

P. O. Box 3632  
ALBUQUERQUE, NEW MEXICO 87119

01871991  
FEB 02 1988

FEB 02 1988

Shuart Reeder  
Hydrology Dept  
Old City Hall

|                              |                 |
|------------------------------|-----------------|
| DATE<br>2.1.88               | JOB NO.<br>6718 |
| ATTENTION<br>Mr. Reeder      |                 |
| RE:<br>CVI Laser<br>L-22/D4) |                 |

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via \_\_\_\_\_ the following items:

[illegible]

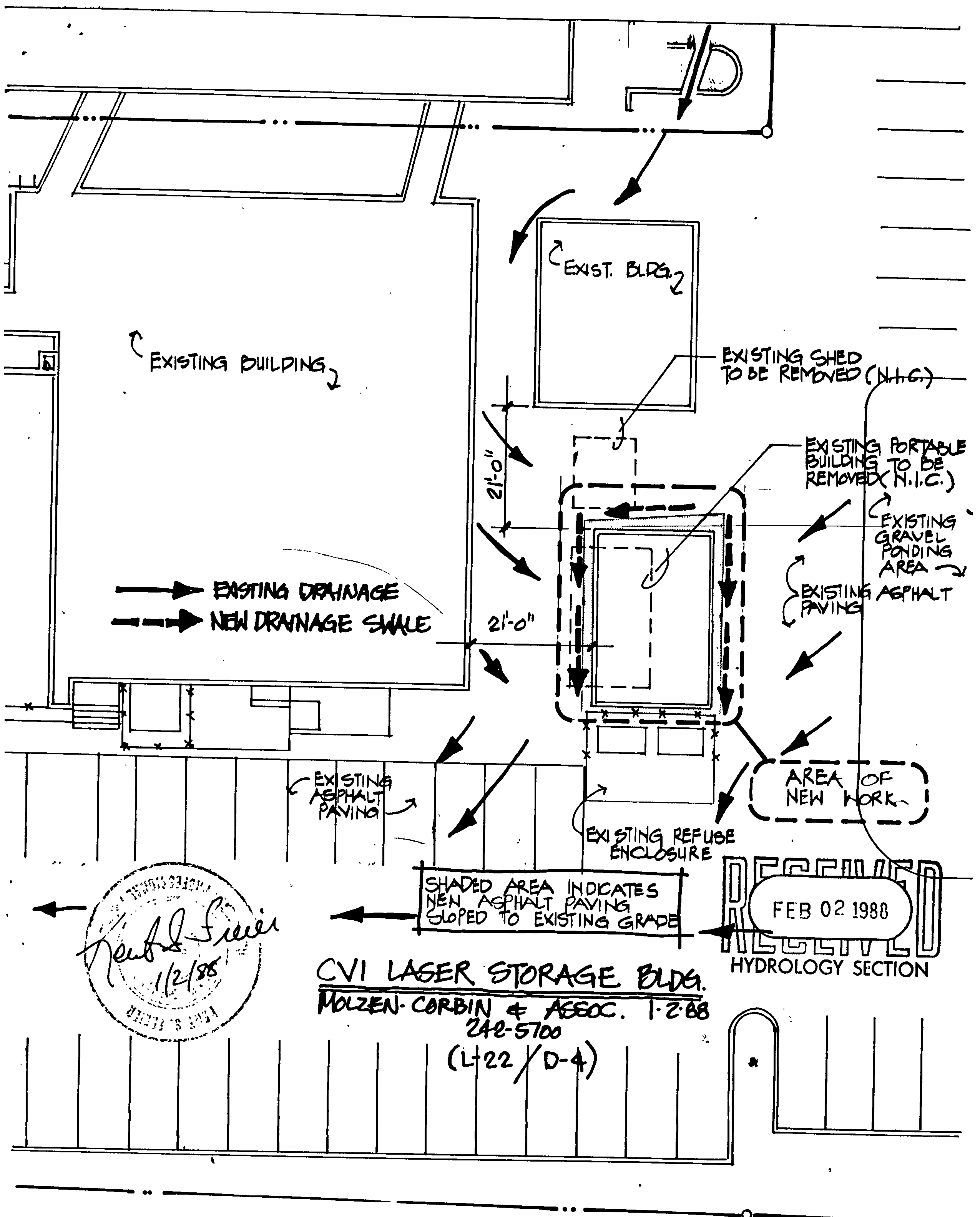
☐ For approval                      ☐ Approved as submitted                      ☐ Resubmit\_\_\_\_\_copies for approval  
☒ For your use                      ☐ Approved as noted                      ☐ Submit\_\_\_\_\_copies for distribution  
☒ As requested                      ☐ Returned for corrections                      ☐ Return\_\_\_\_\_corrected prints  
☐ For review and comment                      ☐ \_\_\_\_\_  
☐ FOR BIDS DUE \_\_\_\_\_19\_\_\_\_\_  
☐ PRINTS RETURNED AFTER LOAN TO US

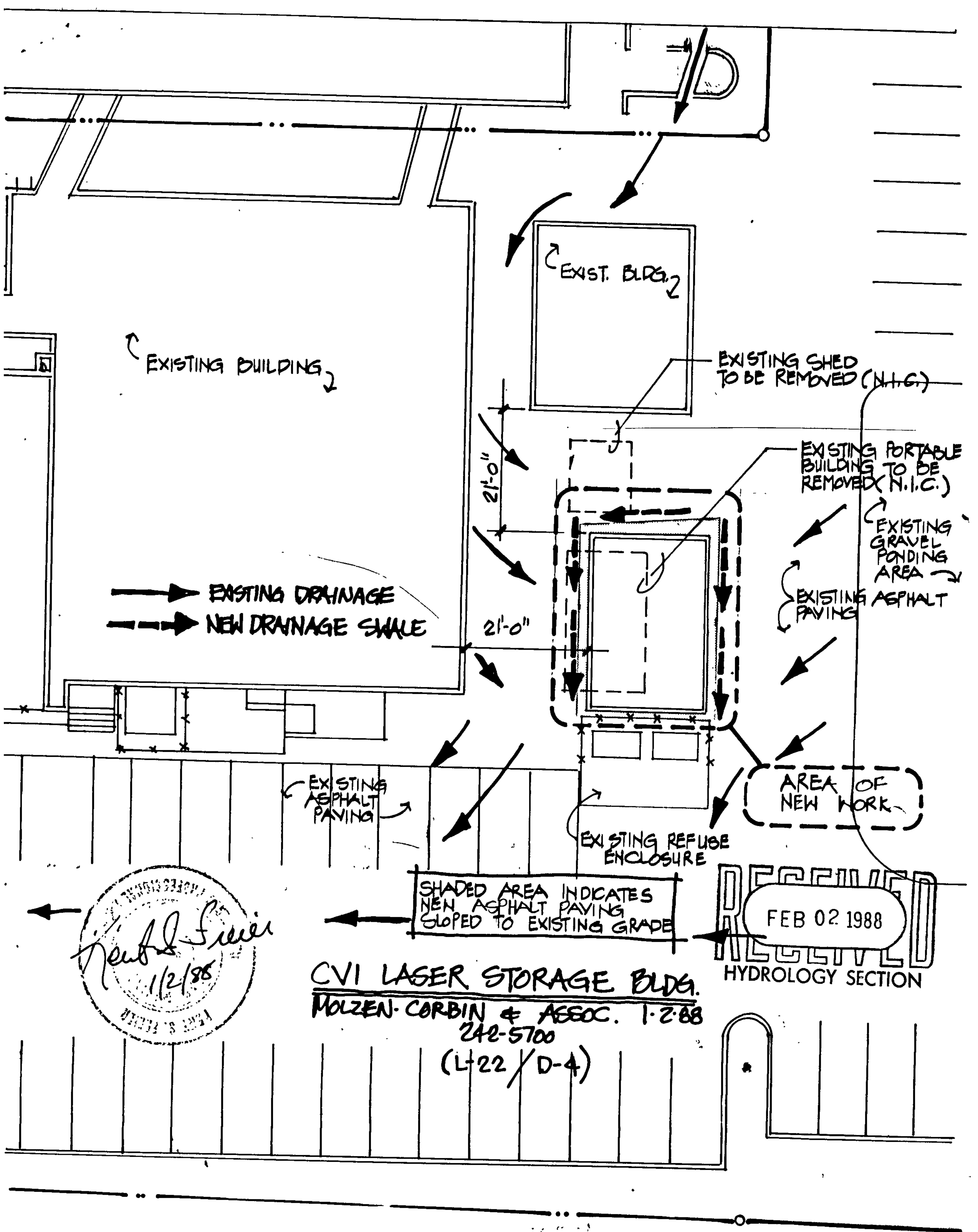
[illegible]

2/2/88

**SIGNED:**

James Lacy  
us at once.





EXISTING BUILDING

EXIST. BLDG. 2

EXISTING SHED TO BE REMOVED (N.H.G.)

EXISTING PORTABLE BUILDING TO BE REMOVED (N.H.G.)

EXISTING GRAVEL PONDING AREA

EXISTING ASPHALT

EXISTING DRAINAGE  
NEW DRAINAGE SWALE

21'-0"

21'-0"

EXISTING ASPHALT PAVING

EXISTING REFUSE ENCLOSURE

AREA OF NEW WORK

SHADED AREA INDICATES  
NEW ASPHALT PAVING  
SLOPED TO EXISTING GRADE

FEB 02 1988

HYDROLOGY SECTION

CVI LASER STORAGE BLDG.  
MOLZEN-CORBIN & ASSOC. 1-2-88  
242-5700  
(L-22/D-4)



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 2, 1987

Ms. Janet Lacy, AIA  
Molzen-Corbin & Associates  
2701 Miles Road, SE  
Albuquerque, New Mexico 87106

RE: CVI LASER STORAGE BUILDING  
(L-22/D4)

Dear Ms. Lacy:

I am writing in response to your request for a waiver of our requirement of an updated drainage report as a condition for this department's sign-off on the Certificate of Occupancy.

Our survey of the site has convinced me that the site is in substantial compliance with the drainage plan on file. The only apparent problem is that there is an existing paved swale ditch which will be covered up by the new paving and the new building. Your site plan does not make it obvious to the contractor that he will have to deal with a drainageway which he must not block.

If you will revise your drawing to insure that the contractor understands the drainage of the area and his responsibilities, we will be satisfied. Copies of the revised drawing must be attached to the City Building Plans on file with Code, and sent to the contractor and to us for our file. I have taken the liberty of marking a copy of your present submittal as a sample of what I had in mind.

Thank you for your cooperation. If you have any questions, please call me at 768-2650.

