G.E. may modify buildings or otherwise slightly modify the existing on-site drainage patterns. All on-site flows are discharged in the San Jose Drain.

The question is; Does the City require a drainage plan submittal for site re-paving, building modifications and/or storm drainage systems modifications.

It is my understanding that no drainage plan submittal is required. Reasons are that the plant was devleoped prior to pertinent regulations and the site is virtually all impervious today. City Hydrology does request that G.E. provide a copy of the drainage study and system for its files.

If these items summarize your understanding of the discussion and conclusions reached in our meeting, please sign below and return one copy to us for our files. If corrections or further data is required, please call.

Pete Phelan

PETE PHELAN

er

Fred D Aguirre, P.E.

City Hydrology

I concur subject to the following

No drainage plan required if the proposed construction:

1. Does not constitute grading, cut, fill or importation of material in excess of 500 cubic yards or grading of any area of one (1) acre or more (see Sec. 12, Item B3 of the Drainage Ordinance).

2. Paving is not larger than 1000 sq. ft. or more (see Sec. 12, Item B4 of the Drainage Ordinance).

3. Addition (if applicable) to the site is not greater than 500 square ft. in plain view (see Sec. 12B of the Drainage Ordinance).

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
UTILITY DEVELOPMENT DIVISION/HYDROLOGY SECTION

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: M14-/D6 DATE: 6/18/90

EPC NO.: _____ DRB NO.: _____ ZONE: _____

SUBJECT: G.E. Plant

STREET ADDRESS: 336 Woodward S.E.

LEGAL DESCRIPTION: Lot 17 South Broadway Acres

APPROVAL REQUESTED:

____	PRELIMINARY PLAT	____	FINAL PLAT
____	SITE DEVELOPMENT PLAN	✓	BUILDING PERMIT
____	GRADING/PAVING PERMIT	____	OTHER

ATTENDANCE:	WHO	REPRESENTING
	Bernie J Montoya	City of Albuquerque
	Pat Conley	S-SEC

FINDINGS:

1. Master Drainage plan similar to Exhibit #2 of Leedshill-Herkenhoff Inc. September 1988 drainage plan will be required.

2. Existing Master plan may be used providing it is stamped by a registered Engineer from the S-SEC firm. No other stamp can exist on the drawing.

3. As each development is proposed, the master can be revised to indicate area of work along with what method is to be used to address the drainage issues.

4.

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

SIGNED:	[signature]	SIGNED:	Bernie J Montoya
TITLE:	Eng I	TITLE:	Engineering Assistant
DATE:	6/19/90	DATE:	6/19/90

****NOTE**** PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL.

CITY OF
Albuquerque

July 20,1998

Clint Dodge PE
Leedshill-Herkenhoff , Inc.
500 Copper Avenue Suite 500
Albuquerque, New Mexico 87103

RE: GRADING PLAN FOR GE BUILDING DEMOLITION (M14-D6) ENGINEER'S STAMP DATED 6/10/98

Dear Mr. Dodge:

Based on the information provided on your June 12,1998 submittal, the above referenced site is approved for Grading Permit.

Please be advised that after completion of the grading, Engineer Certification per the DPM checklist will be required.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya

Bernie J. Montoya CE
Associate Engineer

DRAINAGE INFORMATION SHEET

PROJECT TITLE: 1998 GE Building Demolition ZONE ATLAS/DRNG.FILE #: M-14-Z b

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: MRGCD Map 44, Tracts 64A1A4, 64A1B, 18, 19, 20, 21 and a portion of 17.

CITY ADDRESS: 336 Woodward SE, Albuquerque, New Mexico 87102

ENGINEERING FIRM: Leedshill-Herkenhoff, Inc. CONTACT: Clint Dodge, P.E.

ADDRESS: 500 Copper Avenue, Albuquerque PHONE: (505)247-0294

OWNER: General Electric Aircraft Engines CONTACT: Jim Miller

ADDRESS: 336 Woodward SE, Albuquerque PHONE: (505)848-7727

ARCHITECT: Leedshill-Herkenhoff, Inc. CONTACT: Eric Stoehr

ADDRESS: 500 Copper Avenue, Albuquerque PHONE: (505)247-0294

SURVEYOR: Arctic Slope Technical Services, Inc. CONTACT: Andy Potts

ADDRESS: 500 Copper Avenue, Albuquerque PHONE: (505)247-0294

CONTRACTOR: Not yet determined CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
__X__ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
__X__ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERTIFICATION
_____ OTHER

PRE-DESIGN MEETINGS:

_____ YES
__X__ NO
_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

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

DATE SUBMITTED: 6/10/98

BY: Karen M. Jacobsen

RECEIVED
JUN 12 1998
HYDROLOGY SECTION

G \DATA\PROJECTS\GE\98001\98001_07\CHRONO\DRAININF.SHT

LEEDSHILL-HERKENHOFF, INC.
an ASCG *Company*
500 Copper Avenue NW, Suite 500
P.O. Box 1217
Albuquerque, New Mexico 87103
(505) 247-0294 Fax (505) 242-4845

515-98001.07/1600-98

June 10, 1998

RECEIVED
JUN 12 1998
HYDROLOGY SECTION

Fred Aguirre, P.E.
Hydrology Section/PWD
City of Albuquerque
P.O. Box 1217
Albuquerque, New Mexico 87013

RE: GENERAL ELECTRIC AIRCRAFT ENGINES
GRADING AND DRAINAGE PLAN

Leedshill-Herkenhoff, Inc. (LH) has prepared this letter drainage report for the above referenced project site. We are providing the items required by the City for a Grading and Drainage Permit.

The drainage calculations were performed in accordance with Section 22.2 of the Development Process Manual for the City of Albuquerque (See Attachment A).

We obtained topographical survey information for this project from Arctic Slope Technical Services, Inc. and the proposed native seeding was coordinated with the City Specifications for Public Works Construction. As shown on the grading and drainage plan, this project will convert 4.8 acres of impervious area to native seeding.

Drainage calculations were performed to determine the amount of runoff for each drainage basin with the project site for both existing and proposed conditions. The results are summarized below:

CALCULATED	EXISTING	CONDITIONS	PROPOSED	CONDITIONS
DISCHARGE	SOUTH INLET	NORTH INLET	SOUTH INLET	NORTH INLET
Q100	34.8 cfs	38.2 cfs	27.6 cfs	30.4 cfs
Q10	23.2 cfs	25.4 cfs	16.9 cfs	18.5 cfs

The existing buildings on site will be demolished, and hauled away to be recycled. The disturbed area will be replaced with native grass seeding. The peak runoff from the proposed conditions is less than for the existing conditions. Therefore, it is anticipated that continued free discharge

into the San Jose Drain is acceptable. Off site flows were not incorporated because the property to the west has recently undertaken a paving project and has constructed a detention basin for the site. Woodward Road and Descanso Road have storm drains that collect the runoff from the north and south.

The project site is located in Zone X (Areas determined to be outside the 500-year floodplain) as indicated on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Community Panel 35001C0342 D, dated September 20, 1996 (See Attachment B). Therefore, no special design considerations were required.

LH requests your approval for a Grading and Drainage Permit for the above referenced project site, and trusts that the information provided is satisfactory. If you have any questions please call me or Clint Dodge.

Karen M. Jacobsen

KAREN M. JACOBSEN
Engineering Intern

Clinton Dodge

CLINTON DODGE, P.E.
Principal Engineer

kmj/bz

Enclosures

cc: Jim Weeks, LH

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HYDROLOGY SECTION

ATTACHMENT A

CALCULATIONS

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION: 1998 9E BUILDING DEMO			SHEET NO. 1 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO.: 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

1.0 SUBJECT

1998 9E BUILDING DEMOLITION
DRAINAGE FOR PROPOSED CONDITIONS.

2.0 PURPOSE

CALCULATE RUNOFF Q FOR EXISTING AND PROPOSED CONDITIONS TO QUANTIFY DIFFERENCE.

3.0 REFERENCES

- DEVELOPMENT PROCESS MANUAL VOLUME 2, SECTION 22.2, HYDROLOGY

4.0 ASSUMPTIONS

EXISTING CONDITIONS

ENTIRE AREA IS IMPERVIOUS EXCEPT FOR LANDSCAPE BUFFER
LAND TREATMENT "D"

PROPOSED CONDITIONS

APPROXIMATELY 1/3 OF AREA WILL BE DISTURBED AND REPLACED WITH NATIVE VEGETATION
LAND TREATMENT "A".

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HYDROLOGY SECTION

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO.			SHEET NO. 2 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

5.0 CRITERIA / REQUIREMENTS

- MIMIC HISTORIC DRAINAGE PATTERNS AS CLOSE AS POSSIBLE.
- DISTURBED AREA TO BE SEEDED WITH NATIVE SEED.
- SILT FENCE TO BE INSTALLED AROUND ENTIRE SITE BEFORE DEMOLITION AND TO REMAIN IN PLACE UNTIL VEGETATION TAKES ROOT.
- DO NOT INCREASE RUNOFF.

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION: 1998 9E BUILDING DEMO			SHEET NO. 3 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

6.0 SKETCHES.

SEE ATTACHED DRAWINGS, FOR DESIGN AND EXISTING SYSTEM

7.0A.1 CALCULATIONS, EXISTING CONDITIONS

USING THE RATIONAL METHOD, DETERMINE **100 YR** PEAK RATE OF DISCHARGE FOR **EXISTING CONDITIONS, SOUTH INLET**

(AREAS CALCULATED FROM AUTOCAD r14 FILE.)

ZONE 2 FROM DPM, VOL 2, SECT 22.2

IMPERVIOUS AREA TREATMENT "D" = 7.4 acres

LANDSCAPE BUFFER TREATMENT "A" = 0.0 acres

$Q = CiA$

TABLE A-11

100 YR $C_D = 0.93$

100 YR $C_A = 0.31$

TABLE A-10

100 YR $i = 5.05$ IN/HR @ $t_c = 0.2$ HR

$\Sigma Q_{100} = (0.93 * 5.05 * 7.4)$

$\Sigma Q_{100} = \underline{\underline{34.8 \text{ cfs}}}$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION: 1998 9E BUILDING DEMO			SHEET NO. 4 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

7.0 A.2 CALCULATIONS, EXISTING CONDITIONS

USING THE RATIONAL METHOD, DETERMINE

10 YR PEAK RATE OF DISCHARGE FOR

EXISTING CONDITIONS, SOUTH INLET

ZONE 2, FROM DPM, VOL 2, SECT 22.2

IMPERVIOUS AREA TREATMENT "D" = 7.4 ACRES

LANDSCAPE BUFFER TREATMENT "A" = 0.0 ACRES

$Q = CiA$

TABLE A-11

$10_{YR}\ C_D = 0.92$

$10_{YR}\ C_A = 0.11$

TABLE A-10

$10_{YR}\ i = 3.41\ IN/HR$ @ $t_c = 0.2\ HR$

$SQ_{10} = (0.92 * 3.41 * 7.4)$

$SQ_{10} = 23.2\ cfs$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO			SHEET NO. 5 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/2/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

7.0 A3 CALCULATIONS, EXISTING CONDITIONS

USING THE RATIONAL METHOD, DETERMINE 10 YR & 100 YR PEAK RATE OF DISCHARGE FOR EXISTING CONDITIONS, NORTH INLET

ZONE 2 FROM DPM, VOL 2, SECT. 22.2

IMPERVIOUS AREA TREATMENT "D" = 8.1 ACRES

LANDSCAPE BUFFER TREATMENT "A" = 0.1 ACRES

$Q = CiA$

TABLE A-11

100 YR $C_D = 0.93$

100 YR $C_A = 0.31$

10 YR $C_D = 0.92$

10 YR $C_A = 0.11$

TABLE A-10

100 YR $i = 5.05$ IN/HR @ $t_c = 0.2$ HR

10 YR $i = 3.41$ IN/HR

$N\ Q_{100} = (0.93 * 5.05 * 8.1) + (0.31 * 5.05 * 0.1)$

$N\ Q_{100} = \underline{38.2 \text{ cfs}}$

$N\ Q_{10} = (0.92 * 3.41 * 8.1) + (0.11 * 3.41 * 0.1)$

$N\ Q_{10} = \underline{25.4 \text{ cfs}}$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO			SHEET NO. 6 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

7.0B1 CALCULATIONS, PROPOSED CONDITIONS.

USING THE RATIONAL METHOD, DETERMINE 100YR PEAK RATE OF DISCHARGE FOR PROPOSED CONDITIONS, SOUTH INLET

ZONE 2, FROM DPM, VOL 2, SECT 22.2

IMPERVIOUS AREA = (7.4 - 2.3) = 5.1 AC.
TREATMENT "D"

VEGETATIVE COVER = 2.3 ACRES
TREATMENT "A"

$Q = CiA$

TABLE A-11

$100_{YR} C_D = 0.93$

$100_{YR} C_A = 0.31$

TABLE A-10

$100_{YR}\ i = 5.05\ IN/HR$ @ $t_c = 0.2\ HR$

$SQ_{100} = (0.93 * 5.1 * 5.05) + (0.31 * 2.3 * 5.05)$

$SQ_{100} = \underline{27.6\ cfs}$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO			SHEET NO. 7 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

7.0B2 CALCULATIONS, PROPOSED CONDITIONS

USING THE RATIONAL METHOD, DETERMINE

10YR PEAK RATE OF DISCHARGE FOR

PROPOSED CONDITIONS, SOUTH INLET

ZONE 2, FROM DPM, VOL 2, SECT. 22.2.

IMPERVIOUS AREA TREATMENT "D" = 5.1 ACRES

VEGETATIVE COVER TREATMENT "A" = 2.3 ACRES

$Q = CiA$

TABLE A-10

$10_{YR}\, i = 3.41$ IN/HR

@ $t_c = 0.2$ HR

TABLE A-11

$10_{YR}\, C_D = 0.92$

$10_{YR}\, C_A = 0.11$

$$SQ_{10} = (0.92 * 5.1 * 3.41) + (0.11 * 2.3 * 3.41)$$

$$SQ_{10} = \underline{16.9 \text{ cfs}}$$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO			SHEET NO. 8 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/2/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

7.0 B3 CALCULATIONS, PROPOSED CONDITIONS.

- USING THE RATIONAL METHOD, DETERMINE 10YR & 100YR PEAK RATE OF DISCHARGE FOR PROPOSED CONDITIONS, NORTH INLET ZONE 2, FROM DPM, VOL 2, SECT 22.2

IMPERVIOUS AREA TREATMENT "D" = 5.6 ACRES

VEGETATIVE COVER TREATMENT "A" = 2.6 ACRES

$Q = CiA$

TABLE A-11

$100_{YR}\ C_D = 0.93$

$100_{YR}\ C_A = 0.31$

$10_{YR}\ C_D = 0.92$

$10_{YR}\ C_A = 0.11$

TABLE A-10

$100_{YR}\ i = 5.05\ IN/HR$

$10_{YR}\ i = 3.41\ IN/HR$

@ $t_c = 0.2\ HR$

$N\ Q_{100} = (0.93 * 5.05 * 5.6) + (0.31 * 5.05 * 2.6)$

$N\ Q_{100} = \underline{30.4\ cfs}$

$N\ Q_{10} = (0.92 * 3.41 * 5.6) + (0.11 * 3.41 * 2.6)$

$N\ Q_{10} = \underline{18.5\ cfs}$

P:\ACAD\REV-SHT

LEEDSHILL – HERKENHOFF, INC. ENGINEERS ARCHITECTS ALBUQUERQUE • SANTA FE COMPUTATIONS	NAME OF PROJECT/CALCULATION 1998 9E BUILDING DEMO.			SHEET NO. 9 OF
	COMPUTED BY: KMJ	CHECKED BY:	JOB/TASK NO. 98001.07/0500	DATE: 6/1/98

IDENTIFY/ADDRESS THESE ELEMENTS	1.0 SUBJECT	2.0 PURPOSE	3.0 REFERENCES	4.0 ASSUMPTIONS	5.0 CRITERIA / REQUIREMENTS
	6.0 SKETCHES	7.0 CALCULATIONS	8.0 CONCLUSIONS	9.0 ATTACHMENTS	

REVISION #	SUPERSEDES CALC TITLE	CHECKED BY:	DATED

8.0 CONCLUSIONS

DEMOLISHING THE BUILDINGS AND A PORTION OF THE SURROUNDING AREA AND REPLACING THE COVER WITH NATIVE VEGETATION RESULTS IN A NET DECREASE IN RUNOFF.

	EXISTING CONDITIONS		PROPOSED CONDITIONS	
	SOUTH	NORTH	SOUTH	NORTH
Q 100	34.8cfs	38.2cfs	27.6cfs	30.4cfs
Q10	23.2cfs	25.4cfs	16.9cfs	18.5cfs

9.0 ATTACHMENTS

ZONE ATLAS PAGE

SOIL CONSERVATION SERVICE

FEMA MAP

STORM DRAIN ATLAS PAGE

P:\ACAD\REV-SHT

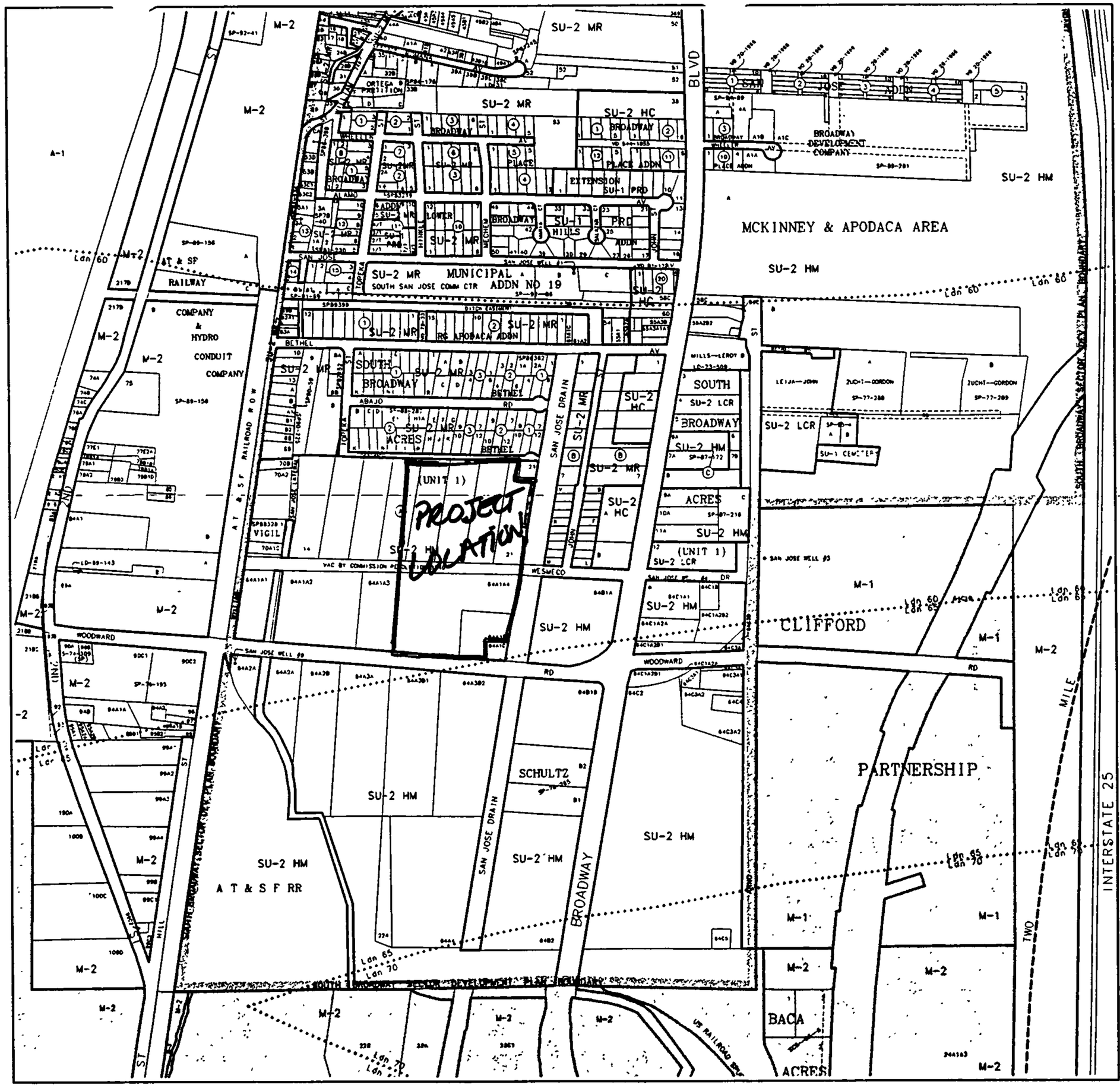
ATTACHMENT B

ZONE ATLAS PAGE M-14-Z

SOIL CONSERVATION SERVICE MAP

FEMA MAP

STORM DRAIN ATLAS PAGE M-14-S



GRAPHIC SCALE IN FEET

250 0 500 1000

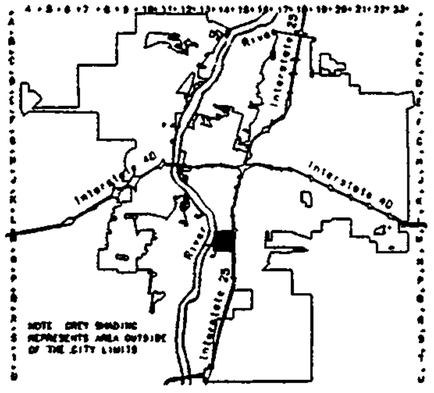
CITY OF Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

© Copyright 1995

Map Amended through September 01, 1995



LEGAL DESCRIPTION

T10N

R3E

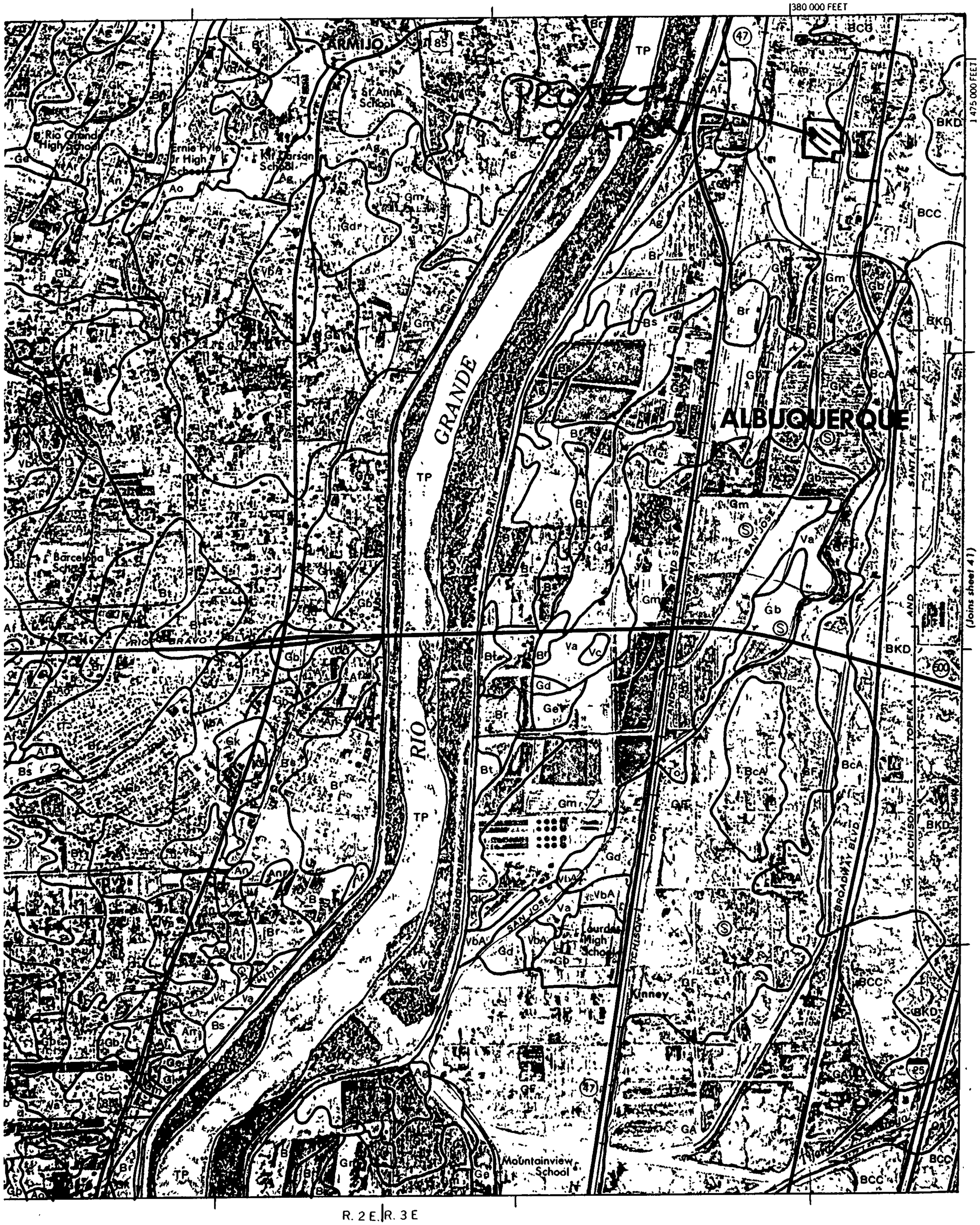
SEC 32

UNIFORM PROPERTY CODE

1-014-068

M-14-Z

AND VALENCIA COUNTIES, NEW MEXICO — SHEET NUMBER 40



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 342 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

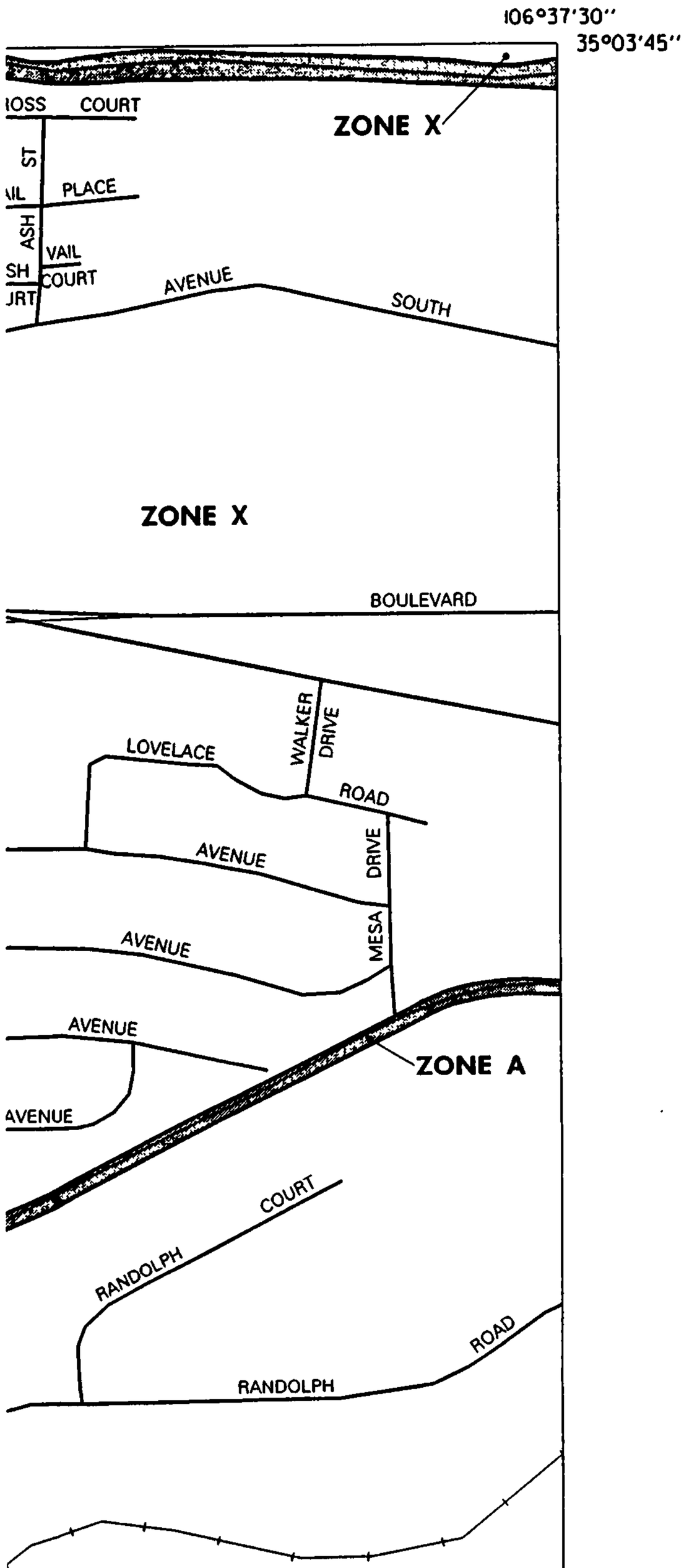
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0342	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0342	D

MAP NUMBER
35001C0342 D

EFFECTIVE DATE:
SEPTEMBER 20, 1996

Federal Emergency Management Agency



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100–YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100–year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action), no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500–year flood; areas of 100–year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100–year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500–year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone See Map Index for Elevation Datum.

RM7 × — Elevation Reference Mark

● M2 — River Mile

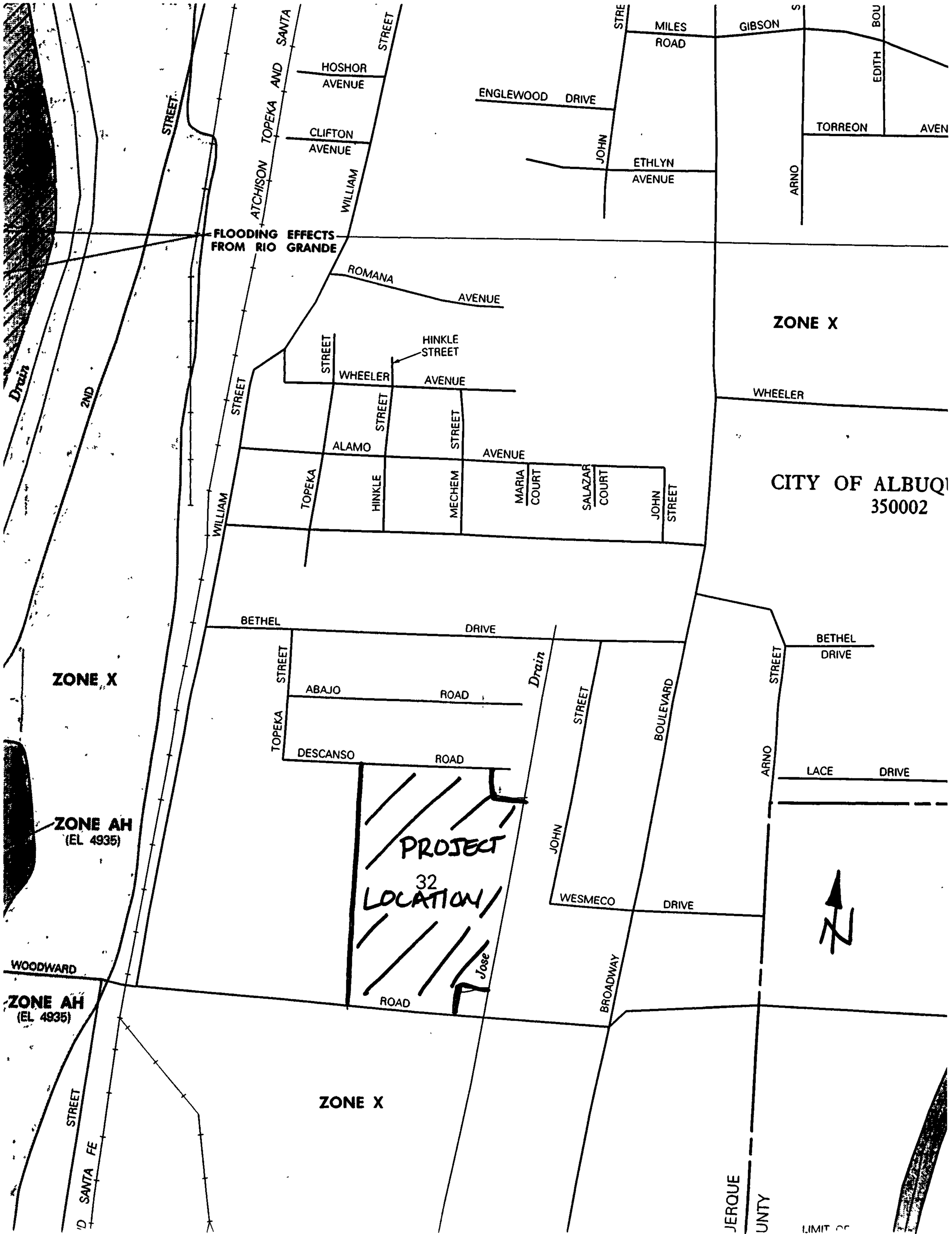
97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

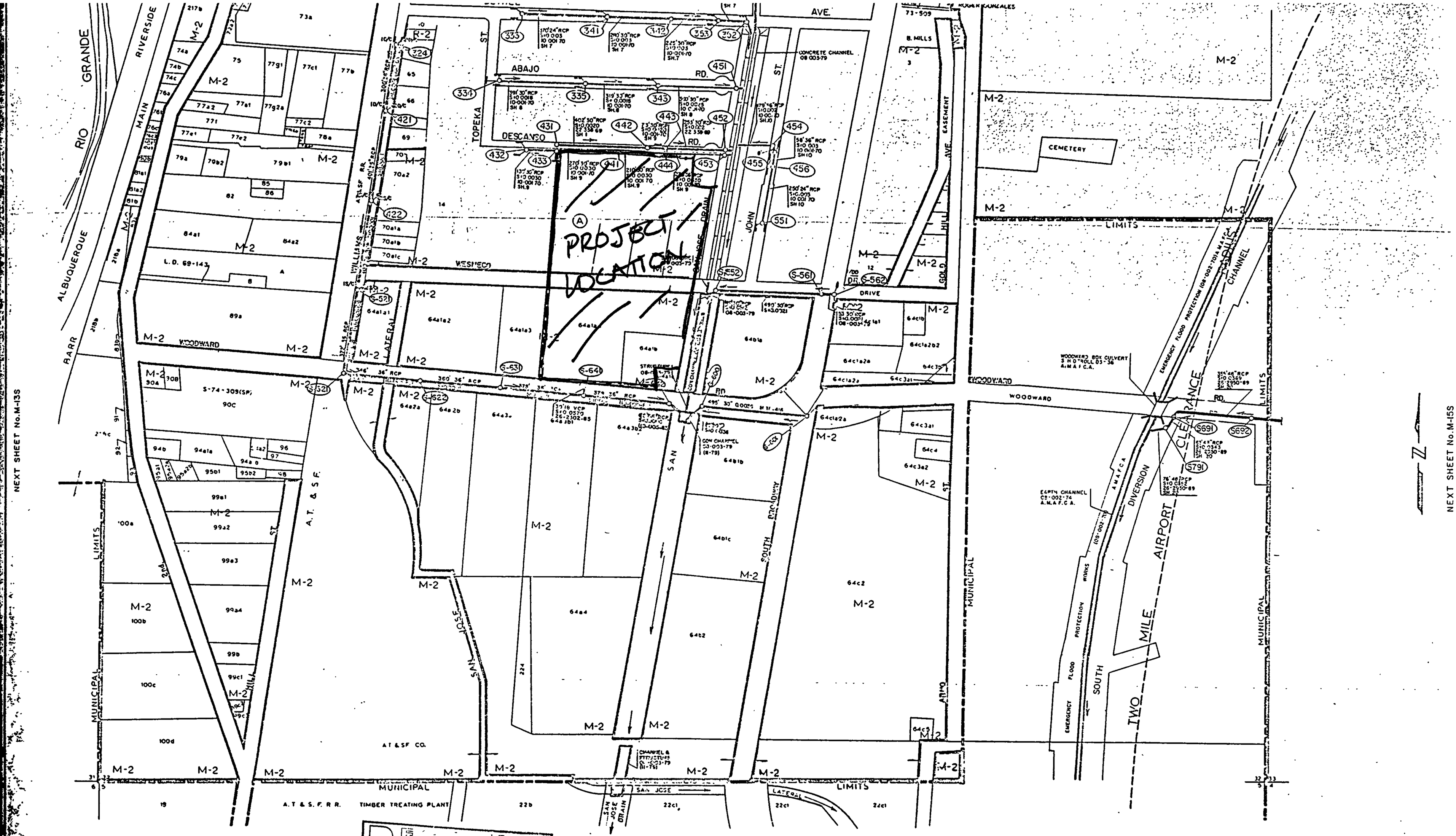
NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning

Areas of Special Flood Hazard (100–year flood) include Zones A, AE, AH, AO, A99, V and VE


SANTA
STREET
HOSHOR
AVENUE
AND
TOPEKA
CLIFTON
AVENUE
ATCHISON
WILLIAM
STREET
FLOODING EFFECTS
FROM RIO GRANDE
ROMANA
AVENUE
ZONE X
HINKLE
STREET
STREET
WHEELER
AVENUE
STREET
STREET
ALAMO
AVENUE
TOPEKA
HINKLE
MECHEM
MARIA
COURT
SALAZAR
COURT
JOHN
STREET
WILLIAM
WHEELER
MILES
ROAD
GIBSON
ENGLEWOOD
DRIVE
JOHN
ETHLYN
AVENUE
TORREON
EDITH
ARNO
CITY OF ALBUQ
350002
BETHEL
DRIVE
STREET
ABAJO
ROAD
TOPEKA
DESCANSO
ROAD
Drain
STREET
BOULEVARD
BETHEL
DRIVE
STREET
ARNO
LACE
DRIVE
ZONE X
ZONE AH
(EL 4935)
PROJECT
32
LOCATION
JOHN
WESMECO
DRIVE
N
WOODWARD
ZONE AH
(EL 4935)
ROAD
Jose
BROADWAY
ZONE X
STREET
SANTA FE
JERQUE
UNTY
LIMIT OF



JUN 12 1998
HYDR... ...CT.

LEGEND	NOTES
STORM SEWER LINE	1. MANHOLE IDENTIFICATION REQUIRES BOTH THE MAP GRID & MANHOLE NO.
MANHOLE	2. MANHOLE NUMBERS CARRIED FROM ADJACENT MAPS HAVE THE MAP GRID SHOWN.
S-112 MANHOLE NUMBER	
STORM INLET	
I C 2 NUMBER, TYPE, GRATES	

REVISIONS	
DATE	REMARKS
4-11-89 P.A.Y.	EMERGENCY FLOOD PROTECTION WORKS
5-3-89 P.A.Y.	BOX CULVERT ON WOODWARD RD.
4-17-89 P.A.Y.	ADDED PROJ 2950 ON WOODWARD RD.

DRAINAGE FACILITIES MAP

— MAP GRID

M-14S

1986.11

PRELIMINARY ANALYSIS OF DESIGN

HAZARDOUS WASTE CONTAINMENT AND STORM DRAINAGE IMPROVEMENTS G.E. AIRCRAFT ENGINE PLANT ALBUQUERQUE, NEW MEXICO

Prepared for
GENERAL ELECTRIC COMPANY

RECEIVED
JAN 21 1985
HYDROLOGY SECTION

July 1984

LEEDSHILL-HERKENHOFF, INC.

500 Copper Ave., N.W.
P.O. Box 1217 - Phone (505) 247-0294
Albuquerque, New Mexico 87103

ENGINEERS ARCHITECTS

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

851-1986.11-84

July 5, 1984

Mr. John Rose
General Electric Co.
336 Woodward Rd., S.E.
Albuquerque, NM 87103

RE: Preliminary Analysis of Design, Hazardous Waste Containment and Storm Drainage Improvements, G.E. Aircraft Engine Plant, Albuquerque, NM

Transmitted herewith are four copies of the narrative and exhibits, and two sets of the calculations for the referenced analysis.

The report contains recommendations for containment of hazardous waste spills and evaluations of the existing plant storm drain capabilities, along with preliminary designs for improvements. The intent of the report is to provide G.E. with adequate information to choose the improvements required by the Company's needs.

The basic recommendation for managing hazardous waste spills is to provide containment structures on existing storm drains at outfalls to the San Jose Drain. Manholes, sumped to provide contaminant storage and provided with remotely activated drain valves are generally recommended. Due to the depth of the existing storm drain relative to the San Jose Drain flow line elevation, a remotely activated sump pump is recommended in lieu of a gravity drain line for the southernmost storm drain pipes (in Area 100). Because storm drain, channel and pavement flows outfall to the pavement surface in the northernmost parking lot (in Area 800), open basin containment with a valved gravity drain release is recommended. These containments and associated improvements were assigned as Priority I work in the report.

It is interpreted that existing flood hazard studies indicate a potential of shallow flooding of the plant locale from at least the 100 year storm.

Because of the generally flat gradients for overland flows in pavement sections, storm drains serve as the major storm carriers on the plant site. Flows are intercepted by grate-type catch basins and trench drains located in pavement depressions. Water must temporarily pond to gain entry over the perimeter of the catch basin grates. All storm drains outfall to the San Jose Drain. Maximal capacities of the existing main line storm drains were evaluated using pressure flow analyses. The capabilities of individual main lines were found to range between those for 10 and 100 year rainfalls using City of Albuquerque rational formula hydrology. Catch basin piping in the upstream reaches of drainage areas sometimes has much less capacity than that of main lines. Improvements to upstream piping were assigned as

priority II work. Where sediment of trash deposition in flat or adverse gradient pipes could result in flow restrictions or where a supplementary main line pipe would result in a significant increase in system capability, improvements were assigned as Priority III work.

We will be pleased to answer any questions you may have concerning this report.

Pete Phelan

PETE PHELAN

PP/lb

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Section		Page
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III.	Storm Drain Hydrology and Hydraulics	4
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V.	Proposed Improvements and Cost Estimates	12

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3.	Schematic, Typical Containment Basin	16

Folded Maps

Exhibit No. 1, Existing Drainage Systems

Exhibit No. 2, Proposed Drainage Improvements

Attachments

Annotated Letter to City Hydrology Staff

Calculations Appendix

SECTION I
INTRODUCTION

The General Electric Company has requested an engineering analysis of alternatives for hazardous waste containment and evaluations of existing and potential storm drainage capability at their aircraft engine plant in the south valley of Albuquerque, New Mexico. This report both describes our findings concerning the two systems' existing physical and hydraulic characteristics and presents preliminary design solutions for consideration. Only after review and any necessary modifications by plant personnel should final design solutions be pursued.

The problems to be addressed are as follows. The Environmental Protection Agency has been monitoring the water quality of the San Jose Drain on the east side of the plant. One potential source of contamination was from direct releases to the Drain via pipes from buildings. By a combination of plugging, provision of dry pits within the buildings and otherwise discontinuing pipe usage, this problem appear to have been almost solved. A second source of contaminants has been the entry of surface spills via pavement outlet pipes located along the curb of the east perimeter road pavement south of Woodward Road. These pipes have been plugged. A third source has been entry of spills to the storm drain system through catch basins and trench drains. Although a contaminant storage building has been constructed at the southeast corner of the plant, pavement spills remain a potential problem.

The function of storm drains is therefore significantly related to contaminant management. Also, at this time, G.E. is planning some paving improvements for the plant. Pavement modifications can result in worsening storm ponding problems, if not based on knowledge of the storm drain capabilities. Any desired storm drain improvements should be installed prior to repaving. The City requires a storm drainage plan for some modifications. (See pertinent letter attached at end of report.) As part of this study, a comprehensive analysis of the characteristics, function and capability of the

existing storm drain system is provided.

The goal of this submittal is to present the data required for General Electric to determine the best and most economical course of action for implementing adequate contaminant - storm drain provisions at the plant.

SECTION II
DATA ACQUISITION

Using G.E.'s "As-built Storm Drain System" map, Drawing No. P 0095, as a reference, our survey party acquired the rim or grate and invert elevations of storm drain facilities shown on that map or encountered in the field. This vertical field data was required for the analysis of storm drain capabilities. Pipe sizes for hydraulically significant lines were verified where manholes could be opened. Horizontal distances measured from the map were adequate for analyses.

The G.E. plant was found to have eight major onsite drainage areas, seven of which are served by storm drains or culverts outfalling to the San Jose Drain. A central zone, Area 600, delivers overland flow to Woodward Road. For analyses, the major areas were numbered as areas 100 through 800 running from south to north. Corresponding main line storm drain manholes and catch basins were numbered upstream from the Drain with A, B, etc. designations given to side line catch basins and trench drains. The "Existing Drainage Systems" map, prepared from Drawing No. P 0095, graphically shows the location, type and size of existing storm drain facilities and potential hazardous waste pipes; also shown are tabulations of rim or grate and invert elevations for storm drain facilities, data on recurring trickle flow sources and on non-storm drain pipes.

Concurrent with the survey party work, a hydrologist performed field reconnaissances to define the general roof and overland flow patterns to catch basins and trench drains on the plant site and to find the sources of potential hazardous waste releases. The resulting patterns of storm flow are shown on the map. Waste disposal is discussed in Sections IV and V.

Other sources of information were conferences and discussions with plant personnel and the City hydrology staff, plant site plans, City two foot contour interval topographic maps M-14 and N-14, flood hazard maps and as-built plans for this firm's design of the San Jose Drain.

SECTION III
STORM DRAIN HYDROLOGY AND HYDRAULICS

A. DRAINAGE AREA CHARACTERISTICS

Following are descriptions of the general nature of potential inflows to the G.E. plant from offsite and the onsite drainage areas.

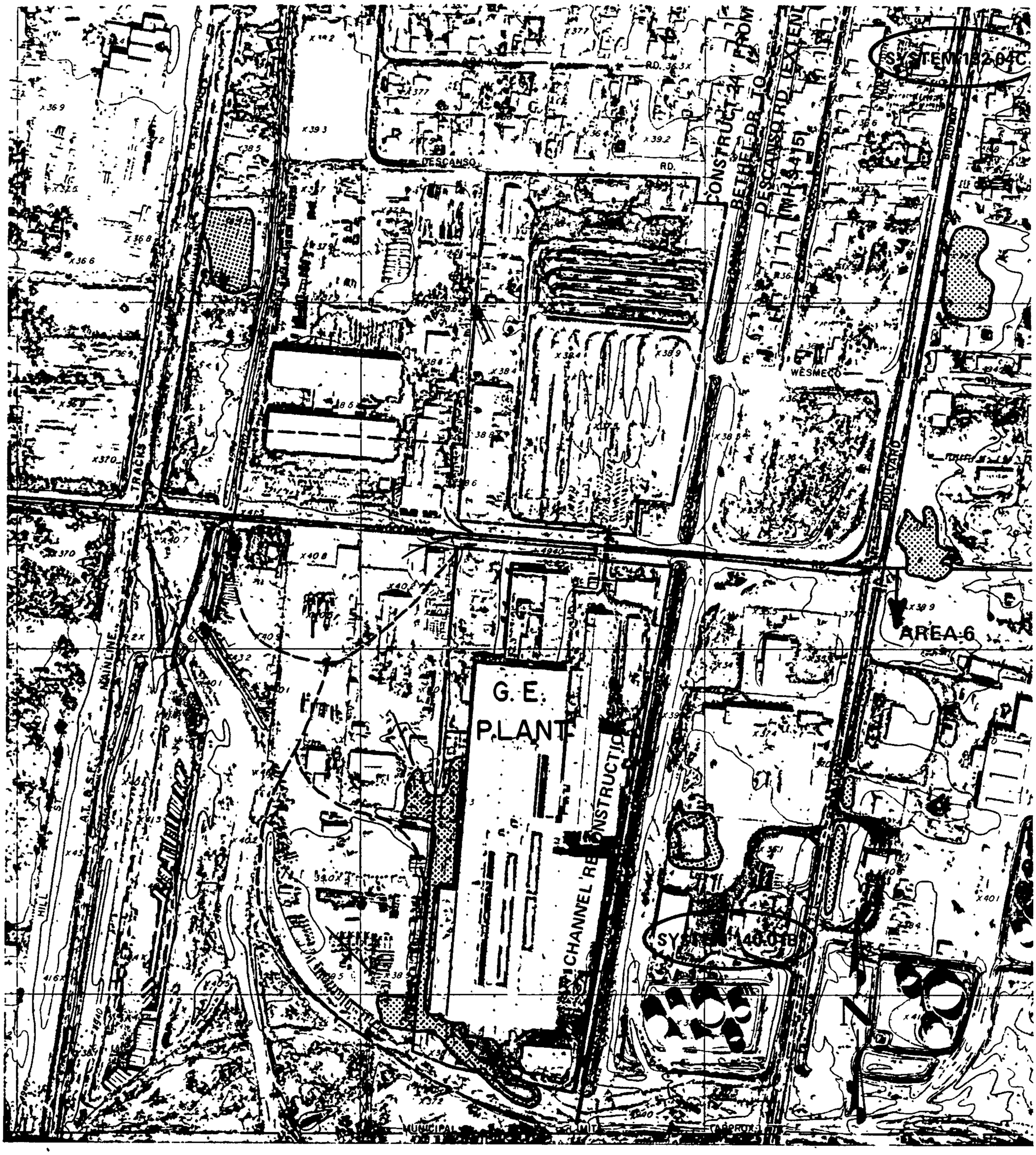
1. Offsite Flows

Plate No. 1, the Vicinity Map, shows plant locale features and two foot interval contours as of 1976. The evidenced major change in the interim was the paving of the north parking lot north to Descanso Road.

Drainage divides superimposed on the map are for frequently recurring flows. The effect of these flows are included in the analyses of storm drain capability. The results of the two most recent 100 year flood hazard studies are described and evaluated in the following paragraphs.

In 1981, the City issued Volume I of the Albuquerque Master Drainage Study. Map M-14 of that study shows projected flood hazard zones on the plant site south of Woodward Road. The 100 year zone runs along the west side of Buildings 14DD, 14D and 14E and in the south perimeter road. The latter road area has a 10 year hazard zone shown in the depression between two railroad spur lines. Plate No. 1, excerpted from flood hazard Map M-14, shows these zones. By AMDS definition, these zones are areas of move than one foot depth water on areas of more than one half acre. It is also stated that in the 100 year storm, the 364 cfs flow in the San Jose Drain will cause overflow of its banks south of Woodward Road.

In 1983, the Federal Emergency Management Agency issued firm flood insurance maps for the City of Albuquerque. Panel 34 of 50 shows the G.E. plant and lands west to the AT&SF tracks to lie within their Zone C. Zone C is defined in the legend as "areas of minimal flooding" (from 100 and 500 year storms). The map shows no storm drainage information and is therefore not included in this submittal. It can be inferred from other data in the



LEGEND

200 100 0 200 400 600 800

150 50

SCALE IN FEET

G.E. PLANT BOUNDARY LINE

A.M.D.S. 100 YEAR FLOOD HAZARD AREA.

A.M.D.S. 10 YEAR FLOOD HAZARD AREA.

OFFSITE DRAINAGE DIVIDES, RECURRING FLOWS.

VICINITY MAP

PLATE I

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map's legend that flows from the 500 year storm were estimated to average less than a foot depth in the plant locale.

The information of the two studies is limited concerning specific flood hazards to the G.E. site. The 100 year AMDS flooding shown along the west side of the 14 series buildings probably did not take into account the existence of Area 100's 15 year return frequency storm drain. The capacity of the existing San Jose Drain and its structural plate pipe arches is considerably greater than 364 cfs where adjacent to the plant; however, it is noted that a vegetated and constricted flow path south of G.E. could conceivably result in ponding at south end of the plant. Also noted is the fact that, at the Drain design flow depth of 7', the most northerly parking lot can be flooded to elevation 4935.5. This elevation is at the top of the 50"x 31" CMPA of Area 800. The flood hazard studies do not note that the embanked Woodward Road approach to the embanded AT&SF tracks could divert any Valley flows easterly toward the plant.

Based on the above information, it is considered prudent to assume some potential for shallow flooding from offsite to the northwest (and possibly the north) exist if the authoritys' 100 year design storm occurs.

2. Onsite

The 34.75 acres of tracts occupied by the G.E. plant are currently about 95 percent developed to impervious building and asphalt paving surfaces. The Plate No. 1 Vicinity Map shows the major features of the G.E. plant site, some spot elevations, and two foot interval contours. It appears that the general trend of flows was east to the San Jose Drain prior to construction of the plant. This flow pattern has been perpetuated by plant storm drains. There is no meaning full north to south drop across the plant site.

The long-distance available gradient for pavement is about 0.1 percent. A minimal 0.4 percent pavement gradient is desirable, but is not always possible, to prevent duckponds. In order to provide drainage therefore, storm drains were built to serve local pavement depressions

provided with catch basins or longitudinal pavement swales provided with trench drains. With the exception of portions of the east perimeter road south of Woodward Road, storm drains are the major storm flow carriers on the G.E. plant site. The protection provided to the plant from flow generated onsite is, for all practical purposes, based on the capability of its storm drains.

The analyses of this study are therefore keyed to existing storm drain locations. Eight major drainage areas were defined for the purpose of analyses. Drainage areas 100 through 500 and areas 700 and 800 are correlated with the existing storm drain system numbering system shown on the Existing Drainage Systems map. Area 600 releases overland flow to Woodward Road. Typically, drainage areas include roof outflow, subsequent overland flow to depressed catch basins or trench drains and then passage in storm drains to outfall in the San Jose Drain.

B. HYDROLOGY

The review hydrology used for these analyses was the City of Albuquerque's Rational Formula of their Development Process Manual. The six hour, 100 year return frequency rainfall amount was read at 2.25" Other return frequency amounts are described in a later paragraph. The rainfall intensities as a function of time were taken from DPM Plate 22.2 D-2 included in the Calculations Appendix. All contributing lands were assumed to be 100% developed to impervious surfaces (onsite is 95% today), and therefore a 100% runoff factor was used.

The initial time of concentration of flows was based on an average collecting velocity of 1 fps from the pitched roofs of the G.E. plant. The pavement flow velocity was estimated at 0.75 fps based on the assumption of 0.3% local gradients leading to catch basin depressions (Plate 22.2 B-1 of the City's DPM). The travel time in pipes was based on Manning's formula.

The peak flow rate from a given return frequency storm is estimated by the formula $Q = C \times R \times I \times A$, where:

C is the coefficient of runoff, (1.00, this study)

R is the six hour rainfall amount

R = 2.25" for the 100 year storm

R = 2.07" for the 50 year storm

R = 1.48" for the 10 year storm

R = 1.22" for the 5 year storm

R = 1.00" for the 2 year storm

I is the Plate No. 22.2 D-2 dimensionless rainfall intensity at the computed time of concentration.

A is the drainage area size in acres.

By City criteria, the rainfall intensity up to 10 minutes time of concentration is uniformly 2.11 cfs per acre per inch of 6 hour rainfall and then decreases thereafter. Estimated times of concentration in this study range from 3 to 12 minutes.

This is a severe hydrology when compared to some other hydrologies. It is used by the City of Albuquerque to review storm carrier provisions for sites of up to 320 acres size.

C. HYDRAULICS

Manning formula pressurized flow analyses were used in this study. The roughness factors used were 0.011, 0.014, 0.017 and 0.025 respectively for roof drain pipes, reinforced concrete pipe, pavement surfaces and corrugated metal pipes. Gravity flow conditions were considered for storm drain analysis but it was found that they did not represent flow capabilities for the flat gradient storm drains. Most storm drains will pressurize if the San Jose Drain flow depth gets over six feet deep or if the storm drain capacity is evaluated at its highest potential. The peak inflows from the G.E. plant will enter the San Jose Drain long before the flow depth reaches the six foot depth which could begin to affect storm drain performance.

SECTION IV
EVALUATION OF THE EXISTING SYSTEMS

A. STORM DRAIN SYSTEM

1. General

Management of storm flows generated onsite is virtually all dependent on the proper location, sizing and gradient of storm drains and their catch basins and trench drains. Gradient is not usually available to convey flows to outfall in pavement sections. Inflows from offsite are predicted to enter the site from some storm less than the 100 year return frequency.

The storm drain pipe systems are properly located around the plant to provide interception where needed. However, the system capacities are sometimes restricted by small pipes or flat gradients and pipe gradients are generally too flat to achieve desirable self-cleaning velocities of 3 fps at one quarter depth of flow. Pavement depressions with catch basins and trench drains are typically well located but significant ponding depth must sometimes build up to develop their capacities. Example: for a one acre sub area contributing 3.1 cfs in a 10 year storm, the pavement must pond up to three inches depth (four inches depth for the 100 year storm) to permit passage of flow over the edges of a 2'x 2' catch basin grate. Also, due to shallow catch basin depths and the typical 12" dia. of inlet lines, the catch basin outlet capacity can be limited to about 3 cfs. These conditions could result in widespread temporary ponding as the result of minor storms. In the context of this background, the results of detailed analyses of storm drain capabilities follow.

2. Review Analyses

Area 100: The pipe system from Outlet 101 to MH 109 will convey the 15 year storm without submerging catch basin grates. The major capacity limitation is the reach of 24" pipe between MH 106 and MH 107. The 30" pipes in the south perimeter road have very flat gradients which will result in

relatively low gravity flow velocities and probably sediment deposition. The construction of building 14E restricted the overland flow path to the south and probably eliminated a needed catch basin and its swale. The pipes for the CB 109I to CB 109L system in the northwest parking lot are too small. The CB 109D to CB 109H catch basins are filled with dirt.

Area 200: Outlet 201 to CB 202 is adequate to intercept 100 year storm flows assuming head developed by parking lot ponding. Outlet 203 to CB 204 is not adequate to intercept the 10 year storm flows even when ponded.

Area 300: The 340-foot long trench drain, point 305 to point 306, portion of this facility should be just adequate to convey 5 year flows if the bottom can be kept free of dirt and debris. The top-of-grate to adjacent finished building floor vertical distance is minimal in this reach. Downstream portions of this system are adequate for 100 year flows.

Area 400: CB 402 was not found. It may have been provided as a sump release. If it was a storm drain basin serving about 45% of drainage area 400, the basin - 8" pipe system could just convey a ten year flow rate.

Area 500: Outlet 501 to trench drain 504 pipes can convey 100 year flows. Trench drain 504 to 506 pipes can handle 5 year flows. Trench drain 504 to 504B storm drains should be capable of handling 100 year storm flows. The catch basin at point 510 is understood to have been plugged during an era when hazardous waste liquids flowed to its depression. Flows have ponded in the CB 509 depression and caused water to enter the northeast corner of Building 6. The probably cause of ponding was malfunction of the flap gates on the three 12-inch diameter CMP outlets at point 507.

Area 600: Is overland flow to Woodward Road.

Area 700: The outlet 701 to trench drain point 705 and MH 703 to MH 706 to MH 708 and MH 706 to CB 707 system can convey the 25 year storm flow. The 8" diameter MH 708 to CB 709 reach can convey less than two year flows if adjacent lands are paved. The pipe between CB 702 and CB 703 has an adverse

gradient which may cause sediment deposition in that pipe and upstream.

Area 800: The 50" x 31" outlet culvert can handle 100 year flows. The outlet 802 to inlet 805 system can convey 10 year flows. The outlet 806 to CB 808 system can handle about ten year flows if properly developed. At the present time, it serves a very minor drainage area. The channel along the north and then east perimeter can handle 100 year flows.

B. TRICKLE FLOWS

A major goal of the plant is to prevent the entry of hazardous waste spills to the San Jose Drain. Spills on the pavement from 55 gallon drums (7.35 cubic feet) are the most common source of problems. These spills and their wash water tend to flow to catch basins and into the storm drain system. Once in, the volume of undesirable material can be multiplied many times over by augmentation from non-contaminant trickle flows. Observed trickle flows are released from heat exchangers in building 14CC to trench drain 109B and also flow entry into CB 302. The former source was observed to pass up to a measured six cubic feet (44 gallons) of flow per minute at a velocity of one-foot per second through the entire 100 series storm drain. This level of nuiscance flow makes containment virtually impossible. The CB 302 - CB 303 flow rate was too minor for measurement; the source is not known.

C. POTENTIAL HAZARDOUS WASTE SOURCES

Underground sources of possible hazardous waste are tabulated on Exhibit 1, the Existing Drainage Systems map. As is seen, release from the majority of these sources have been managed by discontinued use, plugging or diversion to the sanitary sewer. Evaluation of the adequacy of this analysis is requested of plant personnel. All 4-inch diameter pavement drains which would have formerly delivered spills directly to the San Jose Drain have been plugged at the outlet. A hazardous waste containment building has been constructed. The main containment problem is that of entry of spills to the storm drain system.

SECTION V
PROPOSED IMPROVEMENTS AND COST ESTIMATES

A. DESCRIPTION

The improvements proposed in this section are based on preliminary designs developed only to the extent required for feasibility and costing. Numerous potential improvements are described with the intent to give G.E. the information required to provide the extent of protection they desire.

The improvements have been differentiated into three priorities in the following discussions, on the Proposed Drainage Improvements map and in the preliminary cost estimates.

- Priority I improvements are hazardous waste containments and appurtenances. Where storm drain modifications are required for Priority I work, they are sized for 100 year flows.
- Priority II improvements are recommended to upgrade portions of the existing storm drain systems which have considerably less capacity than upstream or downstream reaches or to provide interception capacity where ponding problems are indicated.
- Priority III improvements are provided to reduce anticipated maintenance requirements. They are sized for 100 year flows.

B. PRIORITY I IMPROVEMENTS

These are the improvements recommended for managing hazardous waste spills. The primary goal is to prevent entry of reported spills to the San Jose Drain. Other goals are simplicity and economy of construction, operation and maintenance.

Some constraints on containments are that there must be no leakage of contaminants and that storm drain function should not be impaired.

Several alternative systems were considered for accomplishing the goals. Following is a short discussion of the advantages and disadvantages of each.

- One basic approach was to provide for local containment at individual pavement depressions. Asphalt perimeter ridges, containment catch basins or open pits would be disruptive to normal plant activities and require considerable maintenance. This approach was rejected.

- A second basic approach was to provide a separate storm drain system with first call on any pavement flows, flow delivered to a containment structure or basin. This system would have the advantage of permitting continuance of trickle flows in the existing storm drains but the new pipes could entrap sediment unless the gradient-pipe size relation approached that of the existing system. This is an expensive solution which would however double the existing storm drain capacities. The economics of this basic approach led to its rejection.

- The basic approach adopted was to use the existing storm drain system for conveying contaminants and storm flows, discontinue trickle flows and build manhole type containments at the system outfalls to the San Jose Drain. This alternative has the advantages of simplicity and economy.

One technically feasible sub alternative for outfall containments, the use of open basins, was rejected for general usage. Open basins would be quite deep in order to match storm drain inverts, would therefore occupy significant amounts of the already constricted roadway system and are only proposed for the parking lot of Area 800 where storm drains and channels outfall on the pavement surface.

The generally recommended basic system is to provide manhole type closed containment structures at centralized system outfalls to the San Jose Drain.

For the purpose of discussion, improvements are differentiated between (1) containment structures and basins and (2) provisions for directing spills and wash water to those containments.

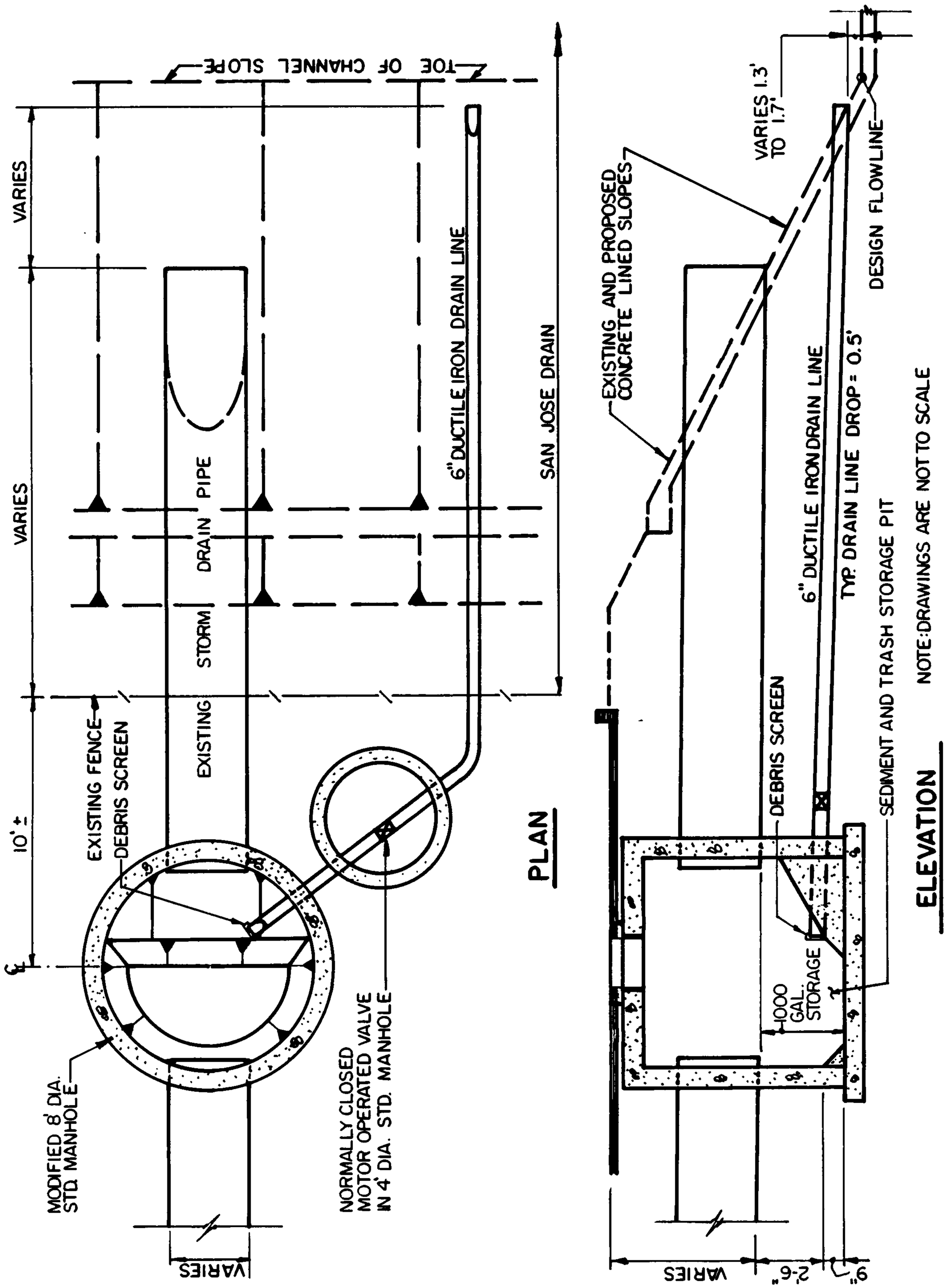
1. Containment Structures and Basins: The proposed manhole type containment structures are located on existing pipes near their San Jose Drain outfall locations. The proposed Area 800 open containment basin is located in the parking lot adjacent to the upstream entrance to an existing 50"x 31" corrugated metal culvert pipe outfall.

At the present time, pavement spills will enter the San Jose Drain via storm drain pipes or culverts. The purpose of the proposed containment is to provide interception and temporary storage volume for spilled contaminants and wash water until it can be removed by a pumper truck.

The proposed containment structure is a modified eight foot diameter City of Albuquerque Standard Type "C" Manhole, sumped to develop contaminant, wash water and sediment storage and provided with a gravity flow drain line with a normally closed motor-operated valve placed in a four foot diameter valve access manhole. If no spill has occurred, the valve can be opened at the end of a workday or as required to empty any trickle or storm drainage inflows. A disadvantage of this system is, that for the assumed 1,000 gallons storage, the gravity flow drain lines must enter the San Jose Drain just above its design flow line. The worst case, the Area 100 containment drain line, would enter at 0.5 feet above that flow line. This containment will require a sump pump delivery to the Drain. The remaining containment drain lines can enter at 1.4 feet or more above that flow line. San Jose Drain flows can cause debris to enter the drain pipes. Therefore, drain lines will require periodic flushing during the Drain's flow season. Plate No. 2 schematically shows the gravity drain containment structure.

The proposed open containment basin is a ten foot by ten foot bottom by one foot deep fenced reinforced concrete pool with a local sump and a gravity drain line equipped with a normally closed motor-operated valve. If no spill has occurred, the valve can be opened at the end of a work day or as required to release any minor inflows. Plate No. 3 schematically shows that containment basin system.

Both containments as shown will store at least 1,000 gallons. 1,000 gallons was chosen as a reasonable volume for storage. The reservation of storage for spills is clearly dependent on preventing entry of significant trickle flows. Therefore, as a Priority I item, current clean water releases to the storm drain systems must be recycled, diverted or otherwise discontinued.



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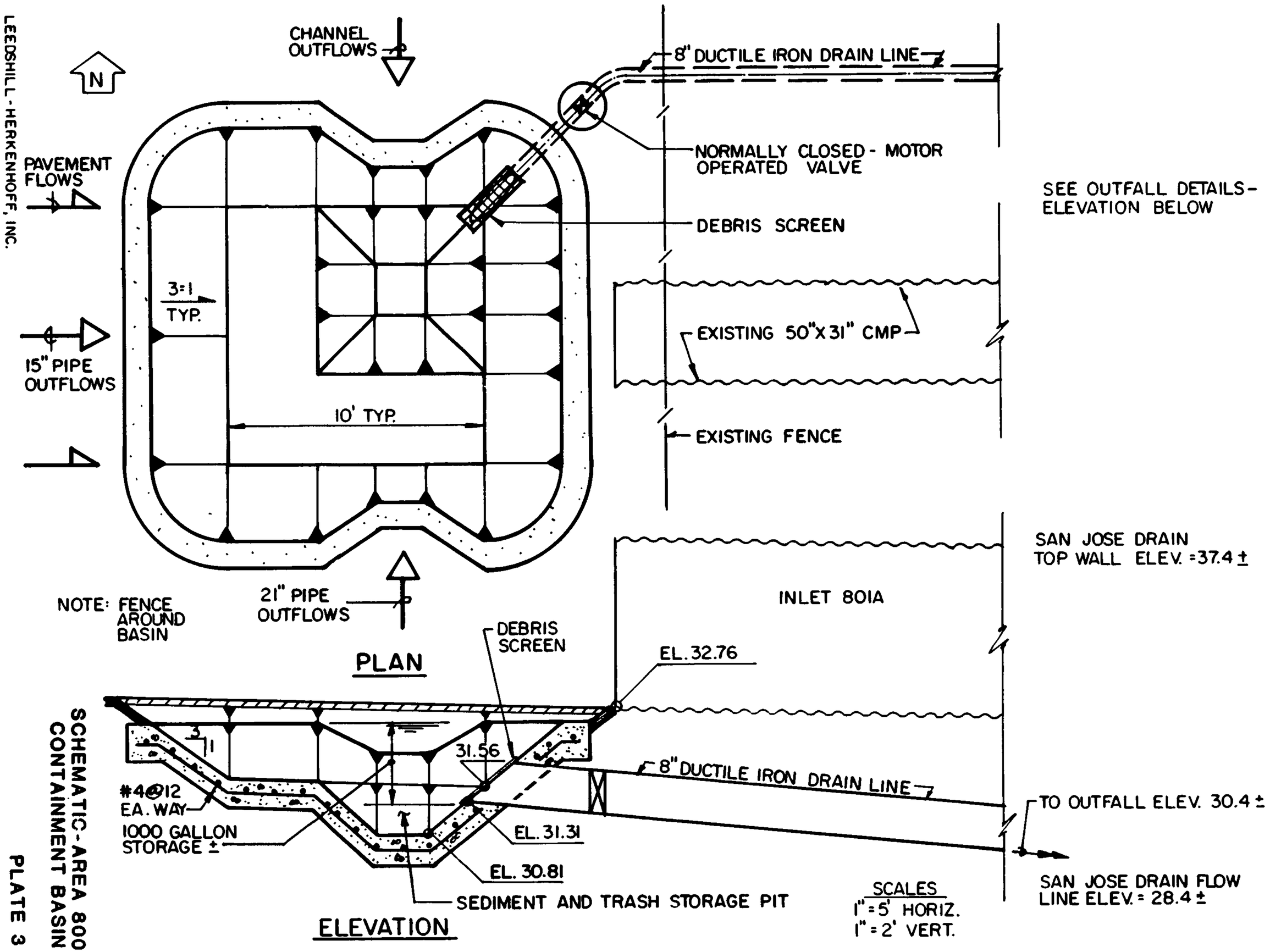
SCHEMATIC - TYPICAL CONTAINMENT STRUCTURE
PLATE 2



SCHEMATIC-AREA 800 CONTAINMENT BASIN

PLATE 3

It is desirable that both containment structures and basins be remotely operated from a central location. It is recommended that all valves and sump pump operations be controlled from the main guard shack, that a panel indicating the current status of sump pumps and valves be provided in that shack and that all spills be first reported to that shack where the sump pump or valve status can be verified and from which the proper authorities can be notified.

The following alternatives were considered in the development of the manhole containment structure.

a. Continuation of the storm pipe through the manhole with a screen bottom for release of minor flows to the sump; this approach would require cleaning of both the screen and the sump.

b. The addition of a normally open motor-operated valve on the storm drain line downstream of the manhole to provide emergency supplementary storage in the pipe system; The valve would be closed in the event of a reported spill. This system is most meaningful if containment must be provided during rainfalls or if trickle flow cannot be stopped. For this alternate, the pumping of high volumes of highly diluted contaminant must be acceptable to G.E. Also, the effect of closing the valve during a rainfall could be to pressurize the storm drain and lead to ponding at upstream catch basin and trench drain depressions.

c. Manual or electrical pump or valve control at the containment structure or basin site were not considered to be desirable alternatives. The reason was the long term manhours required for operation. It is noted that if manual valve control is used, the estimated priority I Construction Costs of Section V can be reduced by $43,000.

d. Consideration was given to controlling liquid storage by means of a sump pump rather than a motor operated valve. Sump pump placement in both the containment structure and in an adjacent smaller diameter and deeper manhole are evaluated. The latter was perferred from the standpoint of minimizing sediment inflow to the pump well and ease of pumping out contaminants. This is an acceptable alternative to the gravity flow system. This alternative has the advantage of allowing release high on the banks of the San Jose Drain. It has the potential disadvantage of requiring more maintenance, if corrosive liquids are to enter the wet well.

The motor operated valve drain line is the generally recommended approach.

The number of containment structures will be minimized by consolidating flows from adjacent storm drains in one central containment structure. See Proposed Drainage Improvements map for locations.

2. Provisions for Directing Spills and Wash Water to Containments: The second category of hazardous waste containment facilities includes construction of intercept flows for delivery to the containments. This work includes the proposed paved swale shown around the northwest perimeter of Area 800. Also, if desired by G.E. and found to be feasible by field surveys, a linear pavement swale served with catch basins can be provided along the fence line separating building 21D from the parking lots in Areas 700 and 800. The purpose of these latter improvements would be to eliminate the need to wash spills long distances across occupied large parking lots.

C. PRIORITY II IMPROVEMENTS:

These are improvements recommended to bring the portions of the existing storm drain system up to the level of the capacity of the remainder of given Area's pipes. With reference to the review analyses of Section IV of this report, the recommendations by areas are:

Area 100: It is indicated that two catch basins should be provided between MH 106 and MH 107 to moderate ponding around building 14D and at building 14E. Local repaving will be required.

Area 200: The outlet 203 to CB 204 flow constriction will be relieved as part of the Priority I work. See Proposed Drainage Improvements map.

Area 300: A strong maintenance program for trench drain points 305 to 306 should provide five year capability, or consider Priority III construction work.

Area 400: It is probable that the plugging of the pavement drain pipes at the San Jose Drain may have left ponding areas. If detailed field surveys support this assumption, a new 100 year storm drain and containment structure is recommended. No system is shown on the map because of lack of adequate topography.

Area 500: Provide larger pipes between TD 504 and TD 506. Will currently convey up to five year flows.

Area 600: No apparent problems.

Area 700: Supplement the existing MH 708 to CB 709 to CB 709A system running under building 21D. Existing capacity is minor and CB 709 and CB 709A will not prevent ponding against west side of building 21D. Extend 15 inch and then 12 inch pipes southerly from CB 808 to two new catch basins to develop existing 15 inch Outlet 806-CB 808 pipe. Connect CB 709 to upstream catch basin with small pipe. System will be limited to 10 year capacity by existing 15 inch pipe size and gradient from CB 806 to CB 808.

Area 800: See interrelated preceding Area 700 recommendations.

All Areas: G.E. personnel will be aware of problems which our investigations and analyses have not uncovered. One such Priority II item

would be ponding which is a nuiscance or which has indundated plant floors. If the existing storm drain pipe sizing has been found to be adequate in this study, then the probability is that the catch basin interception is inadequate. There are three reasons for ponding at catch basins. The pavement depression may be too shallow, the grate perimeter may not be long enough to permit weir overflow without unacceptable ponding or the inlet line size or slope may be too small. Prior to repaving around existing inlets, G.E. should point out specific areas where severe ponding has recurred or where ponding must be reduced so that this type of problem can be remedied. Also, the detailed field surveys required as part of pavement design may evidence the need for more local interception.

D. PRIORITY III IMPROVEMENTS:

These are storm drain improvements which are anticipated to reduce maintenance. The recommended components are for 100 year systems.

Area 100: The reach of 30" pipe running from MH 102 to MH 105 has a flat gradient relative to upstream gradients. This means that for low flows, the velocity will be about 2/3 of the upstream velocity and the sediment transport capability will be in the range of 15% to 30% of that upstream. If deposition is a maintenance problem, a regraded 36 inch pipe between the proposed containment structure and MH 104 will both provide self cleaning velocity and upgrade the outlet 101 to MH 109 system capability from the 15 to 25 year level. Transported sediment will pass to the containment structure sump.

Paralleling of the existing 24 inch pipe with a new 30 inch pipe between MH 106 and MH 107 alone will upgrade the Outlet 101 to MH 109 Area 100 main line storm drain from the 15 to the 50 year level. In combination with the pipe replacement between outlet 101 and MH 104, 100 year capacity will be achieved. This does not, however, mean that an upgraded system will manage 100 year flows from major offsite areas.

Also, the pipe sizes between the CB 109I and CB 109L are too small and should be replaced with 12 inch pipe. The CB 109D and CB 109H catch basins

are filled with dirt. It is therefore probable that the system is inadequate. If detailed field surveys indicate that the system's function is meaningful, then new system drain piping to serve the existing catch basin is indicated.

Area 200: No additional recommendations.

Area 300: If recommended maintenance does not adequately solve the reported overflow problem between trench drain points 305 and 306 or if greater than five year capability is desired, then parallel portions of the existing trench drain with a new 18 inch RCP running northerly on a steeper gradient from MH 304 to a location south of trench drain point 306. Connect trench drain to new pipe with inlet lines. Will convert trench drain to a linear catch basin with 100 year capacity.

Area 400: See Priorities I and II.

Area 500: No additional recommendations.

Area 600: No recommendations.

Area 700: The pipe between CB 702 and MH 703 is on an adverse gradient. If kept clean, the system from Outlet 701 to MH 708 will convey the 25 year flow. If the required maintenance level is found to be unacceptable or if a 100 year system is desired, then abandon that reach and run a new 30 inch pipe on a steep uniform gradient from a second Area 800 containment basin uphill to MH 703. It is noted that if the Priority I catch basins and paved swale are built along building 21D and if hazardous waste spills are not a problem in the employee parking lot, then the Priority I containment structure can be used for the new 30" line. The 30" and existing 50"x 31" system must be separated for hydraulic reasons.

Area 800: No additional recommendations.

E. PRELIMINARY COST ESTIMATES

Detailed cost estimates are included in the calculations. The following summaries define construction costs for individual facilities. Engineering costs will be a function of the extent of containment, paving and storm drain work to be performed and are therefore not included.

SUMMARY OF PRELIMINARY COST ESTIMATES

Priority I Improvements - Hazardous Waste Containment	
Area 100	
1. Containment structure, sump pump, and wet well, catch basin and Inlet Lines.	$19,380
Area 300	
1. Containment structure, motorized valve components and S.D. piping modifications.	15,755
Area 500	
1. Containment structure, motorized valve components and S.D. piping modifications.	13,170
Area 700	
1. Containment structure, and motorized valve components.	11,025
2. Catch basins and pavement modifications	29,100
Area 800	
1. Containment basin, motorized valve components and fencing.	10,590
2. Asphalt Swale at northwest perimeter.	4,700
Subtotal, Excluding Controls	$103,720
Control Panel, Controls, Conduit & Wiring	30,000
Estimated Priority I Construction Costs	$133,720

SUMMARY OF PRELIMINARY COST ESTIMATES

Priority II Improvements - Storm Drain, Capacity Related

Area 100		
1.	Two Catch Basins & Inlet Lines, MH 106 to MH 107	$10,640
2.	Reconstruct CB 109D to CB 109H System	17,850
3.	New Piping, CB 109L to CB 109I	2,000
Area 500		
1.	New Piping, Trench Drain 504 to Trench Drain 506	1,000
Area 700		
1.	Two Catch Basins & Pipes, to CB 808.	13,610
	Estimated Priority II Construction Costs	$45,100

Priority III Improvements - Storm Drain, Maintenance & Capacity Related

Area 100		
1.	36" RCP and MH's, Outlet 101 to MH 104.	$40,500
2.	30" RCP and Two MH's, MH 106 to MH 107.	33,720
Area 300		
1.	New 18" pipe, MH 304 to north for 300 feet.	17,700
Area 700		
1.	New 30" RCP, Outfall 701 to MH 703.	16,120
	Estimated Priority III Construction Costs	$108,040

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

481-1986.11-84

April 24, 1984

Mr. Fred Aquirre
Chief-City Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: GENERAL ELECTRIC AIRCRAFT ENGINE PLANT - STORM DRAINAGE

This letter is written to summarize the discussions and conclusions of our meeting of April 6, 1984.

The G.E. plant is located at Broadway, S.E. and Woodward Road S.E. within the City limits. The City has no site drainage plan on file. The plant reached its current stage of development by the mid-1950's. The 35 acre site is currently over 90% impervious building and paved parking lots. Outflows are directed east to the adjacent San Jose Drain at several locations via storm drains with some overland flow. The approximate 1.3 square mile San Jose Drain upstream drainage area, west of the South Diversion Channel, is urbanized; downstream lands are predominately rural.

G.E. is engaged in a program to prevent the entry of contaminants into the drain. This, along with possible storm flow problems, will require some modifications or supplements to the existing storm drainage system and site grading. Also, G.E. may modify buildings or otherwise slightly modify the existing on-site drainage patterns. All on-site flows are discharged in the San Jose Drain.

The question is; Does the City require a drainage plan submittal for site repaving, building modifications and/or storm drainage systems modifications.

It is my understanding that no drainage plan submittal is required. Reasons are that the plant was devleoped prior to pertinent regulations and the site is virtually all impervious today. City Hydrology does request that G.E. provide a copy of the drainage study and system for its files.

RECEIVED
MAY 29 1984
RECEIVED

If these items summarize your understanding of the discussion and conclusions reached in our meeting, please sign below and return one copy to us for our files. If corrections or further data is required, please call.

Pete Phelan

PETE PHELAN

er

Fred D. Gowin, P.E.
City Hydrology

I concur subject to the following

No drainage plan required if the proposed construction:

1. Does not constitute grading, cut, fill or importation of material in excess of 500 cubic yards or grading of any area of one (1) acre or more (see Sec. 12, Item B3 of the Drainage Ordinance).

2. Paving is not larger than 1000 sq. ft. or more (see Sec. 12, Item B4 of the Drainage Ordinance).

3. Addition (if applicable) to the site is not greater than 500 square ft. in plain view (see Sec. 12B of the Drainage Ordinance).

SYSTEM MAPS

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GE-Aircraft Eng.Plant ZONE ATLAS/DRAINAGE FILE # M-14 D-6

LEGAL DESCRIPTION: MRGCD Map 44, 642361, 642362, 6424

CITY ADDRESS: 337 Woodward Rd. S.E.

ENGINEERING FIRM: Leedshill-Herkenhoff CONTACT: Suzi Balogh

ADDRESS: 500 Copper N.W. PHONE: 247-0294

OWNER: General Electric CONTACT: Dennis Martin

ADDRESS: 336 Woodward Rd. S.E. PHONE: 765-9200

ARCHITECT: Leedshill-Herkenhoff CONTACT: _____

ADDRESS: 500 Copper N.W. PHONE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

___ YES

X NO

___ COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED JUL 15 1988 HYDROLOGY SECTION

DRB NO. _____

EPC NO. _____

PROJECT NO. _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT SUPPLEMENT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAIN PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SECTOR PLAN APPROVAL

___ 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

___ OTHER _____ (SPECIFY)

DATE SUBMITTED: July 15, 1988

BY: Suzi Balogh

PROJECT MANUAL

REPAVE WEST ROADWAY

PE 1073

GENERAL ELECTRIC

AIRCRAFT ENGINE BUSINESS GROUP
336 WOODWARD ROAD SE
ALBUQUERQUE, NEW MEXICO 87102

NOVEMBER, 1987

SPEC. NO. 7037.21-1073

LEEDSHILL-HERKENHOFF, INC.

500 Copper Ave., N.W.
P.O. Box 1217 - Phone (505) 247-0294
Albuquerque, New Mexico 87103

ENGINEERS ARCHITECTS

PROJECT MANUAL

RECEIVED
NOV 24 1987
HYDROLOGY SECTION

REPAVE WEST ROADWAY

PE 1073

GENERAL ELECTRIC

AIRCRAFT ENGINE BUSINESS GROUP
336 WOODWARD ROAD SE
ALBUQUERQUE, NEW MEXICO 87102
NOVEMBER, 1987
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LEEDSHILL-HERKENHOFF, INC.
500 Copper Ave., N.W.
P.O. Box 1217 - Phone (505) 247-0294
Albuquerque, New Mexico 87103
ENGINEERS ARCHITECTS

CLINTON DODGE
NEW MEXICO
6410
REGISTERED PROFESSIONAL ENGINEER

I, Clinton Dodge, Registered Professional Engineer No. 6410, hereby certify that these documents were prepared by me, or directly under my supervision, and are true and correct to the best of my knowledge and belief.

Registered Professional Engineer
No. 6410

REPAVE WEST ROADWAY

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CERTIFICATION

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01300 - Submittals
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Section 900 - Sanitary and Storm Sewer Facilities

Section 2000 - Standard Detail Drawings

AGREEMENT

1. CONTRACT FORM:

   The successful Contractor will be required to enter into a written contract with the General Electric Company by executing the Company's standard contract form.

2. The WORK contracted for hereunder is described as follows and shall include the furnishing of all materials, tools, equipment, labor superintendence, services and facilities necessary therefore; excepting, however, any items which are to be specifically furnished or performed by the General Electric Company or by other contractors; if this occurs, it will be described in detail.

3. All of the WORK performed shall be subject to the inspection and approval of an Engineer designated by General Electric Company and shall be in accordance with any plans, spcifications, general conditions or other papers attached to or referred to herein, which together with this Agreement are hereafter called the Contract Papers, and Contractor shall do everything necessary to complete said WORK according to the general plan and intent therof, notwithstanding that the same may not be specifically shown or mentioned in said Contract Papers. In the event any question or conflict or inconsistency should arise between the provisions, date or terms of any of the Contract Papers, the governing provisions, date or terms shall be those contained in the respective papers in the following order of priority: (1) this Agreement, (2) Specifications, (3) General Conditions, (4) Plans, (5) Other Papers. All plans and specifications supplied by the General Electric Company shall remain the property of the Company and shall be returned to it upon completion or termination of this Agreement.

4. The General Electric Company may make changes in the WORK from time to time but no alterations shall be made therein except upon written order of the Engineer, and when so made the value of the work added or omitted shall be computed by the Engineer. The amount so ascertained shall be added to or deducted from the contract price in joint agreement by the Engineer and successful bidder prior to the initiation of work change. Only the Engineer may initiate work changes, Purchasing will authorize said work changes.

4.a PROJECT RECORD DOCUMENTS

A. General: Throughout the progress of the Work, the Contractor shall maintain an accurate record of all changes in the Contract Documents and variations in the actual construction from that described in the Contract Documents. The purpose of this record is to provide the Architect-Engineer factual information regarding both concealed and visible aspects of the Work so that modifications can be made to the visible aspects of the Work so that modifications can be made to the original Contract Documents reflecting the actual construction.

B Maintenance of Job Set:

1. Identification: Immediately following award of Contract, obtain from Architect-Engineer one complete set of all Documents and identify it as "RECORD DRAWINGS-JOB SET."

2. Storage: Store documents at the site separate from those used for construction. Protect the job set from loss or damage.

3. Entries: Using an erasable colored pencil clearly describe all changes by note and by graphics as required. Date all entries. call attention to the entry by circling areas affected. Keep documents current; do not permanently conceal any work until required information has been recorded.

4. Submittal: At contract closeout submit documents with transmittal letter containing date, project title, Contractor's name and address, list of documents, and signature of Contractor.

EXHIBIT 'A'

5. CONTRACTOR FURTHER AGREES TO:

(a) Perform the WORK in a substantial and workmanlike manner by workmen skilled in their respective trades, and in such a way as to cause the least possible interference with the operations of other contractors or with the General Electric Company's operations. All materials furnished by Contractor shall be new and the best of their respective kinds, unless otherwise specified.

(b) Give all requisite notices to public authorities and provide all permits necessary for carrying on the WORK.

(c) Observe, and require Contractor's employees and subcontractors, material men and their employees to comply with, all regulations and rules in effect at the site of the WORK relating to employees, passes, badges, lists of employees and the conduct of the WORK on the property.

(d) Remove all debris, tools, temporary structures and excess material and clean up the premises upon completion of the WORK.

(e) Comply at all times during performance of the WORK with all rules, regulations, ordinances and laws relating to the WORK or the conduct thereof, including the provisions of any social security or unemployment insurance laws, state or federal, as now or hereafter in force, and the provisions of applicable workmen's compensation laws.

(f) Indemnify and save Owner harmless at all times against any liability, contributions or taxes payable under any of said laws and on account of any and all claims, damages, losses, litigation, expenses, counsel ffés, and compensation arising out of injuries (including death) sustained by, or alleged to have been sustained by the servants, employees, or agents of Owner or Contractor, its subcontractors, or material men and from injuries (including death) sustained by, or alleged to have been sustained by, the public, servants, employees, agents of the public, any or all persons on or near the WORK, or by any other person or property, real or personal, occasioned in whole or in part by the acts of omissions of Contractor, any subcontractor, material man, or anyone directly or indirectly employed by them or any of them while engaged in the performance of this contract.

(g) Maintain at all times public liability, property damage, and employer's liability insurance, as hereinafter provided, to protect Contractor and Owner from any and all of the foregoing risks and from any and all claims under such workman's compensation laws.

5. (h) Satisfy immediately any lien or incumbrance which, because of any act or default of Contractor, is filed against the premises; and indemnify and save Owner harmless against all resulting loss and expenses, including attorney's fees.

(i) Protect and hold Owner harmless against any and all demand and claims on account of infringements or alleged infringements of patented or alleged patented articles or inventions used on or for the WORK and, at its own costs and expense, defend any and all suits which may be brought against Contractor or Owner on account of infringements or alleged infringements and pay any and all fees, costs, and damages resulting therefrom. Contractor shall not, however, assume any liability for patent infringement with respect to any article or invention which is specifically required to be used on or in connection with the WORK by the Owner's specifications or instructions, unless Contractor has knowledge of the infringing nature of such use.

(j) Not assign this Agreement, or any of the payments to become due thereunder, not sublet any part of the WORK to be performed on Owner's premises, except as provided in the Contract Papers or with Owner's written consent (it being agreed that any assignment of this Agreement or of any interest herein or of any payment due or to become due hereunder, without written consent of Owner, shall be void).

(k) Remove, on written notice from the Engineer, all materials, whether worked or unworked, and all portions of the WORK which the Engineer shall condemn as unsound or unsatisfactory.

(l) Fullfill any special warranties of material or equipment installed, and repair or replace any part of the WORK which proves defective in workmanship or material within one year from date of substantial completion.

6. The Contractor shall complete the entire WORK at his own risk; however, the Owner agrees to keep the entire work comprehended by this Agreement, including all materials delivered on the premises, fully insured against fire and other risks included in standard extended coverage endorsement, exclusive, however, of Contractor's and Subcontractor's tools and equipment. Owner will provide such coverage by extending his existing policies on his plant to cover the WORK and the interest of the Contractor therein.

EXHIBIT 'A'

7. IT IS MUTUALLY AGREED THAT:

(a) Should Contractor be delayed in the WORK due to causes beyond the Contractor's reasonable control, such as the act, neglect, delay or default of Owner, or the Engineer, or of any other contractor employed by Owner upon the WORK, acts of God, acts of civil or military authority, priorities, fires, strikes, floods, epidemics, quarantine restrictions, war, riot, delays in transportation, or car shortages, then the time fixed for the completion of the WORK shall be extended for a period equivalent to the time lost, as determined by the Engineer, but no extensions shall be made unless written claim therefore is made within five (5) days after any delay due to such causes commences, nor shall any adjustments be made in the contract price by reason of such delays.

(b) Should Contractor within five (5) days after notice refuse to replace defective materials, correct defective workmanship, fail to prosecute the WORK with diligence, or violate any covenant herein contained, or should Contractor make a general assignment for the benefit of its creditors, or should a receiver of any property of Contractor be appointed, or should a petition be filed either by or against Contractor in any proceeding under the bankruptcy or insolvency laws, Owner may terminate this Agreement and may enter the premises, and take possession of all materials, tools, and appliances, and completion of performance of the WORK by Owner or another may be had at Contractor's expense.

(c) All decision of the Engineer as to the interpretation or application of any of the terms or provisions of the Contract Papers, and any determinations made by the Engineer pursuant to this Agreement, shall be binding on the Contractor unless within ten (10) days thereafter written objection is filed with Owner. If such objection is duly filed, or if there is any other disagreement concerning the interpretation or application of any provision of this Agreement, the matter shall be settled by arbitration in accordance with the then current rules of the American Arbitration Association, each party to select one arbitrator and the two selected to choose the third. The decision of any two shall be binding and conclusive on the parties.

EXHIBIT 'A'

IT IS MUTUALLY AGREED THAT: Continued

(d) Before commencing performance of the WORK , Contractor shall furnish evidence to the General Electric Company, by delivering three (3) copies of a "Certificate of Insurance" (and copies of the policies, if requested) completed by his insurance carrier certifying that insurance is in effect in the following minimum amounts for the risks indicated.