Cordially,

*Stuart Reeder*  
G. Stuart Reeder, P.E.  
C.E./Hydrology Section

GSR/bsj

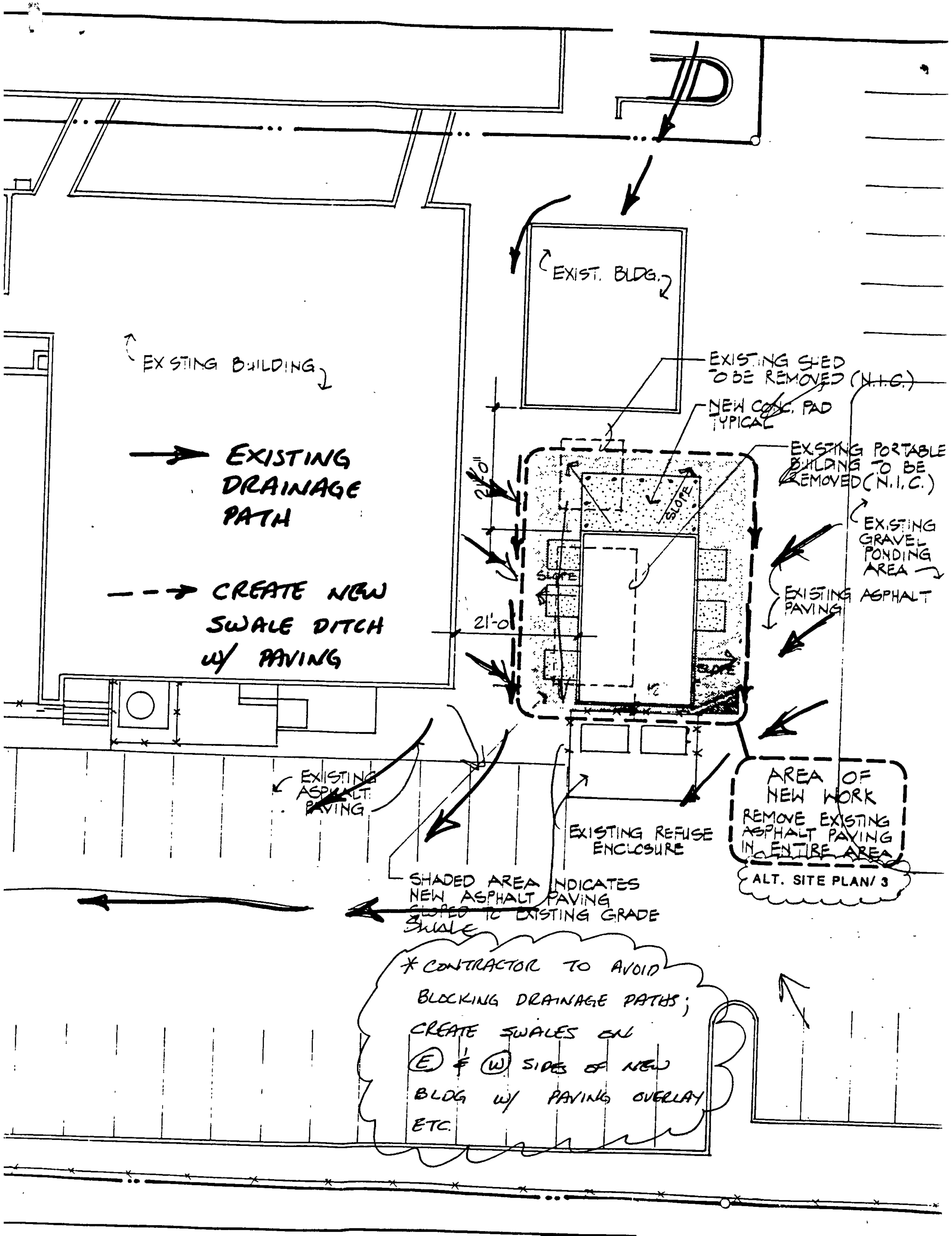
PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER



FILE COPY



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz  
Mayor

UTILITY DEVELOPMENT DIVISION  
HYDROLOGY SECTION  
(505) 768-2650

October 15, 1987

Ms. Janet Lacy  
Molzen-Corbin and Associates, Inc.  
2701 Miles Road SE  
Albuquerque, New Mexico 87106

RE: CVI LASER STORAGE BUILDING (L-22/D4)

Dear Ms. Lacy,

I am writing to you regarding the new storage building which your client wishes to build. Our inspector, Rick Duran, looked at the site yesterday, October 14, and reported no existing drainage problems. As you pointed out in our initial meeting, the area is completely paved, with two smaller metal sheds existing which will be removed to make way for the new building. Because there is no change in the amount or direction of runoff, we will not require a new drainage plan to be submitted.

Your project is approved for building permit sign-off by Hydrology.

As a condition of our sign-off of the Certificate of Occupancy, we request that you have the latest drainage plan updated to show the new foot print. That plan, according to our records, was done for you by Tom Mann and Associates, in April 1986.

Again, I offer my apologies for misdirecting you initially, and hope you have suffered a minimum of inconvenience.

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

Sincerely,

G. Stuart Reeder, P.E.  
Civil Engineer  
Hydrology Section

GSR/lk

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

Pre-Design Investigation  
(Additions)

DATE 13 Oct 87

ADDRESS 200 DORADO PLACE ZONE ATLAS # L22/04

LEGAL DESCRIPTION \_\_\_\_\_

OWNER \_\_\_\_\_

ARCHITECT/ENGINEER MOLZEN-CORBIN

LOT SIZE \_\_\_\_\_

ZONING \_\_\_\_\_

PROPOSED DEVELOPMENT REMOVE EXISTING BLDGS & REPLACE W/ NEW BLDG

|                                  | YES      | NO       | NA | COMMENTS |
|----------------------------------|----------|----------|----|----------|
| FLOOD HAZARD AREA                |          | <u>C</u> |    |          |
| PART OF AN APPROVED REPORT       | <u>✓</u> |          |    |          |
| CONSTRUCTION PLANS ON MICRO-FILM | <u>✓</u> |          |    |          |
| FIELD INSPECTION                 | <u>✓</u> |          |    |          |

COMMENTS:

AREA OF NEW ADDITION CURRENTLY DRAINS  
INTO EXISTING SHALE WHICH DRAINS OUT THRU  
DRIVE PAD. SEE NO POTENTIAL PROBLEM WITH  
PROPOSED ADDITION.

DRAINAGE REQUIREMENTS:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FILE COPY



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

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

May 5, 1986

Jeff Mortensen  
Tom Mann & Associates, Inc.  
811 Dallas, NE  
Albuquerque, New Mexico 87110

RE: DRAINAGE PLAN FOR CVI LASER (L-22/D4)  
RECEIVED APRIL 24, 1986

Dear Mr. Mortensen:

The above referenced plan, dated April 18, 1986, is approved for Building Permit. However, please be advised of the following:

1. An S.O. #19 will be required for Building Permit release.
2. A retaining wall permit will be needed from Code Administration.
3. City approved street grades will be needed for adjoining Cochiti Road.

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

Cordially,

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

CAM/bsj

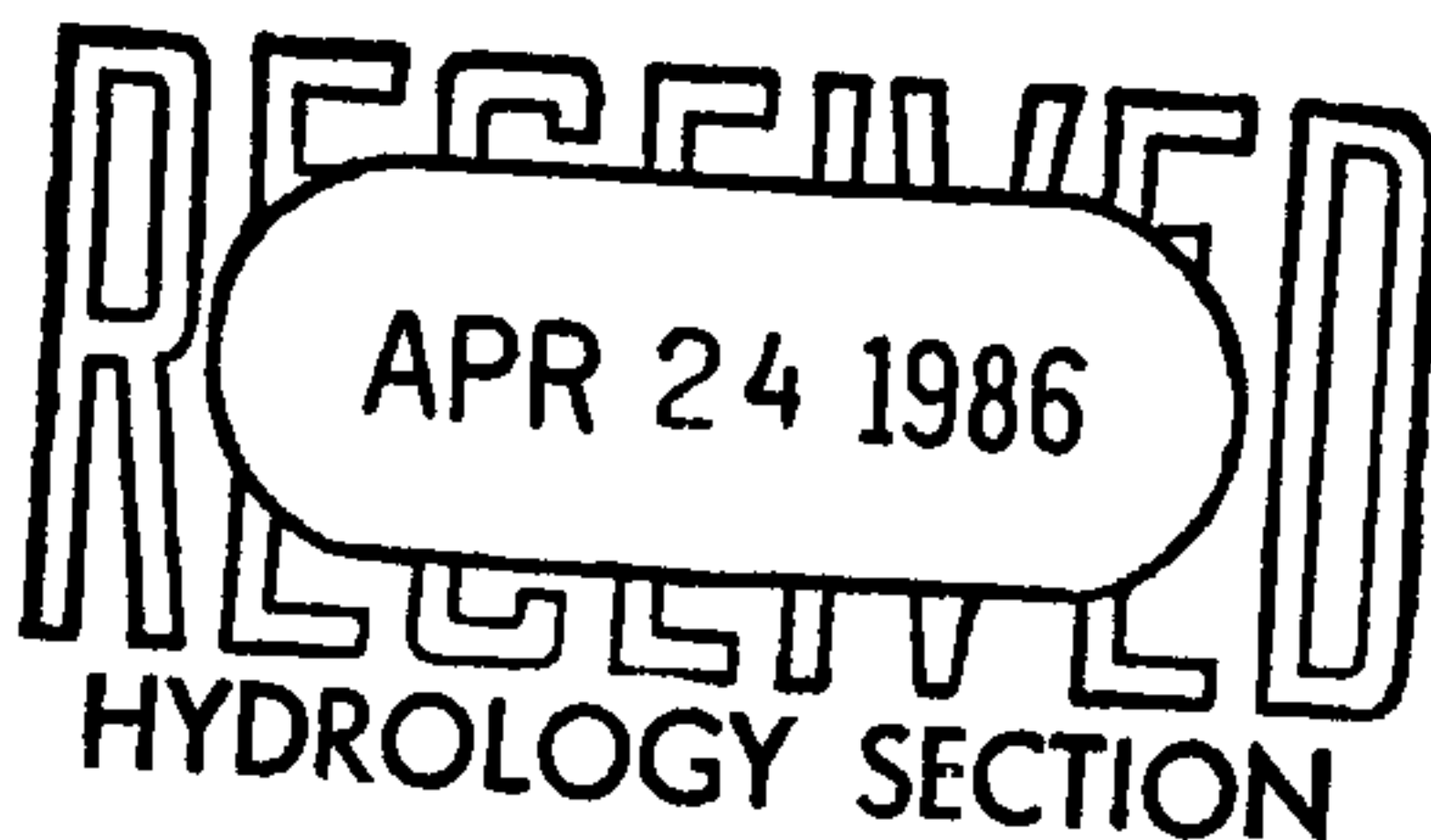
*Copy to  
C.O.*

## DRAINAGE INFORMATION SHEET

60372

PROJECT TITLE: CVI LASER ZONE ATLAS/DRNG. FILE #: L22/04  
LEGAL DESCRIPTION: LOTS C-1 & C-2 DORADO VILLAGE, BLK C  
CITY ADDRESS: 200 DORADO PL. SE  
ENGINEERING FIRM: TOM MANN & ASSOC. CONTACT: J.G. MORTENSEN  
ADDRESS: 811 DALLAS NE. PHONE: 265-5611  
OWNER: CVI LASER CONTACT: ARCHITECT  
ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_  
ARCHITECT: CLAUDIO ANTONIO VIGIL & ASSOC CONTACT: Jim Rogers  
ADDRESS: \_\_\_\_\_ PHONE: 247-1000  
SURVEYOR: TOM MANN & ASSOC. CONTACT: J.G. MORTENSEN  
ADDRESS: 811 DALLAS NE PHONE: 265-5611  
CONTRACTOR: NOT KNOWN CONTACT: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

PRE-DESIGN MEETING:

☒ YES☐ NO☒ COPY OF CONFERENCE RECAP  
SHEET PROVIDEDDRB NO.       EPC NO.       PROJ. NO.       

TYPE OF SUBMITTAL:

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

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL☐ PRELIMINARY PLAT APPROVAL☐ SITE DEVELOPMENT PLAN APPROVAL☐ FINAL PLAT APPROVAL☒ BUILDING PERMIT APPROVAL☐ FOUNDATION PERMIT APPROVAL☐ CERTIFICATE OF OCCUPANCY APPROVAL☐ ROUGH GRADING PERMIT APPROVAL☐ GRADING/PAVING PERMIT APPROVAL☐ OTHER \_\_\_\_\_ (SPECIFY)DATE SUBMITTED: 04-24-86BY: J.G. MORTENSEN

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

CONFERENCE RECAP

DRAINAGE FILE/ZONE ATLAS PAGE NO.: L22 DATE: 4/8/86 @ 8:30  
PLANNING DIVISION NOS: EPC: \_\_\_\_\_ DRB: \_\_\_\_\_  
SUBJECT: CVI Laser SE corner Durado Pl & Cochiti  
STREET ADDRESS (IF KNOWN): 200 Durado, SE Lot C-1 & C-2 Rear!  
SUBDIVISION NAME: Block C

APPROVAL REQUESTED:

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

|             | WHO                   | REPRESENTING                 |
|-------------|-----------------------|------------------------------|
| ATTENDANCE: | <u>Jeff Mortensen</u> | <u>Tom Mann &amp; Assoc.</u> |
|             | <u>Carlos Montoya</u> | <u>Design Hydrology</u>      |

FINDINGS:

- ① Drainage plan per DPM
- ② City approved street grade for Cochiti prior to C.O. release (2652)
  - (A) site does not drain to Cochiti
  - (B) Cochiti not used for design
- ③ Discharge from site needs to be controlled
  - (A) 4 hills shopping ctr controls discharge
  - (B) 0.5 cfs/AC can be used as determined by the 4 Hill shopping ctr drainage report (L22-D32). If different rate is used then engineer must address.