Workman's Compensation and Employer's Liability, including coverage under United States Longshoremen's and Harbors' Act where applicable, covering any and all claims under the laws of the state where WORK is to be performed.

Manufacturer's or Contractors' Liability (Minimum Coverage):

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property Damage (including coverage for damage caused by blasting, collapse or structural injury and/or damage to underground utilities)	$100,000 Each Accident	$200,000 Aggregate

Contractor's Protective Liability

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property Damage	$100,000 Each Accident	$200,000 Aggregate

Contractual Liability in accordance with agreement(s) between Owner and Contractor.

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property Damage	$100,000 Each Accident	$200,000 Aggregate

EXHIBIT 'A'

Contractual Liability continued

Automobile Liability, covering all automobiles, trucks, tractors, trailers, motorcycles, or other automotive equipment whether owned or rented by the Contractor, or owned by employee of the Contractor, including the loading and unloading thereof - (including the Owner as an additional insured with respect to any owned or hired automobile equipment used by or with the permission of the Contractor) -

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property Damage	$100,000 Each Accident	

The forms of all such insurance policies (and bond) and the companies issuing same shall be subject to General Electric Company's approval, and upon request said policies shall be delivered to General Electric Company for inspection. Such policies shall provide that material changes or cancellations will not be made until ten (10) days after written notice by the Insurance carriers direct to the General Electric Company at address furnished in the Instructions to Bidders.

8. The time for performance specified in the Bid Form is of essence in this Agreement.

1. GENERAL CONDITIONS:

To establish Contractor's responsibilities and set Standards for the execution of the work at the General Electric Company Albuquerque Plant.

a. SITE INVESTIGATION

The Contractor shall visit the site of construction to become familiar with existing structural conditions and difficulties involved in the performance of the work. Failure to do so will be entirely at the risk of the Contractor and will not be recognized as a basis for claims for extra compensation. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and similar physical conditions at the site; the character of equipment and facilities needed preliminary to and during the prosecution of the work; and all other matters upon which information is reasonably obtainable and which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work.

b. SAFETY AND ACCIDENT PREVENTION

The Contractor shall take all reasonable precautions in the performance of the work under this contract to protect the health and safety of employees and public and to minimize danger from all hazards to life and property; and shall comply with all health and safety, fire protection regulations and requirements of the Occupational Safety and Health Act of 1970. In the event the contractor fails to comply with the said safety provisions, or with the said directions of the Plant Engineer, the Plant Engineer, without prejudice to any other rights of the General Electric Company, may issue an order stopping all or any part of the work; thereafter, a start order for resumption of work may be issued at the discretion of the Plant Engineer. No extension of time or compensation for damages by reason of, or in connection with, such work stoppage will be allowed.

1. b. SAFETY AND ACCIDENT PREVENTION
continued

GENERAL ELECTRIC has a strict commitment to adhering to imposed environmental regulations and maintaining the integrity of the facility environs. Accordingly, we would appreciate and expect your cooperation in adhering to these same plant regulations.

STORM SEWERS: All storm sewer drains emit to the San Jose Ditch. This ditch is used for irrigation, and no material other than storm water runoff may be emitted to these drains. The outfalls into the ditch are tested daily to determine if fugitive hazardous material has been put into the storm drains. Only uncontaminated water may be put into the storm drains. Under no circumstances is water with cement, water with diluted chemicals, water with soap, oil, etc., to be allowed into the storm drain. No exceptions will be made. If you do emit any material other than water into the storm sewer system, call EXT's -367,521,226,or 227 immediately.

SANITARY SEWERS: The same restrictions apply to both the sanitary and storm sewers. Under no circumstances are materials other than water to be emitted into the sanitary sewer.

SEWERS: If you have a material which you feel can be safely emitted into a sewer, you MUST request permission from the Environmental Engineer first. If the EE feels that the material can be emitted to one of the sewer systems, you will be given a permit which states the material to be discharged, the sewer type it is to be emitted to, and the approximate quantity.

HAZARDOUS WASTE: If you generate a hazardous waste at the facility, you must package and label the drum according to the DOT Regulations, and have it removed by an approved hazardous waste transportation company. If you have any questions about the definition of hazardous waste or the packaging, labeling, or transportation regulations, you may call extension 367 or 521 for guidance. NO MATERIAL WILL BE PUT INTO THE TRASH BINS UNLESS IT IS PAPER REFUSE.

(Contractors who violate plant regulations will not be awarded future contracts.)

c. PLANT SECURITY

The current requirements of the General Electric Security Procedures and the Department of Defense Industrial Security Manual shall serve as security criteria.
All Contractor personnel will be subject to the provisions of the Federal Espionage and Sabotage Acts and to all other Federal Criminal Statutes as may be applicable.'

d. SPECIFICATIONS, DRAWINGS, AND BLUEPRINT INFORMATION

(1) Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of the like effect as if shown or mentioned in both. In any case of discrepancy in the figures, drawings or specifications, the matter shall be immediately submitted to the Engineer without whose decision said discrepancy shall not be adjusted by the Contractor save only at his own risk and expense.

(2) Shop Drawings

(a) The Contractor shall submit to the Engineer for approval all shop drawings and/or manufacturers' "descriptive literature" or "catalog data", as called for under the various headings of these specifications. These drawings and/or catalog data shall be complete and shall contain all required detailed information. If approved by the Engineer, approval will be indicated on each copy by appropriate stamp and date. The Contractor shall make any correction required.

The approval of the drawings shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections details and satisfactory construction of all work.

(3) Departures from Drawings

Interferences encountered requiring deviation from the drawings shall be called to the attention of the Engineer for corrective action determination.

(4) The Contractor shall furnish the Engineer drawings showing the "As-Built" condition of the work.

(5) The Contractor shall at all times maintain at least one (1) set of drawings and specifications correctly marked, showing any and all changes made in the field and on completion of the project these drawings are to be turned over to the Engineer.

(a) Fire Alarm System Drawings:

"Marked up" drawings of Fire Alarm System shall be made available to the manufacturers representative for verification at time of connection of alarm devices to Data Gathering Panel.

e. ENTRANCE TO THE PLANT

The Contractor and his subcontractors are advised that access to the plant area will be given only to persons approved by the General Electric Company, Albuquerque Plant Administrator of Security, as permitted under current company and Government security directives. The Contractor shall submit a list of all prime and subcontract employees to work on this contract, indicating job superintendent, job foremen, basic craft of each employee and list of apprentices, including years completed in training.

f. LISTING AND CLEARANCE OF EQUIPMENT, SMALL TOOLS AND MATERIALS

Immediately upon arrival at the plant site, the Contractor will submit to the Administrator of Security a list of his personally owned construction and shop equipment, including general purpose vehicles. In addition to the forgoing, the Contractor will set up and maintain stock records which will show at all times the status of small tools and materials initially brought to the plant site, with subsequent acquisitions and disposals.

At the completion of the work, the Administrator of Security will, upon request by the Contractor, provide clearance for the removal of the Contractor's equipment, small tools and any unused materials which are the property of the Contractor.

g. MATERIAL AND PACKAGE PASSES

During the construction period, material and package passes will be issued when necessary to designated employees of the Contractor and his subcontractors upon request to the Administrator of Security.

2. CONSTRUCTION OPERATIONS

a. All operations of the Contractor, including storage of materials upon premises of the General Electric Albuquerque Plant, shall be confined within the area where the work is to be performed. Warehouse, shop and office facilities and stockpile areas will be provided by the Contractor at his own expense. The Contractor may, in locations on the site to be designated by the Engineer, erect structures, install utilities, and establish storage areas as may be necessary to prosecute the work under the contract. All of the above structures and facilities shall remain the property of the Contractor and, unless otherwise authorized by the Engineer, shall be removed from the site of the work or should Contractor make a general assignment for the benefit of its creditors, or should a receiver of any property of Contractor be appointed, or should a petition be filed either by or against Contractor in any proceeding under the bankruptcy or insolvency laws, Owner may terminate this Agreement and may enter the premises, and take possession of all materials, tools and appliances, and completion of performance of the WORK by Owner or other may be had at Contractor's expense.

EXHIBIT 'B'

2. CONSTRUCTION OPERATIONS
Continued

(c) All decisions of the Engineer as to the interpretation or application of any of the terms or provisions of the Contract Papers, and any determinations made by the Engineer pursuant to this Agreement, shall be binding on the Contractor unless within ten (10) days thereafter written objection is filed with Owner. If such objection is duly filed, or if there is any other disagreement concerning the interpretation or application of any provision of this agreement, the matter shall be settled by arbitration in accordance with the then current rules of the American Arbitration Association, each party to select one arbitrator and the two selected to choose the third. The decision of any two shall be binding and conclusive on the parties.

(d) Before commencing performance of the WORK, Contractor shall furnish evidence to the General Electric Company, by delivering three (3) copies of a "Certificate of Insurance" (and copies of the policies, if requested). completed by his insurance carrier certifying that insurance is in effect in the following minimum amounts for the risks indicated.

Workmen's Compensation and Employer's Liability, including coverage under United States Longshoremen's and Harbors' Act where applicable, covering any and all claims under the laws of the state where WORK is to be performed.

Manufacturer's or Contractor's Liability (Minimum Coverage):

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property damage (including coverage for damage caused by blasting, collapse or structural injury and/-or damage to underground utilities)	$100,000 Each Accident	$200,000 Aggregate

Contractor's Protective Liability

Bodily Injury	$250,000 Each Person	$500,000 Each Accident
Property Damage	$100,000 Each Accident	$200,000 Aggregate

g. HOUSEKEEPING

The Contractor shall at all times keep the work site, including storage areas used by him, free from accumulations of waste material, slash or rubbish; and prior to the completion of work, remove any such accumulation from and about the premises and all tools, scaffolding, equipment and materials not the property of General Electric Company.

Upon completion of the construction, the Contractor shall leave the work and premises in a condition satisfactory to the Engineer.

h. TEST REQUIREMENTS

The Contractor shall furnish promptly, without additional charges, all reasonable facilities, labor and materials necessary for the safe and convenient inspections and tests that may be required by the Engineer. All inspections and tests requested by the Engineer shall be performed in such manner as not to unnecessarily delay the work. Upon completion of the work and prior to acceptance of the installation, the Contractor shall subject all systems and equipment to such operating tests as may be required to demonstrate satisfactory functional and operating efficiency, subject to the approval and under the direction of the Engineer. All instruments, facilities and labor required to conduct these tests shall be provided by the Contractor.

i. USE OF PLANT EQUIPMENT

The use of equipment other than Contractor-owned equipment shall require approval by the Plant Engineer. Should approval be granted, the Contractor must provide competent, qualified operators for each particular type of equipment and one who has in his possession a qualified validated operator's license. The Contractor shall also so schedule his work that his use of the equipment shall not interfere with General Electric Company and their requirements or use of the same piece of equipment. When a condition does occur, the contractor shall withdraw from the equipment until General Electric Company has fulfilled their requirements. Also, if the Contractor is using the equipment for other than what it is specifically designed, he shall be restricted from using any type of equipment other than his own, but in no case does this relieve the Contractor of his obligation in complying with all safety requirements according to all health and labor standards during all phases of construction work.

j. STORAGE OF MATERIALS

The prime contractor shall arrange with the Engineer for suitable space from which to work and to store materials and equipment belonging to the Contractor. The Contractor shall post a sign in this area giving notice that said material and/or equipment is the property of the contractor. All possible material and equipment shall be confined within this area during the Contractor's non-working hours.

k. SALVAGED MATERIALS

All materials to be removed, in the course of construction, which are indicated on the drawing or otherwise indicated by the Engineer to be salvaged, shall be delivered to the Albuquerque Plant storage yard or other places on the premise and placed in the proper area by the Contractor.

l. ACCOMPLISHMENT OF WORK

The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours as may be necessary to insure the prosecution of the work in accordance with the progress schedule. If in the opinion of the Engineer, the Contractor falls behind the progress schedule, the Contractor shall take such steps as may be necessary to improve his progress to the satisfaction of the Engineer, without additional cost to the General Electric Company.

n. SERVICES FURNISHED TO THE CONTRACTOR

(1) Water, Electricity and Air -- All water, electricity and air will be furnished to the Contractor without charge, subject only to availability of same. In the event the Engineer determines such utilities are not available, the Contractor will furnish his own utilities as may be necessary from other sources at no additional cost to General Electric Company.

(2) Water -- Water for domestic consumption and construction purposes may be secured at taps on or near the site or work, the locations of which will be designated by the Company. Water shall be transported by the Contractor for the convenience of his employees.

(3) Electricity -- If deemed not available by Engineer. The Contractor shall be responsible for generating or otherwise acquiring electrical power for construction and space illumination including portable lighting fixtures. Wiring to and of the construction facilities will be performed by the Contractor at his own expense, and subject to the approval of the Engineer.

n. SERVICES FURNISHED TO THE CONTRACTOR

(4) Sanitary Toilet Facilities -- Sanitary toilet facilities as available may be utilized by the Contractor.

(5) Shop Air -- Will not be made available for use by the Contractor except upon authority of the Engineer.

(6) Telephones -- All telephones required by the Contractor shall be furnished at his own expense, and separate from the Plant Telephone System.

o. CONNECTIONS TO PLANT UTILITIES

Any work that requires the shut-down of main utility lines or plant equipment shall be performed at a time designated by the Manager of Plant Engineering so it will not interfere with production activities of the plant. The time designated by the Manager of Plant Engineering may be on a Saturday, Sunday or any time other than regular working hours.

p. LIABILITY FOR DAMAGES

The Contractor shall be responsible for all injury or damage to persons or property or utilities that may or may not be indicated in the specifications and/or drawings, that occurs as a result of the fault or negligence of the Contractor, or its agents, servants, or employees in connection with the prosecution of the work; shall protect, defend, indemnify, and hold harmless General Electric Company and its officers and employees from and against all claims or suits based upon any such injury or damage; and shall be responsible for all materials delivered and work performed until completion and final acceptance of the work.

Q. SUPERVISION AND COORDINATION

The Contractor shall have adequate supervision on the job at all times to see that the work is properly laid out and performed in a workmanlike manner. If, for sufficient reasons, at any time during the progress of the work, the Engineer determines that any subcontractor is incompetent or undesirable, he will notify the Prime Contractor accordingly and immediate steps will be taken by the Prime Contractor with corrective action. The foreman of the Prime Contractor shall be responsible for coordinating all subcontractor work scheduling so that all work will proceed without interference or delay due to lack of coordination.

3. MATERIALS AND EQUIPMENT

a. The term "Approved Equal" as used in these specifications or drawings shall mean that the Contractor must have approval from the Engineer prior to opening of bids and this approval must be contained in an addendum issued to all bidders, for the substitution of any items and/or manufacturers.

b. Reference to brand names is intended to be descriptive and not restrictive unless it is specifically stated that no substitutes will be permitted. Substitutions must be approved by the Engineer in accordance with Paragraph a.

c. Where equipment, materials, or articles are referred to in the specifications, as "equal to" any particular standard, General Electric Company shall decide the question of equality. The Contractor shall furnish to the Engineer for his approval the name of the manufacturer of other equipment which he contemplates incorporating in the work, together with their performance capacities and other pertinent information. When required by the specifications or when called for by the Company, the Contractor shall furnish the Engineer for approval full information concerning the materials or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for approval when so directed. Equipment, materials and articles installed or used without such approval shall be at the risk of subsequent rejection.

d. SPECIFICATIONS AND STANDARDS

Where specifications or standards of the Federal Government technical societies or testing organizations are included in these specifications by reference, the latest revisions to such specifications or standards shall govern.

e. RECEIVING OF MATERIALS AND EQUIPMENT

Shall be handled by the Contractor or his employees, and shall have the Contractor's name and job description on each separate item.

f. SAMPLES AND DESCRIPTIVE DATA

(1) If required by the Engineer, samples and descriptive data shall be submitted, within a reasonable time before use, to permit inspection and testing.

f. SAMPLES AND DESCRIPTIVE DATA
Continued

(2) Samples may be retained until completion of the work, but thereafter will be returned to the Contractor, if so requested and at his own expense. Failure of any samples to pass the specified requirements will be sufficient cause for refusal to consider further any samples from the same manufacturer whose materials failed to pass the tests.

g. STANDARD TESTS AND QUALITIES

(1) All materials, supplies and parts and assemblies thereof entering into the work to be done under these specifications shall be tested as specified herein or, if not specified, in conformity with the contract article entitled "Test Requirements", and according to the best modern approved method for the particular type and class of work.

(2) Unless otherwise authorized or directed, where standard published specifications of recognized authorities or organizations are specified, the latest revisions of such specifications current at the time the work is executed shall govern.

(3) Unless waived by the Engineer, All tests and trials shall be made in the presence of the Engineer. When such presence is so waived, sworn statements of the tests made and the results thereof shall be furnished to the Engineer by the Contractor as soon as possible after the tests are made.

(4) All costs of tests and trials incurred by the Contractor, unless otherwise specified in these specifications shall be borne by the Contractor and shall be included in the contract unit price for the items to which tests and trials apply.

h. STANDARD STOCK ARTICLES

Standard products other than those specified will be accepted when it is proved to the satisfaction of the Engineer, in accordance with the contract article entitled "Materials and Equipment" that they are equal in strength, durability and usefulness and convenience for the purpose intended. Any changes required in the details and dimensions indicated on the drawings as a result of substitution of standard products other than those provided for, shall be properly made as approved by the Engineer, and at the expense of the Contractor.

i. SURPLUS FURNISHED MATERIAL AND EQUIPMENT

All equipment and material furnished to the Contractor by General Electric Company for installation in the work, which is not actually installed, shall remain the property of the General Electric Company.

4. DEFINITIONS

a. Architect has been designated "Engineer" for the work covered by this contract with authority to establish controls for the work; to inspect the work for quality and for compliance with plans and specifications as a representative of the Plant Engineer, of the General Electric Company.

b. Field Engineer - The term Field Engineer means the person acting on behalf of General Electric Company who is properly designated. The term includes, except as otherwise provided in this contract, the authorized representative of General Electric Company acting within the limits of his authority.

c. The term WORK shall mean the work to be done including the materials, equipment, apparatus, etc., to be furnished by the Contractor under contract.

5. FEDERAL, STATE AND LOCAL TAXES

a. Except as may be otherwise provided in this contract, the contract price all applicable Federal, State, and local taxes and duties.

b. State and local taxes shall be included as separate line items.

c. Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by the Contract, if a statute, court decision, written ruling, or regulation takes effect after the contract date, and

(1) Results in the Contractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the contract price shall be increased by the amount of such tax or duty or rate increase; provided, that the Contractor if requested by the General Electric Company, warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price as a contingency reserve or otherwise; or

c. (2) Results in the Contractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the contract price, the contract price shall be decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the General Electric Company, as directed by the Owner. The contract price shall be similarly decreased if the contractor, through his fault or negligence or his failure to follow instructions of the General Electric Company, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

5. FEDERAL, STATE AND LOCAL TAXES

d. No adjustment pursuant to paragraph 2 above, will be made under this contract unless the aggregate amount thereof is or may reasonably be expected to be over $100.00.

e. As used in paragraph 2 above, the term contract date means the date set for the bid opening. As to additional supplies or services procured by modification to this contract, the term "contract date" means the date of such modification.

f. Unless there does not exist any reasonable basis to sustain an exemption, the General Electric Company, upon request of the Contractor, without further liability, agrees, except as otherwise provided in this contract, to furnish evidence appropriate to establish exemption from any tax which the Contractor warrants in writing was excluded from the contract price. In addition, the General Electric Company may furnish evidence to establish exemption from any tax that may, pursuant to this clause, give rise to either an increase or decrease in the contract price. Except as otherwise provided in this contract, evidence appropriate to establish exemption from duties will be furnished only at the direction of the General Electric Company.

g. The Contractor shall promptly notify the General Electric Company of matters which will result in either an increase or decrease in the contract price, and shall take action with respect thereto as directed by the General Electric Company.

GENCOND2/pv

EXHIBIT "C"

A E G

GENERAL ELECTRIC

ALBUQUERQUE PLANT

PLANT ENGINEERING STANDARD

DATE	SUBJECT	STANDARD
	SAFETY, FIRE AND PROPERTY PROTECTION REQUIREMENTS	

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GENERAL ELECTRIC

ALBUQUERQUE PLANT

PLANT ENGINEERING STANDARD

DATE	SUBJECT	STANDARD
	SAFETY, FIRE AND PROPERTY PROTECTION REQUIREMENTS	

1.0 SCOPE

This standard defines special requirements relating to safety, fire, and property protection which shall be conformed to by contractor(s) performing work on property owned by the General Electric Company.

Compliance with the following specific requirements, does not relieve the Contractor of his responsibility for knowing and complying with any federal, state, county, municipal, underwriters, or any other statutory, regulatory, or contractual requirements.

2.0 DEFINITIONS

2.1 Contractor: Shall mean any person, corporation, or partnership engaged in performing work on the premises whether as a Contractor or Sub-Contractor.

2.2 Field Engineer: Shall refer to the Owner's representative in charge of the field work on the project.

2.3 Fire Inspector: Shall refer to the Owner's representative in charge of issuing Fire Permits.

3.0 FIRE SAFETY

3.1 Tarpaulins: All canvas and tarpaulins used within the building shall be Underwriter's Laboratories listed flame retarded or noncombustible. Polyethylene film may be used

3.2 Combustible crates, cartons, and packing must be removed from material, equipment, machinery, etc., before being stored in areas not covered by sprinklers.

3.3 <u>Welding, Cutting and Open Flame Permits</u>.

3.3.1 Burning, cutting, or welding to building structure is strictly prohibited.

3.3.2 Flame Permits are required for welding, heating, flame cutting or soldering with portable equipment in all areas of the Plant. Flame Permits are obtained from the Owner's Field Engineer. Such permits are issued for one work period in each specific area. The existence of a permit for one work period does not authorize work in any other work period; nor does a permit issued for one area authorize work elsewhere. The Field Engineer will assist the Contractor in obtaining flame permits.

APPROVAL	SUPERSEDES	DATED	SHEET	NUMBER
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3.0 3.3.3 Welding or Flame cutting in potential danger areas: The Owner's Safety Inspector will check the following areas with an explosimeter to ensure the absence of explosive conditions before issuing a permit:

Areas near fuels, flammable liquids including solvents, hazardous chemicals or near tanks or containers which hold such materials;

Areas in or near sumps, pits, manholes and enclosed areas where gases may accumulate;

Areas in or near ventilators, shafts, air intakes and plenum changers;

Fuel storage or oil separator tanks.

The Owner's Safety Inspector will also make periodic checks during the progress of the work. If, in the opinion of the Fire Inspector, it becomes unsafe to continue work the Contractor shall stop work immediately and shall not resume work until given clearance. The Contractor shall furnish an explosimeter and shall take periodic readings and shall be responsible for the safety and protection of the people, material and structures within the immediate and surrounding areas of the job site.

3.3.4 Precautions to be taken in all areas: The Owner's Fire Inspector shall make certain that the area sprinkler system is in service. The Contractor shall furnish fully charged fire extinguishers in good working order, at the job site and ready for use.

The Contractor shall sweep the floor within the area(s) of danger and shall prevent the accumulation of any combustible materials or debris therein. Should welding or flame cutting be required above wooden floors, the Contractor shall cover same with non-combustible protector and shall contact the Field Engineer for approval.

Combustible materials and the Owner's production material must be moved, far enough away from the work, to avoid damage. Arrangements to handle the Owner's production material may be made through the Owner's Field Engineer.

3.0 3.3.4 When required by the Fire Inspector, cutting, welding, or using an open flame, the Contractor shall station an extra man, or men as required, with fire extinguishers to prevent the spread of flames from sparks. The person, or persons, so stationed, shall have no other duties.

After completion of actual welding or cutting; the area shall be kept under surveillance by the Contractor for one-half hour, for possible smoldering fires.

Welding, burning, flame cutting and open flame equipment shall not be used near flammable liquids.

Welding, flame cutting and open flame equipment shall not be used near Magnesium or Titanium machining, buffing, grinding, storage or scrap areas.

The Contractor shall remove inside deposits, such as: Dust, paints, lacquers, grease, oil or any other combustibles, before working on ventilation ducts.

Purging of combustible materials and gases from piping, before pipe is welded or flame cut, shall be done in accordance with specific instructions in the Job Specifications or Standards.

No welding, cutting, grinding, or drilling will be allowed around spraying areas, where paints or coatings are applied, without proper authorization.

The Contractor shall take any other specific safety precautions as established and as directed by the Owner's Field Engineer.

3.4 FLAMMABLE MATERIALS:

3.4.1 Flammable liquids shall be stored outside of buildings in drums equipped with safety plugs or approved safety cans, in locations approved by the Fire Inspector. It is the Contractor's responsibility to keep materials properly stored in order and to avoid creating a fire hazard. The Owners Field Engineer will make the necessary arrangements for allocating adequate storage space for the Contractor.

3.4.2 Flammable liquids may be dispensed for use only from safety containers equipped with flame arresters, as approved by Factory Mutual Engineering. The Fire Inspector must be notified in advance of any use of flammable liquids within the Owner's Plant.

3.4.3 The fuel tanks of vehicles, powered by flammable liquids must be filled outside of buildings, with engine or engines turned off.

3.4.4 Fuel tanks of blow torches, portable gasoline driven equipment (except motor vehicles) and other equipment powered by flammable liquids may be filled inside of buildings, only if equipped with Factory Mutual Approved Flame Arresters.

3.4.5 Contractors are cautioned that Magnesium and Titanium are machined in many areas of the Plant. The chips of these metals, particularly Magnesium, appear deceptively harmless but are highly combustible, and once ignited are very difficult to extinguish. Conventional fire extinguishing materials usually aggravate Magnesium fires. Water or CO_2 is never to be used on a Magnesium fire. Only Ansul Chemical Company "Met-L-X", Pyrene Manufacturing Company GI Powder, or dry sand may be used on a Magnesium fire. The Owner's Fire Inspector will supply these extinguishing materials when notified that work is to be done near Magnesium machining, storage, or scrap area.

3.4.6 In occupied buildings, when more than eight (8) hour supply of paints, thinners, lacquers, and other flammable and combustible liquids must be stored, the same shall be stored in approved safety cans within approved flammable liquid cabinets.

3.4.7 Waste oil, fuel, paint, etc., may never be disposed of into storm or sanitary sewers. Contractor owned liquid waste shall be disposed of away from the General Electric Company's premises and according to State and Local Codes. E.P.A. considers this as "Hazardous Waste." See Paragraph 5.0.

3.4.8 A pan or dam shall be in place and wherever flammable liquids are stored, to prevent leakage or spillage into sewer systems.

3.5 Work on Fire Protection Equipment: Any work to be performed on the Owner's fire protection equipment is to be done only with the knowledge and consent of the Field Engineer. Opening and closing of valves and hydrants in fire protection lines will be done only by a representative of the Owner.

3.5.1 Work on or in vicinity of fire alarm devices or circuits: The Contractor shall be held responsible for the cost of repair of any damage or impairment of the Fire Alarm System and any excess damages occurring due to loss of alarm signals due to the impairment of the Fire Alarm System by Contractor or his representatives. All work on the existing alarm circuit shall be coordinated with Security and the Project Coordinator.

3.6 Catalytic, Propane and Butane Heaters: Catalytic, propane and butane heaters shall be UL rated, rugged design, kept in good condition at all times, not easily overturned, not left unattended and kept at least ten (10) feet away from any ignitable material or equipment. Such units may be used outside or within new buildings under construction providing adequate ventilation is available. Owner's Fire Inspector must be contacted for a Fire Permit prior to use. When refueling, be sure that the heater is cold. Carry same outside and away from the building, and refuel from container approved by O.S.H.A. 2201-32. Heaters must be extinguished at the end of each working day (unless required for masonry construction work, in which case, the Fire Inspector may request that an attendant be provided by the Contractor). Heaters must be kept away from areas where they are liable to be upset by work operations.

Canvas or combustible materials for weather protections near or within (10) feet of the heater(s) is prohibited.

4.0 OTHER GENERAL SAFETY REQUIREMENTS

4.1 Safe Equipment: All equipment used by the Contractor shall be maintained in a safe operating condition, free from defects or wear which may constitute hazard to any person or property. Any equipment which does not meet this requirement must be repaired at once, prior to further use, or removed from the premises.

4.2 Powder Actuated Tools: Powder actuated tools may not be used in the Plant unless specific written permission of the owner's Field Engineer is obtained.

4.3 Protection of Owner: Contractor must provide adequate safeguards to protect the owner"s employees, property, and visitors from injuries, damage, or loss in the course of the work.

4.4 Accidents: In the event of an accident, involving the Contractor's personnel, equipment, or operations which results in injury or damage to personnel or property, the Contractor shall notify the Owner's Field Engineer at once.

It is the Contractor's responsibility to provide first-aid and medical attention for his own personnel. However, the Field Engineer will assist in obtaining first-aid. The owner may furnish first-aid, within available capability, as a humanitarian act, but the provision of such first-aid or ambulance service does not constitute an acknowledgement of any responsibility for the accident or injury, nor does such humanitarian act relieve the Contractor of any responsibility .

4.4 Should an accident result in fatality(s) and/or hospitalization for five or more employees, the Contractor shall record and report same as per O.S.H.A. Standards.

4.5 Safety Glasses: The Contractor or Foreman must make approved "Eye Protection Devices" available to their personnel and enforce their use in areas where eye protection is a posted requirement or demolition, drilling, grinding, and buffing or chipping would cause fragmented materials to become airborne. (per OSHA Standards).

4.6 Barricades: Where surface work is being done, such as: Concrete removal, chipping, excavating, trenching, grinding, or activities involving spillage or water or slippery substances, sufficient barricades, ropes, signs, guards, warning lights, etc., shall be provided by the Contractor to adequately warn and exclude unauthorized persons from the unsafe area.

4.6.1 When overhead work is being performed, the Contractor must isolate the working area and post signs to alert others of the overhead activity and shall take all precautionary measures to avoid danger to personnel, materials, structure and equipment.

4.0 4.7 Blocking of Aisles, Roadways or Means of Egress:

4.7.1 Written permission is required prior to blocking any roadway or emergency aisle with concurrence of the Owner's Field Engineer and Plant Security.

4.7.2 When blocking is necessary, the Contractor shall establish and maintain a safe alternate route(s) as directed by the Owner's Field Engineer.

4.7.3 Short-narrow vehicles will be allowed into the work area for hauling material equipment, tools and debris. Once unloaded/loaded, the vehicle shall be removed to outside of the building. No parking inside of buildings.

4.7.4 Basement Aisles or Exitways shall not be restricted beyond safe limits.

4.8 Hot Kettles: Hot Kettles must be placed in a safe location outside of buildings, at a location approved by Environmental Quality and Fire Inspector. Wood fired hot kettles are prohibited. They must be gas or oil fired. Two or more dry powder extinguishers shall be located near the hot kettles at all times. Hot kettles shall not be positioned near any building Fresh Air Supply Intakes. The Contractor is responsible for checking and assuring that the wearing apparel for Hot Kettle operators, and for personnel handling hot materials, is adequate to prevent such materials from making direct contact with their skin.

5.0 ENVIRONMENTAL REQUIREMENTS

5.1 Air-Borne Particle Control: When any work is done within the Owner's buildings, including but not limited to demolition, cutting, excavation, drilling or breaking of concrete or masonry, loose fiber insulating, spraying of paints or fibers, mixing dry powders or aggregates, that may generate particles (dust, grit or fibers) that may be air-borne, the Contractor shall completely enclose the area with approved materials as mentioned in paragraph 3.6 above. Additional measures to control dust are:

When cutting concrete use wet mops and sufficient water to control the dust but not flood the area; when drilling concrete or masonry, a dust collector (vacuum cleaner) or a shroud may be used around the drill;

When breaking concrete or masonry, use sufficient water to prevent the spread of dust and grit;

When water is used for: dust control; cleaning; or rinsing; it is likely to run or drip onto equipment, furniture, or materials; in areas below. All such items shall be covered to prevent damage of same. Use wet vacuuming for floor clean-up is mandatory.

5.2 CHEMICAL USE

5.2.1 General: The Contractor shall apply a Material Safety Data sheet to the Owners Field Engineer for ALL CHEMICALS used the duration of the project two weeks prior to starting any project.

5.2.2 Asbestos: The Contractor shall supply O.S.H.A. Standards for the protection of contractor and General Electric Personnel. The Contractor shall contact the Owner's Field Engineer one week prior to starting any project which has potential asbestos, (see Environmental Practice #6) toxic material or noise hazard. At this time a written schedule of work shall be agreed on. The Owner's Field Engineer notify the Industrial Hygiene Unit prior to the commencement of the project. Particular attention is called to O.S.H.A.; 1910-1001 Asbestos Toxic Materials; and 1910-0095 Noise.

5.2.3 Noise: Loud bench type operations such as abrasive sawing shall be done away from occupied areas. Other loud activity such as jack hammering within buildings or near occupied areas shall be done in the least disruptive manner, and only after specific scheduling and written permission from the Owner's Field Engineer.

5.3 DISPOSAL OF MATERIALS GENERATED

5.3.1 General: The Contractor will prepare a table listing of all chemicals (paints, thinners, cleaning fluids, adhesives, acids, bases, solvents, etc.,) used in a project, the hazardous waste stream that will be generated and the intended disposal of each waste stream two weeks prior to starting any project. All waste that is generated by a contractor will be starting any project. All waste that is generated by a contractor will be disposed according to all local, state and federal regulations by the contractor. All waste generated by General Electric, but handled by the Contractor (for instance when a contractor is hired to clean one of the acid tanks), will be disposed of by General Electric.

5.3.2 Sanitary Sewer: No material other than water may be placed into the sanitary sewer system by the Contractor. If the Contractor wishes to place non-hazardous material into the sewer system, he should indicate that as the desired disposal technique on the Table referred to in 5.3.1. If the Manager of Environmental Control approves the disposal into the sanitary sewer system, the Contractor will receive written approval within one week of submission. NO CONTRACTOR MAY PLACE ANY WASTE OTHER THAN WATER INTO THE SANITARY SEWER SYSTEM WITHOUT WRITTEN APPROVAL.

5.3.3 Storm Sewer System: No material other than water may be placed into storm sewer system. All drop inlets outside of building at the Plant constitute the storm sewer system. Material from the storm sewer goes to the San Jose Ditch. Effluent to this ditch is regulated and only storm water runoff may be emitted to the storm sewer system. For this reason, nothing other than water may be placed into the storm sewer system. No allowances will be made.

5.3.4 Disposal of Owner Generated Waste: All waste that has been generated by General Electric, and is to be handled by the Contractor will be disposed by the Owner. In the table of generated waste, the Contractor will list the existence of such waste, and the intended dates of generation.

The Manager of Environmental Control will respond with a list of the action which will be taken by Environmental Control. The Owner will supply all containers used to dispose of the material and will remove them from the site of the contractor's work. The contractor will be supplied with identification stickers that must be used to identify the contents and generation point.

5.3.5 Contractor Generated Waste: All waste that will be generated by the contractor and the intended disposal procedure will be listed on the table mentioned in 5.3.1. The table will be submitted to the Manager of Environmental Control. Within one week of receipt of the table the Manager will provide approval for the generation of such waste. The contractor will be usable to remove the waste from facility until such approval is granted.

5.4 PCB WASTE

5.4.1 General: Many PCB items are in use at the plant. PCB capacitors are used on the machines and 12 PCB transformers are in use at the plant. All PCB waste will be removed and disposed by General Electric. No machine may be moved until the PCB capacitor has been moved. No fluid may be removed from the transformers.

5.5 SPILLS

5.5.1 General: ALL spills of material will be IMMEDIATELY reported to Environmental Control (X367, 521, or O[ask for members of EC]).

5.6 CONFINED SPACE ENTRY

5.7 EXHAUST FUMES

6.0 HOUSEKEEPING REQUIREMENTS

6.1 Dropcloth Protection: When any work within the Owner's buildings involves cleaning, or painting, the Contractor shall cover all equipment, furniture, materials, and facilities to prevent paint and dirt from dropping or accumulating onto same.

6.2 Housekeeping: (Refer to Barricades paragraph if actual construction is required in aisles). The Contractor shall, at all times, keep the Owner's premises and the adjoining premises, driveways, and streets clean of rubbish and debris caused by the Contractor's operation.

The Contractor is responsible for removing his own rubbish from the Plant.

6.2 Accumulations of rubbish and debris, including all combustible waste, shall be cleaned up and removed daily. The Contractor shall, upon completion of the work, remove from the premises, his tools, temporary work, and surplus materials, and he shall leave the work and area clean and ready for use.

All incidental construction damage shall be corrected.

7.0 PROPERTY PROTECTION REQUIREMENTS

7.1 Support of Ladders and Scaffolding: Piping, bueways, sprinkler lines, and other building appurtenances which are not specifically designed as load bearing members shall not be used as supports for ladders, scaffolding, or other equipment; nor shall Contractor's personnel walk or otherwise place weight upon such appurtenances.

7.2 ROOF PROTECTION

7.2.1 Whenever it is required to perform work on or from a roof surface, the Contractor will take all necessary precautions to ensure adequate protection, to the roof surface, flashings, sumps, drains, copings, gravel stops, expansion seams, down spouts and gutters.

7.2.2 Protective precautions should include, but not be limited to, the following:

(a) Use of ladder stand-off support to guard against damage to gutters, and metal work.

(b) Use of bearing plate of sufficient area under all ladders, scaffolding, rigging and rigging equipment to ensure adequate bearing areas for membrane protection.

(c) Use of planking plywood or other protection when transporting material, equipment, over roof surface or when excessive personnel traffic is required for performance of work.

7.0 7.3 DEMOLITION OF CONCRETE AND MASONRY STRUCTURES:

7.3.1 Unless otherwise specified, concrete breaking devices such as: Tractor mounted hammers, "headache" balls, etc., shall not be used inside buildings or in any other area where resulting vibrations may cause damage to the Owner's property, without specific written approval from the Owner's Field Engineer.

7.3.2 The Contractor shall provide all shoring and bracing necessary for the protection of personnel and property.

7.4 Burning, cutting or welding to building structure is strictly prohibited.

8.0 OTHER REQUIREMENTS

8.1 Posted Safety Rules: Contractor's personnel must observe all the requirements of this standard, as well as all posted safety rules and regulations, which apply to the Owner's employees.

8.2 Connections to Existing Services: When connections are made to existing services, the Contractor shall verify that the existing service is clear, and unobstructed by visual and test flow means where practical.

8.3 Plant Traffic Regulations: Drive no faster than 15 miles per hour, slower if posted. Stop completely at all stop signs. All vehicles must yield the right of way to pedestrians and emergency vehicles at all times.

BPS001/pv

SECTION 01010

SUMMARY OF THE WORK

PART 1 - GENERAL

1.01 SUMMARY

A. This Section provides a general description of the Work and type of contract, allowances and field engineering.

B. Related requirements:

1. Submittals: Section 01300.

2. Construction Facilities: Section 01500.

3. Substitutions: Section 01630.

1.02 CONTRACT METHOD

A. Construct the Work under a single fixed price contract.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. General:

1. Work of this Contract covers three paving jobs and storm drain modifications at the General Electric Plant, 336 Woodward Road S.E., Albuquerque, N.M. Work includes, but is not limited to the following:

a. Paving two storage yards south of Woodward Road and west of Building 14DD.

b. Construction of a storm inlet and inlet line to provide drainage for the paved storage yards.

c. Repairing pavement between Buildings 5 and 6.

d. Repairing pavement north of Woodward Road on the east side of Building 21D.

B. Contractor's duties:

1. Except as specifically noted, provide and pay for:

a. Labor, materials, and equipment.

b. Tools, construction equipment, and machinery.

2. Pay legally required sales, consumer, and use taxes.

3. This project is to be constructed on privately-owned property and therefore permits from the City of Albuquerque are required. The Contractor shall secure and pay for the following as necessary for proper execution and completion of the Work.

   a. Government fees.

   b. Licenses.

4. Give required notices.

5. Comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities which bear on performance of the Work.

6. It is not the Contractor's responsibility to make certain that Drawings and Specifications comply with codes and regulations. However, Contractor shall promptly submit written notice to Architect-Engineer of observed variance of Contract Documents from legal requirements. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for work known to be contrary to such requirements for which written notice was not given.

7. Enforce strict discipline and good order among employees. Do not employ on Work:

   a. Unfit persons.

   b. Persons not skilled in assigned task.

D. In the event that the sum of all allowances which the Architect-Engineer has authorized differs from the total allowance funds available, then the Contract Sum shall be adjusted accordingly by Change Order. Any increase will include additional handling costs on the site, labor and installation costs, overhead, profit, and other associated costs.

1.04 OWNER OCCUPANCY

A. Owner will occupy adjacent building during entire construction period for the conduct of his normal operations.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

1.05 COORDINATION

A. Coordinate work to assure expeditious, orderly sequence of installation of construction elements.

1.06 FIELD ENGINEERING

A. Provide field engineering services; establish grades, lines and levels, by use of recognized engineering survey practices.

1.07 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of the standard, except when stricter requirements are specified or are required by applicable codes.

B. The date of the standard is that in effect as of the date of receipt of bids, except when a specific date is specified.

C. Obtain copies of standards direct from publication source, when needed for proper execution of the Work or when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

1.08 TESTING LABORATORY SERVICES

A. Owner shall pay for services of an independent testing laboratory to perform inspection, tests and other services required by Division 17, Supplemental Specifications. Contractor shall pay for services of an independent testing laboratory to perform inspection, tests and other services required by other sections of the specifications.

B. Services will be performed in accordance with requirements of governing authorities and with specified standards.

C. Reports will be submitted to Architect-Engineer in duplicate giving observations and results of test, indicating compliance or non-compliance with specified standards and with Contract Documents.

D. Contractor shall cooperate with testing laboratory. personnel; furnish tools, samples of materials, equipment, storage and assistance.

1. Notify Architect-Engineer and testing laboratory 24 hours prior to expected time for operations requiring testing services.

2. When initial tests indicate non-compliance with requirements, Contractor shall employ and pay for services of the testing laboratory to make retests.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes procedures for submitting to the Architect-Engineer shop drawings, product data, samples, manuals, and certificates required by specification sections.

B. Related work: Submittal of Project Record Drawings and Warranties: Section 01700.

1.02 PROCEDURES

A. Deliver submittals to the Architect-Engineer, Leedshill-Herkenhoff, Inc., at 500 Copper Avenue N.W., P.O. Box 1217, Albuquerque, New Mexico, 87102. Identify project and state name, address, and telephone number of Contractor, subcontractor, and major supplier. Identify as appropriate the pertinent drawing sheet, detail number, and specification section number. Identify any deviations from Contract Documents.

B. Timing of submittals:

1. Make all submittals for the items of equipment and materials set forth below in accordance with the coded legend set forth below within 30 days after receipt of Notice to Proceed (Submittals marked with an asterisk must be in reproducible form, the same size and scale as the contract drawings, or as directed by the Architect at the preconstruction conference)

2. In scheduling, allow at least three full working days for Architect-Engineer's review following his receipt of the submittal.

3. Approval of descriptive submittals will not relieve the Contractor of the responsibility for correcting any errors which may exist or for meeting requirements of the specifications. No partial submittals will be accepted.

C. Resubmission: If requested, resubmit submittals in a timely manner. Resubmit as specified for initial submittal. Indicate any changes which have been made other than those requested by Architect-Engineer.

A. Shop drawings are original drawings prepared by the Contractor, subcontractor, supplier, or distributor which illustrate some portion of the work by showing fabrication, layout, setting or erection details.

B. Make shop drawings accurately to scale and sufficiently large to show all pertinent features and methods of connection.

C. Copies required: Submit all shop drawings in the quantity which is required to be returned plus two copies which will be retained by the Architect-Engineer and Owner.

1.04 PRODUCT DATA

A. Manufacturer's standard schematic drawings:

1. Modify drawings to delete information which is not applicable to Project.

2. Supplement standard drawings to provide additional information applicable to Project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data:

1. Clearly mark each copy to identify pertinent materials, products, or models.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

4. Show wiring diagrams and controls.

C. Provide information on time required for delivery.

D. Copies required: Submit product data in the quantity which is required to be returned plus two copies which will be retained by the Architect-Engineer.

1.05 SAMPLES

A. Office samples:

1. Submit samples of sufficient size and quantity to clearly illustrate:

a. Functional characteristics of product or material, with integral parts and attachment devices.

b. Full range of color, texture, and pattern.

2. Provide permanent identification for each sample.

3. Color and pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to the Architect-Engineer for his review and selection. Printed color charts are not acceptable.

4. Number required: Submit all samples in the quantity which is required to be returned plus one which will be retained by Architect-Engineer.

B. Mock-ups: Erect field samples and mock-ups at the Project site to illustrate materials, equipment, or workmanship and to establish standards by which completed work is judged.

C. After return of office samples or review of field samples, these items may be used in the construction of the Project with the approval of the Architect-Engineer.

1.06 MANUALS

A. General: Where manuals are required to be submitted covering items included in this Work, prepare all such manuals in durable binders approximately 8-1/2 by 11 inches in size and with at least the following:

1. Identification on, or readable through, the front cover stating general nature of the manual.

2. Neatly typewritten index at the front of the manual, furnishing immediate information as to location in the manual of all data regarding the installation.

3. Complete instructions regarding operation and maintenance of all equipment involved.

4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.

5. Copy of all guarantees and warrantees issued.

6. Copy of the approved Shop Drawings with all data concerning changes made during construction.

B. Extraneous data: Where contents of manuals include manufacturers' catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.

1.07 MANUFACTURER'S CERTIFICATES

A. Submit certificates in duplicate, in accordance with requirements of each specification section.

1.08 SUBMITTALS - SPECIFIC REQUIREMENTS

A. The Contractor shall submit all forms, data, information, certificates, schedules, etc., as required in other sections of the specifications. Omission of an item from the list does not relieve the

Contractor from the responsibility for submitting the item required (See submittals list).

a. Shop Drawings
b. Certifications
c. Equipment List
d. Material List/Mix Design
e. Elementary Diagrams and Wiring Diagrams
f. Installation Instructions
g. Maintenance Instructions
h. Operating Instructions
i. Samples Colors
j. Welders Certifications
k. Performance Curves
l. Catalog Data
m. Recommended Spare Parts Lists
n. Computations
o. Labels
p. Contractor Test Results/Laboratory Test Reports
q. Mix Design

1.09 FIELD ORDERS

A. Purpose:

1. The purpose of a Field Order is to clarify a specific item in either the contract documents or the project manual, which has been identified after the bids have been received.

B. Form:

1. Architects Field Order shall be in a form similar to AIA document G708 and shall be submitted by the Architect to the Owner, and then from the Owner to the Contractor, to expedite the work.

C. Terms:

1. You are hereby directed to execute promptly this Field Order which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

2. If you consider that a change in Contract Sum or Contract Time is required, please submit your itemized proposal to the Owner and the Architect immediately and before proceeding with this Work. If your proposal is found to be satisfactory. and in proper order, this Field Order will in that event be superseded by a Change Order.

D. Timing:

1. All field orders will be issued in a timely manner by the Architect and dated. Upon receipt of the Field Order the

Contractor will have not more than 5 full working days to respond in writing with an itemized proposal to the terms of that field order.

2. The Architect will allow not more than 3 full working days upon receipt of the itemized breakdown to appraise the proposal.

3. The Owner will execute a Change Order on those items found to be satisfactory within 3 days of the Architects response to the Contractor's proposal for the Field Order.