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: Carlos A. Montoya  
TITLE: \_\_\_\_\_  
DATE: 4-8-86

SIGNED: Jeffrey G. [Signature]  
TITLE: \_\_\_\_\_  
DATE: 04-08-86

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



# CVI LASER CORPORATION

200 DORADO PL., SE P.O. BOX 11308 ALBUQUERQUE, NEW MEXICO 87192 505 296-9541 TELEX 660335

January 6, 1982

Mr. Fred Aguirre, P.E.  
Hydrology Engineering Division  
Municipal Development Department  
P.O. Box 1293  
Albuquerque, New Mexico 87103

RE: CVI Laser Corporation Site  
200 Dorado Place, S.E.  
Zone Atlas Page L-22  
Bovay Number 6014-168/186

RECEIVED  
JAN 8 1982  
CITY ENGINEER

Dear Mr. Aguirre:

According to letter and drawings furnished to you by Mr. Fritz of Bovay Engineers, the construction of drainage requirements needed for our receiving a green tag for certificate of occupancy has now been completed. We appreciate your patience in this matter.

Will you please advise me if we have to do anything additional with either your department or other city departments in order to fulfil all requirements in obtaining our certificate of occupancy.

Very truly yours,

  
F. J. Brandiger

FJB/lad



# BOVAY ENGINEERS, INC.

HOUSTON  
AUSTIN

SPOKANE  
ALBUQUERQUE

BATON ROUGE  
WASHINGTON, D. C.

RECEIVED  
JAN 7 1982  
CITY ENGINEER

January 5, 1982

Mr. Fred Aguirre, P.E.  
Hydrology Engineering Division  
Municipal Development Department  
P. O. Box 1293  
Albuquerque, New Mexico 87103

RE: CVI Laser Corporation Site  
200 Dorado Place, S. E.  
Zone Atlas Page L-22  
Bovay Number 6014-168/186

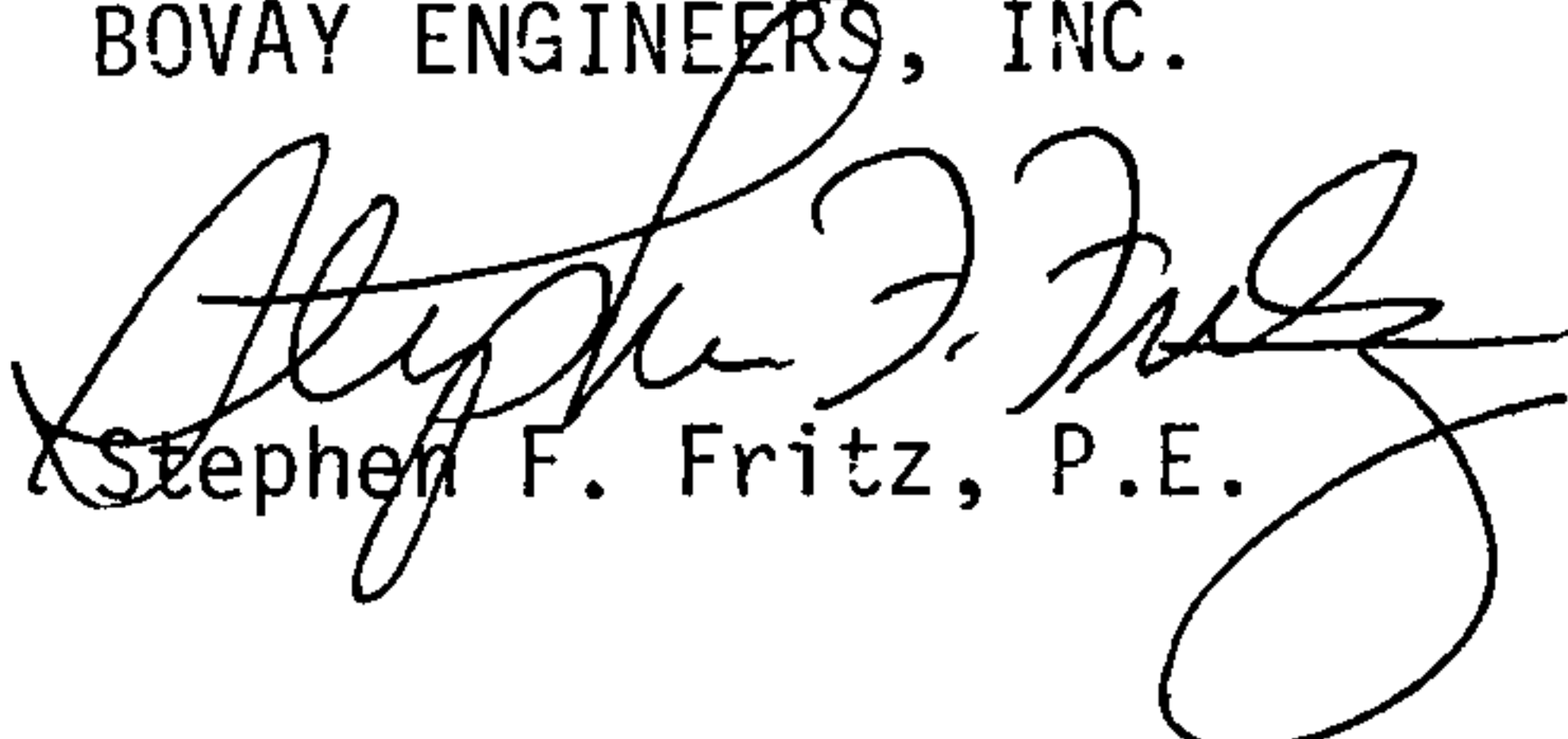
Dear Mr. Aguirre:

Please find enclosed three copies of the Record Drawing for the project referenced above. I have certified that the improvements were constructed in accordance with City approved drainage concept.

If you should have any questions, please do not hesitate to call.

Sincerely,

BOVAY ENGINEERS, INC.

  
Stephen F. Fritz, P.E.

cc: Mr. Joe Brandiger, w/enclosure  
CVI Laser Corporation

RECEIVED  
JAN 9 1982  
CITY ENGINEER



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 26, 1981.

C.V. I. Laser, Inc.  
180 Dorado Pl. S.E.  
Albuquerque, N.M. 87123

Gentlemen:

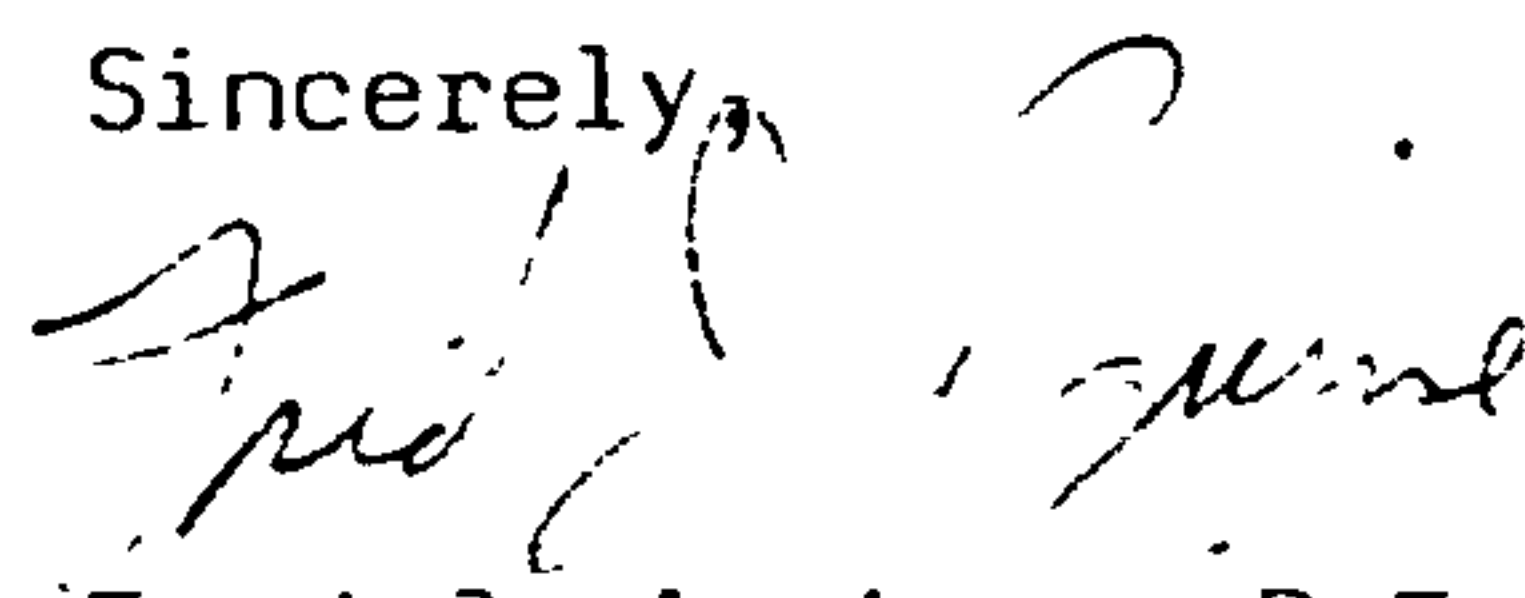
A review of our records indicates that this office has never given a final drainage approval at 180 Dorado Pl. S.E.. Further, I have noted that the building is being occupied without a Certificate of Occupancy which is contrary to Section 306 of the City Building Code.

In order to provide fair, effective enforcement of drainage policy, it is imperative that I, or one of my staff, make a final inspection of all buildings prior to occupancy. Please make immediate arrangements with me to allow for an inspection of the above mentioned property.

If arrangements for an inspection and approval of your site are not completed within 30 days from the above date, this office will take the necessary legal steps to invoke one or more of the penalties listed under Section 205 of the City Building Code.

If you have any questions concerning this matter, do not hesitate to call me.

Sincerely,

  
Fred J. Aguirre, P.E.  
Civil Engineer

FJA/tsl

cc: Barbara Stephenson,  
City Attorneys Office

MUNICIPAL DEVELOPMENT DEPARTMENT

August 8, 1979

Robert Romero  
Zoning  
City of Albuquerque

Re: C.V.I. Laser  
180 Dorado

Dear Mr. Romero:

We have discussed the problem with Fabrizio Bertolotti and agree to provide a signed site development plan for (2-73-14) by October 15th.

This site development plan was not asked for in 1973 and an existing building has been permitted and on the site since November, 1973. We have been working on this plan since the middle of March and are being held up by the City Engineer's office and their shortage of manpower.

Please accept this letter and be assured you will receive this site development plan by 10/15/79.

Sincerely,

Robert F. Armstrong  
Architect A.I.A.

RFA/bda

cc: C.V.I.  
General Contractor - Bob Fitzgibbon



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

L-22-D4

August 5, 1981

Joe Brandiger  
C.V.I. Laser Corporation  
180 Dorado Place S.E.  
Albuquerque, New Mexico 87123

RE: Revised Drainage Report for C.V.I. Laser  
dated June 1981

Dear Mr. Brandiger:

The referenced drainage report is approved. We also agreed with the postponement of the channel construction until the rear portion of the lot is developed. According to your engineer, the postponement of this channel will not have an adverse affect on the drainage improvements proposed at this time.

Please advise us when the construction for the existing development is completed, so that we can inspect and certify.

To lend some coordination between the design and construction, we would recommend that you have your engineer inspect and certify for the purpose of obtaining a Certificate of Occupancy. Please advise this office of your decision.

Sincerely,

Fred J. Aguirre, P.E.  
Civil Engineer

FJA:gc  
7824A

cc Stephen F. Fritz, Bovay Engineers  
Drainage Files ✓  
f/Reading

MUNICIPAL DEVELOPMENT DEPARTMENT



# CVI LASER CORPORATION

200 DORADO PL., SE P.O. BOX 11308 ALBUQUERQUE, NEW MEXICO 87112 505-298-9541 TELEX 660335

July 16, 1979

RECEIVED  
JUL 26 1979  
CITY ENGINEER

Mr. Richard Heller  
City Engineer  
City of Albuquerque

REFERENCE: CVI Laser Building  
180 Dorado Place, S.E.  
Albuquerque, New Mexico

Dear Mr. Heller:

We have authorized the architect and engineer to prepare and submit a summary plat for the portion of our total property which has the new construction.

It is our understanding that this summary plat is only for the purpose of expediting the building permit. We reserve the right and will exercise the option to submit a re-plat after the new building is completed and occupied.

The original intention was to submit for a permit with this parcel of ground being divided out from the total five (5) acres, but we were told we needed to have a site development plan for the entire site. We are agreed to obtaining an approved site development plan when we obtain grades for Cochiti Road from the city. However, we ask approval of the summary plat so we may get a permit.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Y. H. Hahn'.  
Y. H. Hahn  
President

/eh

CC: Robert F. Armstrong, Architect  
Bob Fitzgibbon, General Contractor



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR

David Rusk

April 30, 1979

Mr. Levi J. Valdez, P.E.  
Valdez Engineering & Testing  
Rt. 1, Box 71  
Pojoaque Plaza  
Santa Fe, N.M.

L 22-104

Ref: CVI Laser, Inc. - Drainage Analysis Report

Dear Mr. Valdez:

I have reviewed the drainage report for the referenced project and my comments are as follows:

The report states that "no overhead water drain into the property." The enclosed copy of the Ortho-Topo map shows that at least ten acres of land east of this parcel drain across the property. The Site plan enclosed with the drainage report shows up to 12 feet of difference in elevation between Cochiti Rd. and the northernmost landscaping and ponding area. No information is supplied on how this difference in elevation will be taken care of. I call your attention to Section 40C of the Zoning Ordinance and to Section 10B of the Subdivision Ordinance: Sufficient grading information details must be supplied for the City Engineer's Office to grant approval to the Site development plan. You are also requested to obtain from the City Engineer's Office the proposed grades on Cochiti and prepare a grading plan in accordance with the grades provided by the mentioned office.

In regard to the internal drainage provisions for the Site, I note that the landscaping and ponding area has been estimated in 42,000 square feet versus the reported 127,800 square feet of the drainage report. The drainage report must clearly indicate which area drains into which pond and demonstrate that there is balance between the runoff volume and the corresponding ponding area.

This office is particularly concerned with the handling of the off-site flow through the property and the demonstration that the Site grading will not, in any way, affect the integrity of the ground of the adjacent properties.

The drainage report is therefore not approved.

Very truly yours,

Bruno Conegliano

Assistant City Engineer-Hydrology

BC/ms

cc - Richard Heller, City Engineer

Bob Kielich, Design

Rich Leonard, AMAECA

Drainage File

EQUAL OPPORTUNITY EMPLOYER

Reading

BRUNO 4/23/79

THESE ARE MY COMMENTS FOR THE CVI DRAINAGE REPORT.

ORTHO-TOPO MAP INDICATES THE SITE TO INTERCEPT ~~210~~ ACRES  
OF ~~RAINFALL~~ <sup>STORM</sup> RUNOFF.

CHANGES IN GRADE RANGING FROM 11' (AT THE N.E. CORNER) TO 0.5'  
(AT THE S.W. CORNER) IS PROPOSED AT THE PERIMETER OF THE  
PROPERTY WITH NO RETAINING WALLS INDICATED.

PROPOSED STREET GRADES FOR COCHITI Rd NEED TO BE OBTAINED  
FROM THE ASSISTANT CITY ENGINEER-DESIGN.

~~I APPROXIMATED~~ THE LANDSCAPED AREA (OR UNDEVELOPED) IS  $\approx$   
~~TO BE~~  $42000 \text{ ft}^2$ ; HIS ESTIMATE IS  $127,800 \text{ ft}^2$ .

THE SITE PLAN FOR THE REPORT SHOULD OUTLINE THE  
DRAINAGE AREAS.

Mr. Levi J. Valdez, P.E.  
Valdez Engineering & Testing  
Rt. 1, Box 71  
Pojoaque Plaza  
Santa Fe, N.m.

Ref: CVI Laser, Inc. - Drainage Analysis Report

Dear Mr. Valdez:

I have reviewed the drainage report for the referenced project and my comments are as follows:

The report states that "no overhead water drain into the property". The enclosed copy of the Ortho-Topo map shows that at least ten acres of <sup>east of this</sup> land ~~is to the~~ parcel drain across the property. The Site plan enclosed with the drainage report shows up to 12 feet of difference in elevation between Cochiti Rd. and the northernmost landscaping and ponding area. No information is supplied on how this difference in elevation will be taken care of. I call your attention to Section 40C of the Zoning Ordinance and to ~~Subdivision~~ Section 10B of the Subdivision Ordinance!

Sufficient grading information details must be supplied for the City Engineer's office to grant approval to the Site development plan. You are also requested to obtain from the City Engineer's ~~Office Design Section~~ (Mr. Kielich) the proposed grades on Cochiti and prepare a grading plan in accordance with the grades provided by the mentioned office.

In regard to the internal drainage provisions for the site, I note that the landscaping ponding area has been estimated in 42,000 square feet versus the reported 127,800 square feet of the drainage report. The drainage report must ~~also~~ clearly indicate which area drains into which pond and <sup>demonstrate</sup> that <sup>is balance</sup> there are bonds between the runoff volume and the corresponding ponding area.

~~I want to again stress that~~ This office is particularly concerned ~~number 1~~ with the handling of the off-site flow through the property and the demonstration that the <sup>site</sup> grading operations will not, in any way, affect the integrity of the

Valdez

-2-

*adjacent*  
ground along the ~~boundaries~~ of ~~the~~ *properties*

The drainage report is therefore not approved.

Very truly yours,

BC

Assitant City Eng.-Hyd

cc: Dick Hller, City Engineer  
Bob Kielich, Design

*Richard Amatore*  
Drainage file

# VALDEZ ENGINEERING & TESTING

Bus. 455-2245

Rt. 1 Box 71, Santa Fe, N.M.  
Pojoaque Pueblo Plaza

Home 455-7945

*Consulting Civil Engineers*

- Construction Management
- Quality Assurance

April 6, 1979

- Design
- Materials Testing

Mr. Bob Armstrong  
Architect  
Albuquerque, N.M., 87501

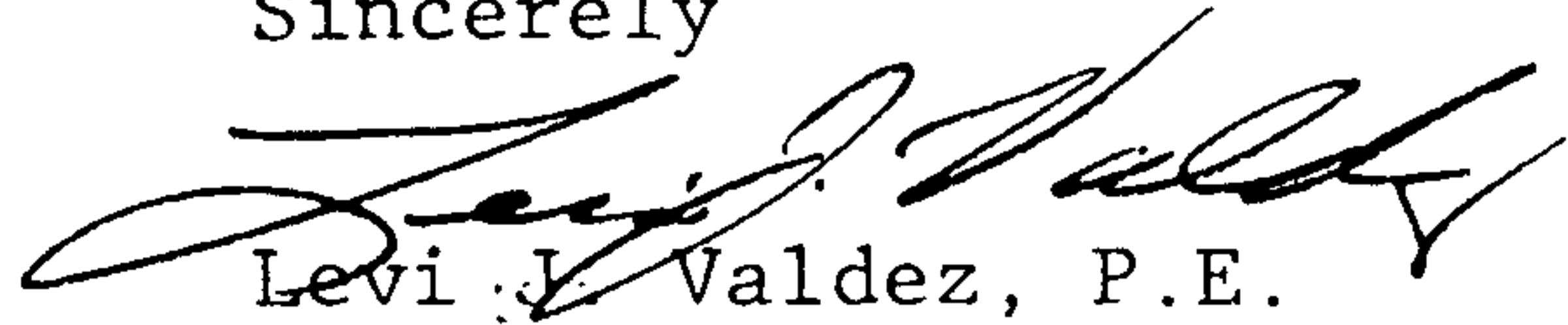
Re.: CVI Laser , Inc. Development Plan, Drainage  
and Grading Plan

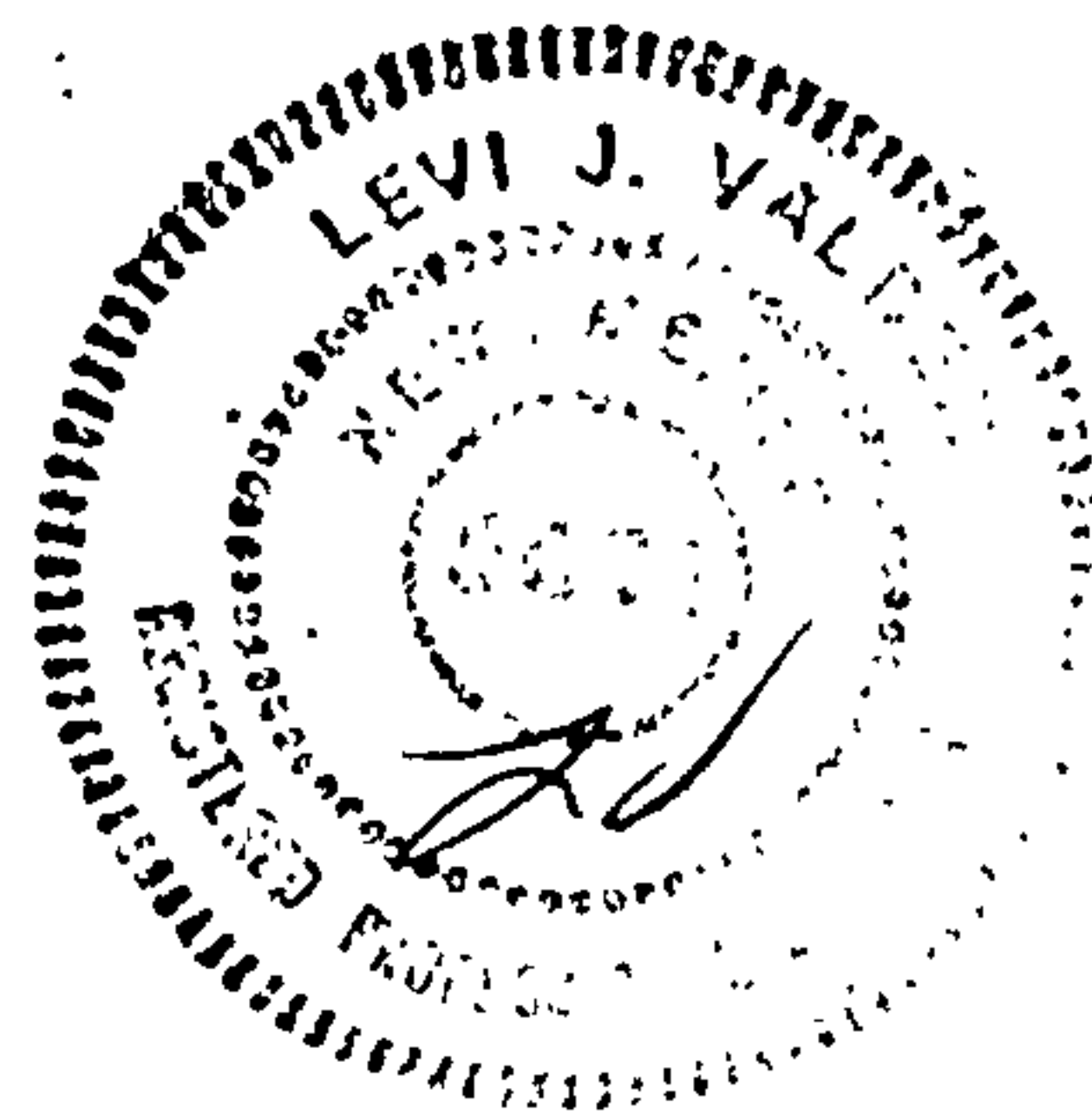
Dear Bob:

The grading and drainage report for the CVI Laser  
development is hereby respectfully submitted.

Please contact our office if you should have any  
questions regarding the subject report.

Sincerely

  
Levi J. Valdez, P.E.



A. INTRODUCTION :

The rational formula  $Q=CIA$  will be used in computing runoff. A 100 year storm of one hour duration of 2.6 inches will be used. The coefficients of runoff will be 0.40 for undeveloped areas and 0.90 for developed areas such as paved areas and roofs. The total area is approximately 5 acres.