E. Compliance:

1. If upon dated receipt of a Field Order the contractor has not responded within the specified time period with the required documentation, the Owner will consider the entire Field Order to be a clarification only that orders minor changes in the work and those changes will be made without change in Contract Sum or Contract Time.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used.

END OF SECTION

CIVIL SUBMITTALS

Submittal	Item	Spec. Ref.	Sub. Req'd.
C-1	Paving Asphalt	Division 17	b,p
C-2	Asphalt Paving Mix	Division 17	b,p,q
C-3	Cemented-Treated Base Course	Division 17	b,p,q
C-4	Reinforced Concrete Pipe	Division 17	b
C-5	Portland Cement Concrete	Division 17	b,p,q
C-6	Steel Reinforcement	Division 17	a,b
C-7	Concrete Curing Compound	Division 17	b
C-8	Cement Mortar and Grout	Division 17	b

SECTION 01500

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section describes temporary utilities, construction facilities, and project sign which are to be provided and maintained by the Contractor.

B. Related sections:

1. Section 01010 - Summary of the Work

2. Section 01700 - Final Cleaning

1.02 TEMPORARY UTILITIES

A. General: The availability of utilities and all connections thereto shall be in accordance with paragraph 2.n. of the General Conditions.

B. Heating and ventilation:

1. Provide and maintain all heat needed for proper installation of work and to protect materials and finishes from damage due to temperature. Special care shall be taken to prevent freezing.

2. Provide ventilation of enclosed areas to cure materials, to disperse humidity, and to prevent accumulation of dust, fumes, or gases.

C. Telephone service: Provide telephone service to field office.

D. Utilities for testing: Normal quantities of utilities required to make final tests of completely installed permanent systems will be furnished at no cost to the Contractor.

1.03 CONSTRUCTION FACILITIES

A. Contractor shall provide a field office building, storage sheds, fencing, barricades, chutes, elevators, hoists, scaffolds, railings and other facilities as required. Design, installation, and maintenance of such items shall be the responsibility of the Contractor.

B. Sanitary facilities: Existing facilities may be used during construction; maintain in a sanitary condition.

C. Removal: Remove temporary facilities as rapidly as progress of the Work will permit. Prior to Substantial Completion, remove all temporary items and clean and repair damage caused by installation or use of temporary facilities.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used.

END OF SECTION

SECTION 01630

SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.

2. To ensure that products are furnished and installed in accordance with the design intent, the procedures described in this Section have been established for advance submittal of design data and for its review and approval or rejection by the Architect-Engineer.

B. Related work: Submittals, Section 01300.

1.02 APPROVAL REQUIREMENTS

A. Substitutions:

1. The Contract is based on the materials, equipment, and methods described in the Contract Documents.

2. The Architect-Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Architect-Engineer to evaluate the proposed substitution.

3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this Work by the Architect-Engineer and the Owner.

B. "Or equal":

1. Where the phrase "or equal" or "or approved equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be accepted as equal by the Architect-Engineer unless the item has been specifically approved for this Work by the Architect-Engineer.

2. The decision of the Architect-Engineer shall be final.

1.03 REQUESTS FOR APPROVAL

A. Architect-Engineer will consider for a period of 30 days after date of Contract, formal requests from Contractor for substitution of products in place of those specified.

B. Submit three copies of request for substitution. Include in request:

1. Complete data substantiating compliance of proposed substitution with Contract Documents.

2. For products:

a. Product identification, including manufacturer's name and address.

b. Manufacturer's literature containing product description, performance and test data, and reference standards.

c. Samples as required.

3. For construction methods:

a. Detailed description of proposed method.

b. Drawings illustrating methods.

4. Itemized comparison of proposed substitution with product or method specified.

5. Data relating to changes in construction schedules.

C. In making requests for substitution, Bidder/Contractor represents:

1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.

2. He will provide the same guarantee for substitution as for product of method specified.

3. He will coordinate installation of accepted substitution into Work making such changes as may be required for Work to be complete in all respects.

4. He waives all claims for additional costs related to substitution which consequently become apparent.

5. Cost data is complete and includes all related costs under this Contract.

D. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accordance with Paragraph 1.03.

2. Acceptance will require substantial revision of Contract Documents.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: This Section describes Contract closeout procedures including cleaning, preparation of Project Record Documents, systems demonstrations, and submittal of warranties.

B. Related Sections:

1. Fiscal provisions and other administrative requirements: General and Supplementary Conditions.

2. Operation and maintenance manuals: Section 01300.

1.02 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion.

B. Owner will immediately occupy Project for the purpose of installation of equipment under provision stated in Certificate of Substantial Completion.

C. When Contractor considers Work has reached final completion, submit written certification that Work has been inspected, final cleaning done, equipment and systems have been tested in the presence of Owner's Representative and are operational, and Work is complete in accordance with Contract Documents and ready for inspection.

1.03 FINAL CLEANING

A. Execute cleaning prior to final inspection.

B. In addition to progressive removal of debris, and cleaning of products specified in various sections, clean interior and exterior surfaces.

C. Remove labels not required to remain.

D. Clean finishes free of dust, stains, films, and other foreign substances.

E. Clean transparent and glossy materials to a polished condition, and remove foreign substances. Polish reflective surfaces to a clear shine.

F. Clean surfaces of equipment, remove excess lubrication.

G. Clean or replace filters of ventilation equipment.

H. Clean plumbing fixtures to a sanitary condition, free of stains.

I. Clean light fixtures and lamps.

J. Remove foreign matter and debris from roofs, gutters, downspouts, and drainage systems.

K. Clean site of litter and foreign matter. Sweep paved areas; remove stains, spills and foreign substances. Rake clean other exterior surfaces.

L. Replace broken and damaged materials.

1.04 PROJECT RECORD DOCUMENTS

A. General: Throughout progress of the Work, the Contractor shall maintain an accurate record of all changes in the Contract Documents and variations in the actual construction from that described in the Contract Documents. The purpose of this record is to provide the Architect-Engineer factual information regarding both concealed and visible aspects of the Work so that modifications can be made to the original Contract Documents reflecting the actual construction.

B. Maintenance of job set:

1. Identification: Immediately following award of Contract, obtain from Architect-Engineer one complete set of all Documents and identify it as "RECORD DRAWINGS-JOB SET."

2. Storage: Store documents at the site separate from those used for construction. Protect the job set from loss or damage.

3. Entries: Using an erasable colored pencil clearly describe all changes by note and by graphics as required. Date all entries. Call attention to the entry by circling areas affected. Keep documents current., do not permanently conceal any work until required information has been recorded.

4. Submittal: At contract closeout submit documents with transmittal letter containing date, project title, Contractor s name and address, list of documents, and signature of Contractor

1.05 SYSTEMS DEMONSTRATION

A. Prior to final inspection, demonstrate operation of each system to Architect-Engineer and to Owner's representative.

B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operating and maintenance data as the basis of instruction.

1.06 WARRANTIES

A. Provide duplicate executed copies of all warranties. Assemble in binders with durable covers and include a table of contents.

B. Submit warranties prior to final request for payment.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used.

END OF SECTION

DIVISION 17

SUPPLEMENTAL SPECIFICATIONS

STANDARD SPECIFICATIONS

For all paving and storm drain construction, the Technical Specifications of The City of Albuquerque Standard Specifications for Public Works Construction, 1986 Edition, shall govern for this project. Applicable portions of these Technical Specifications are incorporated by reference the same as if fully written herein and shall govern only for the construction elements listed in this paragraph. General Condition Section 18 of the City of Albuquerque Standard Specifications for Public Works Construction, 1986 is also incorporated by reference and shall govern the construction elements listed in this paragraph.

The City of Albuquerque Standard Specifications for Public Works Construction, 1986 Edition, may be purchased separately from the City Treasurer's Office, 1st Floor City County Building, 1 Civic Plaza, Albuquerque, New Mexico.

Payment for all items of work for this project shall be included in the lump-sum price in the Bid Proposal, regardless of the method of payment called for in the applicable sections of the specifications.

The pertinent sections are as follows:

General Conditions

Section 18 - Utilities

Technical Specifications

Section 100 - Materials

Section 300 - Streets and Related Work

Section 700 - Trenching and Boring for Utilities

Section 900 - Sanitary and Storm Sewer Facilities

Section 2000 - Standard Detail Drawings

This list is for your reference only and is not an all inclusive list.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

December 10, 1987

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: PAVING PLAN SUBMITTAL OF GE - AIRCRAFT ENGINE PLANT
RECEIVED NOVEMBER 24, 1987 FOR GRADING/PAVING PERMIT (M-14/D6)

Dear Suzi:

The above referenced submittals dated November 20, 1987 are approved for Grading and Paving Permit. The contractor is approved to proceed with construction in accordance with these plans.

If you have any questions, please call me at 768-2650.

Cordially,

Roger A. Green, PE

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

RAG/bsj

K.C.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

November 16, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR THE AUTO CLAVES 5 & 6
(M-16/D4) REVISION DATED NOVEMBER 1, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of November 5, 1987, the above referenced plan is approved for Foundation 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

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

XC.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

April 8, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: GRADING PLAN FOR REFRIGERATED TRAILER SITE (M-14/D6)
ENGINEERS STAMP DATED MARCH 4, 1987 & SUPPLEMENTAL INFORMATION
RECEIVED APRIL 6, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of March 9 and April 6, 1987, the above referenced plan is approved for Grading Permit.

Please advise your client that upon completion of construction, they will need to call Rick Duran at 764-1699 for an inspection.

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

cc: Rick Duran

BJM/bsj

X.C.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

March 16, 1987

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: GRADING PLAN FOR REFRIGERATED TRAILER SITE
(M-14/D6) RECEIVED MARCH 9, 1987

Dear Mr. Dodge:

Based on the information provided on your submittal of March 9, 1987, the above referenced drainage plan cannot be approved at this time until:

1. Please locate the referenced trailer site within the proposed Drainage Improvement Plan submitted on November 4, 1986.

2. Identify which system will be taking care of the developed runoff.

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

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

X.C.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

November 12, 1986

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE REPORT REIVSION OF GENERAL ELECTRIC AIRCRAFT ENGINE PLANT, RECEIVED NOVEMBER 4, 1986 FOR BUILDING PERMIT APPROVAL OF MAINTENANCE TRAINING BUILDING (M-14/D6)

Dear Suzi:

The above referenced submittal, drawing Exhibit No. 2 revised November 4, 1986, is approved for Building Permit. If the building permit has already been issued, it is your responsibility to see that the contractor has the revised approved plan.

If you have any questions, call me at 768-2650.

Cordially,

Roger A Green, PE

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

RAG/bsj

XC.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

August 5, 1986

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE REPORT FOR GENERAL ELECTRIC AIRCRAFT ENGINE PLANT, RECEIVED AUGUST 4, 1986 FOR VERIFICATION OF FLOOD HAZARD AREA REMOVAL (M-14/D6)

Dear Suzi:

The storm drain calculations transmitted with Bobbi Miller's letter dated July 29, 1986, are acceptable. Her previous letter of June 30, 1986 is therefore concurred with.

In regards to your submittal for Building Permit approval, received on July 17, 1986, a resubmittal is required as previously discussed with you between myself and Fred Aguirre.

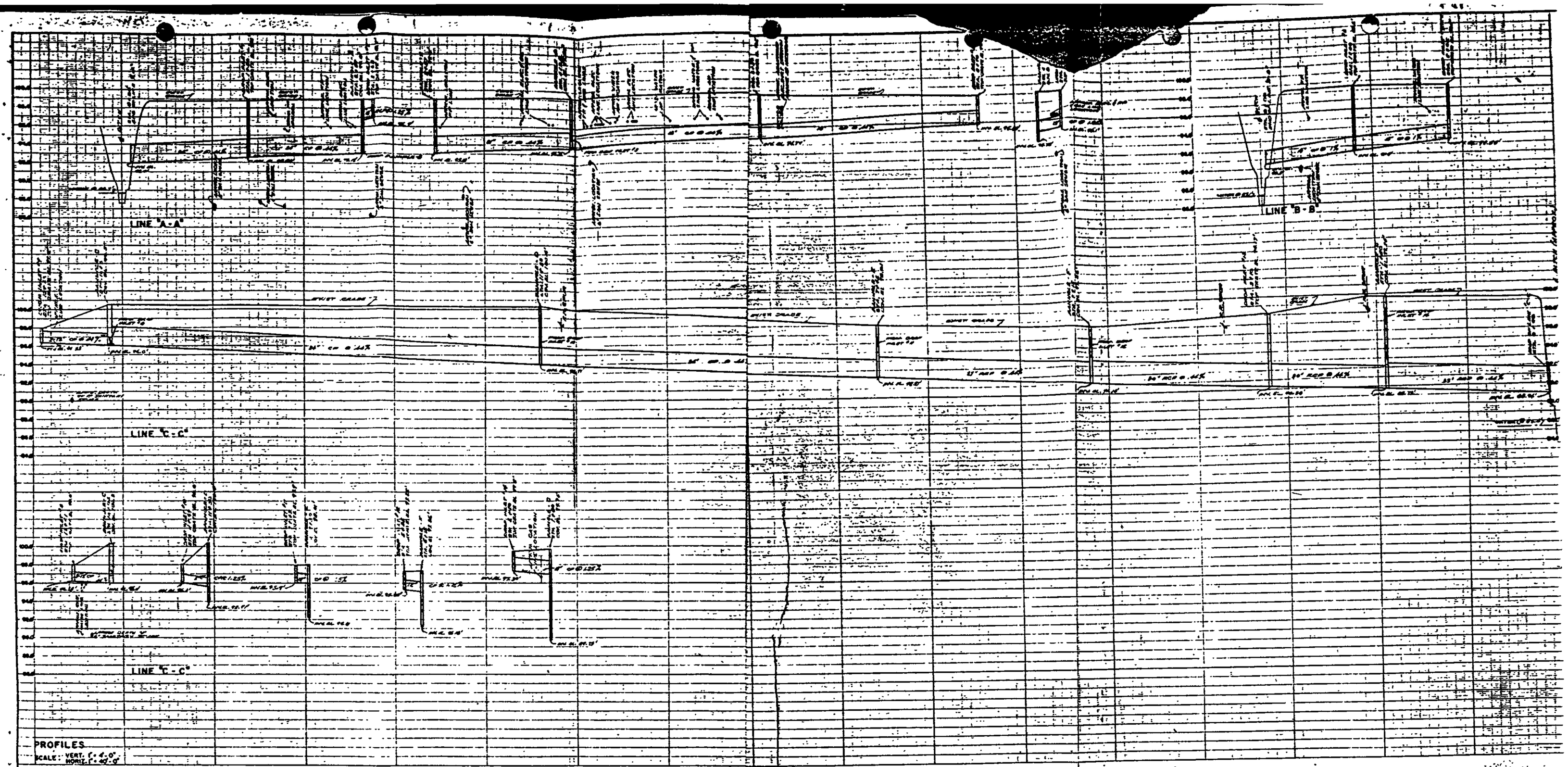
If you have any questions, call me at 766-7644.

Cordially,

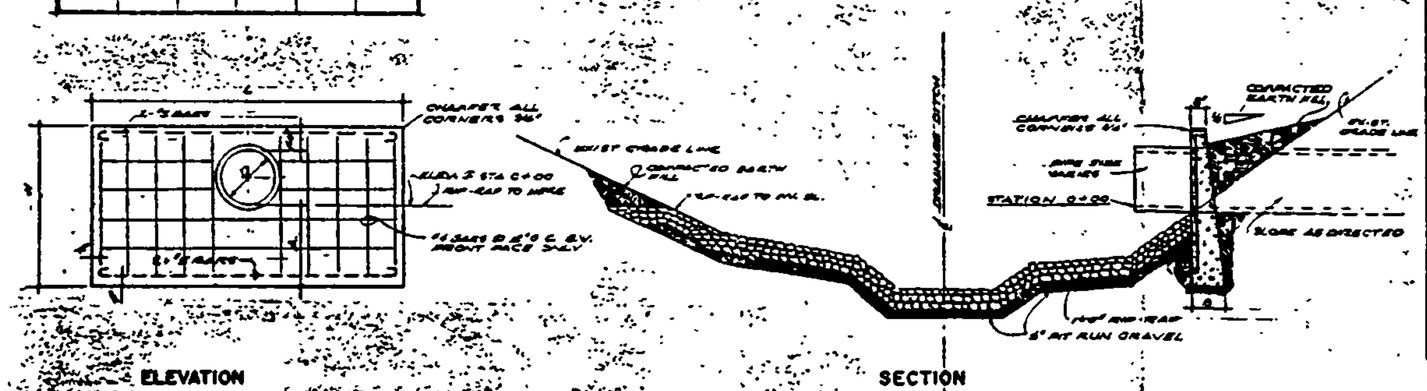
Roger A. Green, PE

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

RAG/bsj



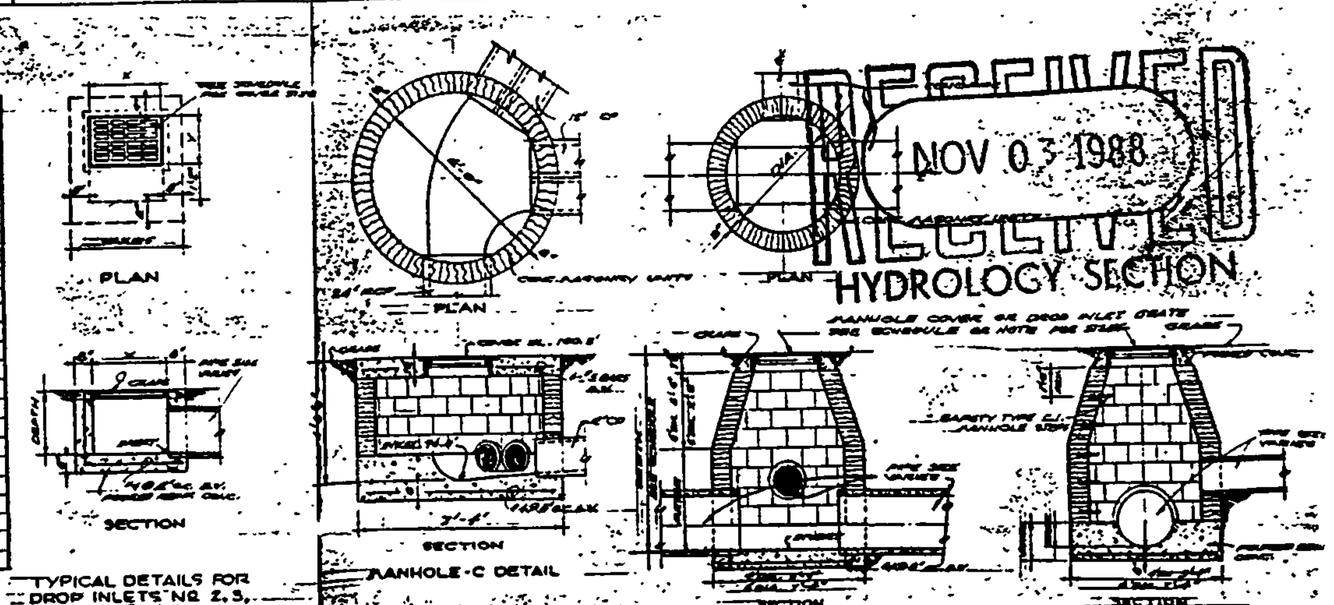
HEADWALL SCHEDULE					
D	A	B	H	L	REMARKS
18"	2'-6"	1'-2"	3'-2"	9'-9"	—
24"	3'-0"	1'-11"	4'-0"	12'-11"	
33"	3'-2"	2'-8"	6'-11"	15'-4"	



RIP-RAP & HEADWALL DETAILS
NO SCALE

MANHOLE & DROP INLET SCHEDULE						
NAME	COVER OR GRATE	SIZE				REMARKS
		SHAPE	DIA.	DEPTH		
A		ROUND	2'-0"	2'-0"		
B		8 SQ. H	2'-0" DIA.	2'-0"		
C		8 SQ. H	2'-0" DIA.	3'-3"		
D		8 SQ. H	2'-0" DIA.	4'-3"		
E		8 SQ. H	2'-0" DIA.	5'-9"		SEE DETAIL
F		8 SQ. H	2'-0" DIA.	6'-9"		
G		8 SQ. H	2'-0" DIA.	8'-9"		
		8 SQ. H	2'-0" DIA.	10'-9"		
		ROUND	2'-0" DIA.	12'-9"		
1			2'-0" x 2'-6"	2'-0"		
2	REINF. CONC.		2'-0" x 2'-6"	2'-0"		
3	REINF. CONC.		2'-0" x 3'-0"	4'-0"		
4		8 SQ. H	2'-0" DIA.	11'-8"		
5		8 SQ. H	2'-0" DIA.	3'-2"		
6		8 SQ. H	2'-0" DIA.	3'-0"		
7		8 SQ. H	2'-0" DIA.	3'-0"		
8	REINF. CONC.		2'-0" x 2'-6"	2'-9"		
9	REINF. CONC.		2'-0" x 2'-6"	2'-0"		
10	REINF. CONC.		2'-0" x 2'-6"	2'-0"		
11	REINF. CONC.		2'-0" x 2'-6"	3'-0"		
12	REINF. CONC.		2'-0" x 2'-6"	2'-0"		
13		8 SQ. H	2'-0" DIA.	7'-0"		
14	REINF. CONC.		2'-0" x 3'-0"	2'-8"		

NOTE: [illegible]



TYPICAL DETAILS FOR DROP INLETS NO. 2, 3, 5, 9, 10, 11, 12, & 14

DROP INLET & MANHOLE DETAILS
NO SCALE

TYPICAL DETAILS FOR MANHOLES & DROP INLETS

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

NO.	DATE	REVISIONS	BY	CK.	APPROVED

U.S. ATOMIC ENERGY COMMISSION
ALBUQUERQUE, NEW MEXICO

PROFILES & DETAILS
STORM SEWER SYSTEM
SOUTH ALBUQUERQUE WORKS

DRAWN | CHECKED | A.E. APPROVED | DESIGN | COMPUTED

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

September 16, 1988

Clinton Dodge
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: DRAINAGE PLAN FOR ADDITIONAL LANDSCAPING & PAVING
FOR G.E. PLANT (M-16/D6) REVISION DATED AUGUST 30, 1988

M14/D6

Dear Mr. Dodge:

Based on the information provided on your submittal of September 1, 1988, revisions as indicated are acceptable. At your convenience, please provide me with any type of correspondence that you have on file pertaining to approval by the M.R.G.C.D. for the construction involving release into the San Jose Drain. If no such documentation exists, I recommend that you call them for their review and approval prior to any further approval by the City of Albuquerque Hydrology Section.

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+856)

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
ALBUQUERQUE PROJECT OFFICE
P. O. BOX 252
ALBUQUERQUE, NEW MEXICO

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

RECEIVED
12 APR 1957
MRGCD

April 10, 1957

Mr. H. K. Shedel, Chief
Real Estate Division
Corps of Engineers
2132 Central Avenue, S.E.
Albuquerque, New Mexico

Dear Mr. Shedel:

Mr. John O'Hara of the Universal Grading Company has requested that the Bureau of Reclamation make a statement concerning a two-pipe, 72-inch culvert installation at Station 131+99, and two 36-inch drain inlets at Stations 130+46.38 and 135+48.68 on the San Jose Drain, as granted by a license approved by the Bureau of Reclamation March 20, 1957.

The above structures were inspected by the Bureau of Reclamation and accepted as meeting all requirements set forth in the license.

The license was transmitted to the Chief Engineer of the Middle Rio Grande Conservancy District for approval and distribution to your office. To date we have not received the executed copy for our files.

Very truly yours,

Charles F. Clark
Acting Project Manager

Copy to: Universal Grading Co.,
Attn: Mr. John O'Hara

Mr. Herbert Hall, Chief Engineer, MRGCD

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

SWKRE

10 April 1957

SUBJECT: Use by the AEC of the San Jose Drain in Connection with AEC-SAW Construction

Mr. Hubert Ball
Chief Engineer
Middle Rio Grande Conservancy District
P. O. Box 581
Albuquerque, New Mexico

Dear Mr. Ball:

Further reference is made to your letter of 19 March 1957, with copies of executed license attached, and letter of the Bureau of Reclamation dated 14 March 1957. In line with the specific request in each of these communications, this District certainly agrees that the licensor should be relieved of damages which might accrue through the construction, operation and maintenance of the facilities specified to be placed by the Atomic Energy Commission.

It is believed that our procedures vary somewhat in the handling of these real estate matters; however, it is recognized that always before, an adequate solution to the differences has been worked out. Our relationships have, in the past, been very desirable in this connection.

It is believed that the inclosed license, which was discussed between you and Mr. Pollock, will fully meet all your requirements, particularly those specified in the above-referenced letters, and it is hoped that this may be executed by the Conservancy District and the Bureau of Reclamation and returned for uses of the Atomic Energy Commission.

Sincerely yours,

1 Incl (quad)
1. License

H. K. SHADEL
Chief, Real Estate Division

March 19, 1957

Mr. Henry K. Shadel, Chief, Real Estate Division
District, Corps of Engineers
P. O. Box 1538
Albuquerque, New Mexico

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Dear Sir:

Attached hereto four copies of a license granting permission to make certain installations in connection with the AEC Project on Woodwood Avenue and San Jose Drain.

Mr. Thompson's letter points out that the Bureau of Reclamation certainly would deny any responsibility for damages incurred by any individual in connection with this installation and I wish to further emphasize that the Middle Rio Grande Conservancy District takes the same position. We expect the Corps of Engineers, or the Atomic Energy Commission, to assume all liability for damages in connection with this work and to provide certain assurances to the Middle Rio Grande Conservancy District that they would so operate.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

HB/mam

attachments

IN REPLY
REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
ALBUQUERQUE PROJECT OFFICE
P. O. BOX 252
ALBUQUERQUE, NEW MEXICO

18 MAR 1957
MRGCD

March 14, 1957

Mr. Hubert Ball, Chief Engineer
Middle Rio Grande Conservancy District
Post Office Box 581
Albuquerque, New Mexico

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Dear Mr. Ball:

Enclosed is a license for a two-pipe culvert and two drain inlets on the San Jose Drain, Property Map 44, Section 32, in the vicinity of Wesmeco Drive, as requested by Corps of Engineers, U. S. Army, and transmitted to us by your letter dated March 6, 1957.

I have approved this license and if you concur, please approve and transmit to the licensee with instructions to execute the license and return one copy for your files and one copy for our files.

Please note that typical drawings for installation of both concrete and corrugated metal pipe culverts are attached to the license. Also note that we have disclaimed responsibility for any flood damages resulting from backflow through the inlets.

Instructions are attached to the license for the convenience of the licensee in requesting elevations and inspection.

I am enclosing an extra copy of this letter for your convenience in transmitting instructions to the licensee. Also enclosed is an extra copy of the license for you to submit to the City Engineer if you so desire.

Sincerely yours,

John C. Thompson
Project Manager

Enclosures

March 6, 1957

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Bureau of Reclamation-Albuquerque Project
P. O. Box 252
Albuquerque, New Mexico

Attention: Charles H. Clark

Gentlemen:

Attached hereto copy of a letter received from Mr. H. K. Shadel, Chief, Real Estate Division, Corps of Engineers, U. S. Army. The subject matter is self-explanatory and I am also including plan for proposed construction as mentioned. I would appreciate an early reply as requested by Mr. Shadel.

The drains requested do not seem to be strictly in line with established policy, however I have been acquainted with this particular area for twenty years and have never seen surface water in any amounts in that particular area which would constitute a hazard to the drain. Also, that land has been irrigated consistently for several years and would be entitled to over flow protection from excessive use of water from conservancy structures.

I would think particular attention should also be paid to height of the particular drains, as you know this structure is used for City storm sewers and it is possible that height of water would reach a point where it would back through the proposed drain inlets and we should certainly be on record as not assuming any liability in connection with any damages which might result due to the previous construction of the City of Albuquerque.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

HB/mam

attachment
cc - to
Corps of Army Engineers
attn.: Mr. H. K. Shadel

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ALBUQUERQUE DISTRICT
P. O. BOX 1538
ALBUQUERQUE, NEW MEXICO

RECEIVED
NOV 07 1988
HYDROLOGY SECTION
MAR 1957
MRGCD

SWKRE

REFER TO FILE NO.

March 1957

SUBJECT: Acquisition of Land, AEC, Albuquerque, New Mexico

Mr. Hubert Ball
Chief Engineer
Middle Rio Grande Conservancy District
510 Second Street N.W.
Albuquerque, New Mexico

Dear Mr. Ball:

Mr. Pollock of this District personally discussed with you, plans of the Atomic Energy Commission close to its ACF Industries plant in south Albuquerque. The current plans of the Atomic Energy Commission provide that two drains would be constructed into the San Jose Drain and the Commission would fill an easement area over the drain, constructing, of course, adequate culvert space thereunder, and the present timber bridge at the point of improvement would be eliminated. At the point of crossing, an easement would be required, approximating 25 feet in width, for road purposes.

As this District understands your requirements, as discussed with Mr. Pollock, a formal presentation is required to your office, and that is the prime purpose of this communication. It is understood that, on the basis of this submittal, consideration will be given and determination will then be made as to the application of the Atomic Energy Commission, and as to the appropriate procedures which should be used in gaining the rights requested.

It is planned that a license interest would be procured in regard to the two drains, and that an easement right would be acquired in regard to the road fill where the bridge now exists. It is understood also that if the Commission would stand the expense of these developments, there would be no charge for the right-of-way instruments requested. It is understood further, from discussions with Mr. Pollock, that you would require two 6-foot culverts under the fill, rather than one, as indicated by the Atomic Energy Commission.

Your early advice in regard to the foregoing will be appreciated. The Atomic Energy Commission is acquiring adjacent lands for development purposes, and will need the facilities mentioned above in the

SWKRE 1 March 1957

SUBJECT: Acquisition of Land, AEC, Albuquerque, New Mexico

immediate future. The maps displayed to you by Mr. Pollock, showing details, are attached.

Sincerely yours,

H. K. SHADEL
Chief, Real Estate Division

1 Incl
Set of Maps

August 21, 1953

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Bureau of Reclamation-Albuquerque Project
P. O. Box 252
Albuquerque, New Mexico

Attention: Mr. John C. Thompson, Project Manager

Re: License-Storm Sewer Drains, San Jose Drain,
South Albuquerque Works, AEC

Gentlemen:

Attached hereto is a copy of a letter from Mr. H. K. Shadel, Chief, Real Estate Division, Corps of Engineers. Also attached hereto is a copy of the proposed plans and specifications for this construction.

There are a couple of matters I think you should consider in making your recommendation for this proposed construction.

1. This land is not within the benefitted area of the Middle Rio Grande Conservancy District and the AEC pays no part of the expenses for the operation, maintenance and construction of Middle Rio Grande Conservancy District works.

2. It seems to me that a license wherein they assume at least a portion of the liability for damages, that might arise through this construction, certainly is in order particularly in view of the fact that this land is not charged for Conservancy benefits.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

HB/mam

attachments

cc - to
Edwin W. Elliott

U. S. ARMY ENGINEER DISTRICT, ALBUQUERQUE
CORPS OF ENGINEERS
P. O. BOX 1538
ALBUQUERQUE, NEW MEXICO

19 AUG 1958
MRGCD

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

REFER TO FILE NO. SWKRE

18 August 1958

SUBJECT: License for Installation of Storm Sewer Drains, San Jose Drain, South Albuquerque Works, AEC, New Mexico

Mr. Hubert Ball
Chief Engineer
Middle Rio Grande Conservancy District
P. O. Box 581
Albuquerque, New Mexico

Dear Mr. Ball:

As you were advised, the Atomic Energy Commission had requested a license for the installation of certain storm sewer drains into the San Jose Drain adjacent to the South Albuquerque Works. You requested maps reflecting the installation and specifications for these drains and in accordance therewith, there are inclosed for your use Drawings SAW-AG-1/2 and 2/2, in duplicate, pertaining to the requested installation.

It will be appreciated if you will take the necessary action toward approving the installation and procuring the necessary license. You will recall that the Bureau of Reclamation approved on September 13, 1957, the installation of two culverts at the South Albuquerque Works and it was thought that perhaps an amendment to the previous license whereby the subject drains could be included might be more expeditious than the acquiring of a license by a separate instrument. You intimated, however, that it would be just as expeditious to procure a new license as it would be to amend the existing agreement. It is assumed that the new license will be on the same terms as with the license granted September 13, 1957.

Please be assured your assistance in this matter will be very helpful and if further information is needed, please advise.

Sincerely yours,

H. K. SHADEL
Chief, Real Estate Division

2 Incl
1. Dwg SAW-AG-1/2 (dup)
2. " " " 2/2 (dup)

October 24, 1957

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Re: File SWKRE

Corps of Engineers, U. S. Army
Office of the District Engineer
Albuquerque District
P. O. Box 1538
Albuquerque, New Mexico

Attention: H. K. Shadel, Chief, Real Estate Division

Dear Sirs:

I am returning herewith your copy of a license permitting installation of certain structures as listed.

In your letter you request additional copies of the license. There were only three copies available and since we do not have the facilities to make unlimited copies, I suggest you have the original--which is herewith returned to you--photostated to fill your requirements.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

HB/mam

encl.

cc - to
Bureau of Reclamation

October 24, 1957

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Bureau of Reclamation-Albuquerque Project
P. O. Box 252
Albuquerque, New Mexico

Gentlemen:

Attached hereto is your copy of license permitting construction of a crossing in the San Jose Interior Drain by the A. E. C. near the A.C.F. plant in the southerly portion of Albuquerque.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

HB/mam

encl.

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ALBUQUERQUE DISTRICT
P. O. BOX 1538
ALBUQUERQUE, NEW MEXICO

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

REFER TO FILE NO SWKRE

9 October 1957

SUBJECT: License for Installation of Pipes and Crossing, San Jose Drain, AEC, SAW, Albuquerque, New Mexico

TO: Mr. Hubert Ball
Chief Engineer
Middle Rio Grande Conservancy District
P. O. Box 581
Albuquerque, New Mexico

Dear Sir:

Receipt of your letter of 30 September 1957 with three (3) copies of License executed by the Bureau of Reclamation, is acknowledged.

The License was duly accepted on behalf of the Atomic Energy Commission on 3 October 1957.

Pursuant to your request, all three (3) copies of the License are being returned herewith for distribution. You are advised that the Atomic Energy Commission has requested one (1) executed copy and four (4) conformed copies. Either one (1) executed copy or a true copy is requested for the files of the Albuquerque District.

Your assistance in expediting this transaction has indeed been appreciated.

Sincerely yours,

H. K. SHADEL
Chief, Real Estate Division

1 Incl (trip)
License

September 30, 1957

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

Corps of Engineers
Albuquerque District
P. O. Box 1538
Albuquerque, New Mexico

Attention: Mr. H. K. Shadel

Gentlemen:

Attached hereto, in triplicate, is license on proposed road crossing on the Sand Jose Drain.

On execution of the license by the proper official, please return to this office and I will handle the distribution of the various copies.

Respectfully yours,

Hubert Ball, Chief Engineer
MIDDLE RIO GRANDE CONSERVANCY DISTRICT

attachment

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ALBUQUERQUE DISTRICT
P. O. BOX 1538
ALBUQUERQUE, NEW MEXICO

27 SEP 1957
MAILED

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

REFER TO FILE NO SWKRE

26 September 1957

SUBJECT: Use by the AEC of the San Jose Drain in Connection with AEC-SAW Construction

Mr. Hubert Ball
Chief Engineer
Middle Rio Grande Conservancy District
P. O. Box 581
Albuquerque, New Mexico

Dear Mr. Ball:

Reference is made to our letters of 10 April 1957 and 26 August 1957, subject as above. It will be appreciated if the information requested is furnished at the earliest possible date.

Sincerely yours,

H. K. SHADEL
Chief, Real Estate Division

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
ALBUQUERQUE PROJECT OFFICE
P. O. BOX 252
ALBUQUERQUE, NEW MEXICO

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

September 13, 1957

Mr. Hubert Ball, Chief Engineer
Middle Rio Grande Conservancy District
Post Office Box 581
Albuquerque, New Mexico

Dear Mr. Ball:

Please refer to my letter of March 14, 1957 transmitting a license to install a 2-pipe culvert and two drain inlets in the San Jose Drain as requested by the Corps of Engineers. Please refer further to a letter of August 26, 1957 addressed to you from Mr. H. K. Shadel requesting status of this license.

We have searched our files and find that our file copy of the license contains a revision of Paragraph No. 2 which was made March 20, 1957. You will, perhaps, recall a conference on that date in our office in which Mr. Pollock was present.

Enclosed is a duplicate license for your approval and transmission to the licensee.

Please instruct the licensee to retain the original license and return one copy for your files and one copy for our files. I am enclosing an extra copy of this letter for your convenience in transmitting instructions to the licensee.

If you have any questions regarding this matter, please contact this office.

Sincerely yours,

John C. Thompson
Project Manager

Enclosures

7-296
(7-56)

RECEIVED
NOV 03 1988
HYDROLOGY SECTION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Project Middle Rio Grande Branch Albuquerque State New Mexico

LICENSE FOR ERECTION AND MAINTENANCE OF STRUCTURES

---

1. Pursuant to authority given by the Commissioner of the Bureau of Reclamation, thereunto duly authorized by the Secretary of the Interior, the undersigned hereby accepts a license to erect and **maintain two 6-foot culverts under a proposed road crossing at Station 131+99 on the San Jose Drain which Station is also the intersection of Wesmeco Drive, and two 36-inch Drain inlets at Station 130+46.38 and 135+48.68 on the said San Jose Drain** in connection with the Middle Rio Grande Project, Bureau of Reclamation, constructed pursuant to the act of Congress approved June 17, 1902 (32 Stat., 388), and acts amendatory thereof or supplementary thereto, at a point

as described above

upon the terms and conditions hereinafter set forth:

~~2. [illegible] damages to the property of the United States [illegible] privileges conferred by this license.~~

2. This license shall continue so long as in the opinion of the licensor it is considered to be expedient and not detrimental to the public interest, and shall be revocable by said officer upon ten days' written notice to the licensee. Upon such revocation the aforesaid structure or structures and all accessories shall be removed without delay at the expense of the **Licensee**.

3. The aforesaid structure or structures shall be so erected as not to obstruct in any manner the flow of water in the canals, laterals, or drain ditches of the United States, or to interfere in any manner whatsoever with the construction, operation, and maintenance of any part of the Project.

4. In the erection of the aforesaid structure or structures the following specifications and conditions must be complied with: **The culverts will be 72-inch I.D. standard strength concrete, or 72-inch, 12-gage corrugated metal pipe, and will be installed in accordance with Drawing 163-D-198 or 163-D-143, as applicable attached hereto and by this reference made a part hereof. Strict conformance with the existing alignment of the San Jose Drain will be required and the invert elevation of the culverts will be one foot below the existing bottom grade of the drain. The drain inlets will be 36-inch, 12-gage corrugated metal pipes and shall be placed in accordance with Drawing 163-D-198. As the City of Albuquerque uses the San Jose Drain as a storm run-off channel, special care should be exercised to keep the outlet end of the inlets as high as possible. The Bureau of Reclamation and Middle Rio Grande Conservancy District disclaim any responsibility for possible flood damage due to backflow through these inlets during storm runoff. All construction is subject to the approval of the Bureau of Reclamation.**

5. Covenant against Contingent Fees. Licensee warrants that no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial agencies maintained by the licensee for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to an-

7. Non-Discrimination Clause. In connection with the performance of work under this license, the licensee agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The licensee agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Project Manager setting forth the provisions of the non-discrimination clause. The licensee further agrees to insert the foregoing provision in all subcontracts hereunder, except subcontracts for standard commerical supplies or raw materials.

Amended

MRecD

Date 9/25/86

Amended
General Electric Co.
By [signature]
licensee.
Date 9/25/86

Dated at Albuquerque, New Mexico

this 3rd day of October, 1957

UNITED STATES ATOMIC ENERGY COMMISSION
Albuquerque Operations Office

BY: [signature]
Licensee
Director, Engineering & Construction Division

Witness:

Approved by: Approved September 13, 1967

HYDRCAL

ONSITE AND OFFSITE FLOW CONTRIBUTIONS

RECEIVED
AUG 04 1986
HYDROLOGY SECTION

JUNE 25, 1986

PROJECT NAME	GE CMMC						
PROJECT NUMBER	5185.1100						
BASIN DESIGNATION	102	103	104	105-106	107	108	109
ANALYSIS POINT	102	103	104	105	107	108	109
BASIN CHARACTERISTICS							
SOIL							
Soil Type (SCS)	Ga-Plate 40	Ga-Plate 40	Ga-Plate 40	Ga-Plate 40	Ga-Plate 40	Ga-Plate 40	Ga-Plate 40
Hydrologic Soil Group	B	B	B	B	B	B	B
SIZE							
Onsite (Acres)	8.5000	7.4000	6.3000	5.7000	4.3000	3.1000	2.1000
Runoff Coefficient (ASCE)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Impervious (Percent)	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000
Offsite (Acres)	9.4000	9.4000	9.4000	9.4000	4.2000	0.8000	0.8000
Runoff Coefficient (ASCE)	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000
Impervious (Percent)	72.0000	72.0000	72.0000	72.0000	72.0000	72.0000	72.0000
Total Basin Size (Acres)	17.9000	16.8000	15.7000	15.1000	8.5000	3.9000	2.9000
% Impervious	85.2961	84.3333	83.2357	82.5695	86.1647	94.2564	92.2759
Composite Runoff Coefficient	0.8425	0.8321	0.8204	0.8132	0.8518	0.9385	0.9172
LENGTH (FT)	1560.0000	1560.0000	1490.0000	1380.0000	780.0000	570.0000	300.0000
UPPER ELEVATION (FT)	4940.0000	4940.0000	4940.0000	4940.0000	4940.0000	4940.0000	4940.0000
LOWER ELEVATION (FT)	4938.2900	4937.9400	4938.3700	4937.9000	4938.5400	4939.2100	4938.4900
SLOPE (FT/FT)	0.0011	0.0013	0.0011	0.0015	0.0019	0.0014	0.0050
TIME OF CONCENTRATION							
Formula Tc	31.3935	28.7948	29.8836	24.8085	14.7635	13.0180	4.8335
Calculated Velocity = L/(Tcx60)	0.8388	0.9029	0.8310	0.9271	0.8806	0.7298	1.0344
Alternate Velocity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Velocity (DPM22.2B-1orB-2)	0.4500	0.5500	0.5500	0.5500	0.5500	0.5500	0.6500
Velocity Tc	58.5185	47.2727	45.1515	41.8182	23.6364	17.2727	7.6923
Tc	31.3935	28.7948	29.8836	24.8085	14.7635	13.0180	10.0000
RAINFALL DATA							
RAINFALL (DPM22.2D-1) (IN/6 HR)	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500
INTENSITY	2.6537	2.7732	2.7212	2.9922	3.8990	4.1574	4.7560
RATIONAL FORMULA Q = CIA							
Q100 = (CFS)	40.0176	38.7700	35.0497	36.7444	28.2287	15.2161	12.6509
Q10 = (CFS)	26.2916	25.4719	23.0276	24.1410	18.5463	9.9970	8.3116
DELTA Q100 TO NEXT ANALYSIS POINT	1.2477	3.7203	-1.6947	8.5156	13.0127	2.5652	12.6509
DELTA Q10 TO NEXT ANALYSIS POINT	0.8197	2.4442	-1.1134	5.5948	8.5493	1.6853	8.3116
TYPE OF INLETS	D	D	D	D	D	D	D
DEPTH OF WATER (FT)	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200
CAPACITY (DPM22.3D)(CFS)	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
NUMBER EXISTING INLETS	1.0000	1.0000	1.0000	2.0000	1.0000	1.0000	10.0000
NUMBER OF NEW INLETS NEEDED	-0.7227	-0.1733	-1.3766	-0.1076	1.8917	-0.4300	-7.1837

3/02/84 FILE NAME:HDBCAMRV.WKS

RECEIVED
AUG 04 1986
HYDROLOGY SECTION

PRESSURIZED STORM SEWER DPM CRITERIA

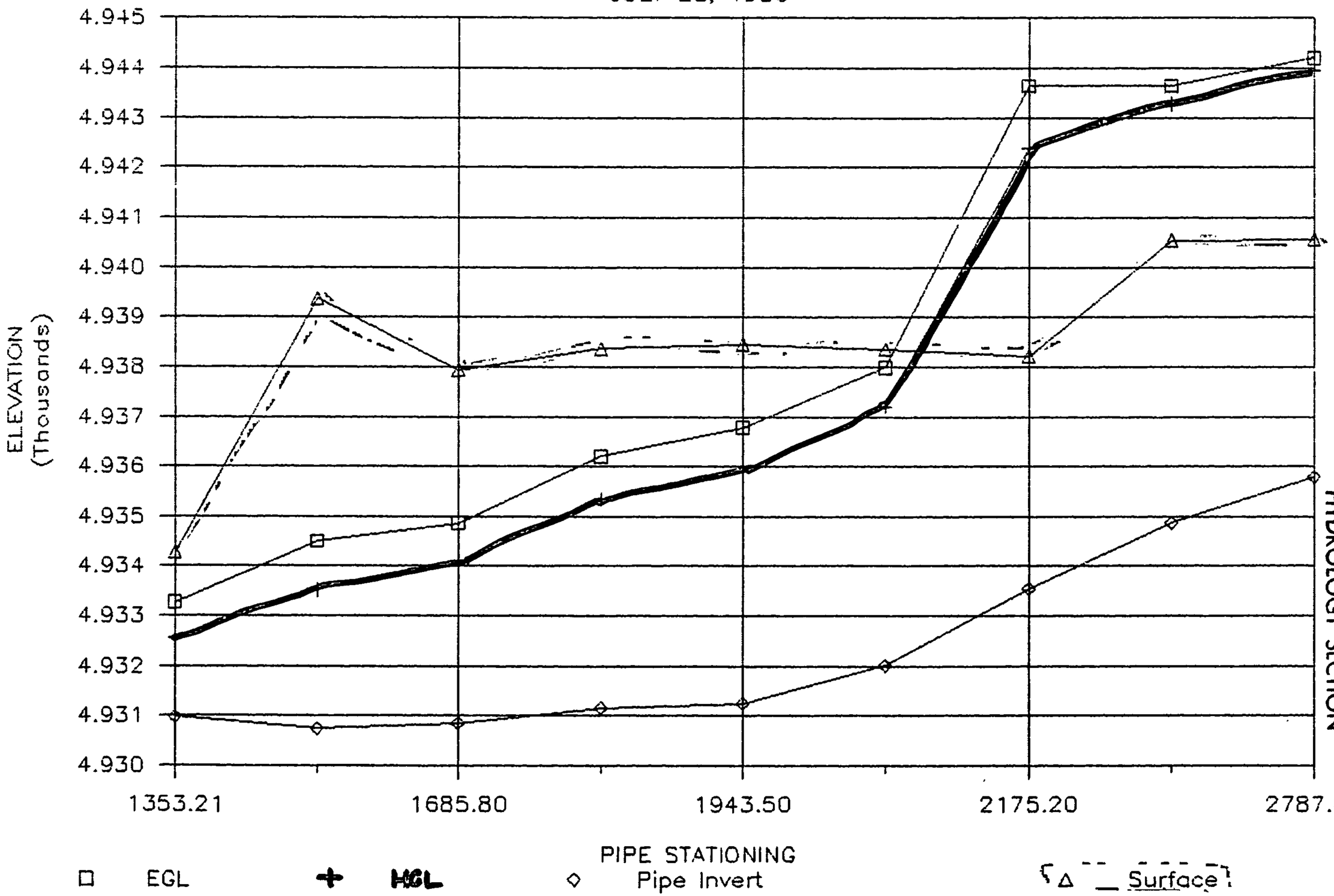
GENERAL ELECTRIC -- CMMC JULY 28, 1986 EXISTING SYSTEM