B. SCOPE OF PROJECT :

The area to be developed is at 200 Dorado S.E. The owner of the property is C.V.I. Laser, Inc. The development will involve the building of industrial type building in a total area of 5 acres. The construction will be accomplished in four phases. Phase one already exists. (See site plan).

C. CONDITIONS BEFORE DEVELOPMENT:

The property is located on lot C-Dorado Village Addition. A 6500 S.F. office and laboratory and paved parking lot exists.

The undeveloped area is a sandy type soil with sparse natural grasses. The land slopes gently to the West and South. No overhead water drain into the property.

The runoff from the five acres is 5.901 C.F.S. or 21,245 cubic feet of water for the 100 year storm of 2.6 inches. (See calculations) The runoff flows on to Dorado Place.

D. CONDITIONS AFTER DEVELOPMENT:

The site when fully developed will contain seven buildings and paved parking lots. (See site plan)

D. CONDITIONS AFTER DEVELOPMENT:

The total runoff after development is 8.122 C.F.S. or 2,9239 cubic feet of water.

The excess runoff will be detained within the C.V.I. property by use of ponding areas. These ponding areas are labeled V1 thru V10 as shown on the site plan. The total volume of the ponding area is 29,259 cubic feet or roughly four times the amount required.

The ponding areas will be connected with a six inch diameter pipe which will allow for overflow to eventual drain into Dorado Place as it did originally.

The water ponded will be a minimum of five feet from any building footing and from the South and North property lines.

Three inch pipe connecting the ponding areas will allow for overflow to drain into Dorado Place.

CVI Laser, Inc.

Runoff Computation  
for  
Development Plan

I. Runoff Before Development:

$$\text{Total Area} = 217,800 \text{ s.f.}$$

$$\begin{aligned} \text{Impervious Area} &= \text{PK Lot} = 17114 \text{ s.f.} \\ &+ \text{Roof} = 6500 \text{ s.f.} \\ &+ \text{Sidewalk} = 40 \text{ s.f.} \end{aligned}$$

$$\underline{23,654 \text{ s.f.}}$$

$$\text{Undeveloped Pervious} = 217,800 - 23,654 = 194,146 \text{ s.f.}$$

$$C_I = 0.90$$

$$C_P = 0.40$$

$$\text{Rainfall Intensity} = 2.6 \text{ in/hr.}$$

$$\Delta H = 16'$$

$$L = 500' \pm$$

$$T_C = 8 \text{ min.}$$

$$Q_I = CIA = 0.90 \times \frac{23,654}{43,560} \times 2.6$$

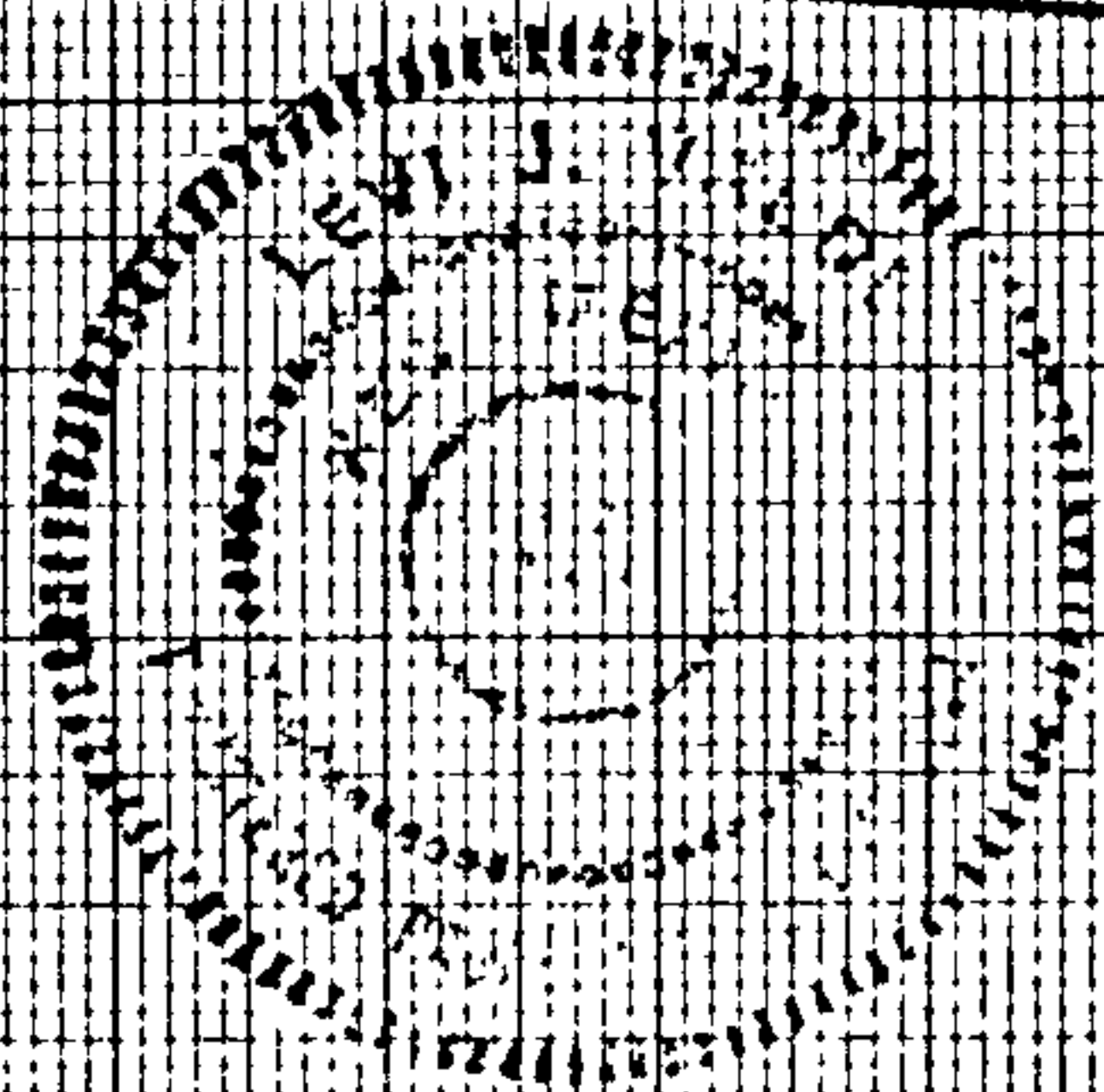
$$Q_I = 1.266 \text{ c.f.s.}$$

$$Q_P = CIA = 0.40 \times \frac{194,146}{43,560} \times 2.6 =$$

$$Q_P = 4.635 \text{ c.f.s.}$$

$$\boxed{\text{Total } Q = 5.901 \text{ ft}^3/\text{sec.}}$$

$$\boxed{\text{Total Volume} = 3600 \times 5.901 = 21,245 \text{ ft}^3}$$



## CUT Runoff Computations (Cont'd.)

### II Runoff After Development:

Imperviable Areas: Roof = 41,200 s.f.  
Parking = 45,700 s.f.  
Sidewalks = 3,100 s.f.  
90,000 s.f.

$$Q = CIA = 0.90 \times 2.6 \times \frac{90,000}{43560} = 4.834 \text{ c.f.s.}$$

$$\text{Volume} = 4.834 \times 3600 = 17,402 \text{ ft}^3$$

### Undeveloped or Landscaped Areas:

$$A_E = 217,800 - 90,000 = 127,800 \text{ s.f.}$$

$$C = 0.40$$

$$Q_L = CIA = 0.40 \times 2.6 \times \frac{127,800}{43560}$$

$$Q_L = 3.051 \text{ c.f.s.}$$

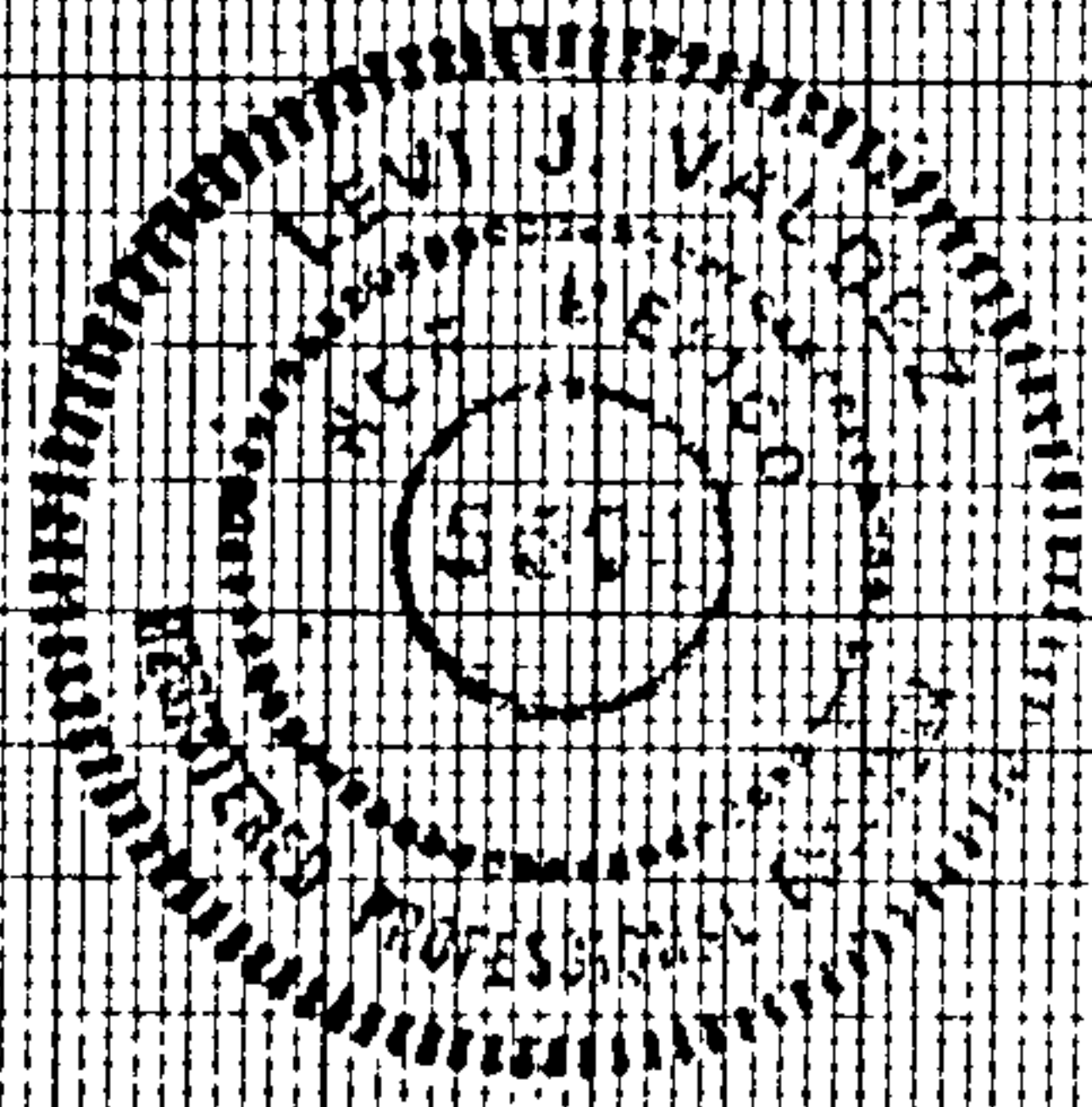
$$\text{Volume} = 3.051 \times 3600 = 10,984 \text{ ft}^3$$

$$\text{Total Volume of Runoff} = 28,386 \text{ ft}^3$$

### III Conclusion:

Total Volume of Ponding Needed =

$$28,386 \text{ ft}^3 - 21,245 \text{ ft}^3 = \underline{7141 \text{ ft}^3}$$



# Computations of Ponding Volumes C.V.I. Laser, Inc.

$$\text{Ponding Vol. } (V_1) = 2291 \text{ c.f.}$$

$$\text{Ponding Vol. } (V_2) = \left( \frac{22 \times 172}{2} \right) + (8 \times 172) + (26 \times 20) = 3888 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_3) = (35 \times 36) + \left( \frac{20 \times 38}{2} \right) + \left( \frac{35 \times 14}{2} \right) + (72 \times 12) = 2749 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_4) = (340 \times 10) + (28 \times 3) + (52 \times 12) + (15 \times 60) = 6199 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_5) = 15 \times 92 = 1380 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_6) = (72 \times 32) + (10 \times 40) = 2704 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_8) = (20 \times 168) + (40 \times 44) + (72 \times 14) = 6208 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_7) = 10 \times 45 = 450 \text{ ft}^3$$

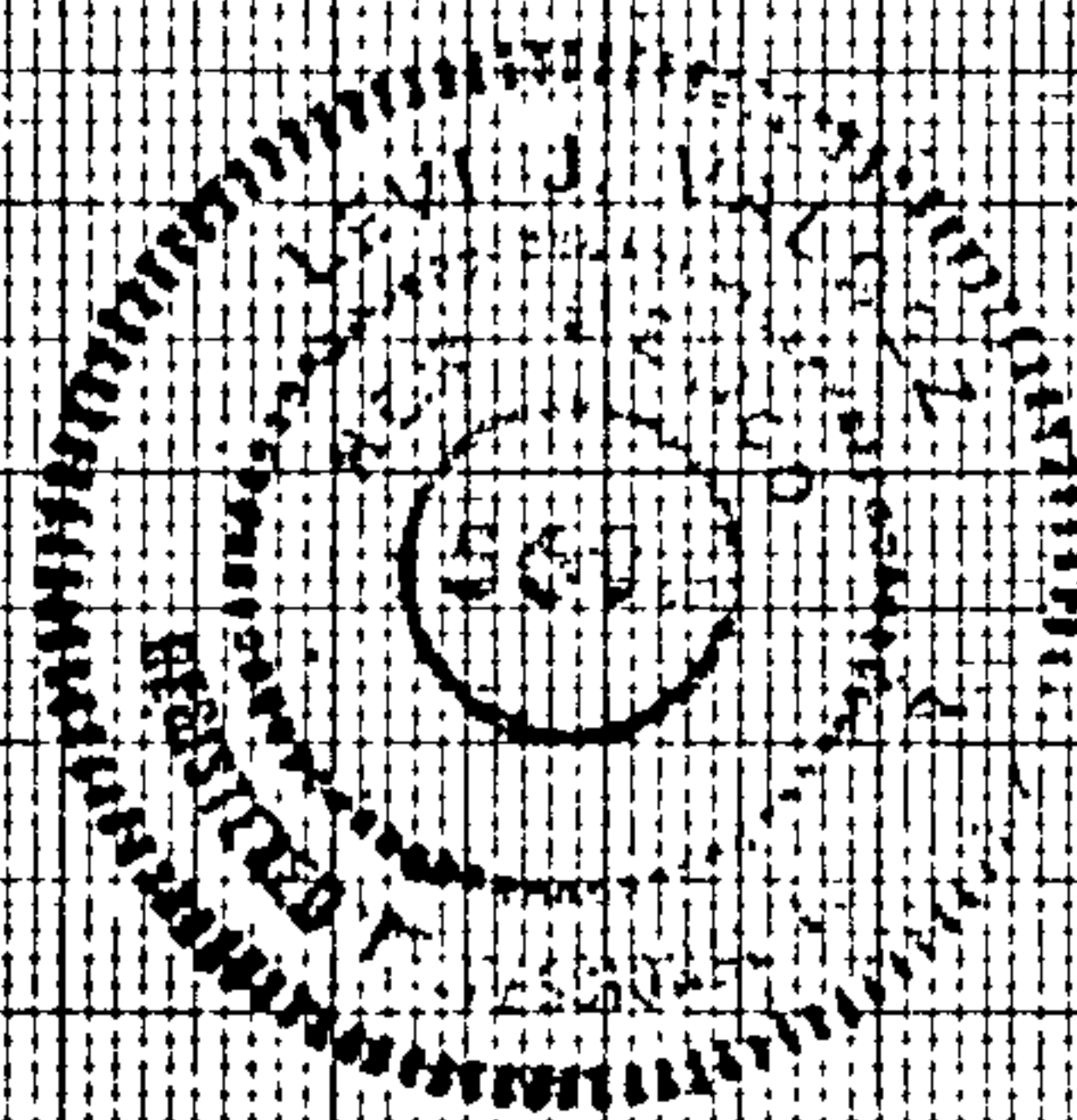
$$\text{Ponding Vol. } (V_9) = 70 \times 14 = 980 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_{10}) = 50 \times 5 = 250 \text{ ft}^3$$

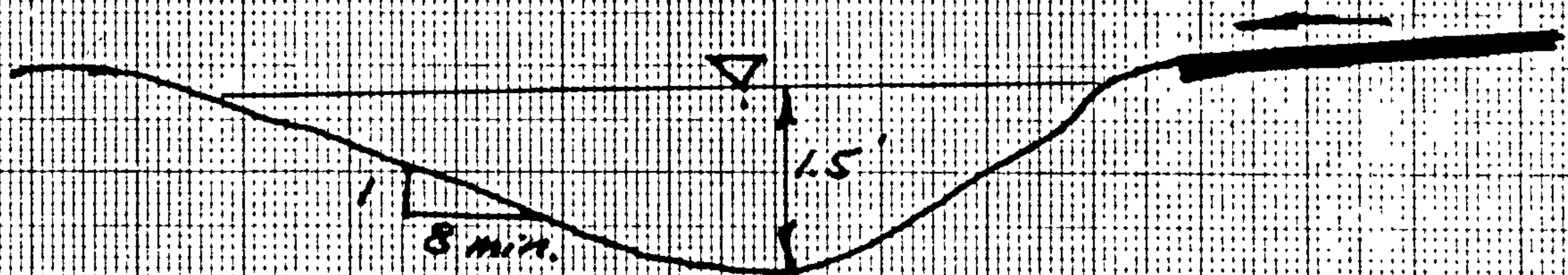
$$\text{Ponding Vol. } (V_{11}) = 15 \times 80 = 1200 \text{ ft}^3$$

$$\text{Ponding Vol. } (V_{12}) = 15 \times 90 = 1350 \text{ ft}^3$$

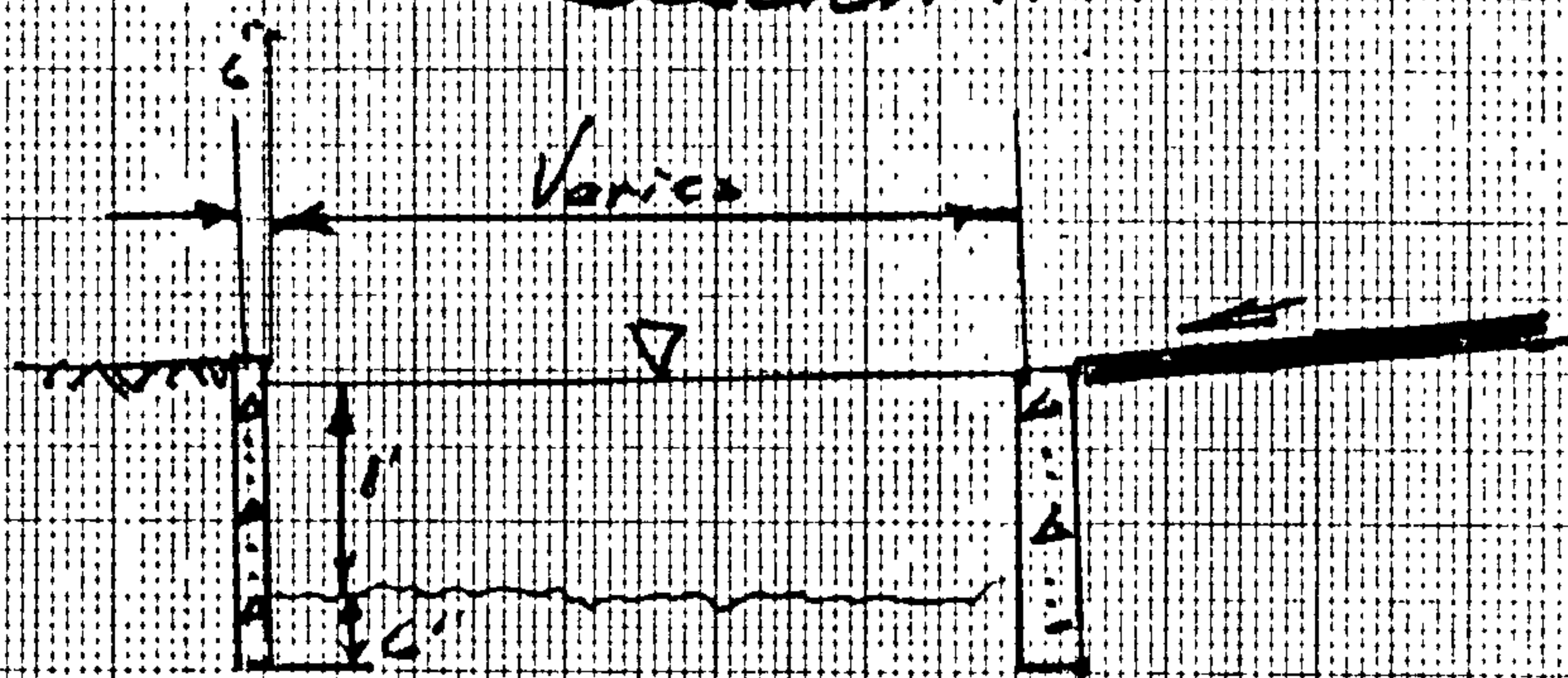
$$\boxed{\text{Total Vol.} = 29649 \text{ ft}^3}$$



CVI Laser, Inc.  
Typical Ponding Sections



Section A-A



Section B-B



Section C-C



# CVI LASER CORPORATION

200 DORADO PL., SE P.O. BOX 11308 ALBUQUERQUE, NEW MEXICO 87112 505 296-9541 TELEX 660335

March 7, 1979

City Planning Department  
City of Albuquerque

ATTENTION: Mr. Phil Garcia

RE: Z-73-14  
CVI Laser Corporation

Dear Mr. Garcia:

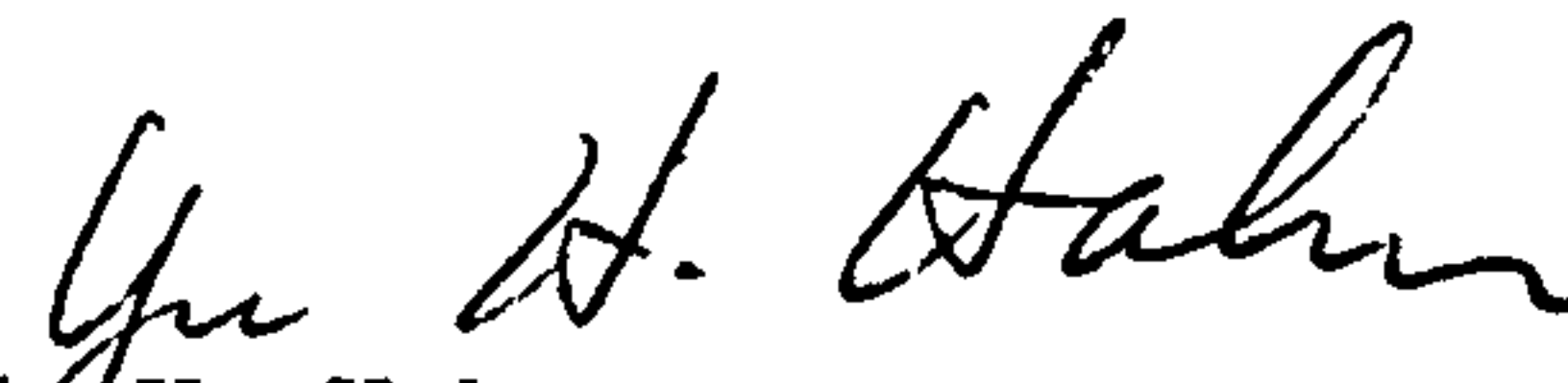
We have conferred with the architect on the above referenced project and offer the following information to clarify our position on the current problem.