MANHOLES ADDED, FRICTION LOSS CHANGED, STATIONING REVISED AND BEGINNING HGL RAISED TO SOFFIT

TITLE									
FROM:	101	102	103	104	105	105.5	106	107	108
TO:	102	103	104	105	105.5	106	107	108	109
REACH NO:	1	2	3	4	5	6	7	8	9
TYPE OF REACH:	P	P	P,T	P	P,JTR	P	P,C	JTR,	P,C
BEGINNING STA:	1353.21	1609.00	1685.80	1763.90	1943.50	1998.50	2175.20	2561.80	2787.60
INV. EL.	4928.53	4930.64	4930.76	4930.91	4931.22	4931.40	4932.00	4933.72	4934.76
BEG PIPE SIZE(FT)	2.75	2.50	2.50	2.50	2.50	2.25	2.00	2.00	2.00
END PIPE SIZE(FT)	2.75	2.50	2.50	2.50	2.50	2.25	2.00	2.00	2.00
PIPE SLOPE	0.00825	0.00138	0.00189	0.00173	0.00335	0.00335	0.00424	0.00430	0.00468
Q (CFS)	40.02	38.77	35.05	36.74	36.74	28.23	28.23	15.23	12.65
LENGTH (FT)	255.79	86.71	79.16	179.66	55.00	177.56	386.60	225.80	244.20
BEGINNING HGL EL.	4931.28	4932.56	4933.54	4934.07	4935.34	4935.90	4937.20	4942.39	4943.28
PIPE AREA:	5.94	4.91	4.91	4.91	4.91	3.98	3.14	3.14	3.14
BEG VEL (FPS)	6.74	7.90	7.14	7.48	7.48	7.10	8.99	4.85	4.03
END VEL (FPS)	6.74	7.90	7.14	7.48	7.48	7.10	8.99	4.85	4.03
BEGINNING EGL EL.	4931.98	4933.53	4934.33	4934.94	4936.21	4936.69	4938.45	4942.76	4943.54
--LOSSES----------									
FRICTION ! n	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
LOSS !LOSS(FT)	1.25	0.66	0.49	1.23	0.38	1.26	5.13	0.87	0.65
TRANS ! D2	0	0	0	0	0	0	0	0	0
LOSS 5D !LOSS(FT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MANHOLE ! NO.	1	1	1	1	0	1	1	1	1
LOSS !LOSS(FT)	0.04	0.05	0.04	0.04	0.00	0.04	0.06	0.02	0.01
BEND ! ANGLE	0	169	0	0	104	0	0	0	0
LOSS !LOSS(FT)	0.00	0.27	0.00	0.00	0.19	0.00	0.00	0.00	0.00
ANGLE !ANGLE									
POINT !LOSS(FT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNCTURE !Q UP									
LOSS !D UP									
!Q LAT	0	0	0	0	0	0	0	0	0
!D LAT									
!ANGLE									
!	0	0	0	0	0	0	0	0	0
!LOSS(FT)	0	0	0	0	0	0	0	0	0
MISC. LOSSES		0							
TOTAL LOSSES	1.28	0.97	0.53	1.27	0.56	1.30	5.19	0.89	0.66
END STATION	1609	1696	1765	1944	1999	2176	2562	2788	3032
END EGL EL.	4933.27	4934.51	4934.86	4936.21	4936.77	4937.98	4943.65	4943.65	4944.20
END HGL EL.	4932.56	4933.54	4934.07	4935.34	4935.90	4937.20	4942.39	4943.28	4943.95
PIPE INV. EL.	4930.6	4930.8	4930.9	4931.2	4931.4	4932.0	4933.6	4934.7	4935.9
SURFACE ELEVATION	4934.28	4939.38	4937.94	4938.37	4938.45	4938.35	4938.22	4940.54	4940.56

GE-CMMC EXISTING SYSTEM

JULY 28, 1986



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AUG 04 1986
HYDROLOGY SECTION

3/02/84 FILE NAME:HDBCAMRV.WKS

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AUG 04 1986
HYDROLOGY SECTION

PRESSURIZED STORM SEWER DPM CRITERIA

GENERAL ELECTRIC -- CMMC JULY 28, 1986 PARALLEL PIPE 106-107

MANHOLES ADDED, FRICTION LOSS CHANGED, STATIONING REVISED AND BEGINNING HGL RAISED TO SOFFIT

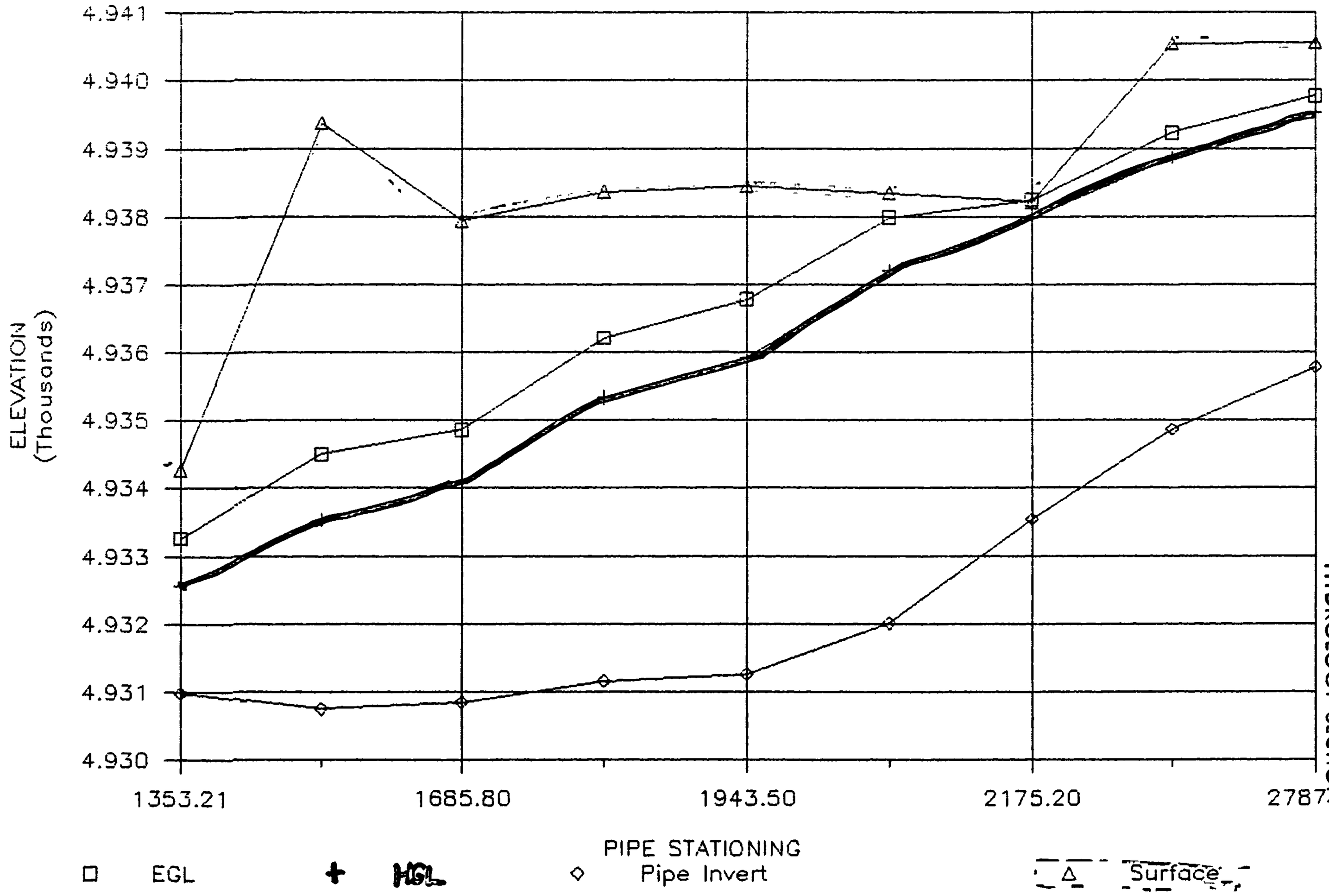
TITLE										
FROM:	101	102	103	104	105	105.5	106	107	108
TO:	102	103	104	105	105.5	106	107	108	109
REACH NO:	1	2	3	4	5	6	7	8	9
TYPE OF REACH:	p	P	P,T	P	F,JTR	P	P,C	JTR,	P,C
BEGINNING STA:	1353.21	1609.00	1685.80	1763.90	1943.50	1998.50	2175.20	2561.80	2787.60
INV. EL.	4928.53	4930.64	4930.76	4930.91	4931.22	4931.40	4932.00	4933.72	4934.76
BEG PIPE SIZE(FT)	2.75	2.50	2.50	2.50	2.50	2.25	2.95	2.00	2.00
END PIPE SIZE(FT)	2.75	2.50	2.50	2.50	2.50	2.25	2.95	2.00	2.00
PIPE SLOPE	0.00825	0.00138	0.00189	0.00173	0.00335	0.00335	0.00424	0.00430	0.00468
Q (CFS)	40.02	38.77	35.05	36.74	36.74	28.23	28.23	15.23	12.65
LENGTH (FT)	255.79	86.71	79.16	179.66	55.00	177.56	386.60	225.80	244.20
BEGINNING HGL EL.	4931.28	4932.56	4933.54	4934.07	4935.34	4935.90	4937.20	4937.97	4938.86

PIPE AREA:	5.94	4.91	4.91	4.91	4.91	3.98	6.83	3.14	3.14
BEG VEL (FPS)	6.74	7.90	7.14	7.48	7.48	7.10	4.13	4.85	4.03
END VEL (FPS)	6.74	7.90	7.14	7.48	7.48	7.10	4.13	4.85	4.03
BEGINNING EGL EL.	4931.98	4933.53	4934.33	4934.94	4936.21	4936.69	4937.47	4938.34	4939.11
--LOSSES---									
FRICTION ! n	0.012	0.012	0.012	0.012	0.012	0.012	0.013	0.012	0.012
LOSS !LOSS(FT)	1.25	0.66	0.49	1.23	0.38	1.26	0.76	0.87	0.65
TRANS ! D2	0	0	0	0	0	0	0	0	0
LOSS SD !LOSS(FT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MANHOLE ! NO.	1	1	1	1	0	1	2	1	1
LOSS !LOSS(FT)	0.04	0.05	0.04	0.04	0.00	0.04	0.01	0.02	0.01
BEND ! ANGLE	0	169	0	0	104	0	0	0	0
LOSS !LOSS(FT)	0.00	0.27	0.00	0.00	0.19	0.00	0.00	0.00	0.00
ANGLE !ANGLE									
POINT !LOSS(FT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNCTURE !Q UP									
LOSS !D UP									
!Q LAT	0	0	0	0	0	0	0	0	0
!D LAT									
!ANGLE									
!	0	0	0	0	0	0	0	0	0
!LOSS(FT)	0	0	0	0	0	0	0	0	0
MISC. LOSSES		0							

TOTAL LOSSES	1.28	0.97	0.53	1.27	0.56	1.30	0.77	0.89	0.66
END STATION	1609	1696	1765	1944	1999	2176	2562	2788	3032
END EGL EL.	4933.27	4934.51	4934.86	4936.21	4936.77	4937.98	4938.24	4939.23	4939.78
END HGL EL.	4932.56	4933.54	4934.07	4935.34	4935.90	4937.20	4937.97	4938.86	4939.53
PIPE INV. EL.	4930.6	4930.8	4930.9	4931.2	4931.4	4932.0	4933.6	4934.7	4935.9
SURFACE ELEVATION	4934.28	4939.38	4937.94	4938.37	4938.45	4938.35	4938.22	4940.54	4940.56

GE-CMMC PARALLEL PIPE 106-107

JULY 28, 1986



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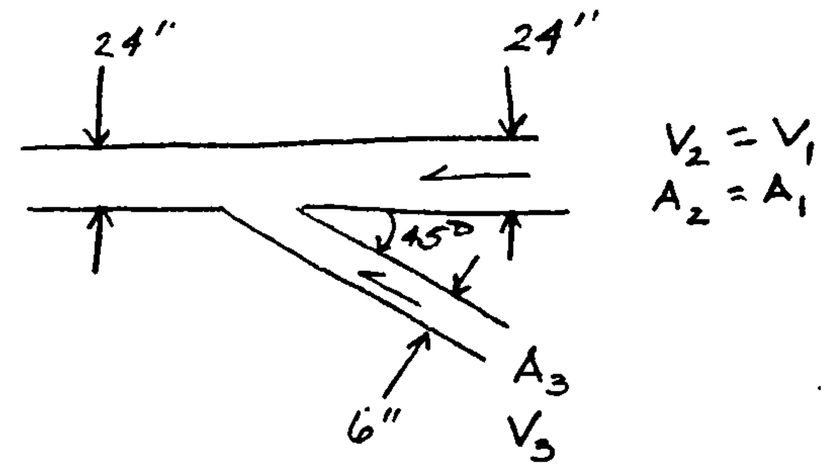
AUG 04 1986
HYDROLOGY SECTION

LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN DIEGO SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT GE-CMMC - JUNCTION LOSS			SHEET NUMBER OF
	COMPUTED BY: BXBBI	CHECKED BY:	JOB NUMBER 5185.11	DATE: 7/28/85

RECEIVED AUG 04 1986 HYDROLOGY SECTION

JUNCTION LOSS - DPM CRITERIA

$$h_j = \frac{V_2^2}{2g} - \frac{V_1^2}{2g} - \frac{2A_3}{A_2} \cdot \frac{V_3^2}{2g} \cdot \cos\theta$$



$V_2 = V_1$
$A_2 = A_1$

Example 24" pipe
6" lateral intersecting at 45°

$$h_j = \frac{2(0.1964)}{3.1416} \cdot \frac{(3.0958)^2}{64} \cos 45°$$

$$h_j = 0.01324 \text{ ft}$$

$$V_1 = \frac{1.486\,(0.5)^{2/3}}{0.012}(0.01)^{1/2}$$

$$V_1 = 7.801 \text{ ft/s}$$

$$V_3 = \frac{1.486\,(0.125)^{2/3}}{0.012}(0.01)^{1/2}$$

$$V_3 = 3.0958$$

$$A_2 = \frac{\pi(2)^2}{4} = 3.1416 \text{ ft}^2$$

$$A_3 = \frac{\pi(1/2)^2}{4} = 0.1964 \text{ ft}^2$$

if A_3 is smaller in proportion to A_2 the loss will even be less which is the case in the 6" lateral intersecting the 30" line

Most laterals intersect at the manholes and manhole losses have been included.

GENERAL ELECTRIC PRINTOUT

# CALC	NODE 1	NODE 2	ELEV	D1	D2	Q	A	V1	V2	K	LENGTH	DELTA	HV	n
1.000	101.000	101.000	4928.530	33.000	0.000	40.020	5.940	6.738	0.000	0.000	0.000	0.000	0.705	0.000
2.000	101.000	102.000	4930.640	33.000	0.000	40.020	5.940	0.000	0.000	572.938	255.790	0.000	0.705	0.012
3.000	102.000	102.000	4930.640	33.000	0.000	40.020	5.940	6.738	0.000	0.000	0.000	0.000	0.705	0.012
4.000	102.000	102.000	4930.640	30.000	33.000	40.020	1.000	7.898	6.738	0.000	4.000	11.000	0.969	0.012
5.000	102.000	103.000	4930.760	30.000	0.000	38.770	4.909	0.000	0.000	444.352	86.710	0.000	0.969	0.012
6.000	103.000	103.000	4930.760	30.000	0.000	38.770	4.909	7.898	0.000	0.000	0.000	0.000	0.969	0.012
7.000	103.000	103.000	4930.760	30.000	30.000	38.770	1.000	7.140	7.898	0.000	4.000	0.000	0.792	0.012
8.000	103.000	104.000	4930.910	30.000	0.000	35.050	4.909	0.000	0.000	444.352	79.160	0.000	0.792	0.012
9.000	104.000	104.000	4930.910	30.000	0.000	35.050	4.909	7.140	0.000	0.000	0.000	0.000	0.792	0.012
10.000	104.000	105.000	4931.220	30.000	0.000	36.740	4.909	0.000	0.000	444.352	179.660	0.000	0.870	0.012
11.000	105.000	105.000	4931.220	30.000	30.000	36.740	1.000	7.485	7.485	0.000	4.000	79.000	0.870	0.012

CODE	NODE	FS	FRIC L	MANH L	BEND L	EXP L	JUNC L	ANG L	CONT L	INLT L	TRANS L	TOT L	HGL	EGL
0.000	101.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4931.280	4931.985
1.000	102.000	0.005	1.248	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.248	4932.528	4933.233
2.000	102.000	0.000	0.000	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.283	4932.563	4933.268
5.000	102.000	0.008	0.025	0.000	0.000	0.000	0.111	0.000	0.000	0.000	0.000	1.394	4932.410	4933.379
1.000	103.000	0.008	0.660	0.000	0.000	0.000	0.111	0.000	0.000	0.000	0.000	2.054	4933.070	4934.039
2.000	103.000	0.000	0.000	0.048	0.000	0.000	0.111	0.000	0.000	0.000	0.000	2.102	4933.118	4934.087
5.000	103.000	0.006	0.028	0.000	0.000	0.000	0.076	0.000	0.000	0.000	0.000	2.178	4933.371	4934.163
1.000	104.000	0.006	0.493	0.000	0.000	0.000	0.076	0.000	0.000	0.000	0.000	2.671	4933.865	4934.656
2.000	104.000	0.000	0.000	0.040	0.000	0.000	0.076	0.000	0.000	0.000	0.000	2.711	4933.904	4934.696
1.000	105.000	0.007	1.228	0.000	0.000	0.000	0.076	0.000	0.000	0.000	0.000	3.939	4935.054	4935.924
5.000	105.000	0.007	0.027	0.000	0.000	0.000	1.435	0.000	0.000	0.000	0.000	5.374	4936.489	4937.359

CODES

1 - PIPE SECTION 2 - MANHOLE 3 - PIPE-BEND 4 - EXPANSION 5 - JUNCTION
6 - ANGLE - POINT 7 - CONTRACTION 8 - INLETS 9 - TRANSITIONS

# CALC	NODE 1	NODE 2	ELEV	D1	D2	Q	A	V1	V2	K	LENGTH	DELTA	HV	n
1.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.000	0.000	0.000	0.870	0.012
2.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.000	0.000	76.000	0.870	0.012
3.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.000	0.000	104.000	0.870	0.012
4.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.234	0.000	45.000	0.870	0.012
5.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.121	0.000	31.000	0.870	0.012
6.000	105.000	105.000	4931.220	30.000	0.000	36.740	4.909	7.485	0.000	0.000	0.000	0.000	0.870	0.012
7.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000%	1.701412E+38	0.000	0.121	0.000	90.000%	2.641944E+36	0.012

CODE	NODE	FS	FRIC L	MANH L	BEND L	EXP L	JUNC L	ANG L	CONT L	INLT L	TRANS L	TOT L	HGL	EGL
5.000	105.000	0.000	0.000	0.000	0.000	0.000	1.435	0.000	0.000	0.000	0.000	5.374	4935.054	493
6.000	105.000	0.000	0.000	0.000	0.000	0.000	1.435	0.000	0.000	0.000	0.000	5.374	4935.054	49
6.000	105.000	0.000	0.000	0.000	0.000	0.000	1.435	0.000	0.000	0.000	0.000	5.374	4935.054	
6.000	105.000	0.000	0.000	0.000	0.000	0.000	1.435	0.204	0.000	0.000	0.000	5.577	4935.25	
6.000	105.000	0.000	0.000	0.000	0.000	0.000	1.435	0.105	0.000	0.000	0.000	5.683	4935.	
2.000	105.000	0.000	0.000	0.043	0.000	0.000	1.435	0.000	0.000	0.000	0.000	5.726	4935.	
6.000	0.000	0.000	0.000	0.000	0.000	0.000	1.435%	3.202036E+35	0.000	0.000	0.000%	3.20203		

% 3.202036E+35

CODES

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

November 10, 1988

Suzi Balogh
Leedshill-Herkenhoff, Inc.
Post Office Box 1217
Albuquerque, New Mexico 87103

RE: ADDITIONAL INFORMATION FOR CONNECTIONS INTO THE SAN JOSE DRAIN (M-14/D6) RECEIVED NOVEMBER 3, 1988

Dear Ms. Balogh:

I am in receipt of the additional information pertaining to permission granted by the Middle Rio Grande Conservancy District for the connections into the san Jose DRain.

Our file is now complete for in case any questions should arise for work being done within the Conservancy's right-of-way.

I thank you for your assistance in providing the information.

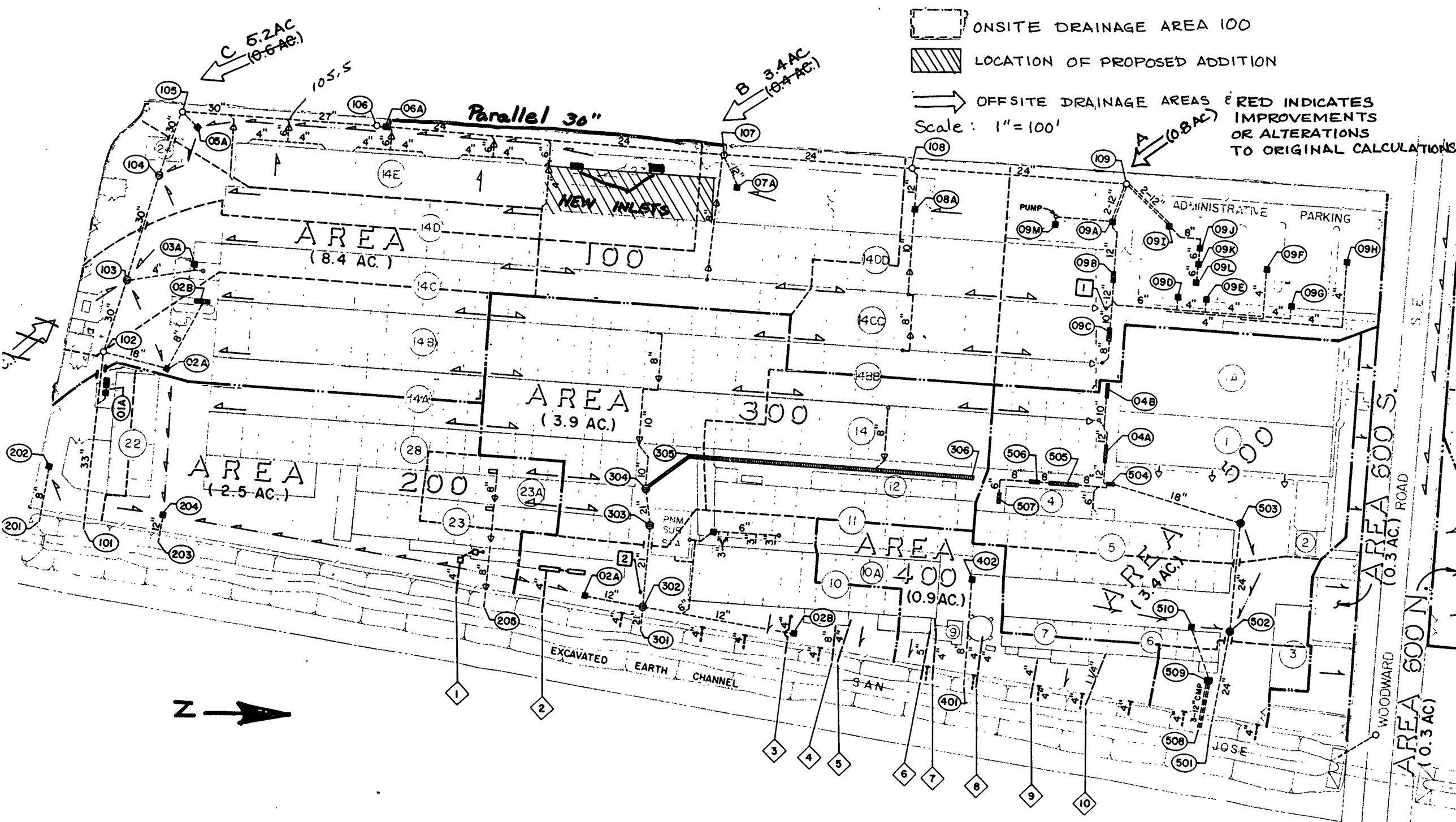
If I can be of further assistance, please feel free to call me at 768-2650.

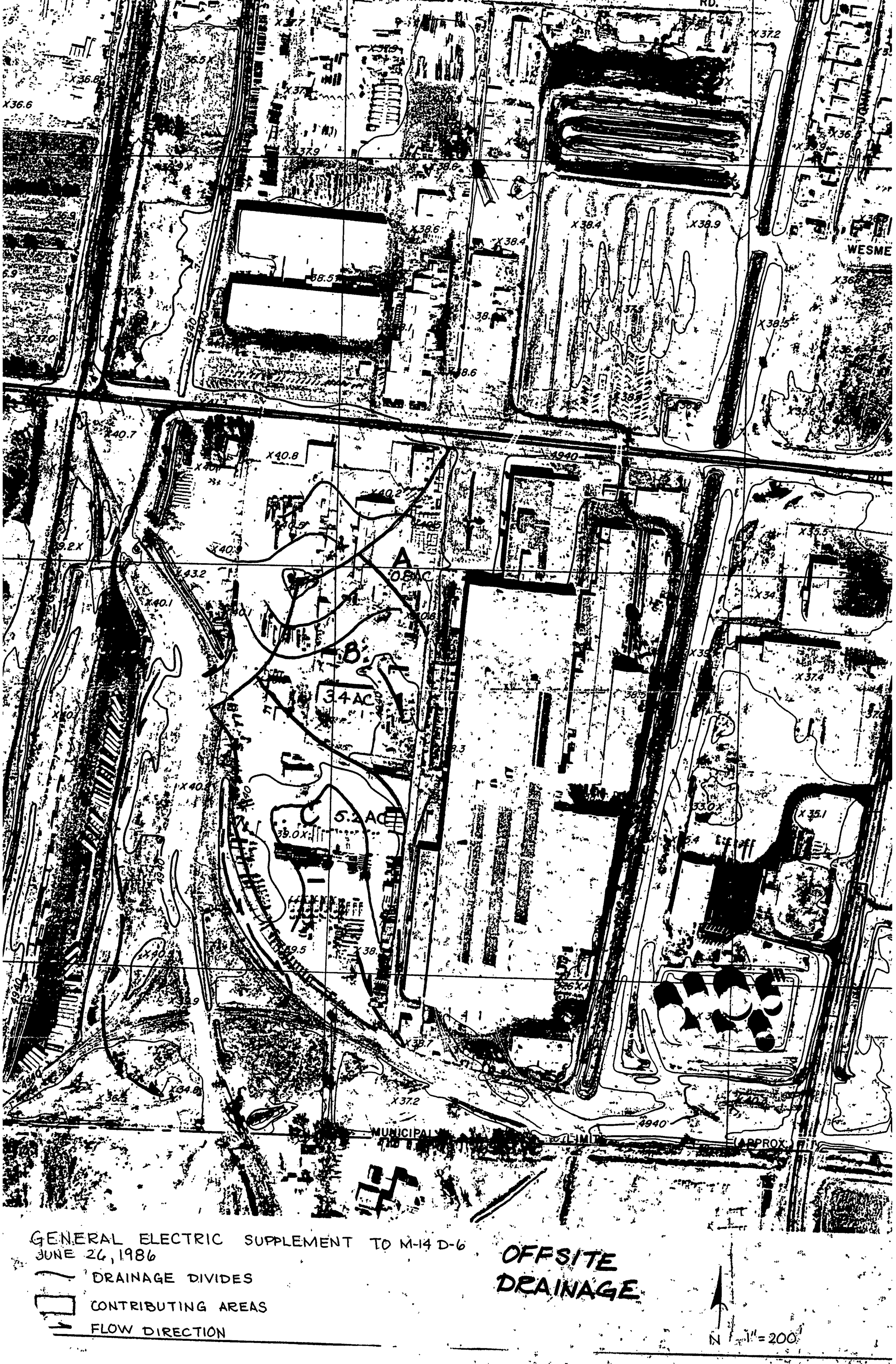
Cordially,

Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj
(WP+856)

GENERAL ELECTRIC SUPPLEMENT TO M-14 D-6
JUNE 26, 1986





GENERAL ELECTRIC SUPPLEMENT TO M-14 D-6
JUNE 26, 1986

DRAINAGE DIVIDES

CONTRIBUTING AREAS

FLOW DIRECTION

OFFSITE DRAINAGE

1986.11

PRELIMINARY ANALYSIS OF DESIGN

CALCULATIONS APPENDIX

HAZARDOUS WASTE CONTAINMENT AND STORM DRAINAGE IMPROVEMENTS G.E. AIRCRAFT ENGINE PLANT ALBUQUERQUE, NEW MEXICO

Prepared for
GENERAL ELECTRIC COMPANY

RECEIVED
JAN 21 1985
HYDROLOGY SECTION

July 1984

LEEDSHILL-HERKENHOFF, INC.

500 Copper Ave., N.W.
P.O. Box 1217 - Phone (505) 247-0294
Albuquerque, New Mexico 87103

ENGINEERS ARCHITECTS

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

92-84927-85

January 18, 1985

Mr. Fred Aguirre, Chief
City Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: GENERAL ELECTRIC AIRCRAFT ENGINE PLANT ROADWAY AND DRAINAGE IMPROVEMENTS

The General Electric Aircraft Engine Plant on Woodward Rd. is pursuing a long range upgrading of the existing facility. A drainage analysis and plan was developed in conjunction with a system to contain hazardous spills within the plant boundary. Several phased projects are anticipated to upgrade the hazardous materials handling and spill protection as well as to rehabilitate existing paving and storm drainage facilities. Concurrent with these civil improvements, extensive modernization of the manufacturing plant facilities is being accomplished.

Transmitted with this letter is an analysis of design titled Hazardous Waste Containment and Storm Drainage Improvements. This report and the accompanying Calculations Appendix constitute the drainage report for this complex. Since portions of the report are beyond the scope required for City Drainage approval, I have tagged those sections which contain the hydrology and hydraulic data.

Please note that the proposed storm drain and paving improvements are modifications of an existing developed site which is essentially 95% impervious.

If you have any questions, please do not hesitate to call.

Sincerely,

Clint Dodge

CLINT DODGE

jm

Enclosures

RECEIVED
JAN 21 1985
HYDROLOGY SECTION

1986.11

PRELIMINARY ANALYSIS OF DESIGN

CALCULATIONS APPENDIX

HAZARDOUS WASTE CONTAINMENT AND STORM DRAINAGE IMPROVEMENTS G.E. AIRCRAFT ENGINE PLANT ALBUQUERQUE, NEW MEXICO

Prepared for
GENERAL ELECTRIC COMPANY

July 1984

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500 Copper Ave., N.W.
P.O. Box 1217 - Phone (505) 247-0294
Albuquerque, New Mexico 87103

ENGINEERS ARCHITECTS

LEEDSHILL-HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

CALCULATIONS INDEX

2-6 Containment

7-12 Hydrology

13-50 Storm Drain Hydraulics, Existing and Proposed Systems

51-52 Quantities & Cost Estimates

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

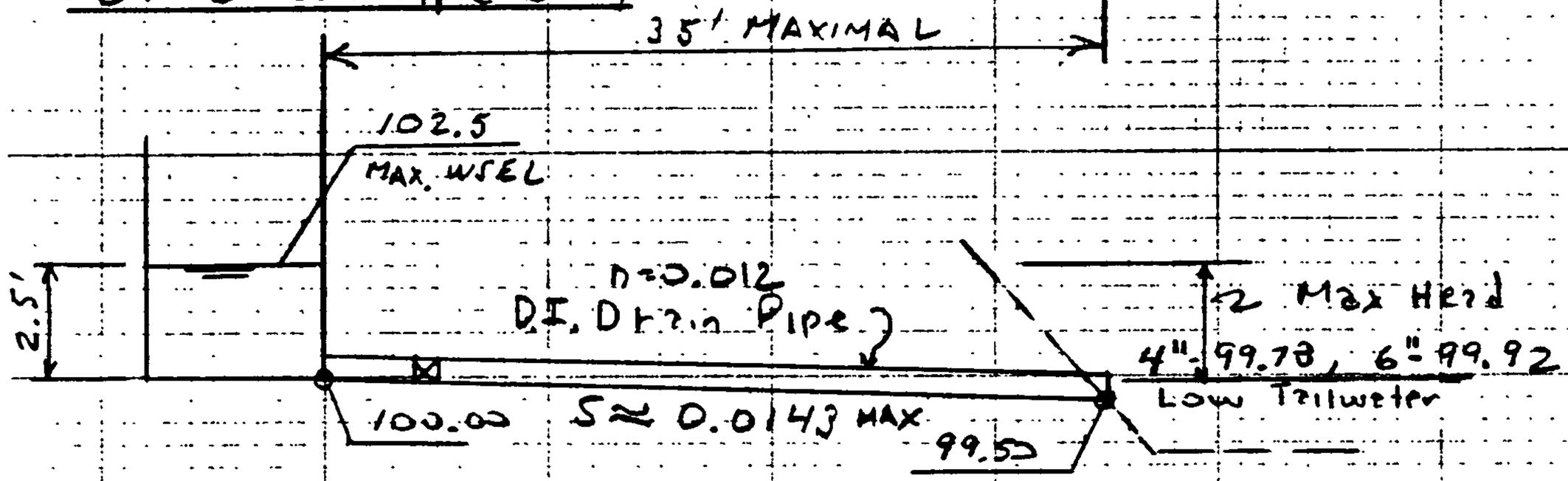
NAME OF PROJECT			SHEET NUMBER 1 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

CONTAINMENT

2. Drain Pipe Sizing & Gradient
3. Drain Pipe Invert vs San Jose Drain Flow Line
4. Linear Containment Alternative
5. Storage Vol for Contaminants & Wash Water

Size Drain Pipe

Set Drain Pipe Slope



Criteria: 4.24 fps velocity in course of emptying

A. Try 4" Drain Pipe: $Q_{4"}$ @ 4.23 fps = 0.37 cfs

$$\text{Reqd Head} = \left[\frac{2.52(0.5 + 0.5 + 1.0)}{0.333^4} + \frac{466.18 \times 0.012^2 \times 35}{0.333^{16/3}}\right] \times \left(\frac{0.37}{10}\right)^2$$

$$= [410 + 823] \times 0.00137 = 1.70' \text{ Head Reqd}$$

Compute WSEL for 4.24 fps, 4"

El. 99.78 + 1.70 = 100.00 = 1.48' deep in basin = 59% depth

& Grav Gradient = 3.8%, vs 1.4% avail, Try 6" Pipe

B. Try 6" Pipe $Q_{6"}$ @ 4.24 fps = 0.83 fps

$$\text{Reqd Head} = \left[\frac{2.52 \times (0.5 + 0.5 + 1.0)}{0.503^4} + \frac{466.18 \times 0.012^2 \times 35}{0.503^{16/3}}\right] \times \left(\frac{0.83}{10}\right)^2$$

$$= [81 + 95] \times 0.0069 = 1.21' \text{ Head Reqd}$$

Compute WSEL for 4.24 fps, 6"

El. 99.92 + 1.21 = 100.00 = 1.13' deep in basin = 45% depth

& Grav Gradient = 1.9%, vs 1.4%, OK

C. CONCLUSION: Use 6" Drain Pipe

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ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 3 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

CONTAINMENT

Estimate Vert. Dist.
San Jose Drain FE & 6" Drain Pipe Invert

	Outlet No.	Storm Drain Inv. 30' Upstream	Approx. Design Flow Line S. J Drain	Avail Drop	Read. Drop Stor.	Sump	Pipe	Tot.	Above Drain' FE
	101	28.8	24.9	3.9	1,000 gal 2.5	0.00	0.50*	3.00	0.50
	301	30.7	25.9	4.8	2.5	"	" *	"	1.80
NOT AVAIL	~~401~~	~~32.6~~	~~26.5~~	~~6.1~~	~~2.5~~	~~"~~	~~" *~~	~~"~~	~~3.10~~
	501	31.6	26.8	4.8	2.5	"	" *	"	1.80
	701	31.6	27.7	3.9	2.5	"	" *	"	1.40
	801/2	32.76	28.4	4.36	1.2	"	0.86**	2.06	2.34

is Basin

CONCLUSION:

No Clearance for Area 100 Drain Pipe
Area 300, 500 & 700 ok
Area 400, when designed, will be ok
Area 800, open basin is ok

* 6" Dia. pressurized flow [illegible] fps
** 8" dia gravity flow 4.23 fps, L = 50' ± @ S = 0.0173, 0.86' drop

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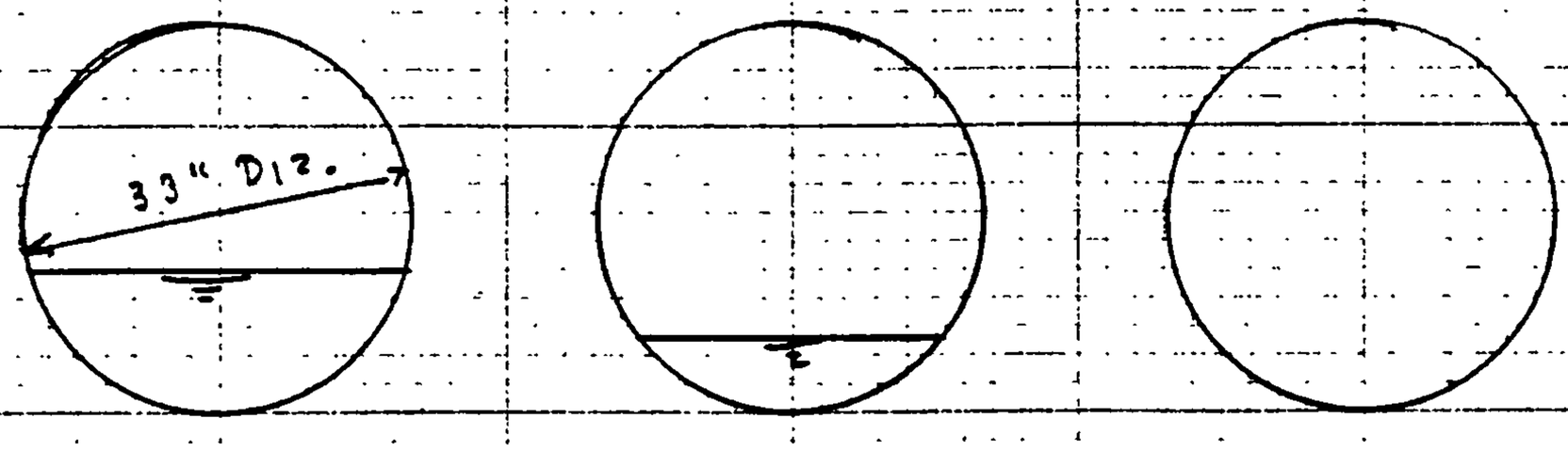
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 4 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Investigate S.D. Pipe as Storage for Containment



		c 1+12.35			c 0+56.18		c 0+00
101-102	28.53	30.4	1.87'	210	0.0089, for 1'		l = 112.35'

A_1 1.0' deep ponding, $d/D = 1/2.75 = 0.364$, $A_1 = 0.32 \times \pi \times \left(\frac{2.75}{2}\right)^2 = 1.90$ □'

A_2 0.5' deep ponding, $d/D = 0.5/2.75 = 0.182$, $A_2 = 0.13 \times \pi \times \left(\frac{2.75}{2}\right)^2 = 0.77$ □'

$A_3 = 0$

$$Vol = \frac{112.35}{6}(1.90 + 4 \times 0.77 + 0) = 93.25 \text{ cf} = \underline{\underline{697 \text{ gals}}}$$

CONCLUSION:

Is ok except sediment problems could arise.

LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT			SHEET NUMBER 5 OF
	COMPUTED BY: TR	CHECKED BY:	JOB NUMBER	DATE: 06/13/84

Contaminant Storage Vol.

Plate No 1 Containment Structure

a. Sump:

Bot of Pipe Inv R = 3.33, A = ½ x πR² = 17.41 □'

At Bot MH R = 4.00' A = " 25.13 □'

21.27 □' Avg

21.27 □' x 0.50' = 10.63 cf

b. MH:

π x 4² x 2.5 = 125.66 cf

Sum 136.29 cf, x 7.481 gal/cf = 1,020 gallon storage

Plate No 2 Containment Basin

a Sump:

Bote Pipe Inv. (2 + 0.5x2x3)² = A = 25 □'

Bot Pond (2 + 2.25x2)² 42.25 □'

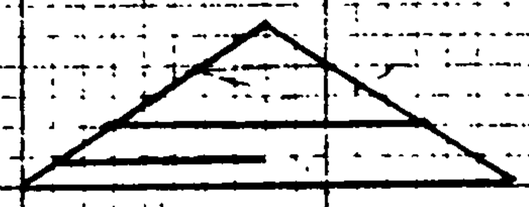
33.62 Avg

x 0.25' = 8.40 CF

b. Basin Bote 10 x 10

Pyramid

Top 16 x 16 16 = (2 x 3:1) =



16² x ⅓ x 2.47 = 10.3² x ⅓ x (1.667 = 0.05)

227.55 cf - 57.18 = 170.36 cf

8 + 170.36 = 178.36 cf = 1337 gallons

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ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 1 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

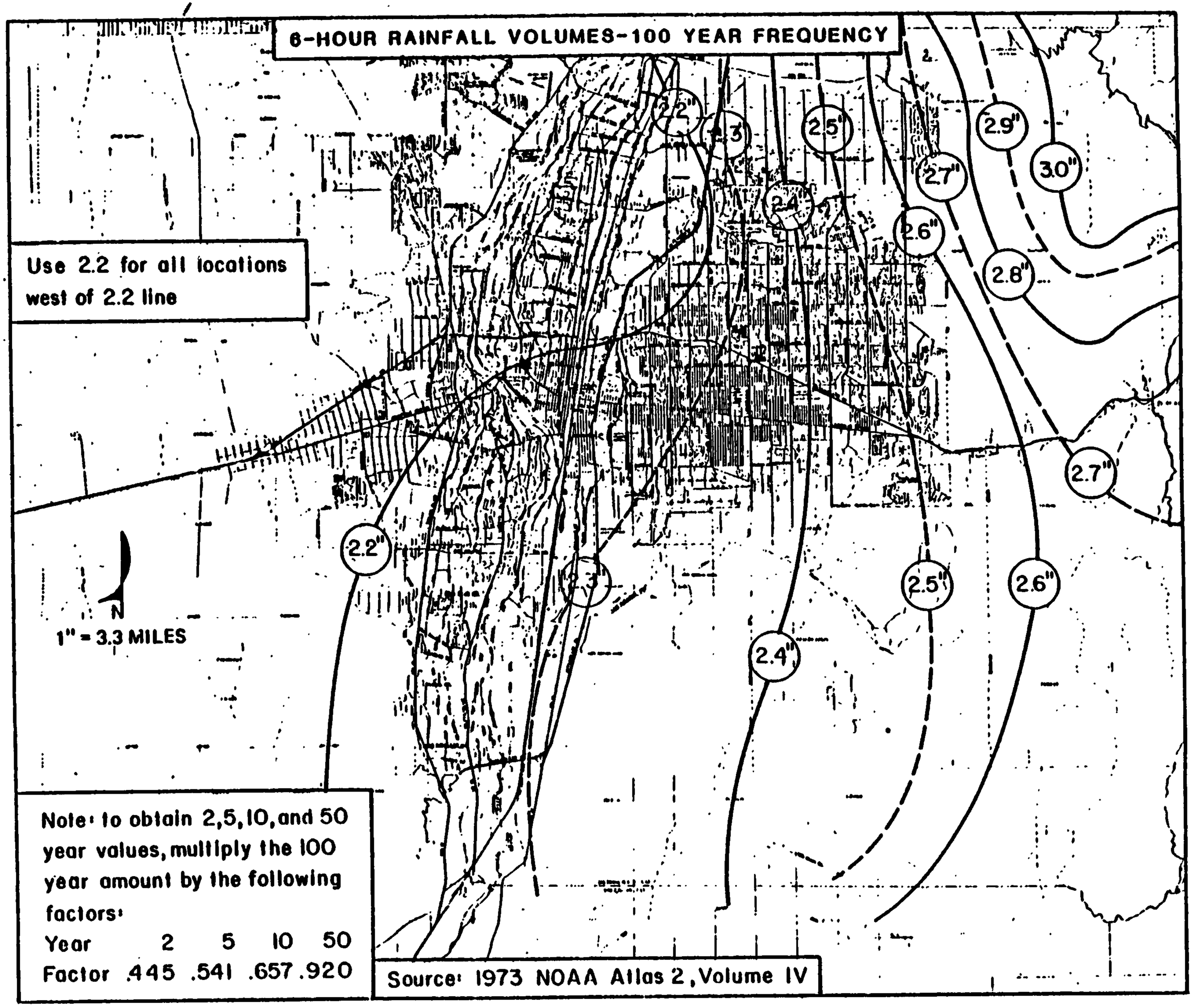
HYDROLOGY

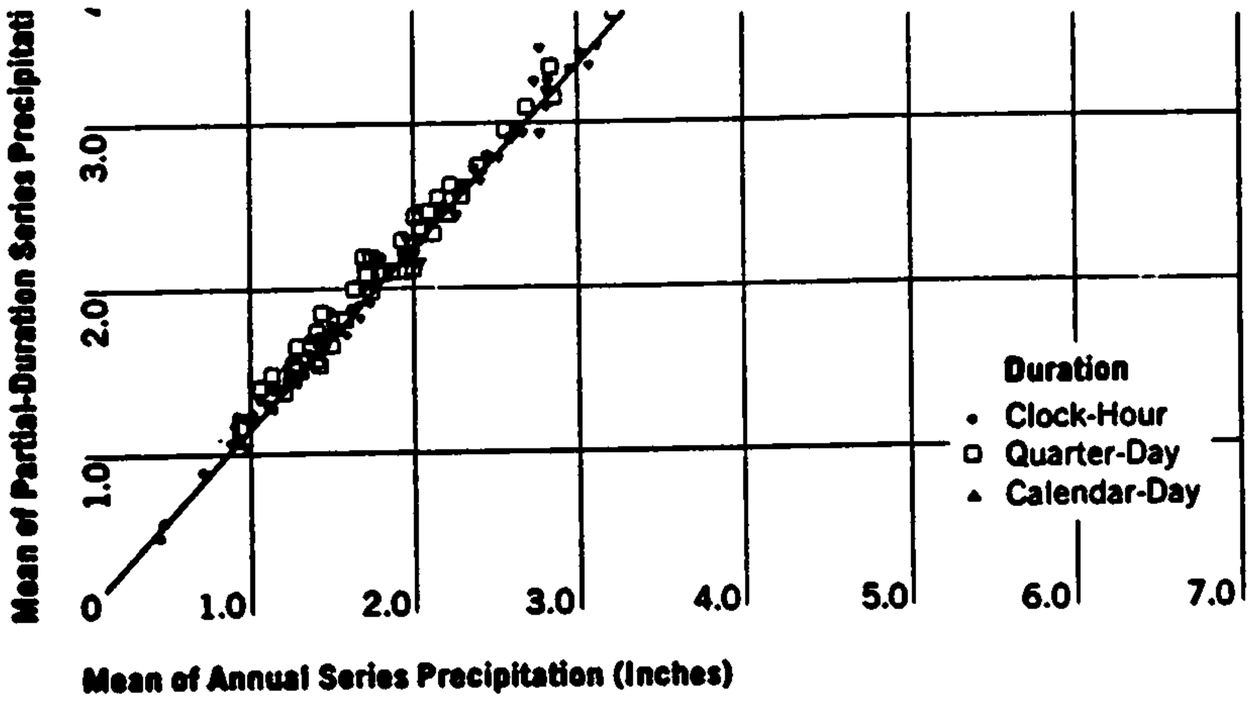
2 & 3 City Plate 22.2 D-1, Rainfall Amounts

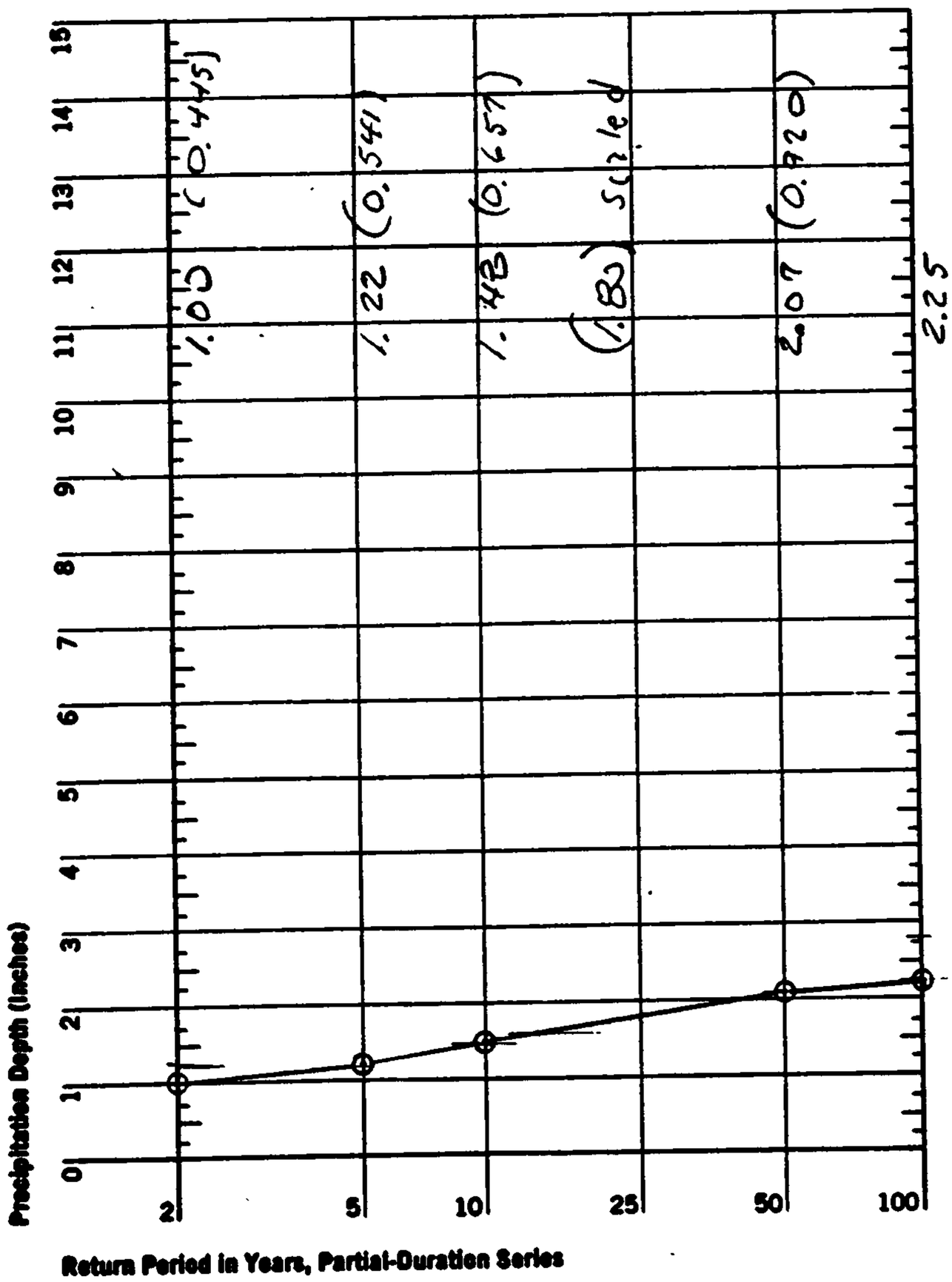
4 & 5 Initial Times of Concentration

6. City Plate 22.2 D-2, Dimensionless Rainfall Intensities

HYDROLOGY


6-HOUR RAINFALL VOLUMES-100 YEAR FREQUENCY
Use 2.2 for all locations west of 2.2 line
1" = 3.3 MILES
2.2"
2.3"
2.4"
2.5"
2.6"
2.7"
2.8"
2.9"
3.0"
Note: to obtain 2,5,10,and 50 year values, multiply the 100 year amount by the following factors:
Year 2 5 10 50
Factor .445 .541 .657 .920
Source: 1973 NOAA Atlas 2, Volume IV





portant. Next, an examination
topographic and meteorologic c
direction to moisture sources. E
ure of some physical reality, an
to variation in the precipitation-

Finally, various climatolog
could be indexes of variation o
were considered. The procedur
equations was a multiple-regres
ess was done by computer us
computer program was capabl
pendent variables for as man
The number of variables scree
between 60 and 100. This do
pletely different factors could
factors might involve different
measures of slope might be ov
ent orientations. In each insta
computer to select the most cri
factor.