We were not aware that any problem existed from six years ago until it was brought to our attention when we were seeking a foundation permit on our new building.

Time is of the essence since we have hired additional personnel, ordered equipment, and have closed on a construction loan. We, therefore, ask consideration by the city to help us out of a potential economic bind and assure that we can take occupancy of the new building by July 15th.

We have contracted with an engineer to provide a drainage study of the entire 5-acre site and will submit the study for approval prior to applying for a construction permit. If the city will allow a foundation permit to be issued, we may proceed with start of construction. This will maintain city control over the project and not alter the basic requirements of a SU site.

Very truly yours,

  
Y. H. Hahn  
President

/eh  
cc: Robert Armstrong, Architect

Bus. 455-2245

# VALDEZ ENGINEERING & TESTING

Rt. 1 Box 71, Santa Fe, N.M.  
Pojoaque Pueblo Plaza

Home 455-7945

*Consulting Civil Engineers*

- Construction Management
- Quality Assurance

January 9, 1979

- Design
- Materials Testing

Mr. Robert E. Armstrong  
Architect  
Albuquerque, N.M.

Dear Bob,

The Drainage Analysis Report for the proposed C.V.I.  
Building at 200 Dorado, S.E. is hereby submitted.

Should you have any questions regarding the results  
and recommendations please contact our office.

Sincerely,

*Levi J. Valdez*  
Levi J. Valdez, P.E.

LJV/iv



## TABLE OF CONTENTS

| <u>Item</u>            | <u>Page</u> |
|------------------------|-------------|
| Introduction           | 1           |
| Scope of Project       | 1           |
| Undeveloped Conditions | 2           |
| Developed Conditions   | 2 - 4       |
| Calculations           | 5 - 6       |
| Cross Sections         | 7           |

A. INTRODUCTION

This report will cover the drainage of a parcel of land at 200 Dorado S.E. The parcel has a total area of 0.9203 acres or 40,088 square feet.

The rational formula will be used  $Q = C.I.A.$  A runoff coefficient of 0.40 will be used for undeveloped existing ground and landscaped areas. A runoff coefficient of 0.90 will be used for impervious areas such as roofs, paved areas and sidewalks. A rainfall intensity of a 100 year, one hour rainfall of 2.6 inches will be used.

The time of concentration was determined to be 4 minutes and will therefore not be considered in the rational equation.

B. SCOPE OF PROJECT

The proposed construction is to be a single story slab on grade building having an area of 14,000 square feet. Some earthwork or modification of the existing terrain is necessary. This is to be done in a cut and fill operation, with most of the dirt coming from within the project site. The cut will not be greater than  $2\frac{1}{2}$  feet nor will the fill be greater than  $2\frac{1}{2}$  feet.

C. UNDEVELOPED CONDITIONS

The lot is vacant and slopes gently to the west at about 4 percent. The soil is very sandy and covered with sparse native grasses. There are no adjacent water courses natural or artificial. The property is not located on any flood plain.

The property intercepts the natural runoff from approximately 3.2 acres due east.

The natural runoff on the parcel is 0.947 cubic feet per second or 3443 cubic feet in one hour.

The runoff onto the parcel from an adjacent off site property is 291 cubic feet per second or 10,483 cubic feet in one hour.

D. DEVELOPED CONDITIONS

As stated previously the site will undergo a slight cut and fill operation. The total volume of runoff from the developed parcel will be 5804 cubic feet. The required ponding volume is  $5804 - 3443$  or 2361 cubic feet.

The ponding will be accomplished using planted areas as shown on the title sheet. The planted areas will be 18 inches deep and enclosed with concrete header curb. The width and length will vary as shown.

Ponding area number one is designated as  $V_1$  and has a volume of 1575 cubic feet. This area is north of the parking lot and will contain the runoff from the paved parking lot. The runoff from the parking lot is 1463 cubic feet.

Ponding area number two is designated as  $V_2$  and has a volume of 675 cubic feet. This area will retain the runoff from the front of the building to the property line or 390 cubic feet. This area is along the west boundary and bounded by concrete header curb.

Ponding area number three is designated as  $V_3$  and is along the west boundary from the parking lot north to the radius point. The volume is 810 cubic feet. It will contain the runoff from the undeveloped area north of the parking lot. This runoff volume is 782 cubic feet.

The total volume of runoff retained is thus 2635 cubic feet which is greater than the 2361 cubic feet required.

The roof area and the area directly south of the building is to be routed to the south and allowed to flow along the curb and gutter of Dorado Street.

The flow of 2.91 cubic feet per second from the vacant property to the east will also follow this path to the curb and gutter of Dorado Street.

The entire property included above, i.e., the project parcel, the vacant property east of it and the property through which the runoff will flow to reach Dorado Street is owned by C.V.I. Laser, Inc.

Drainage Analysis  
Proposed C.V.I. Building  
200 Dorado, S.E.  
Albuquerque, N.M.

CALCULATIONS

A. General:

Use rational method  
Runoff coefficient; Impervious=0.4, Roof & Paved =0.9.  
Assume 100 year, 1 hour rainfall of 2.6 inches.  
Total area of parcel=0.9203 acres=40,088 s.f.

B. Runoff before development:

Impervious area;  $Q=C.I.A.$   
 $Q=0.4 \times 2.6 \times 0.923 = 0.957$  c.s.f.  
 $\text{Volume} = 0.957 \text{ c.f.s.} \times \frac{3600 \text{ sec.}}{1 \text{ Hr.}} = 3443 \text{ c.f.}$

C. Runoff after development:

1. Roof Area =  $140 \times 100 = 14,000$  s.f.  
 $\text{Volume} = 14,000 \times \frac{2.6}{12} \times 0.9 = \underline{2730}$  c.f.
2. Parking lot =  $150 \times 50 = 7,500$  s.f.  
 $\text{Volume} = 7,500 \times \frac{2.6}{12} \times 0.9 = \underline{1463}$
3. Impervious Area =  $40,088 - 21,500 = 18,588$  s.f.  
 $\text{Volume} = 18,588 \times \frac{2.6}{12} \times .4 = \underline{1611}$  c.f.

Total = 5804 c.f.

D. Required P. nding Volume:

Increase in volume =  $5804 \text{ c.f.} - 3443 \text{ c.f.} = 2361 \text{ c.f.}$

E. Ponding areas & runoff retained by each pond:

1. Ponding Area No. 1; Planted area North of Parking lot, area bounded by header curb being  $150 \times 1.5 \times 7 = 1575$  c.f. Parking lot to be drained into  $V_1$ .
2. Ponding Area No. 2; Planted area adjacent to sidewalk West of building bounded by header curb being  $150 \times 3 \times 1.5 = 675$  c.f. Runoff Volume =  $150 \times 30 \times \frac{2.6}{12} \times 0.4 = 390$  c.s.f.
3. Ponding Area No. 3; Planted area along the N.W. corner bounded by header curb being  $72' \times 7.5 \times 1.5 = 810$  c.s.f. Retains Volume from area North of Parking lot;  $\text{Vol}_3 = 55 \times 164 \times \frac{2.6}{12} \times 0.4 = \underline{782}$  c.f.

Total Volume retained =  $V_1 = 1463$  c.s.f.  
 $V_2 = 390$  c.s.f.  
 $V_3 = \underline{782}$  c.s.f.

F. Runoff into Parcel from Adjacent Property

Area = 3.2 acres =

C = 0.35

I = 2.6

T = 4 min.

$Q = C.I.A. = 0.35 \times 2.6 \times 3.2 = 2.91 \text{ c.f.s.}$

Volume = 2.91 c.f.s. x 3600 = 10,483

G. Diversion Ditch

Volume = 2.91 c.f.s. (Adj. Prop.)  
+ 0.75 c.f.s. (Roof)

Area behind building = 4,900 s.f. +  $\frac{0.08 \text{ c.f.s.}}{3.74 \text{ c.f.s.}}$

Slope = 2%

Ditch Width = 10 ft.

Ditch Depth = 1.67 ft.

Side Slopes = 3:1

Q = 3.74

Water Depth = 0.50 ft.

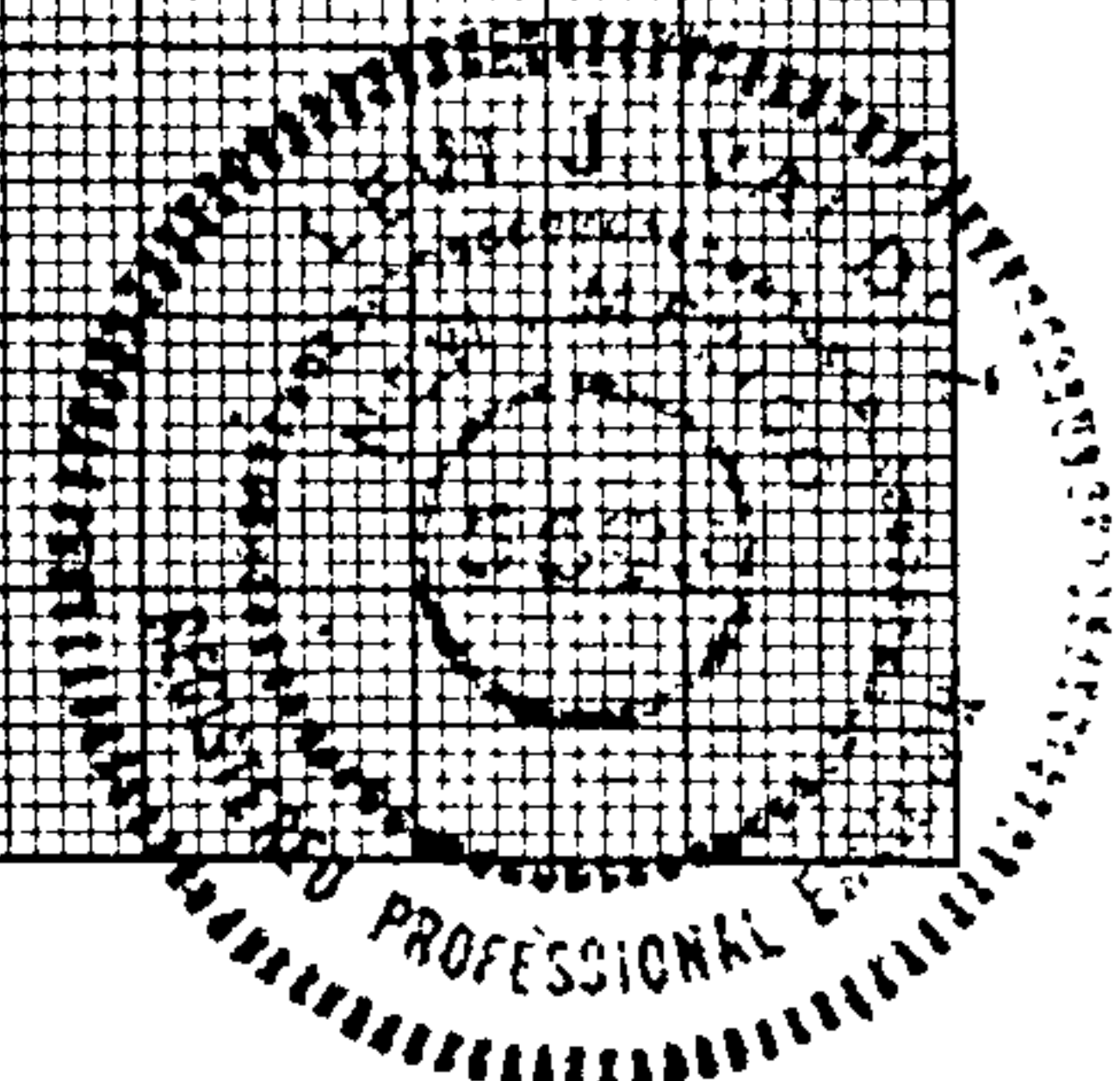
Reference - Nomograph for flow in Triangular  
Channels Chart No. 29, page 37.  
Design for open channel flow, Hydraulic Design  
Series No. 3