Although the computer p
ear during the regression analy
computations to use logarithms
binations of any or all of t
selected the single variable mo
tation-frequency value under
select the variable that, comb
lected, would explain the great
quency values. The third, fou
selected in a similar manner

Figure 6. *Precipitation depth versus return period for partial-duration series.*

6 Hr Rainfall Amounts - DPM

9

Initial

Time of Concentration:

A. Parking Lots:

Assume lots are steepened to 0.003 gradients to direct local flows to inlet grates.

From City DPM Plate 22.2-B-1, Paved Area Vel = 0.75 fps for Paved Parking Lot TC's @ S=0.003.

B. Roof Troughs between buildings & Outlet Pipes.

Typ. Roof drainage area to downspout is

175' x 66', ÷ 43,560 = 0.27 acres

Assume trough slope @ S = 0.0025.

(= 5" drop in typ 175' long reach) "n" = 0.02

1. Trough Vel.

1st Trial: 10 yr.

Assume Vout = 1.5 fps, Vavg = 2/3 x 1.5 = 1.0 fps

Then TC = 175/1.60 = 2.9 minutes

@ 2.9 minutes, Qp/Ac = 2.7 cfs

Qp = 2.7 x 0.27 Ac = 0.73 cfs

read d for 0.73 cfs by T.E. = 0.51' A = 0.52 ft², WP = 2.27

V = 1.39, CAP = 0.71 cfs

0' cfs, 0' depth @ V = 0 @ upper end

0.71 cfs, 0.51' depth & V = 1.39 fps @ spout

2/3 (1.39 - 0) = 0.92 fps, use V = 1.0 fps as average in trough

TC = 3 minutes

2. Outlet Pipe No. 1 10 yr.

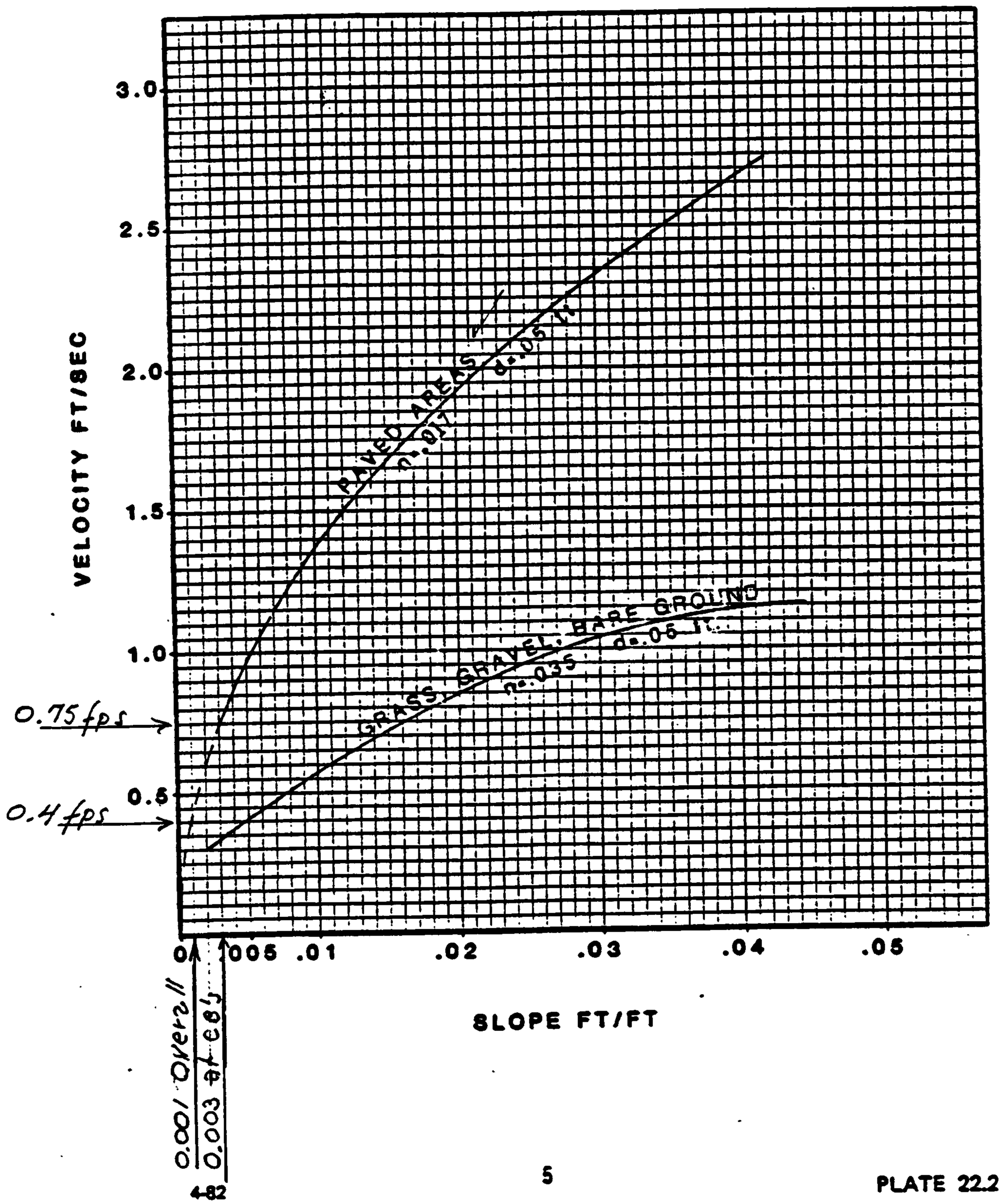
8" pipe to SD Pipe factor = 12 @ n = 0.013

Q = 2 x 0.71 = 1.44 cfs Read S = 0.0144 Vpipe = 4.20 fps reasonable reasonable

1 & 2, More Q, more ponding. Use same V's all Hetfwg tf's is

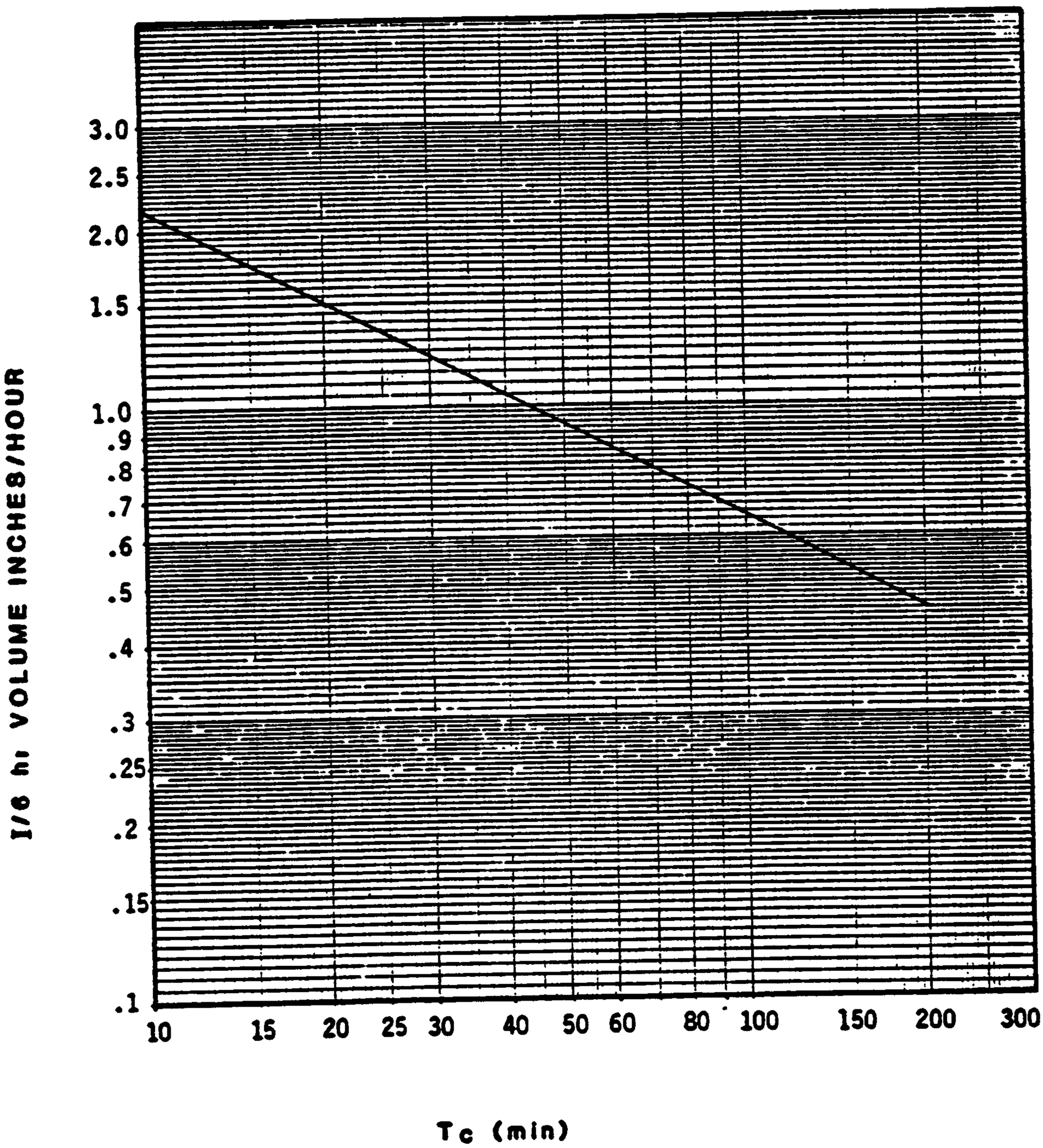
OVERLAND FLOW SEGMENTS

VELOCITY DETERMINATIONS FOR Tc CALCULATIONS



DIMENSIONLESS RAINFALL INTENSITIES

$I = (6\text{-hr. rain})\,6.84\ t_c^{-0.51}$



note: To get actual intensities, multiply rainfall volume from plate D-1 by value from curve. Use reduction factors on Plate D-1 for other than 100-yr.

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ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 1 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

STORM DRAIN HYDRAULICS

EXISTING & IMPROVED SYSTEMS

2 & 3 Circular Pipe Characteristics

4 Some Existing Catch Basin Capabilities

5. Depths & Which S.D. Caps Affected by San Jose Drain flows

6 & 7 San Jose Drain Capacity test for > 364 cfs

8. Pipe Velocities vs Gradients, Gravity Flow

9 - 19 Area 100 SD, Existing & Improved

20-24 Area 300 SD, " "

25- Area 400, Calc existing 0.4 AC Portion PA.

26-28 Area 500, Existing & Improved

29-33 Area 200, " " "

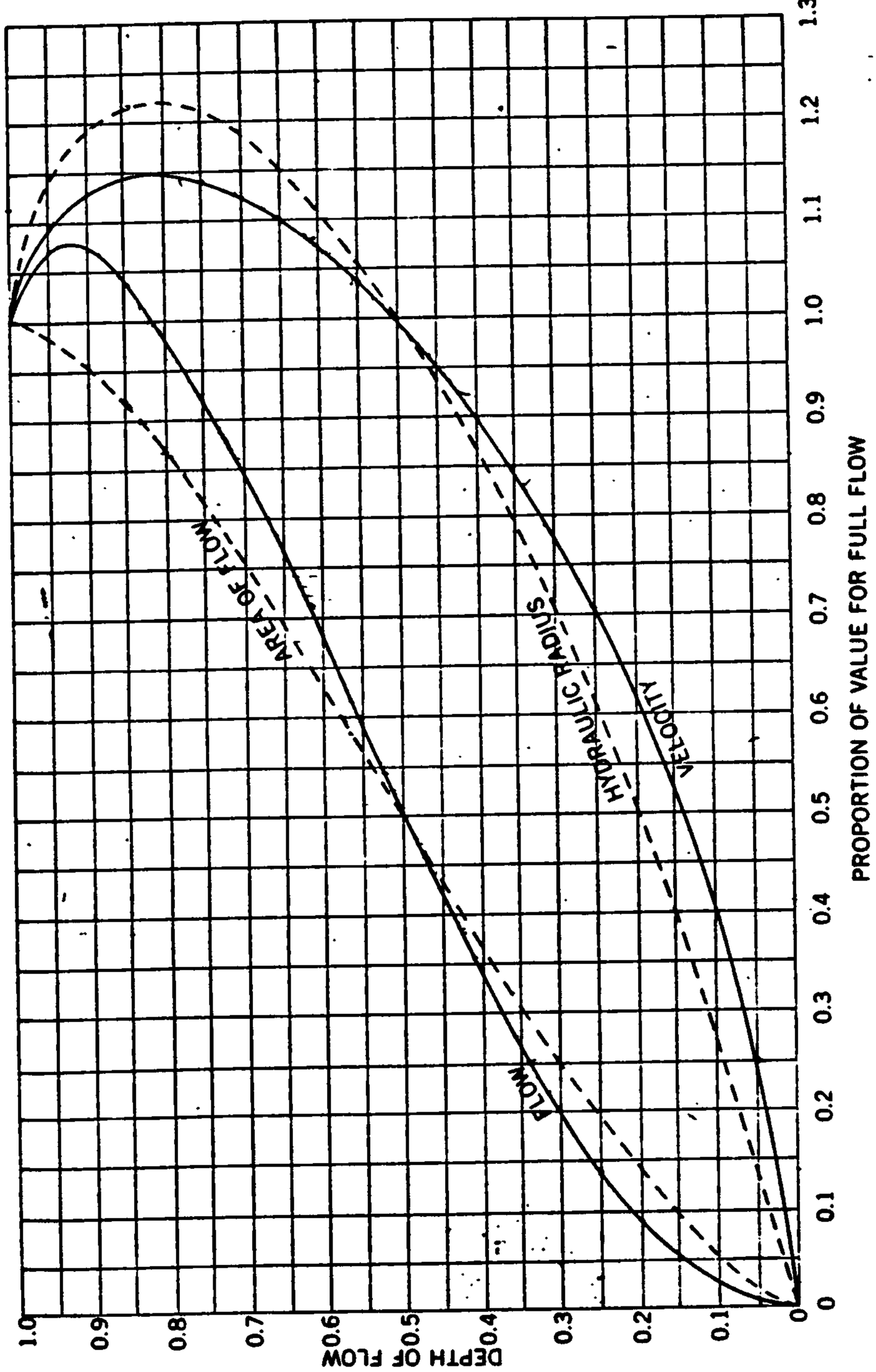
34-36 Area 800, " " "

TABLE 3: FULL FLOW COEFFICIENT VALUES CIRCULAR CONCRETE PIPE

D Pipe Diameter (inches)	A Area (Square Feet)	R Hydraulic Radius (Feet)	Value of $C_1 = \frac{1.486}{n} \times A \times R^{2/3}$			
			n=0.010	n=0.011	n=0.012	n=0.013
8	0.349	0.167	15.8	14.3	13.1	12.1
10	0.545	0.208	28.4	25.8	23.6	21.8
12	0.785	0.250	46.4	42.1	38.6	35.7
15	1.227	0.312	84.1	76.5	70.1	64.7
18	1.767	0.375	137	124	114	105
21	2.405	0.437	206	187	172	158
24	3.142	0.500	294	267	245	226
27	3.976	0.562	402	366	335	310
30	4.909	0.625	533	485	444	410
33	5.940	0.688	686	624	574	530
36	7.069	0.750	867	788	722	666
42	9.621	0.875	1308	1189	1090	1006
48	12.566	1.000	1867	1698	1556	1436
54	15.904	1.125	2557	2325	2131	1967
60	19.635	1.250	3385	3077	2821	2604
66	23.758	1.375	4364	3967	3636	3357
72	28.274	1.500	5504	5004	4587	4234
78	33.183	1.625	6815	6195	5679	5242
84	38.485	1.750	8304	7549	6920	6388
90	44.170	1.875	9985	9078	8321	7681
96	50.266	2.000	11850	10780	9878	9119
102	56.745	2.125	13940	12670	11620	10720
108	63.617	2.250	16230	14760	13530	12490
114	70.882	2.375	18750	17040	15620	14420
120	78.540	2.500	21500	19540	17920	16540
126	86.590	2.625	24480	22260	20400	18830
132	95.033	2.750	27720	25200	23100	21330
138	103.870	2.875	31210	28370	26010	24010
144	113.100	3.000	34960	31780	29130	26890

FIGURE 18

RELATIVE VELOCITY AND FLOW IN CIRCULAR PIPE FOR ANY DEPTH OF FLOW



Catch Basin Capabilities:

	Hydrology		Weir Overflow			Entrance Control				Outlet Control	
CB No.	D.A. Ac	Q10 CFS	Size Ft	Per. Ft.	Pond'g Ft.	C.B. Depth Ft.	Avail. Ft.	Dia "	Cap CFS	ℓ Ft.	Head H Ft
107A	1.6	4.32	1'-8" x 2'-3½	7.91	0.32'	2.25'	1.25'	12"	4.22	45'	1.35'
108A	1.0	2.70	2'-1 x 2'-0½	8.24	0.23	1.67	0.67	12"	3.09	45'	1.35'
109 J & L	0.3	0.81	2' x 2' ±	8'	0.10	1.25	0.50	6"	0.67	20'	0.81'
109 K	0.6	1.62	"	OK	OK	1.39	0.64	6"	0.76	20'	3.25'

CONCLUSION:

Problem for 10 year flows is pond for typical CB's

76

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT: GE Storm Drainage
COMPUTED BY: B
CHECKED BY:
JOB NUMBER
DATE: 06/28/84
SHEET NUMBER 4 OF

LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT			SHEET NUMBER 5 OF
	COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE: 05/16/84

Compute depths of flow e which capacity of G.E. pipes will be affected by flow in San Jose Drain

Out-fall No.	Pipe Inv.	Pipe Ht.	0.85 x	Low Tail water Release El.	Chan. FE (Plans)	Diff (±0.5')
101	28.53	33"	2.33	30.86	24.8	6.06'
201						
203	35.25	12"	0.85	36.10	25.0	11.1
301	29.76	21"	1.49	31.25	25.8	5.44'
401						
507	32.7 ±	12"	0.85	33.55	26.7	6.85'
501	31.36	24"	1.70	33.06	26.7	6.36'
701	31.53	32"	2.37	33.89	27.6	6.29'
801	32.37	28"	1.98	34.35	28.3	6.05'

Note: Pipe invert survey ties, GH&A San Jose Drain const plans & 1984 GE svy correlate outfall pipe inverts, ± 0.10', ∴ same bench mark datum.

INVESTIGATE CAP OF SAN JOSE DRAIN

GIVEN:

9' Deep, 10' Bottom, 2:1 Sideslope Channel @ 2' Freeboard, S = 0.001444

& Woodward Road, 12'-0" Rise by 6'-3" Rise Multiplate Arch @ 12' wide, 1'0" high conc floor & walls. S = 0.001444, ℓ = 120'

A PIPE HYDRAULICS:

DATA: Area multi = 59.0' WP multi = 19.20', n = 0.030
Area floor = 12.0' WP floor = 14.00', n = 0.013
A_T 71.0' WP T 33.20', $n \approx 0.022$
(398")

1. Inlet Control @ 364 cfs

If Area = 71.0' & WP = 33.20 then ~ 11'-10" x 7'-7" Struct Plate Pipe Arch Pipe 58

For smaller 11'-5" x 7'-3 SPPA, HW/D = 0.77

So Read depth ≈ 0.77 (6.25 ft) = 5.6'

CONCLUSION: Inlet Control Does not Govern.

2. Outlet Control: NEGLECT APPROACH VEL, IS CONSERVATIVE

a. For 64.0' 11'-5 x 7'-3, A = 64', $H = f_1 (Q/A)^2$ use $Q = \left(\frac{64}{71}\right)^2 \times 364 = 296$ cfs

Ke = 0.25, mitered, 0.8' head reqd,

$0.25 \times \left(\frac{296}{64}\right)^2 / 2g$ = 0.08' for entry, 0.32 for exit, 0.40 for friction

CAP OF SAN JOSE DRAIN (cont'd)

If friction loss is 0.40' @ n = 0.030

then is $0.40 \times \left(\frac{0.028}{0.030}\right)^2 = 0.24$ for n = 0.028

Summary Total Head reqd = 0.40 @ 6ex loss + 0.24 = 0.64'

∴ WS upstream must be 0.64' higher than downstream

B CHANNEL HYDRAULICS

If 7' deep upstream of pipe (leaves 2' freeboard)

then is 7.00 − 0.64' = 6.36' deep downstream

Compute cap. Chan

$A = (2 \times 6.36 + 10) \times 6.36 = 144.50$ sf

$WP = 2 \times \sqrt{5} \times 6.36 + 10 = 38.44$

$V = \frac{1.486}{0.013} \times 0.001444^{0.5} \times \left(\frac{144.5}{38.44}\right)^{2/3} = 10.50$ fps

CAP = AV = 144.50 × 10.50 = 1517 cfs, > 364

CONCLUSION:

Cap is governed by pipes, which have a capacity > 364 cfs, as relative to depth of flow in channel. Weylech approach vel.

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PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER
GE Storm Drainage			8 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Pipe Velocities v.s. Gradient, Gravity Flow

	3fps Desired Velocity @ 1/4 Depth Flow			Pipe Area	Pipe Factor @ n = 0.014
Vel. @ 1/4 Depth Flow:	3 fps	2.5 fps	2.0 fps		
Dia.	Gradient Reqd.			Sq. Ft	---
8"	1.73%	1.21%	0.77%	0.349	11.2
12"	1.00%	0.70%	0.45%	0.785	33.1
15"	0.75%	0.52%	0.33%	1.227	60.1
18"	0.58%	0.41%	0.26%	1.767	97.5
21"	0.43%	0.33%	0.21%	2.405	146.7
24"	0.40%	0.28%	0.18%	3.142	209.9
30"	0.30%	0.21%	0.13%	4.909	380.7
33"	0.26%	0.18%	0.12%	5.940	492.1
36"	0.23%	0.16%	0.10%	7.069	619.3
6"	2.55%	1.77%	1.13		

237.2

Significance is that 3 fps at 1/4 full depth is desirable for self cleaning. This equates to 4.24 fps for flowing full pipe.

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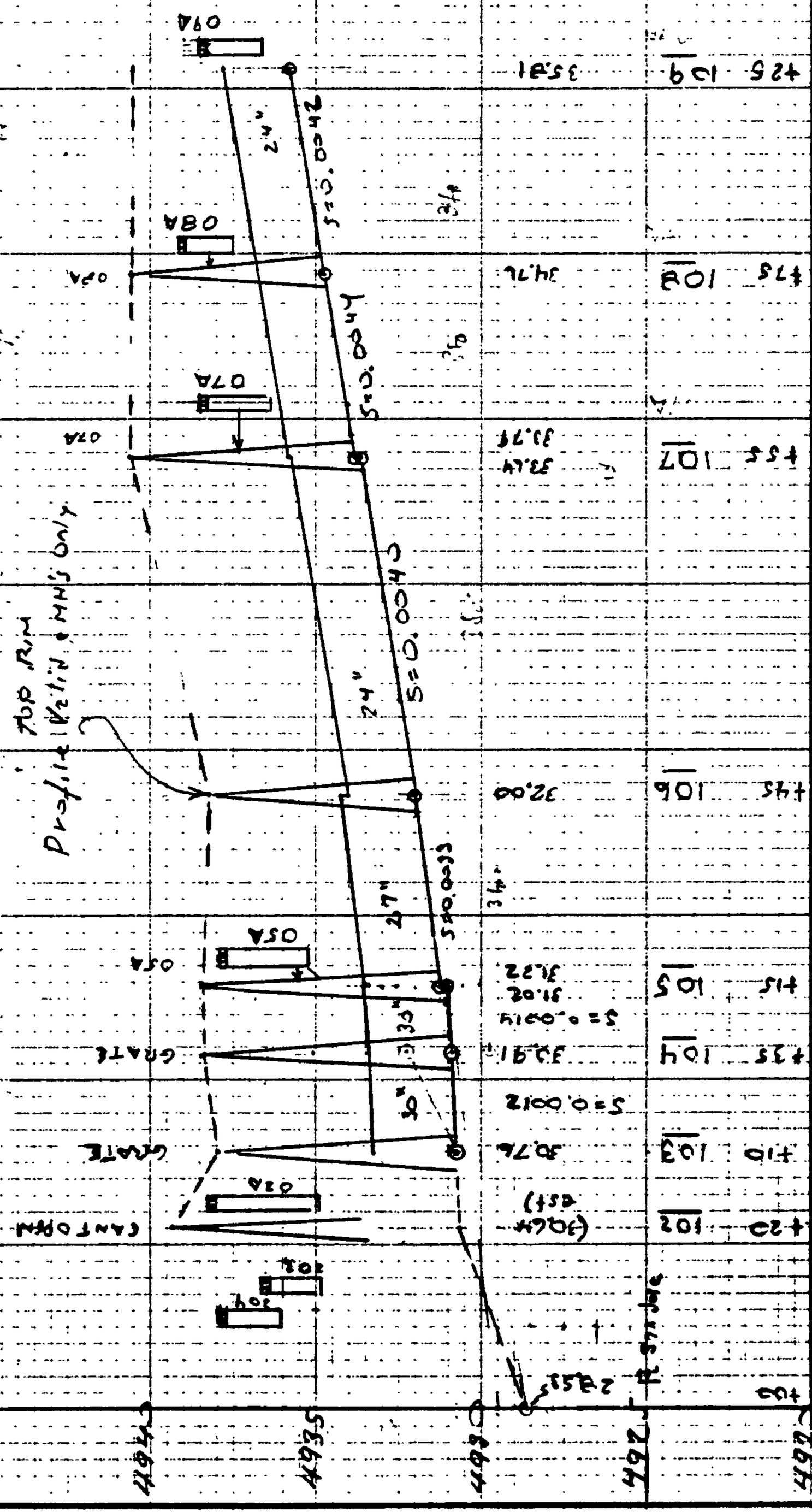
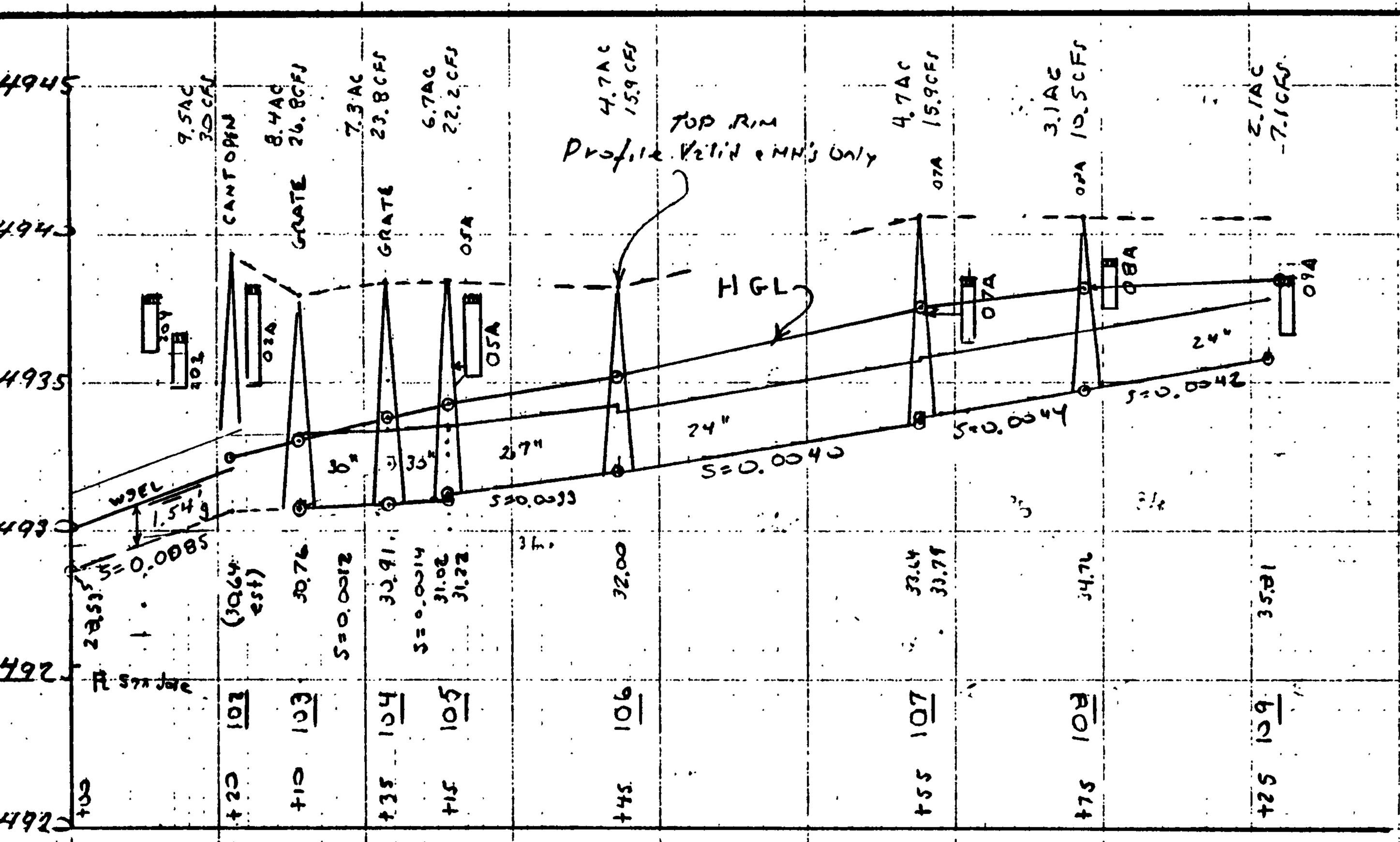
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 9 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

AREA 100





EXISTING SECTION
15 YEAR RAINFALL

AREA 100
EXISTING SYSEM
1.6" RF IN 6 HRS

LEEDSHILL-HERKENHOFF, INC.
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SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT
COMPUTED BY:
CHECKED BY:
JOB NUMBER
DATE:
SHEET NUMBER 9A OF

DRAINAGE AREA NO. 100, Existing System Pressure Flow A

A. HYDROLOGY						
Ret Freq	years	10-25	10-25	10-25	10-25	10-25
6 hr RF	inches	1.60	1.60	1.60	1.60	1.60
Increm DA	acres	2.10	1.00	1.60	0.00	2.00
Accum DA	acres	2.10	3.10	4.70	4.70	6.70
Increm C	---	1.00	1.00	1.00	1.00	1.00
Accum C	---	1.00	1.00	1.00	1.00	1.00
Increm TC	minutes	0.00	1.84	1.10	1.35	0.96
Accum TC	minutes	5.20	7.04	8.14	9.49	10.45
Accum TC	minutes	10.00	10.00	10.00	10.00	10.45
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.07
Qp	CFS	7.10	10.48	15.90	15.90	22.16
B. PRESSURIZED HYDRAULICS						
EG El Up	Feet	4338.49	4338.22	4337.71	4335.58	4334.54
Pipe Dia	Feet	2.00	2.00	2.00	2.25	2.50
Pipe Area	Sq Ft	3.14	3.14	3.14	3.98	4.91
Manngs n	---	.013	.013	.013	.013	.013
Pipe Fac	---	226.22	226.22	226.22	309.70	410.17
Pipe Vel	FPS	2.26	3.34	5.06	4.00	4.51
Pipe Len	Feet	250	220	410	230	80
Trav Time	minutes	1.84	1.10	1.35	0.96	0.30
V2/2g	---	0.08	0.17	0.40	0.25	0.32
Frc Slp	Ft/Ft	9.856E-4	.0021478	.0049371	.0026342	.0029179
Frc Loss	Feet	0.25	0.47	2.02	0.61	0.23
Loss Facs						
Ent & Ex	---	0.25	.25	0.25	.25	.25
Bend	---	0.00	0.00	0.00	1.50	0.00
Other	---	0.00	0.00	0.00	0.00	0.00
Tot Loss	Feet	0.27	0.52	2.12	1.04	0.31
EG El Dn	Feet	4338.22	4337.71	4335.58	4334.54	4334.23
HG El Dn	Feet	4338.14	4337.54	4335.19	4334.30	4333.92
C. GRAVITY FLOW HYDRAULICS:						
Pipe Inv	Feet	4335.81	4334.76	4333.64	4332.00	4331.02
Pipe Slp	---	.0042	.0044	.004	.0033	.0013
Pipe Cap	CFS	14.66	15.01	14.31	17.79	14.79
Q/Cap	---	0.48	0.70	1.11	0.89	1.50

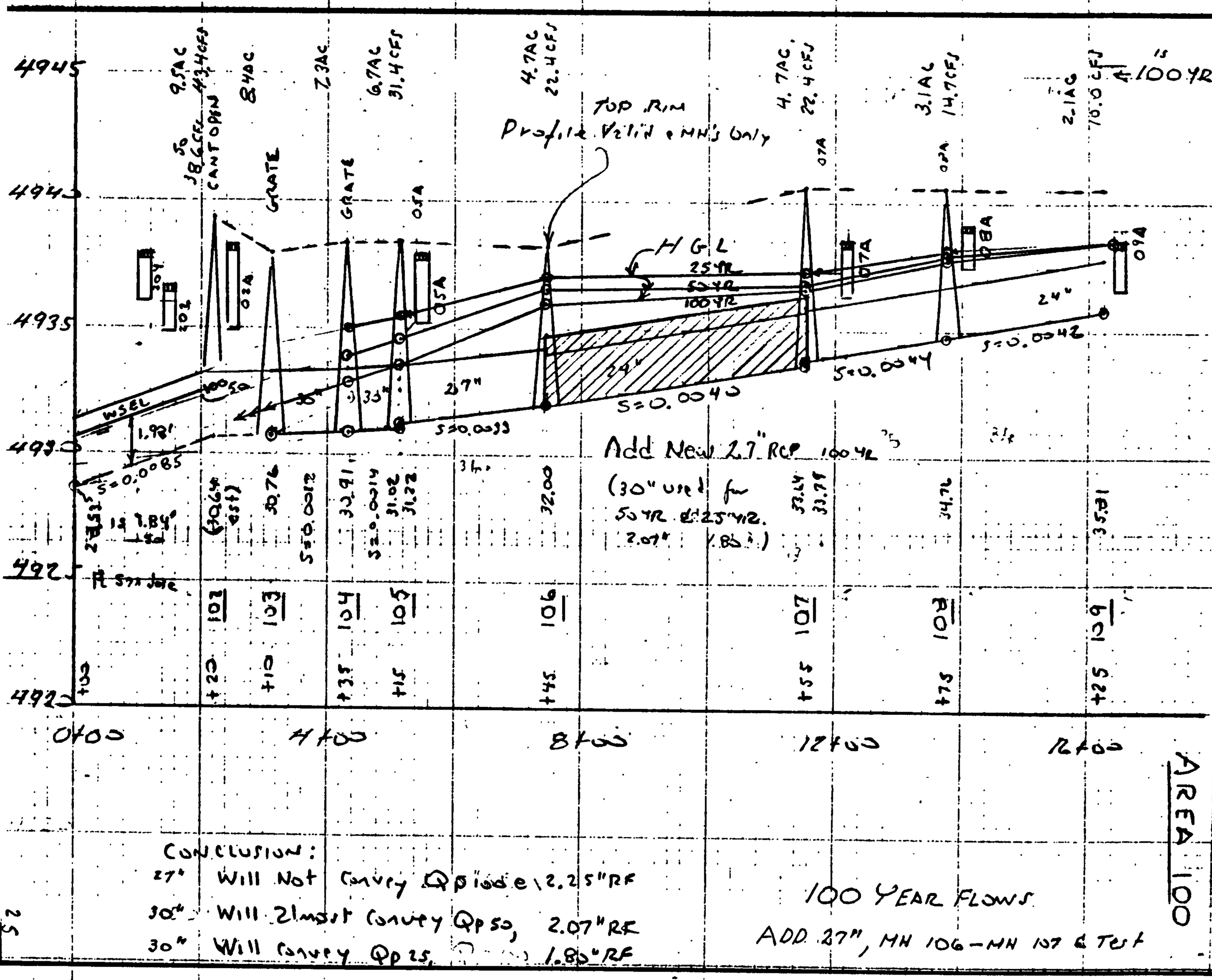
AREA 100 VC"

DRAINAGE AREA NO.
Existing System, Pressure Flow (contd)

		104	103	102	101
A. HYDROLOGY					
Ret Freq	years	10-25	10-25	10-25	
6 hr RF	inches	1.60	1.60	1.60	
Increm DA	acres	0.60	1.10	1.10	
Accum DA	acres	7.30	8.40	9.50	
Increm C	---	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	
Increm TC	minutes	0.32	0.43	0.27	
Accum TC	minutes	10.77	11.20	11.47	
Accum TC	minutes	10.77	11.20	11.47	
Unit Qp	CSA/INCH	2.04	2.00	1.97	
Qp	CFS	23.77	26.81	29.96	
B. PRESSURIZED HYDRAULICS					
EG El Up	Feet	4333.92	4333.41	4332.91	
Pipe Dia	Feet	2.50	2.50	2.75	
Pipe Area	Sq Ft	4.91	4.91	5.94	
Manngs n	---	.013	.013	.013	
Pipe Fac	---	410.17	410.17	528.87	
Pipe Vel	FPS	4.84	5.46	5.04	
Pipe Len	Feet	125	90	220	
Trav Time	minutes	0.43	0.27	0.73	
V2/2g	---	0.36	0.46	0.40	
Trc Slp	Ft/Ft	.0033590	.0042734	.0032089	
Trc Loss	Feet	0.42	0.38	0.71	
Loss Facs					
Ent & Ex	---	0.25	.25	0.25	
Bend	---	0.00	0.00	0.00	
Other	---	0.00	0.00	1.00	
Tot Loss	Feet	0.51	0.50	1.20	
EG El Dn	Feet	4333.41	4332.91	4331.71	
HG El Dn	Feet	4333.04	4332.45	4331.31	
C. GRAVITY FLOW HYDRAULICS:					
Pipe Inv	Feet	4330.76	4330.64	4328.53	
Pipe Slp	---	.0013	.0013	.0175	
Pipe Cap	CFS	14.79	14.79	69.96	
Q/Cap	---	1.61	1.81	0.43	
				outfall	

including
Area 200
A = 12.0 c = 1.00
tc = 11.47 min
I = 3.15
Qp = 37.8 cfs

AREA 101 VC



AREA 100
HYDROLOGY

DRAINAGE AREA NO. 100
100 year System, Pressurized Flow

		109	108	107	106	105	104
A. HYDROLOGY							
Ret Freq	years	100	100	100	100	100	
6 hr RF	inches	2.25	2.25	2.25	2.25	2.25	
Increm DA	acres	2.10	1.00	1.60	0.00	2.00	
Accum DA	acres	2.10	3.10	4.70	4.70	6.70	
Increm C	---	1.00	1.00	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	1.00	1.00	
Increm TC	minutes	0.00	1.31	0.78	2.18	0.68	
Accum TC	minutes	5.20	6.51	7.29	9.47	10.15	
Accum TC	minutes	10.00	10.00	10.00	10.00	10.30	
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.08	
Qp	CFS	9.99	14.74	22.35	22.35	31.39	
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet	4338.49	4337.96	4336.94	4336.19	4334.14	
Pipe Dia	Feet	2.00	2.00	2.00	2.25	2.50	
Pipe Area	Sq Ft	3.14	3.14	7.12	3.98	4.91	
Manngs n	---	.013	.013	.013	.013	.013	
Pipe Fac	---	226.22	226.22	535.92	309.70	410.17	
Pipe Vel	FPS	3.18	4.69	3.14	5.62	6.39	
Pipe Len	Feet	250	220	410	230	80	
Trav Time	minutes	1.31	0.78	2.18	0.68	0.21	
V2/2g	---	0.16	0.34	0.15	0.49	0.63	
Frc Slp	Ft/Ft	.0019491	.0042474	.0017397	.0052093	.0058560	
Frc Loss	Feet	0.49	0.93	0.71	1.20	0.47	
Loss Facs							
Ent & Ex	---	0.25	.25	0.25	.25	.25	
Bend	---	0.00	0.00	0.00	1.50	0.00	
Other	---	0.00	0.00	0.00	0.00	0.00	
Tot Loss	Feet	0.53	1.02	0.75	2.06	0.63	
EG El Dn	Feet	4337.96	4336.94	4336.19	4334.14	4333.51	
HG El Dn	Feet	4337.81	4336.60	4336.04	4333.64	4332.87	
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet	4334.76	4333.64	4332.00	4331.22	4330.91	
Pipe Slp	---	.0042	.0044	.004	.0033	.0013	
Pipe Cap	CFS	14.66	15.01	33.89	17.79	14.79	
Q/Cap	---	0.68	0.98	0.66	1.26	2.12	

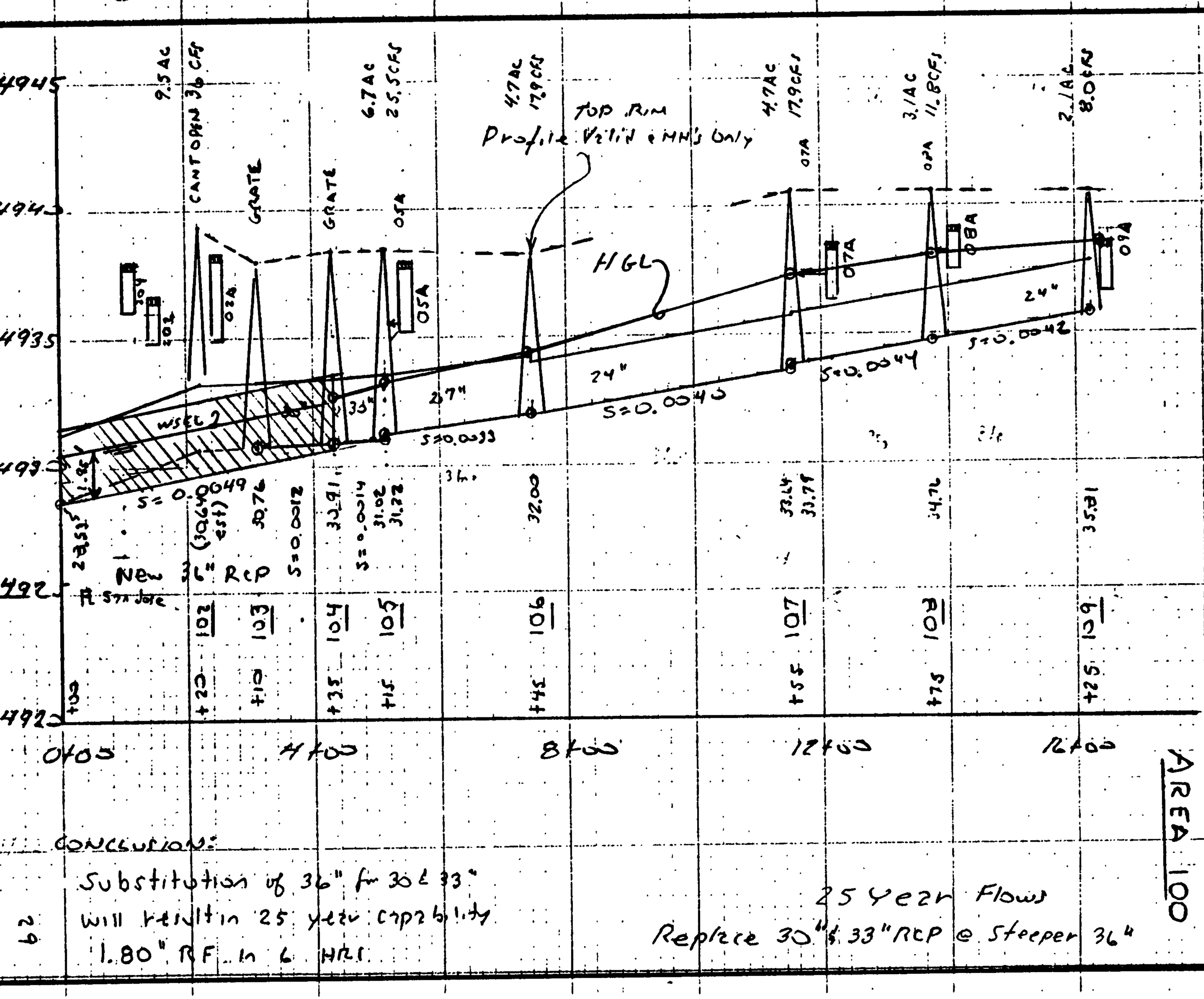
"AREA 102/VC"
"P-9" & BACKUP 4/2

DRAINAGE AREA NO. 100
50 Year System, Pressurized Flow
Add 30" RCP to Parallel 24", MH 106-MH 107

		109	108	107	106	105	104
A. HYDROLOGY							
Ret Freq	years		50	50	50	50	50
6 hr RF	inches		2.07	2.07	2.07	2.07	2.07
Increm DA	acres		2.10	1.00	1.60	0.00	2.00
Accum DA	acres		2.10	3.10	4.70	4.70	6.70
Increm C	---		1.00	1.00	1.00	1.00	1.00
Accum C	---		1.00	1.00	1.00	1.00	1.00
Increm TC	minutes		0.00	1.42	0.85	2.27	0.74
Accum TC	minutes		5.20	6.62	7.47	9.74	10.49
Accum TC	minutes		10.00	10.00	10.00	10.00	10.49
Unit Qp	CSA/INCH		2.11	2.11	2.11	2.11	2.06
Qp	CFS		9.19	13.56	20.56	20.56	28.61
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet		4338.49	4338.04	4337.18	4336.72	4334.98
Pipe Dia	Feet		2.00	2.00	2.95	2.25	2.50
Pipe Area	Sq Ft		3.14	3.14	6.83	3.98	4.91
Manngs n	---		.013	.013	.013	.013	.013
Pipe Fac	---		226.22	226.22	637.75	309.70	410.17
Pipe Vel	FPS		2.92	4.32	3.01	5.17	5.83
Pipe Len	Feet		250	220	410	230	80
Trav Time	minutes		1.42	0.85	2.27	0.74	0.23
V2/2g	---		0.13	0.29	0.14	0.42	0.53
Frc Slp	Ft/Ft		.0016497	.0035950	.0010398	.0044092	.0048650
Frc Loss	Feet		0.41	0.79	0.43	1.01	0.39
Loss Facs							
Ent & Ex	---		0.25	.25	0.25	.25	.25
Bend	---		0.00	0.00	0.00	1.50	0.00
Other	---		0.00	0.00	0.00	0.00	0.00
Tot Loss	Feet		0.45	0.86	0.46	1.74	0.52
EG El Dn	Feet		4338.04	4337.18	4336.72	4334.98	4334.46
HG El Dn	Feet		4337.91	4336.89	4336.58	4334.56	4333.93
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet		4334.76	4333.64	4332.00	4331.22	4330.91
Pipe Slp	---		.0042	.0044	.004	.0033	.0013
Pipe Cap	CFS		14.66	15.01	40.33	17.79	14.79
Q/Cap	---		0.63	0.90	0.51	1.16	1.93

DRAINAGE AREA NO. 100
25 Year System, Pressurized Flow
Add 30" RCP to Parallel 24", MH 106-MH 107

		109	108	107	106	105	104
A. HYDROLOGY							
Ret Freq	years	25	25	25	25	25	
6 hr RF	inches	1.80	1.80	1.80	1.80	1.80	
Increm DA	acres	2.10	1.00	1.60	0.00	2.00	
Accum DA	acres	2.10	3.10	4.70	4.70	6.70	
Increm C	---	1.00	1.00	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	1.00	1.00	
Increm TC	minutes	0.00	1.64	0.98	2.61	0.85	
Accum TC	minutes	5.20	6.84	7.81	10.43	11.28	
Accum TC	minutes	10.00	10.00	10.00	10.43	11.28	
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.11	
Qp	CFS	7.99	11.79	17.88	17.88	25.49	
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet	4338.49	4338.15	4337.50	4337.15	4335.83	
Pipe Dia	Feet	2.00	2.00	2.95	2.25	2.50	
Pipe Area	Sq Ft	3.14	3.14	6.83	3.98	4.91	
Manngs n	---	.013	.013	.013	.013	.013	
Pipe Fac	---	226.22	226.22	637.75	309.70	410.17	
Pipe Vel	FPS	2.54	3.75	2.62	4.50	5.19	
Pipe Len	Feet	250	220	410	230	80	
Trav Time	minutes	1.64	0.98	2.61	0.85	0.26	
V2/2g	---	0.10	0.22	0.11	0.31	0.42	
Frc Slp	Ft/Ft	.0012474	.0027183	7.862E-4	.0033340	.0038626	
Frc Loss	Feet	0.31	0.60	0.32	0.77	0.31	
Loss Facs							
Ent & Ex	---	0.25	.25	0.25	.25	.25	
Bend	---	0.00	0.00	0.00	1.50	0.00	
Other	---	0.00	0.00	0.00	0.00	0.00	
Tot Loss	Feet	0.34	0.65	0.35	1.32	0.41	
EG El Dn	Feet	4338.15	4337.50	4337.15	4335.83	4335.42	
HG El Dn	Feet	4338.05	4337.28	4337.05	4335.52	4335.00	
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet	4334.76	4333.64	4332.00	4331.22	4330.91	
Pipe Slp	---	.0042	.0044	.004	.0033	.0013	
Pipe Cap	CFS	14.66	15.01	40.33	17.79	14.79	
Q/Cap	---	0.54	0.79	0.44	1.01	1.72	



CONCLUSION:

Substitution of 36" for 30 & 33" will result in 25 year capability 1.80" RF in 6 HRS.

25 Year Flows

Replace 30" & 33" RCP @ Steeper 36"

LEEDSHILL-HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT

COMPUTED BY:

CHECKED BY:

JOB NUMBER

DATE:

SHEET NUMBER 15 OF

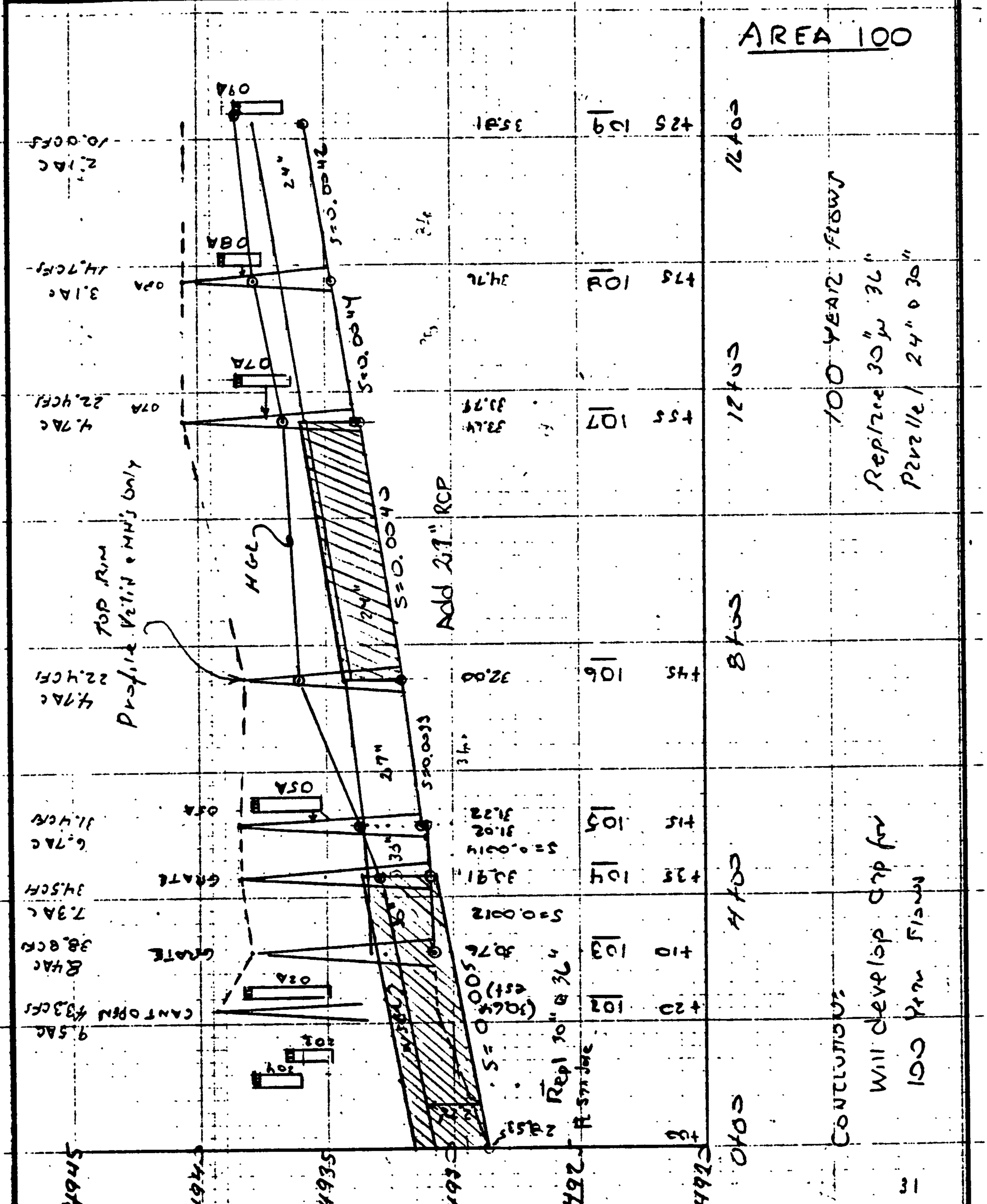
DRAINAGE AREA NO. 100
25 Year System, Pressurized Flow
Repl 30" w 36", Out 101 to MH 104

		109	108	107	106	105	104
A. HYDROLOGY							
Ret Freq	years	25	25	25	25	25	
6 hr RF	inches	1.80	1.80	1.80	1.80	1.80	
Increm DA	acres	2.10	1.00	1.60	0.00	2.00	
Accum DA	acres	2.10	3.10	4.70	4.70	6.70	
Increm C	---	1.00	1.00	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	1.00	1.00	
Increm TC	minutes	0.00	1.64	0.98	1.20	0.85	
Accum TC	minutes	5.20	6.84	7.81	9.02	9.87	
Accum TC	minutes	10.00	10.00	10.00	10.00	10.00	
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.11	
Qp	CFS	7.99	11.79	17.88	17.88	25.49	
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet	4338.49	4338.15	4337.50	4334.81	4333.50	
Pipe Dia	Feet	2.00	2.00	2.00	2.25	2.50	
Pipe Area	Sq Ft	3.14	3.14	3.14	3.98	4.91	
Manngs n	---	.013	.013	.013	.013	.013	
Pipe Fac	---	226.22	226.22	226.22	309.70	410.17	
Pipe Vel	FPS	2.54	3.75	5.69	4.50	5.19	
Pipe Len	Feet	250	220	410	230	80	
Trav Time	minutes	1.64	0.98	1.20	0.85	0.26	
V2/2g	---	0.10	0.22	0.50	0.31	0.42	
Frc Slp	Ft/Ft	.0012474	.0027183	.0062485	.0033340	.0038626	
Frc Loss	Feet	0.31	0.60	2.56	0.77	0.31	
Loss Facs							
Ent & Ex	---	0.25	.25	0.25	.25	.25	
Bend	---	0.00	0.00	0.00	1.50	0.00	
Other	---	0.00	0.00	0.00	0.00	0.00	
Tot Loss	Feet	0.34	0.65	2.69	1.32	0.41	
EG El Dn	Feet	4338.15	4337.50	4334.81	4333.50	4333.08	
HG El Dn	Feet	4338.05	4337.28	4334.31	4333.18	4332.66	
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet	4334.76	4333.64	4332.00	4331.22	4330.91	
Pipe Slp	---	.0042	.0044	.004	.0033	.0013	
Pipe Cap	CFS	14.66	15.01	14.31	17.79	14.79	
Q/Cap	---	0.54	0.79	1.25	1.01	1.72	

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER
			17 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:


AREA 100
100 YEAR flows
Replace 30" w/ 36"
Replace 24" w/ 30"
Add 27" RCP
HGL
Top Rim Profile & MH's only
Repl 30" @ 36"
Will develop cap for future
CONTINUED:
OHCS
4+00
4+25
4+50
4+75
5+00
5+25
5+50
5+75
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DRAINAGE AREA NO. 100
100 year System, Pressurized Flow

		109	108	107	106	105	104
A. HYDROLOGY							
Ret Freq	years	100	100	100	100	100	
6 hr RF	inches	2.25	2.25	2.25	2.25	2.25	
Increm DA	acres	2.10	1.00	1.60	0.00	2.00	
Accum DA	acres	2.10	3.10	4.70	4.70	6.70	
Increm C	---	1.00	1.00	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	1.00	1.00	
Increm TC	minutes	0.00	1.31	0.78	2.18	0.68	
Accum TC	minutes	5.20	6.51	7.29	9.47	10.15	
Accum TC	minutes	10.00	10.00	10.00	10.00	10.30	
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.08	
Qp	CFS	9.99	14.74	22.35	22.35	31.39	
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet	4338.49	4337.96	4336.94	4336.19	4334.14	
Pipe Dia	Feet	2.00	2.00	2.00	2.25	2.50	
Pipe Area	Sq Ft	3.14	3.14	7.12	3.98	4.91	
Manngs n	---	.013	.013	.013	.013	.013	
Pipe Fac	---	226.22	226.22	535.92	309.70	410.17	
Pipe Vel	FPS	3.18	4.69	3.14	5.62	6.39	
Pipe Len	Feet	250	220	410	230	80	
Trav Time	minutes	1.31	0.78	2.18	0.68	0.21	
V2/2g	---	0.16	0.34	0.15	0.49	0.63	
Frc Slp	Ft/Ft	.0019491	.0042474	.0017397	.0052093	.0058560	
Frc Loss	Feet	0.49	0.93	0.71	1.20	0.47	
Loss Facs							
Ent & Ex	---	0.25	.25	0.25	.25	.25	
Bend	---	0.00	0.00	0.00	1.50	0.00	
Other	---	0.00	0.00	0.00	0.00	0.00	
Tot Loss	Feet	0.53	1.02	0.75	2.06	0.63	
EG El Dn	Feet	4337.96	4336.94	4336.19	4334.14	4333.51	
HG El Dn	Feet	4337.81	4336.60	4336.04	4333.64	4332.87	
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet	4334.76	4333.64	4332.00	4331.22	4330.91	
Pipe Slp	---	.0042	.0044	.004	.0033	.0013	
Pipe Cap	CFS	14.66	15.01	33.89	17.79	14.79	
Q/Cap	---	0.68	0.98	0.66	1.26	2.12	

DRAINAGE AREA NO. 100
100 year System, Pressure Flow (contd)
Replace 30" w 36",Outlet 101 to MH 104
Add 30", MH 106 to MH 107

		104	103	102	101
A. HYDROLOGY					
Ret Freq	years		100	100	100
6 hr RF	inches		2.25	2.25	2.25
Increm DA	acres		0.60	1.10	1.10
Accum DA	acres		7.30	8.40	9.50
Increm C	---		1.00	1.00	1.00
Accum C	---		1.00	1.00	1.00
Increm TC	minutes		0.32	0.43	0.27
Accum TC	minutes		10.15	10.58	10.85
Accum TC	minutes		10.15	10.58	10.85
Unit Qp	CSA/INCH		2.10	2.05	2.03
Qp	CFS		34.46	38.82	43.34
B. PRESSURIZED HYDRAULICS					
EG El Up	Feet		4333.51	4333.08	4332.66
Pipe Dia	Feet		3.00	3.00	3.00
Pipe Area	Sq Ft		7.07	7.07	7.07
Manngs n	---		.013	.013	.013
Pipe Fac	---		666.98	666.98	666.98
Pipe Vel	FPS		4.87	5.49	6.13
Pipe Len	Feet		125	90	220
Trav Time	minutes		0.43	0.27	0.60
V2/2g	---		0.37	0.47	0.58
Frc Slp	Ft/Ft		.0026687	.0033871	.0042223
Frc Loss	Feet		0.33	0.30	0.93
Loss Facs					
Ent & Ex	---		0.25	.25	0.25
Bend	---		0.00	0.00	0.00
Other	---		0.00	0.00	1.00
Tot Loss	Feet		0.43	0.42	1.66
EG El Dn	Feet		4333.08	4332.66	4331.00
HG El Dn	Feet		4332.72	4332.19	4330.42
C. GRAVITY FLOW HYDRAULICS:					
Pipe Inv	Feet		4330.14	4329.59	4328.53
Pipe Slp	---		.005	.005	.005
Pipe Cap	CFS		47.16	47.16	47.16
Q/Cap	---		0.73	0.82	0.92
					outfall

include Area 200
A = 12.0
Tc = 10.85 min
C = 1.00
I = 4.57
Qp = 54.8 cfs

"AREA103/VC"

NOT SAVED

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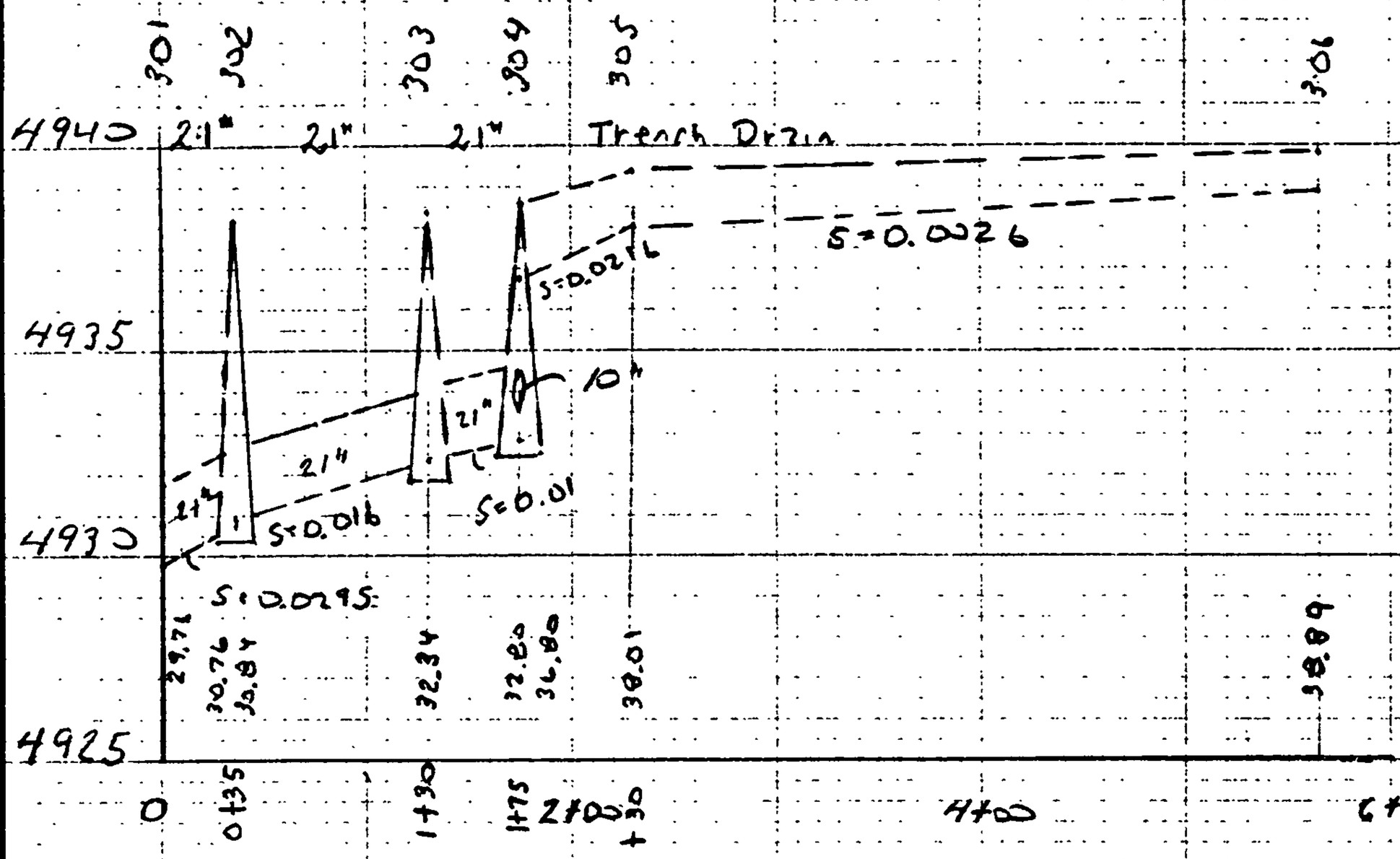
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 20 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

AREA 300



AR A 300

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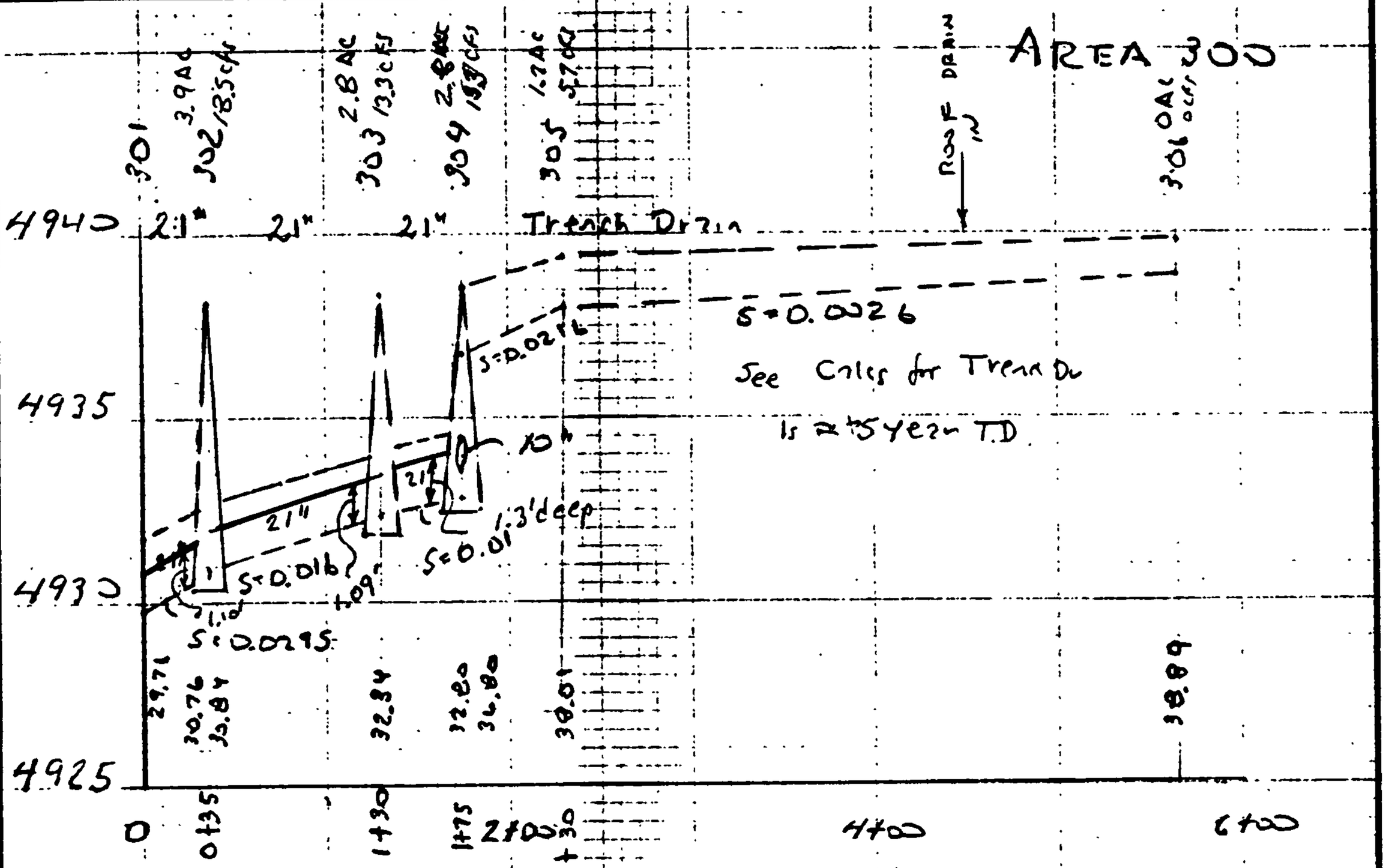
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 21 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:



CONCLUSION
Outlet 301 to MH 304
> 100 year Cap

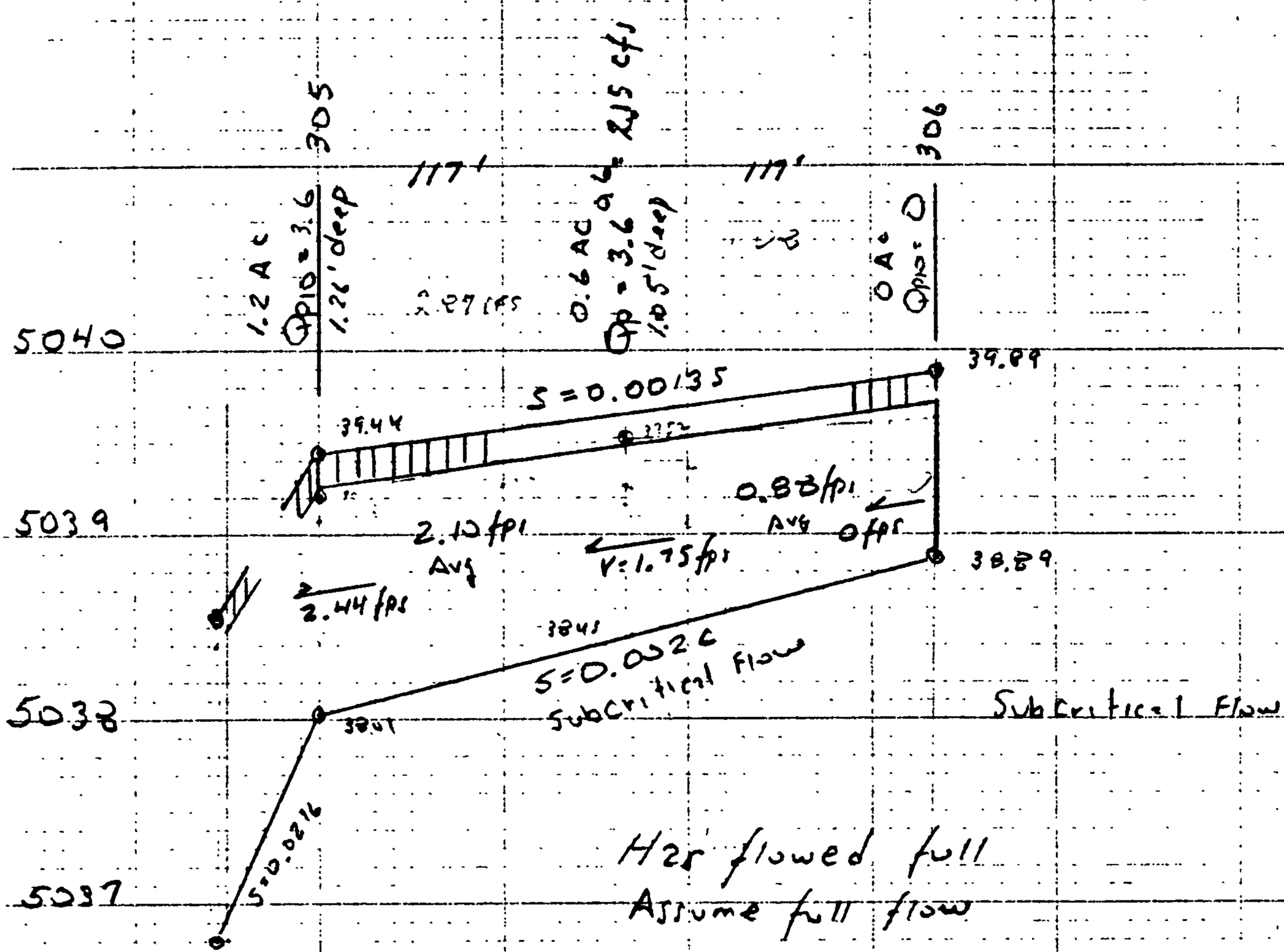
100 Year Flows
Existing System

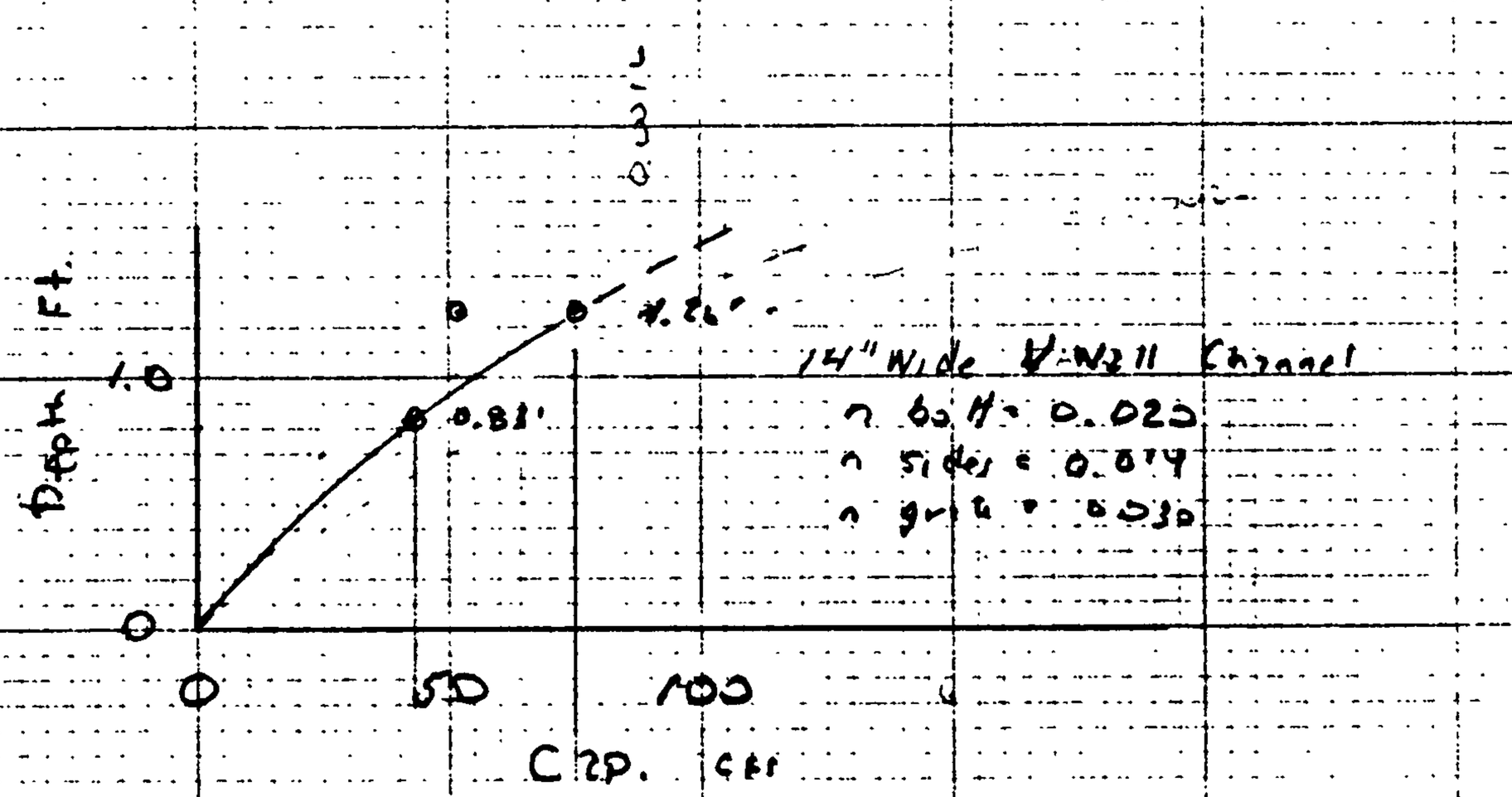
$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

$t_c = \frac{l}{60 \times CSA \sqrt{i}}$ 2.10

LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT			SHEET NUMBER 22 OF
	COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Area 300 Hydraulics



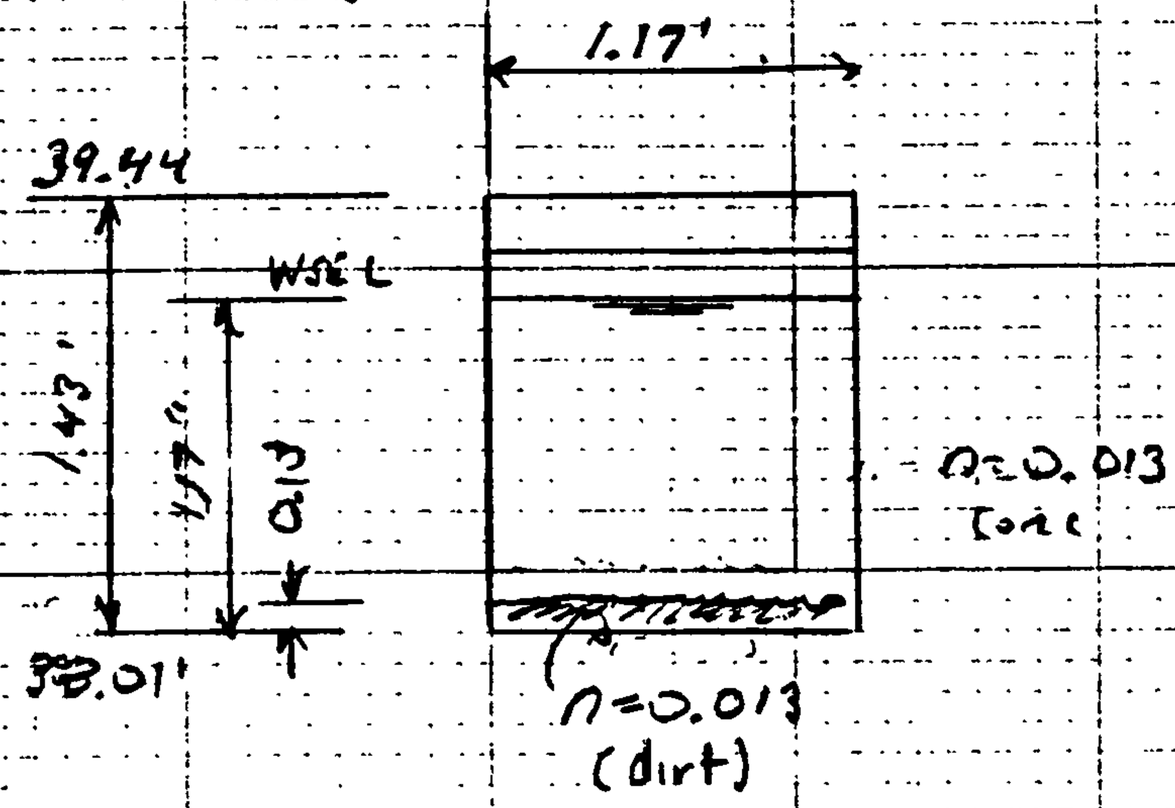


LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT GE SD.			SHEET NUMBER 23 OF
	COMPUTED BY: R	CHECKED BY:	JOB NUMBER	DATE: 06/13/84

TRENCH DRAIN 305-306

AREA 300

Review



Trench Drain between 305 & 306 has overflowed at north end of tunnel. Probably 2 year-10 yr storm

Q_{p10} est ≈ 3.00 cfs

$Q_{p2} \approx 0.475/0.657 = 0.677 \times 3.00 \approx 2$ cfs

Assume 2 year

Bot Width = 1.17', S = 0.88/330' = 0.0027

Assume above section @ 2 cfs

ed = 1.00', A = 1.17 ft², WP = 3.17', n comp ≈ 0.019, S = 0.0027

$$V = \frac{1.486}{0.019} \times 0.0027^{1/2} \times R^{2/3} = 2.09 \text{ cfs}$$

$Q_{2p} = 2.45$ cfs

CONCLUSION: If sediment & trash in bottom, is 2 cfs, not 3 cfs system

RECOMMEND 3 fps, 2 year condition stage gravity flow (Triple the 0.0027 slope

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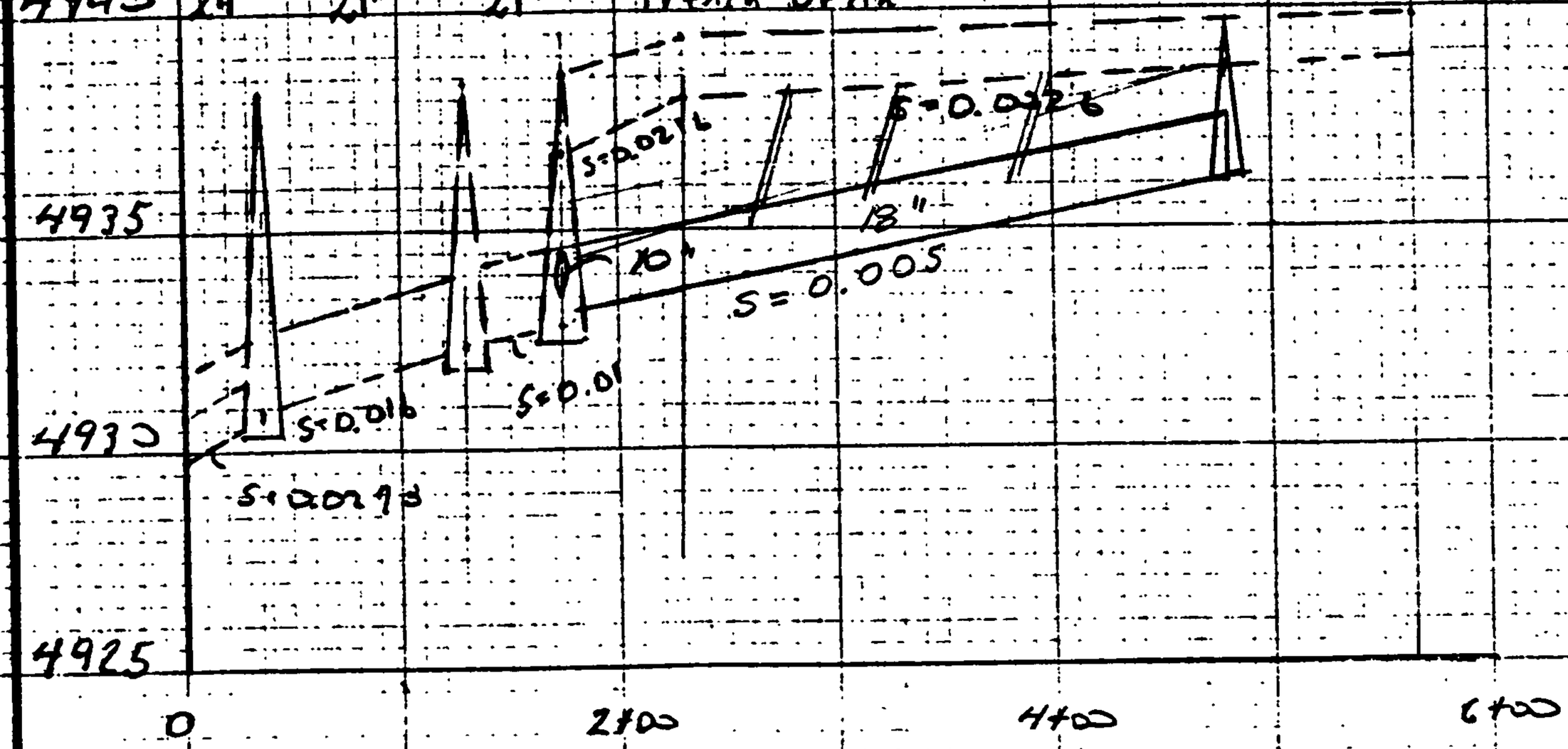
ENGINEERING COMPUTATIONS

NAME OF PROJECT | SHEET NUMBER 24 OF
COMPUTED BY: | CHECKED BY: | JOB NUMBER | DATE:

AREA 305
IMPROVEMENT
305



CONCLUSION

New Pipe @ S=0.005, Qpipe = 5.7 cfs

Read Pipe Factor = 5.7/(0.005^1/2) = 80

use 18" CMP

Pipe Factor = 97 ok

A

TRY TC DRAIN

A = d x 1.17', WP = 2xd + 1.17',

@ S=0.005 & 1.1' deep V = 4.25 Qp = 5.48 cfs

@ 1.15' deep V = 4.30 Qp = 5.80 cfs = 100 yr flow

Test for self cleaning @ 3 fps @ Qp & 1.38 & 5.8 cfs = 0.75 cfs

@ 0.99 cfs, d = 0.91', V = 2.1 fps, too low, use pipe

LEEDSHILL-HERKENHOFF, INC.
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ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 25 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Area 400

C 2P, 8"-CB

$\ell_{8''} = 130'$, DA(W 1/2) = 0.4 Ac $Q_{P10} = 1.27$ *
$Q_{P100} = 1.93$

$$HF_{10} = \left[\frac{2.52 \times 1.5}{0.67^4} + \frac{466.18 \times 0.013 \times 130}{0.667^{16/3}}\right] \times \left(\frac{1.27}{10}\right)^2$$

$$HF = [19.1 + 23.8] \times \left(\frac{1.27}{10}\right)^2 = 1.74'$$

is capable

C

0.4 Ac x 2.15 CSA 1.0"/hr x 2.25" = 1.93 cfs (Q_{P100}), x 0.657 = 1.27 cfs (Q_{P10})

CONCLUSION:

8" Area 400 Pipe could convey ≈ 10 year storm @ 1.3 cfs ≠, if inlet used. West 0.4 Ac & 0.9 Ac

ARSAS & ODH

LEEDSHILL - HERKENHOFF, INC.
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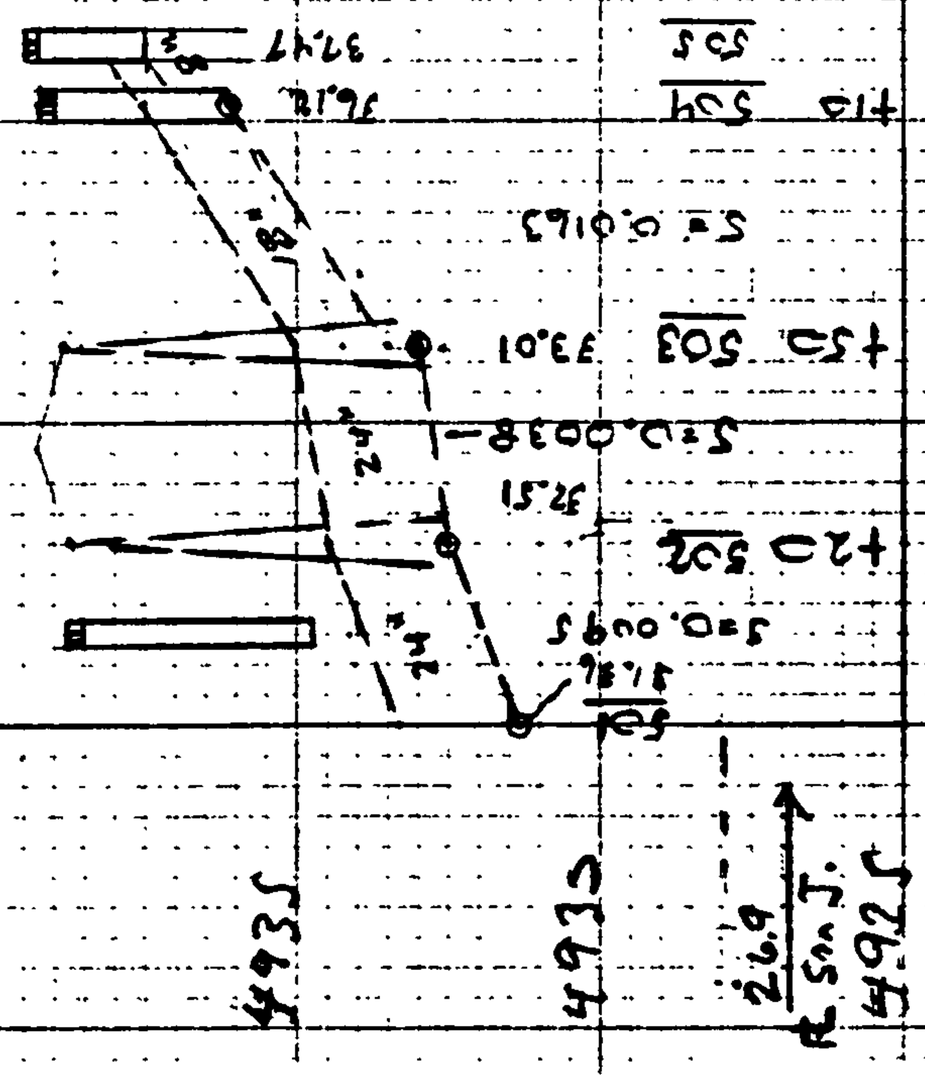
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER
			26 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Area 500



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ALBUQUERQUE
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PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

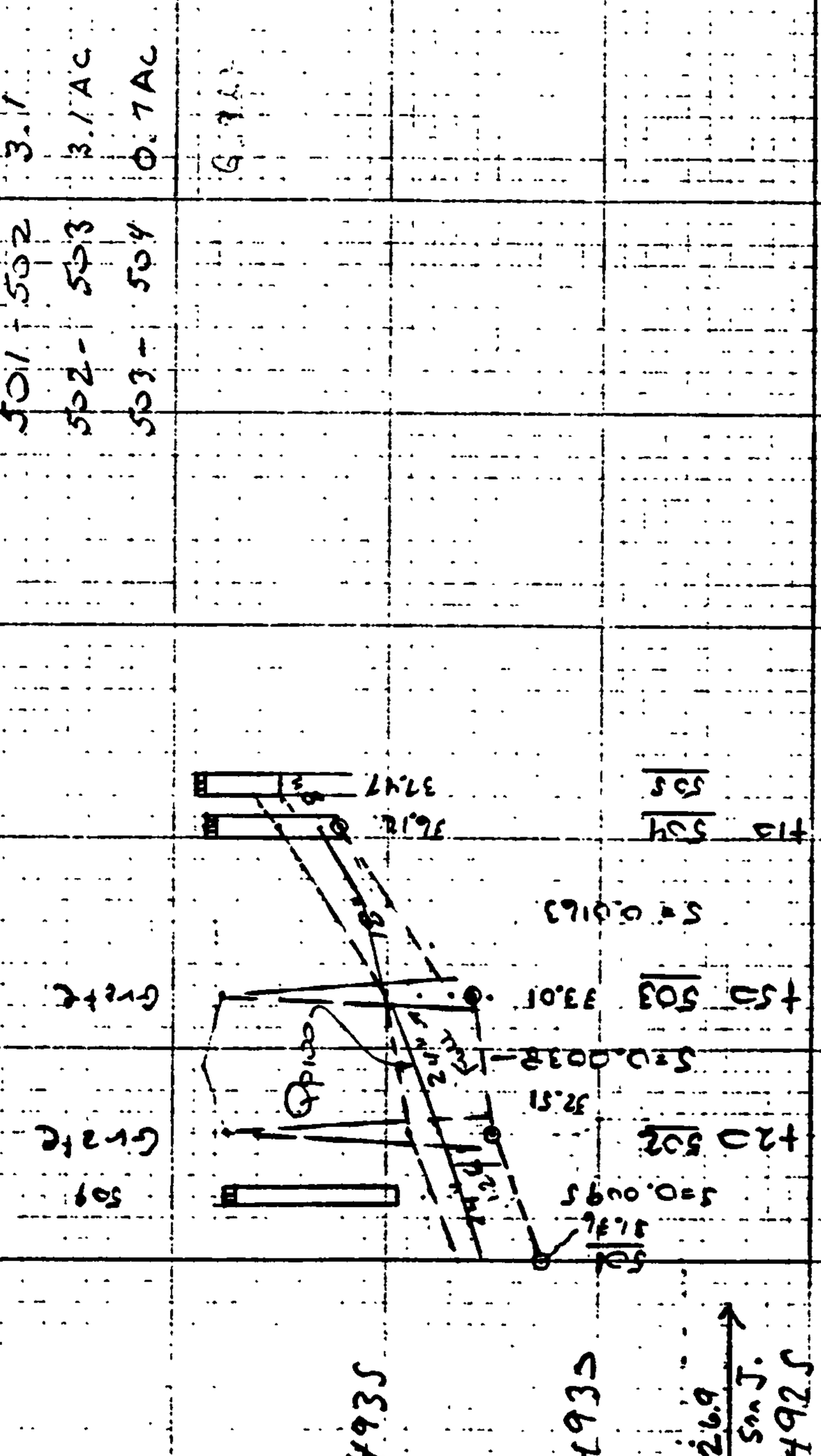
NAME OF PROJECT			SHEET NUMBER 27 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Area 500
City Hydrology

100 YR
225"
15.0 4
15.0
3.4

3.1
3.1 AC
0.7 AC

501 - 502
502 - 503
503 - 504



LEEDSHILL-HERKENHOFF, INC.
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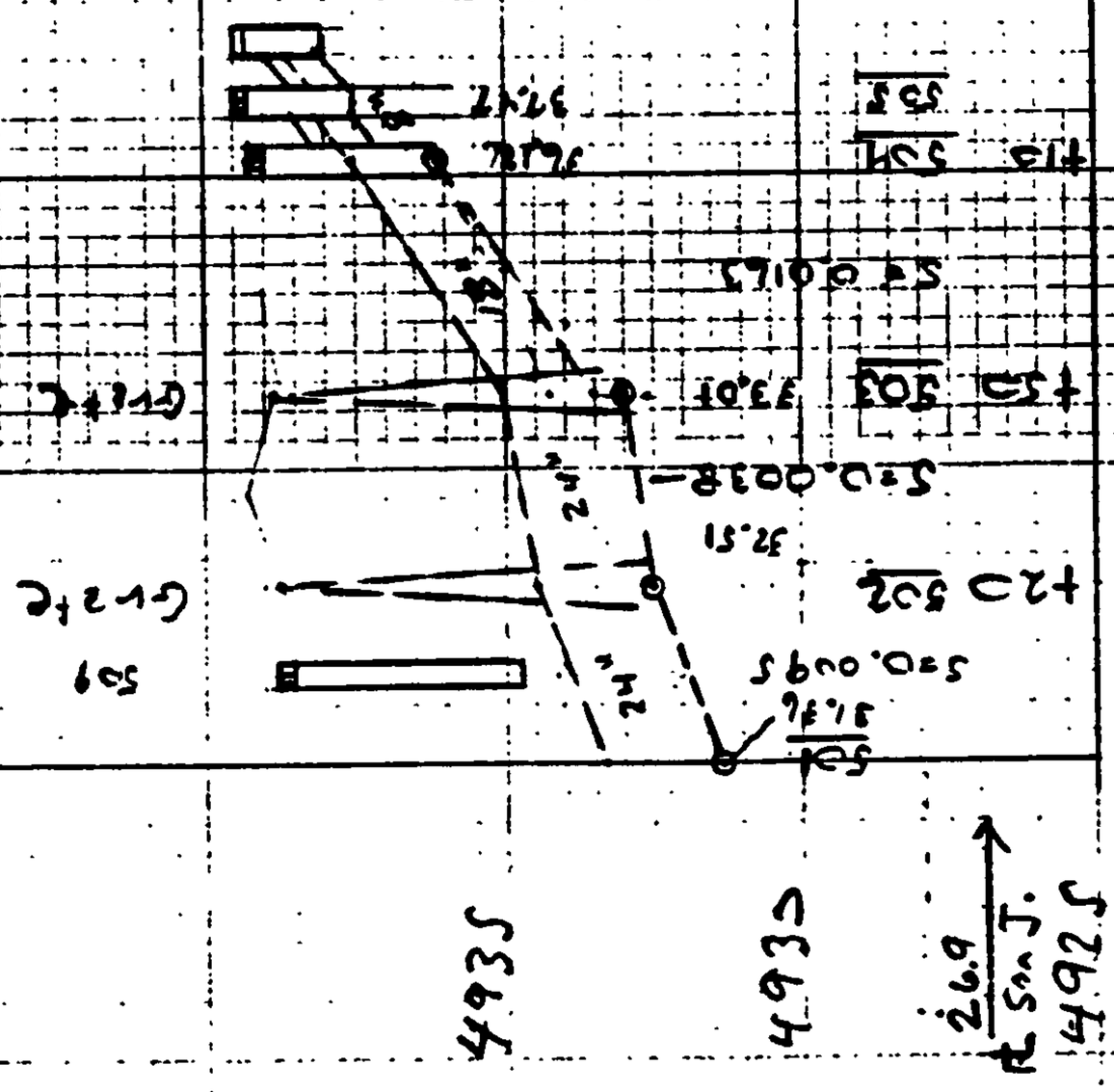
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER
			23 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

Area 500

II. IMPROVEMENTS


0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
4+50
4935
4930
4925
26.9
S.J.
S=0.0095
S=0.0038
S=0.0167
S=0.009
2"
2"
32.51
37.26
37.27
37.26
37.01
37.27
37.26
37.27
37.26
37.27
37.26

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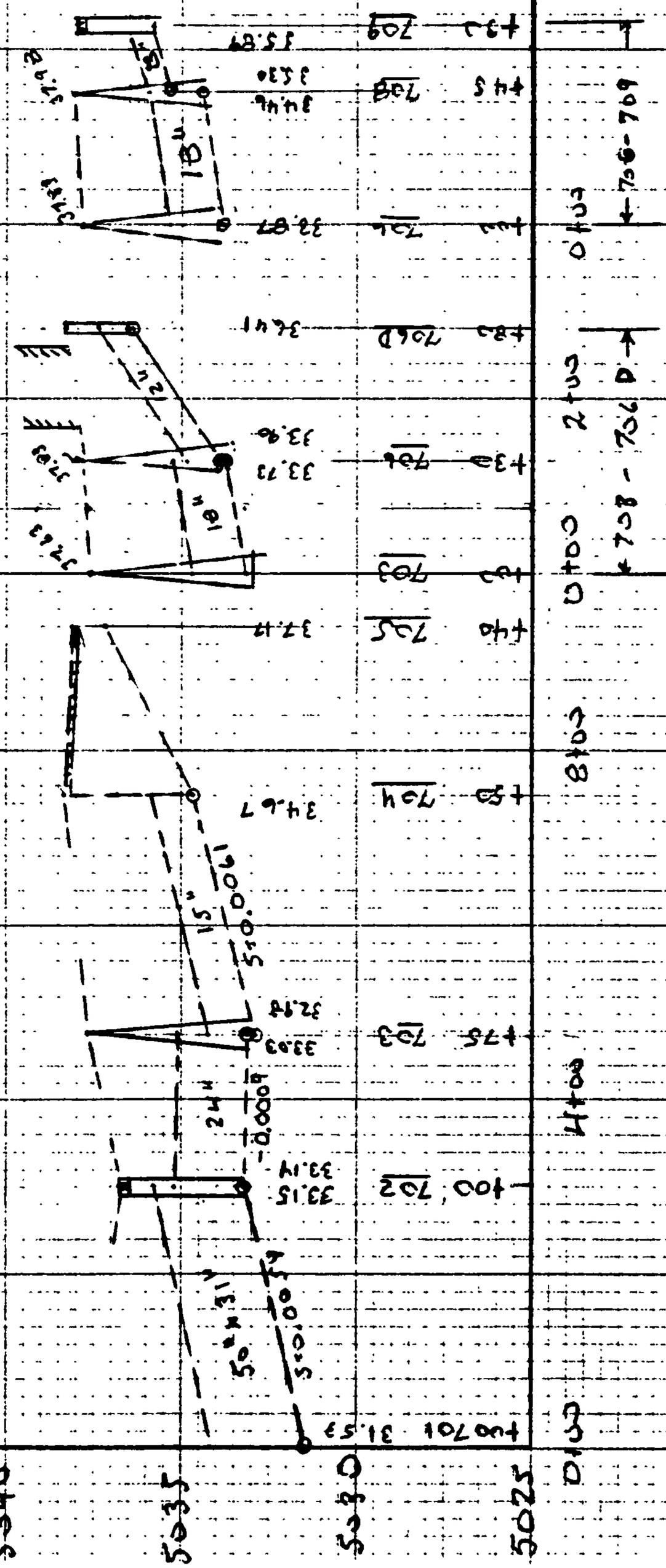
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 29 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

AREA 700


5040
5035
5030
5025
D 0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
706 - 709
707 - 708
706 - 707
705 - 706
704 - 705
703 - 704
702 - 703
701 - 702
700 - 701
33.15
33.14
33.03
32.94
33.73
33.96
34.47
32.17
32.63
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33.57
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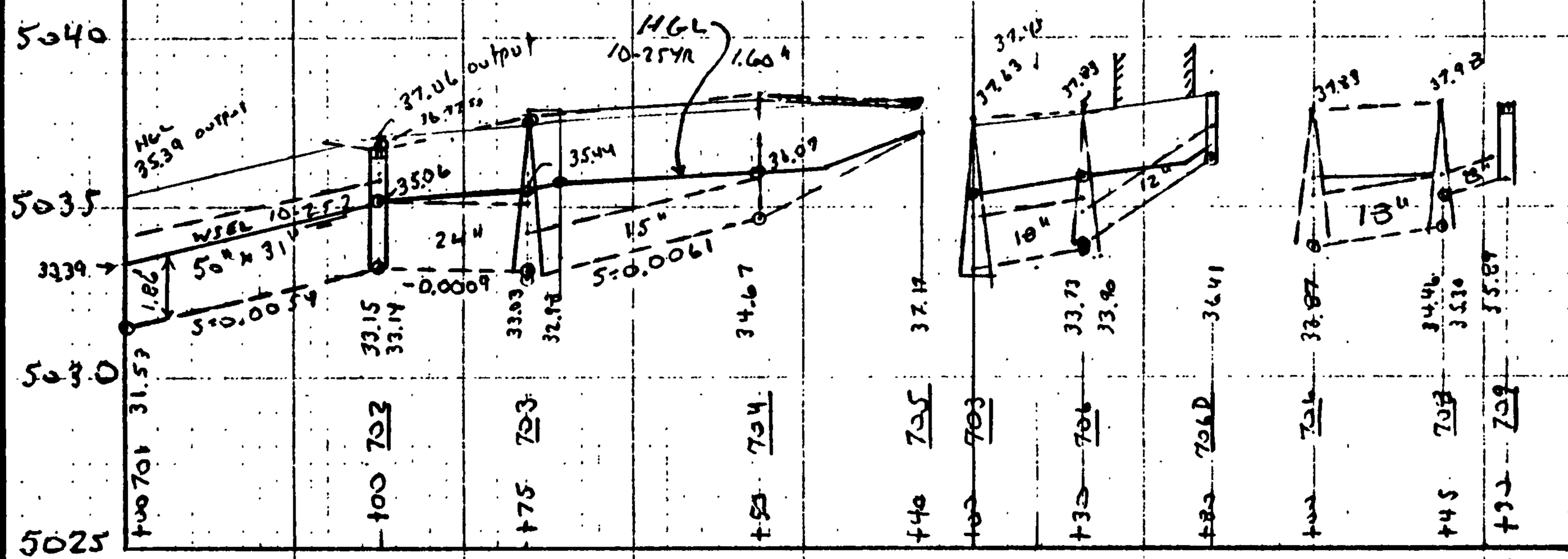
33.34
32.67
32.63
32.94
33.14
33.15
33.03



CONCLUSION:
CAN READILY CONVEY 10-25 YEAR FLOWS, 1.60" RF
ALSO, CAN CONVEY 25 YR @ 1.80" RF

10-25 YEAR FLOWS
Existing System

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
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SAN FRANCISCO
ENGINEERING COMPUTATIONS

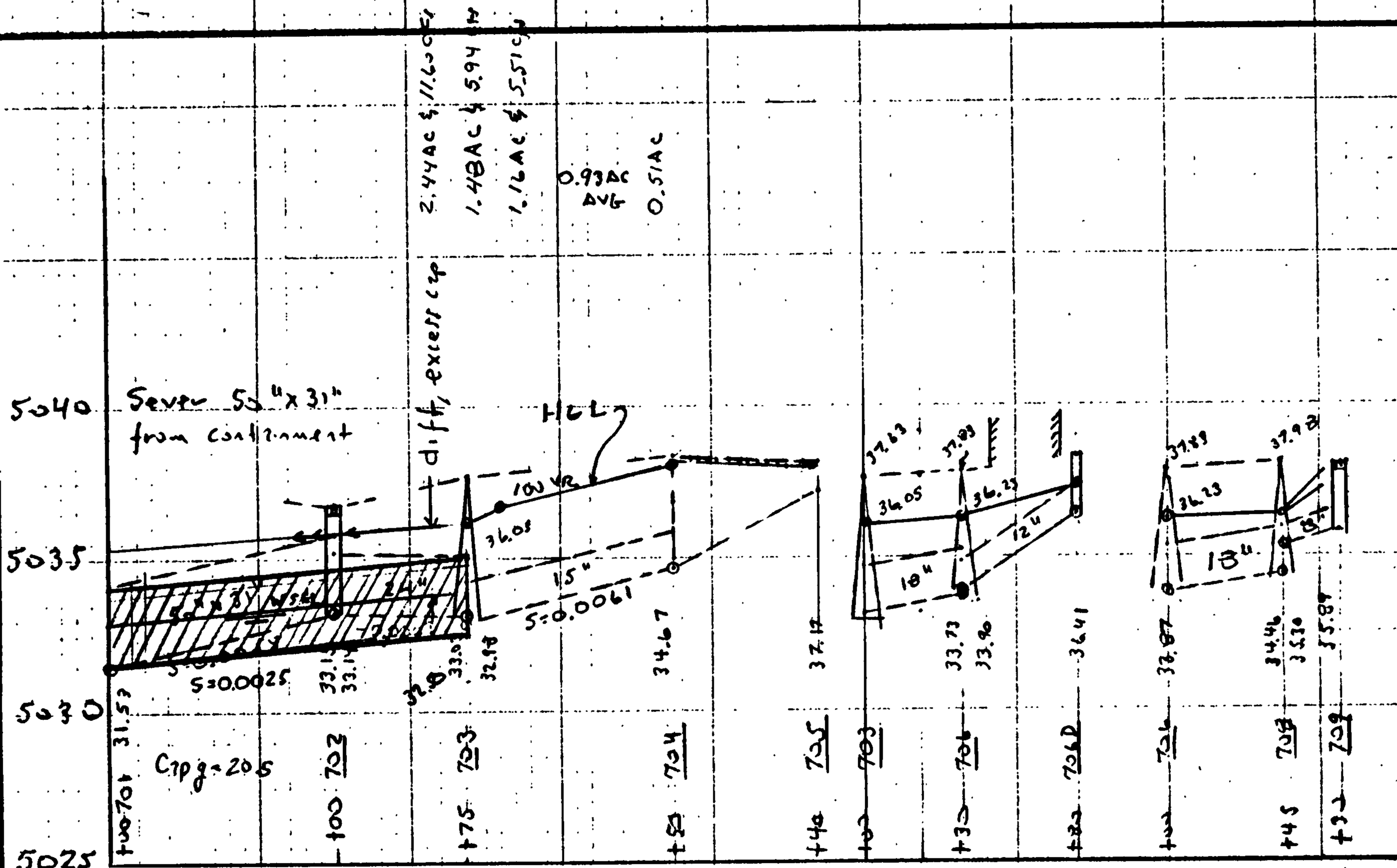
NAME OF PROJECT
COMPUTED BY:
CHECKED BY:
JOB NUMBER
DATE:
SHEET NUMBER 30 OF

43

DRAINAGE AREA NO. 700
Existing System, Pressure Flows

		704	703A	703	707	706	703	702
A. HYDROLOGY								
Ret Freq	years	10-25	10-25	10-25	10-25	10-25	10-25	10-25
6 hr RF	inches	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Increm DA	acres	0.51	0.32	0.46	1.12	0.83	6.39	
Accum DA	acres	0.51	0.83	0.46	1.58	2.41	8.80	
Increm C	---	1.00	1.00	1.00	1.00	1.00	1.00	
Accum C	---	1.00	1.00	1.00	1.00	1.00	1.00	
Increm TC	minutes	0.00	2.79	4.40	1.25	0.71	1.12	
Accum TC	minutes	3.30	6.09	4.40	5.65	6.36	8.00	
Accum TC	minutes	10.00	10.00	10.00	10.00	10.00	10.00	
Unit Qp	CSA/INCH	2.11	2.11	2.11	2.11	2.11	2.11	
Qp	CFS	1.72	2.81	1.57	5.36	8.17	29.78	
B. PRESSURIZED HYDRAULICS								
EG El Up	Feet	38.07	37.89	38.26	37.95	37.58	37.17	
Pipe Dia	Feet	1.25	1.25	1.00	1.5	2.00	3.29	
Pipe Area	Sq Ft	1.23	1.23	0.79	1.77	3.14	8.50	
Manngs n	---	.013	.013	.013	.013	.013	.025	
Pipe Fac	---	64.60	64.60	35.63	105.04	226.22	443.59	
Pipe Vel	FPS	1.41	2.29	2.00	3.03	2.60	3.50	
Pipe Len	Feet	235	40	150	130	175	300	
Trav Time	minutes	2.79	0.29	1.25	0.71	1.12	1.43	
V2/2g	---	0.03	0.08	0.06	0.14	0.10	0.19	
Frc Slp	Ft/Ft	7.129E-4	.0018883	.0019450	.0026029	.0013031	.0045061	
Frc Loss	Feet	0.17	0.08	0.29	0.34	0.23	1.35	
Loss Facs								
Ent & Ex	---	0.25	.25	0.25	.25	.25	.25	
Bend	---	0.00	0.00	0.00	0.00	1.50	0	
Other	---	0.00	0.00	0.00	0.00	0.00	1	
Tot Loss	Feet	0.18	0.10	0.31	0.37	0.41	1.59	
EG El Dn	Feet	37.89	37.80	37.95	37.58	37.17	35.58	
HG El Dn	Feet	37.86	37.72	37.89	37.44	37.06	35.39	
C. GRAVITY FLOW HYDRAULICS:								
Pipe Inv	Feet	33.23	32.98	33.73	33.19	33.14	31.53	
Pipe Slp	---	.0061	.0061	.0167	.0042	.0001	.0054	
Pipe Cap	CFS	5.05	5.05	4.60	6.81	2.26	32.60	
Qp/Cap	---	0.34	0.56	0.34	0.79	3.61	0.91	
							Outlet	

"AREA 700/VC"



CONCLUSIONS:

30" or Invertigate 24" on Final Design

54

LEEDSHILL-HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT

COMPUTED BY:

CHECKED BY:

JOB NUMBER

DATE:

SHEET NUMBER 32 OF

DRAINAGE AREA NO. 700
100 year System, Pressure Flows
Reduce Parking Lot D.A. to 6.4 ac.
Add 475 LF of Independent 30 inch RCP
Remove 50 inch*31 inch CMPA from Containment

		704	703A	703 / 707	706	703	701
A. HYDROLOGY							
Ret Freq	years		100	100	100	100	100
6 hr RF	inches		2.25	2.25	2.25	2.25	2.25
Increm DA	acres		0.93	0.32	0.60	0.36	1.48
Accum DA	acres		0.93	1.48	0.60	0.96	2.44
Increm C	---		1.00	1.00	1.00	1.00	1.00
Accum C	---		1.00	0.84	1.00	1.00	1.00
Increm TC	minutes		5.50	1.09	5.40	5.40	0.84
Accum TC	minutes		5.50	6.59	5.40	5.40	6.24
Accum TC	minutes		10.00	10.00	10.00	10.00	10.00
Unit Qp	CSA/INCH		2.11	2.11	2.11	2.11	2.11
Qp	CFS		4.42	5.94	2.85	4.57	11.60
B. PRESSURIZED HYDRAULICS							
EG El Up	Feet		~~38.36~~ 38.00	~~37.21~~ 36.85	~~38.26~~ 37.44	~~37.25~~ 36.43	~~36.41~~ 36.05
Pipe Dia	Feet		1.25	1.25	1.00	1.5	2.50
Pipe Area	Sq Ft		1.23	1.23	0.79	1.77	4.91
Manngs n	---		.013	.013	.013	.013	.013
Pipe Fac	---		64.60	64.60	35.63	105.04	410.17
Pipe Vel	FPS		3.60	4.84	3.63	2.58	2.36
Pipe Len	Feet		235	40	150	130	475
Trav Time	minutes		1.09	0.14	0.69	0.84	3.35
V2/2g	---		0.20	0.36	0.20	0.10	0.09
Frc Slp	Ft/Ft		.0046882	.0084696	.0064150	.0018892	8.004E-4
Frc Loss	Feet		1.10	0.34	0.96	0.25	0.38
Loss Facs							
Ent & Ex	---		0.25	.25	0.25	.25	.25
Bend	---		0.00	0.00	0.00	0.00	1.50
Other	---		0.00	0.00	0.00	0.00	1.00
Tot Loss	Feet		1.15	0.43	1.01	0.27	0.62
EG El Dn	Feet		~~37.21~~ 36.85	~~36.78~~ 36.42	~~37.25~~ 36.43	~~36.97~~ 36.15	~~35.79~~ 35.43
HG El Dn	Feet		~~37.01~~ 36.65	~~36.41~~ 36.05	~~37.04~~ 36.23	~~36.87~~ 36.05	~~35.70~~ 35.34
C. GRAVITY FLOW HYDRAULICS:							
Pipe Inv	Feet		33.23	32.98	33.73	33.19	31.53
Pipe Slp	---		.0061	.0061	.0167	.0042	~~.0042~~ 0.0025
Pipe Cap	CFS		5.05	5.05	4.60	6.81	~~26.58~~ 20.51 cfs
Qp/Cap	---		0.88	1.18	0.62	0.67	~~0.44~~ 0.57
							Outlet

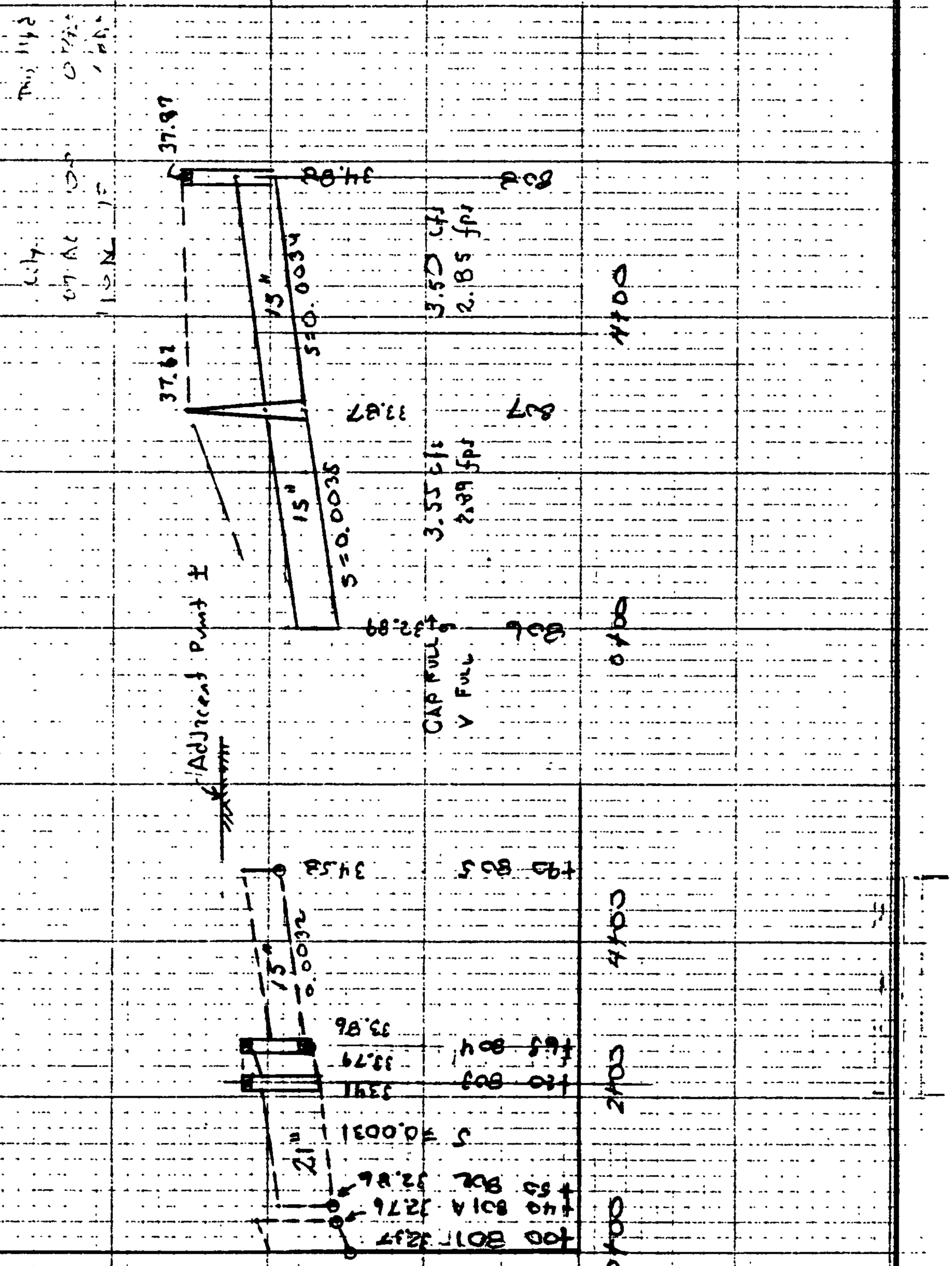
Point 105

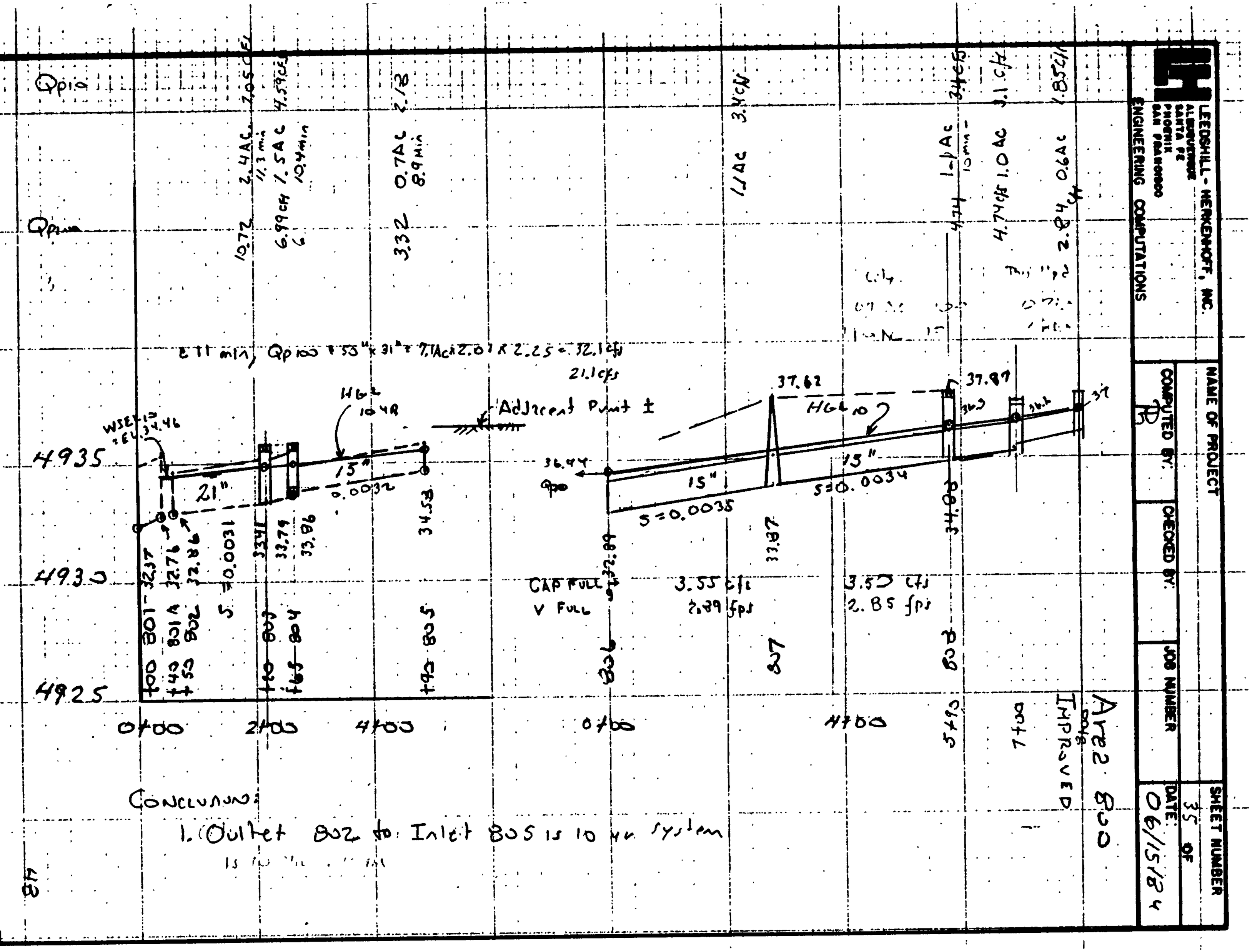
SAME POINT

"AREA701/VC"

LEEDSHILL-HERKENHOFF, INC. ALBUQUERQUE SANTA FE PHOENIX SAN FRANCISCO ENGINEERING COMPUTATIONS	NAME OF PROJECT			SHEET NUMBER 34 OF
	COMPUTED BY: PR	CHECKED BY:	JOB NUMBER	DATE: 06/15/84

Area 800




LEEDSHILL-HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS
NAME OF PROJECT
COMPUTED BY:
CHECKED BY:
JOB NUMBER
DATE: 06/15/84
SHEET NUMBER 35 OF
Area 800
IMPROVED
Adjacent Point ±
HGL 104.8
HGL 10
37.62
37.87
36.44
Qp
4935
4930
4925
0+00
2+00
4+00
6+00
4+00
5+00
7+00
21"
15"
0.0032
S=0.0031
S=0.0035
S=0.0034
34.53
33.79
33.86
33.37
34.06
CAP FULL
V FULL
3.55 cfs
2.89 fps
3.50 cfs
2.85 fps
801-32.37
801A 32.76
802 32.86
803
804
805
806
807
808
Qp100 = 50" x 31" = 7.1Ac x 2.07 x 2.25 = 32.1cfs
21.1cfs
CONCLUSION:
1. Outlet 802 to Inlet 805 is 10 yr system

LEEDSHILL - HERKENHOFF, INC.
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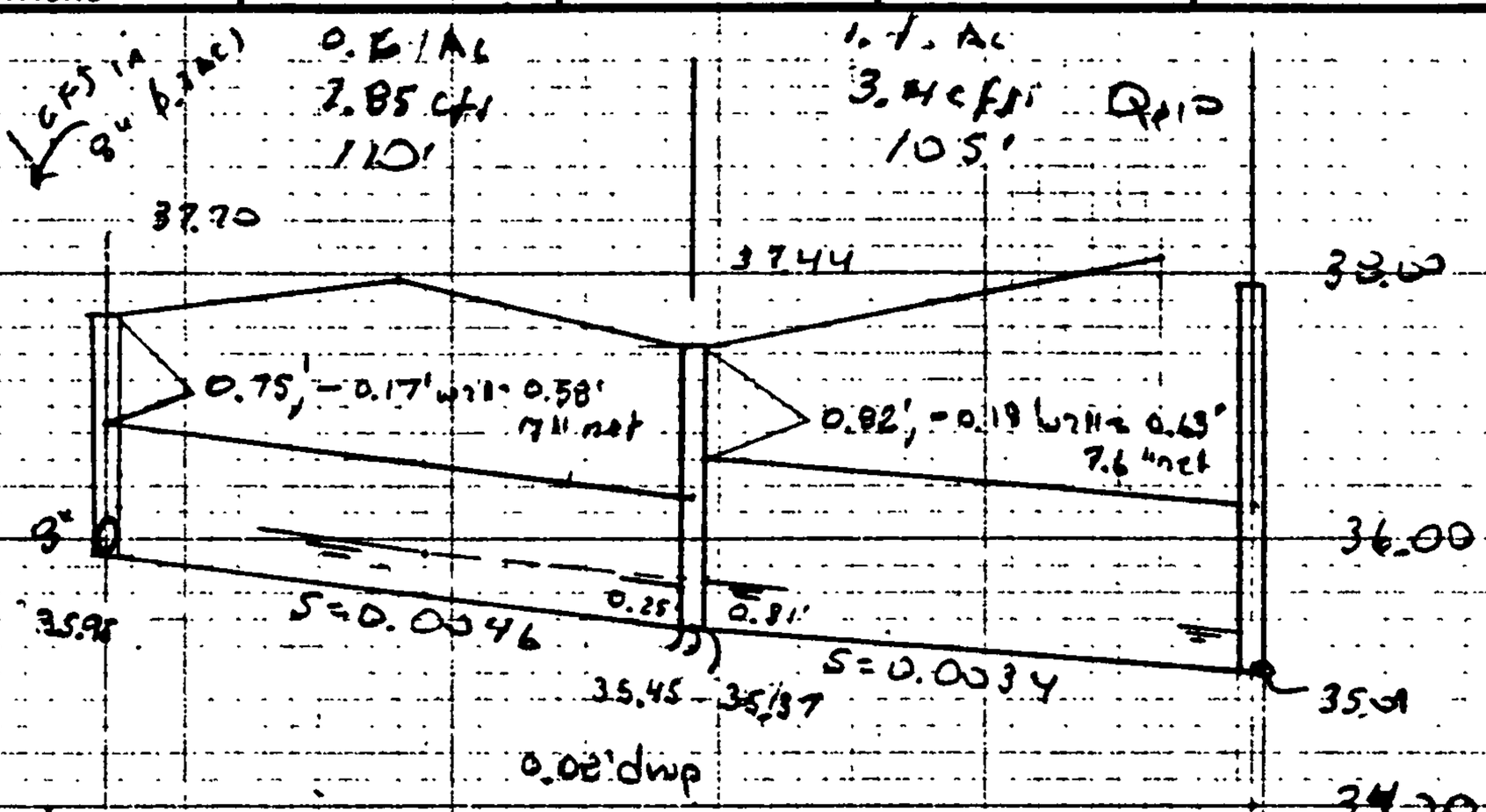
SANTA FE
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER
			36 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE: 06/

Proposed 2 New Catch Basins for Prop Pw Concrete En Cale → 8"



= 10 Year Design - Limitation is Outlet BOB to CB BOB 15" Pipe

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SANTA FE
PHOENIX
SAN FRANCISCO

ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 1 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

QUANTITIES & COST ESTIMATES

2-5 Quantities

6- Cost Estimates

LEEDSHILL-HERKENHOFF, INC.
ALBUQUERQUE
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PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 2 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE:

QUANTITES

Source of Costs is Avg 3 Prices, CASH PAVING #31

Containment:

1. 8' Dia MH's — Quant — 4' Dia MH's

Area 100-200,	13' deep	15' deep @ sump pump
Area 300	11' deep	11' deep valve box
Area 500	11' "	11' " " "
Area 700	10' "	10' " " "

Cost

	8' DIA	4' DIA
Area 100 - Area 200	$1550 + 13 x 220 ≈ $4,400	$1,550 + 150 $1,600
Area 300	$1550 + 11 x 220 ≈ 4,000	$1,500
Area 500	" same 4,000	same 1,500
Area 700	1550 + 10 x 220 ≈ 3,700	1,350

2. Open Basin

10 x 10 Bot		100 ft
Side Area @ 1' deep & 3:1 "	3.16 x 4 x 13	164 ft
Lip Area, 1' width	17 x 4	68 ft
		332 ft ≈ 68 SY

Motor Operators

6" Suppliers Cost = $2,100 x 1.5 = installed ≈	$3,200
8" " " = 2,300 x 1.5 = " ≈	3,500
6" Gate Valve, Each Paving	$400
8" " " " "	$500
Sump pump	$600

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT

SHEET NUMBER 3 OF

COMPUTED BY: CHECKED BY: JOB NUMBER DATE:

Quantities

RCP Costs:

	Pipe	T&B		Total
12"	$15	$7	(0-6')	$22
15"	$19	$7	(0-6')	26
18"	$21	10	x 8'	31
24"	$32	10	x 8'	42
30"	$44	10	x 8'	54
36"	$53	10	x 8'	63

Ductile Iron Costs

10"	$21	$7	28
12"	$24	$7	31
14"	27	$7	34

LEEDSHILL - HERKENHOFF, INC.
ALBUQUERQUE
SANTA FE
PHOENIX
SAN FRANCISCO
ENGINEERING COMPUTATIONS

NAME OF PROJECT			SHEET NUMBER 4 OF
COMPUTED BY:	CHECKED BY:	JOB NUMBER	DATE: 06/27/24

Quantities

Pavement Rem. & Repl. for Cost

Area 100-200 — 110 — 6'

8'	$[(10' + 13 \times 1)/2]^2 \times \pi$	450
4'	$[(6' + 15 \times 1)/2]^2 \times \pi$	346
Pipe	150' x (3+3)	900
		1696 ÷ 9 = 188 SY
		use 180

Area 300

8'	$[(10 + 11 \times 1)/2]^2 \times \pi$	346
4'	$[(6' + 11 \times 1)/2]^2 \times \pi$	227
RCP	30' x (4+4)	240
		813 ÷ 9 = 90 SY

Area 500

8'	same as 300	346
4'	same as 300	227
RCP	25 x (4+4)	200
		773 ÷ 9 = 86 SY

Area 1700

8'	$[(10 + 10)/2]^2 \times \pi$	314
4'	$[(6 + 10)/2]^2 \times \pi$	201
RIP Drain		5
		520 ÷ 9 = 58 SY

Area 800

Bot slp lip outside = $[10 + 2 \times 3 + 2 \times 1 + 2 \times 3] / 9$ = 60 SY 65

Prelim Cost Est.
PRIORITY I

Sheet 6

AREA 100-200

a. Containment

1.	8' Dia MH, Contain Struct	Ea	1	$4,400	$4,400
2.	Sump Pump	Ea	1	600	600
3.	4' Dia MH, Wet Well	Ea	1	1,600	1,600
4.	3" Dia. Steel Drain Pipe	L.F.	30	10	300
5.	Catch Basin	Ea	1	2,700	2,700
6.	18" RCP Inlet Line	L.F.	80	31	2,480
7.	12" RCP Inlet Line	L.F.	70	22	1,540
8.	Alter. Asph Pvmt. Rem & Repl.	S.Y.	180	32	5760
	AREA 100-200 Sub Total				$19,380

AREA 300

a. Containment

1.	8' Dia M.H., Contain Struct.	Ea	1	4,000	4,000
2.	6" Gate Valve	Ea	1	400	400
3.	Valve Motor Operator	Ea	1	3,200	3,200
4.	4' Dia MH, Valve Access	Ea	1	1,550	1,550
5	6" Ductile Iron Drain Line	L.F.	35	15	525
6	4' Dia M.H., Storm Drain	Ea	1	1,300	1300
7.	24" RCP	LF	40	42	1,680
8.	12" RCP	LF	10	22	220
9.	Alternat Asph. Pvmt. Rem & Repl.	S.Y.	90	32	2,880
	Area 300 Subtotal				$15,755

PRIORITY I, (Cont'd)

Sheet of

AREA 500					
a. Containment					
1.	8' Dia MH, Contain Struct	Ea	1	4000	4000
2.	6" Gate Valve	"	1	400	400
3	Valve Motor Operator	"	1	3,200	3,200
4	4' Dia MH, Valve Access	"	1	1,550	1,550
5	6" Ductile Iron Drain Line	LF	35	15	525
6	18" RCP	LF	25	31	775
7	Arterial Asph Pvmt Rem & Repl.	S.Y.	85	32	2720
	AREA 500 Sub Total				$13,170
AREA 700					
a. Containment					
1.	8' Dia MH, Contain Struct.	Ea	1	3,700	3,700
2.	6" Gate Valve	"	1	400	400
3.	Valve Motor Operator	"	1	3,200	3,200
4.	4' Dia MH, Valve Access	"	1	1,550	1,550
5.	6" Ductile Iron Drain Line	L.F.	45	15	675
6.	P. Lot Asph Pvmt Rem & Repl.	SY	60	25	1,500
b. Other Priority I Work					
1.	Catch Basins	Ea	3	2,700	8,100
2.	Arterial Asph Pvmt Rem & Repl.	S.Y.	840	25	21,000
	AREA 700 Sub Total				$40,125

PRIORITY I (Cont'd)

Sheet 6

AREA 800

a. Containment

1.	Reinf. Conc Open Basin	S.Y.	35	$60	$2,100
2.	8" Gate Valve	Ea	1	500	500
3.	Motor Operated Valve	"	1	3500	3500
4.	4' Dia MH, Valve Access	"	1	1200	1200
5.	8" Ductile Iron Drain Line	L.F.	50	16	800
6.	4' High Chain Link Fence	L.F.	80	20	1,600
7.	P. Lot Asph Pvmt Removal	S.Y.	65	4	260
8.	P. Lot Asph Pvmt Replace	S.Y.	30	21	630

b. Other Priority I Work

1.	6' Width Asphalt Swale	S.Y.	470	10	4700

AREA 800 Sub Total $15,290

Sub Total, Preceding Const Costs	$103,720
Control Panel, Controls, Conduit & Wiring	24,000
Total, Priority I Costs	$127,720

Prelim Cost Est.
PRIORITY II IMPROVEMENTS

AREA 100				
a. Catch Basins MH 106 to MH 107				
1. Catch Basins	Ea.	2	$2,700	$5,400
2. 15" RCP Inlet Lines	L.F.	120	26	3,120
3. Arterial Asph. Pvmt. Rem & Repl.	S.Y.	60	32	1,920
b. Reconstruct CB 109D to CB 109H System				
1. 6' Dia Manholes	Ea	1	1,800	1,800
2. 4' Dia Manholes	"	2	1,100	2,200
3. 15" RCP	LF	350	26	9,100
4. P. Lot Asph Pvmt Rem & Repl.	S.Y.	190	25	4750
c. Piping, CB 109I to 109L				
1. Pipe & Pavement Items	LS	1	1,000	1,000
AREA 100 Sub Total				
AREA 500				
a. Piping, TD 504 to TD 506				
1. Pipe & Pavement Items	L.S.	1	2,000	2,000
AREA 700				
a. Convey Flows North to CB 808				
1. Catch Basins	Ea	2	2,700	5,400
2. 14" DI Pipe	LF	100	34	3,400
3. 12" DI Pipe	LF	110	31	3,410
4. 10" DI Pipe	LF	50	23	1,400
PRIORITY II Total				$44,900

Prelim Cost Estimates
PRIORITY III

AREA 100				
a. Pipe Replacement, Outlet 101 to MH 104				
1. 6' Dia Manhole	Ea.	1	2,500	2,500
2. 36" RCP	LF	400	63	25,200
3. Arterial Asph Pvmt. Rem & Repl.	S.Y.	400	32	12,800
b. Supplemental Pipe, MH 106 to MH 107				
1. 8' Dia Manhole	Ea	2	2700	5,400
2. 24" RCP	LF	400	42	16,800
3. Arterial Asph	S.Y.	360	32	11,520
AREA 300:				
a. New Pipe, MH 304 to Bldg 14 Roof Drain				
1. 18" RCP	LF	300	31	9,300
2. Conc. Pvmt. Rem & Repl.	S.Y.	170	40	6,800
3. Asph Pvmt. Rem & Repl.	S.Y.	50	32	1,600
AREA 700:				
a. New Pipe, Outlet 701 to MH 703				
1. 4' Dia M.H.	Ea	1	1,900	1,900
2. 30" RCP	L.F.	430	54	23,220
3. 50" x 31" CMPA	L.F.	50	50	2,500
4. P. Lot Pvmt. Rem & Replacement	S.Y.	340	25	8,500
Total Cost				$128,040

FLOW CHARACTERISTICS

Manhole	With Improvements		Before Improvements
	Q_{100}	HGL	Q_{100}
101	54.8	4930.4	43.3
203	--	--	11.8
301	18.4	4930.8	18.4
501	15	4931.4	15 (includes 509)
701	30.4	4935.4	29.8
801	32.1	4935.0	32.1