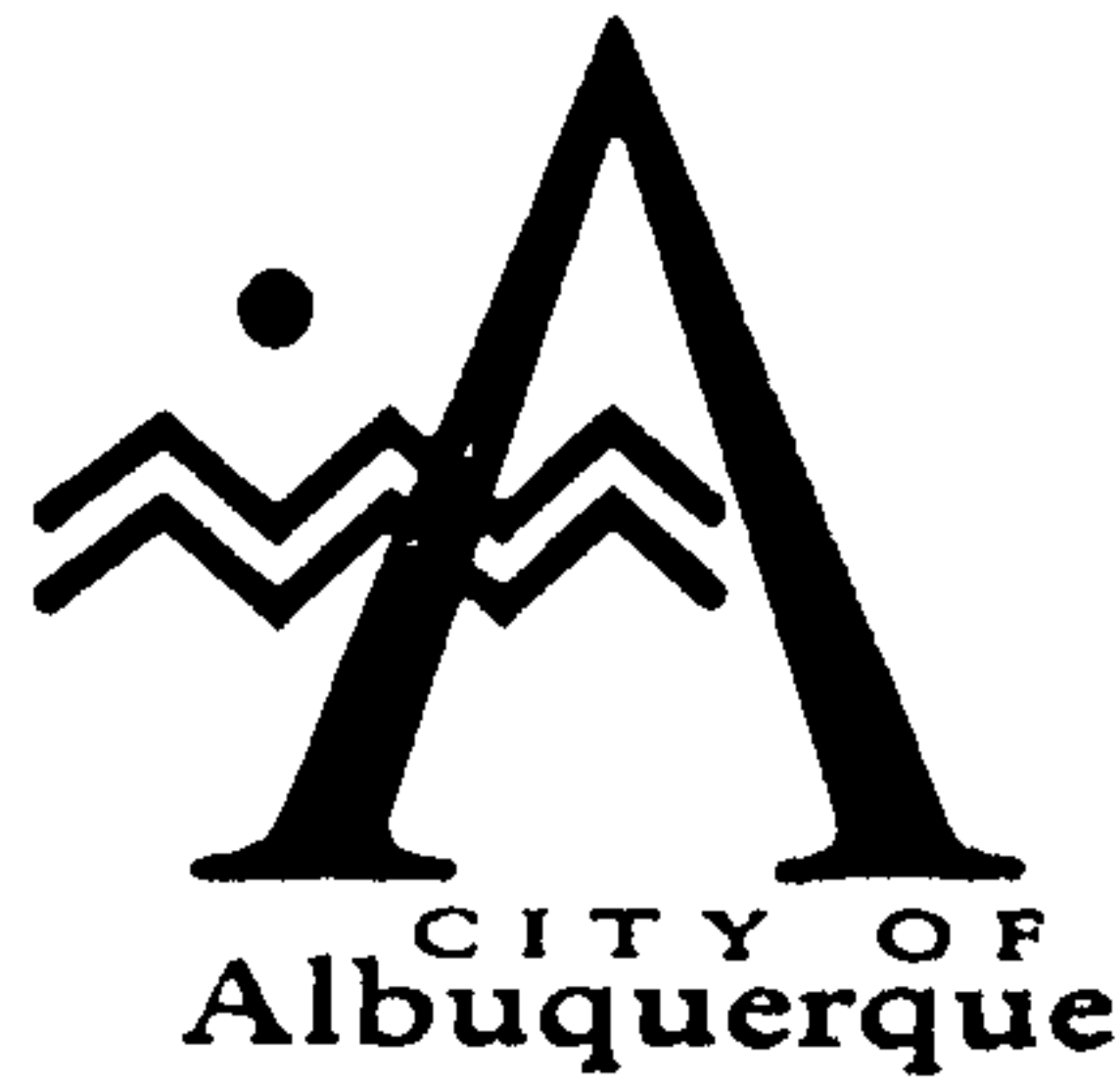


7


$$V_3 = 72' \times 9.5' \times 1.5 = 810 \text{ c.f.}$$

Triangular Ditch





February 18, 1998

Tom Mann, P.E.  
Engineering & Surveying Assoc.  
5312 Noreen NE  
Albuquerque, NM 87111

**RE: CVI LASER(L22-D4). GRADING AND DRAINAGE PLAN FOR SITE  
DEVELOPMENT PLAN FOR SUBDIVISION (lot line removal) AND BUILDING  
PERMIT APPROVALS. ENGINEER'S STAMP DATED MAY 11, 1998.**

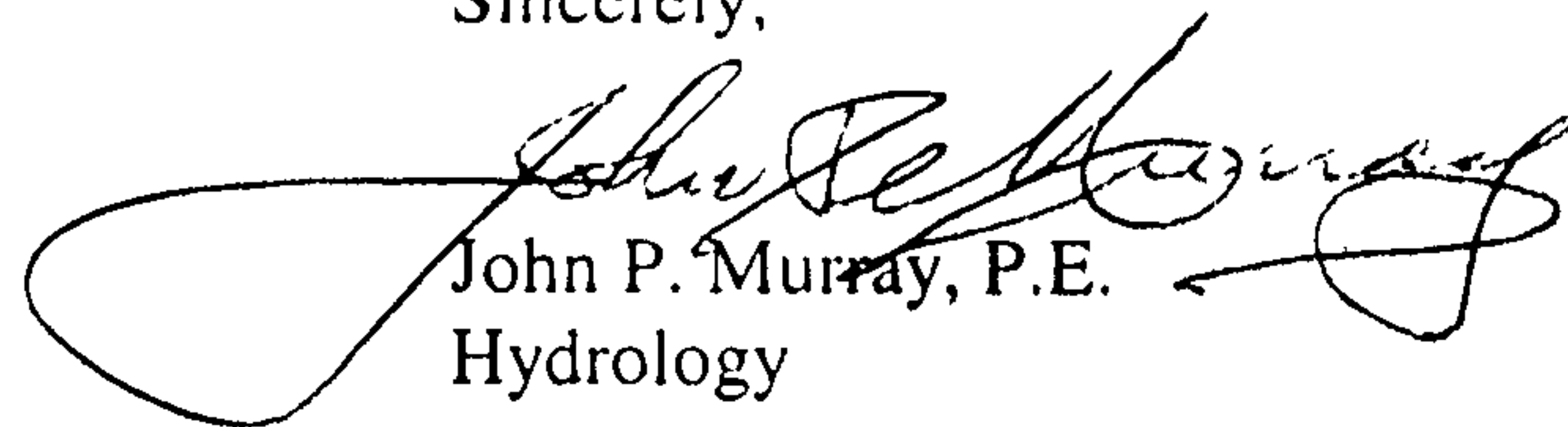
Dear Mr. Mann:

Based on the information provided on your May 13, 1998 submittal, the above referenced project is approved for Site Development Plan for Subdivision ( lot line removal) and Building Permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

  
John P. Murray, P.E.  
Hydrology

c: Andrew Garcia  
✓ File

Good for You, Albuquerque!



# DRAINAGE INFORMATION SHEET

PROJECT TITLE: CVI Laser ZONE ATLAS/DRNG. FILE #: L22/DA  
 DRB #: 98-206 EPC #: \_\_\_\_\_ WORK ORDER #: \_\_\_\_\_  
 LEGAL DESCRIPTION: Lots C-1 & C-2 Dorado Village  
 CITY ADDRESS: 200 Dorado Place SE  
 ENGINEERING FIRM: Engineering & Surveying Assoc CONTACT: Tom Mann  
 ADDRESS: 5312 Noren Dr NE 87111 PHONE: 298-4651  
 OWNER: CVI Laser CONTACT: Unknown  
 ADDRESS: 200 Dorado Place SE PHONE: \_\_\_\_\_  
 ARCHITECT: Jim Miller CONTACT: Jim Miller  
 ADDRESS: 2823 Richmond NE PHONE: 884-1255  
 SURVEYOR: Engineering & Surveying Assoc CONTACT: Tom Mann  
 ADDRESS: 5312 Noren Dr NE PHONE: 298-4651  
 CONTRACTOR: Unknown CONTACT: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

## TYPE OF SUBMITTAL:

\_\_\_\_ DRAINAGE REPORT  
☒ DRAINAGE PLAN  
 \_\_\_\_ CONCEPTUAL GRADING & DRAINAGE PLAN  
☒ GRADING PLAN  
 \_\_\_\_ EROSION CONTROL PLAN  
 \_\_\_\_ ENGINEER'S CERTIFICATION  
 \_\_\_\_ OTHER \_\_\_\_\_

## PRE-DESIGN MEETING:

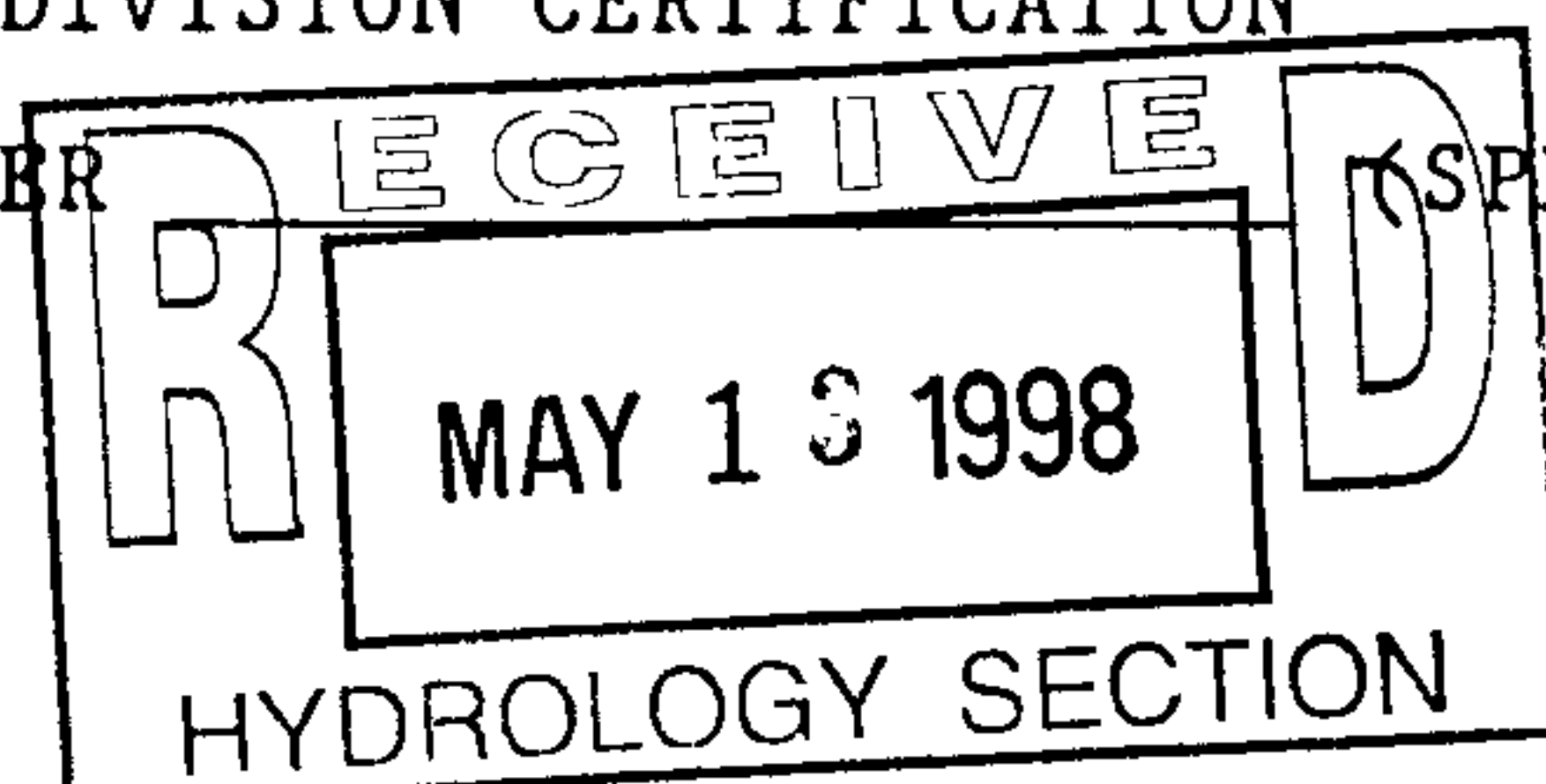
\_\_\_\_ YES  
☒ NO  
 \_\_\_\_ COPY PROVIDED

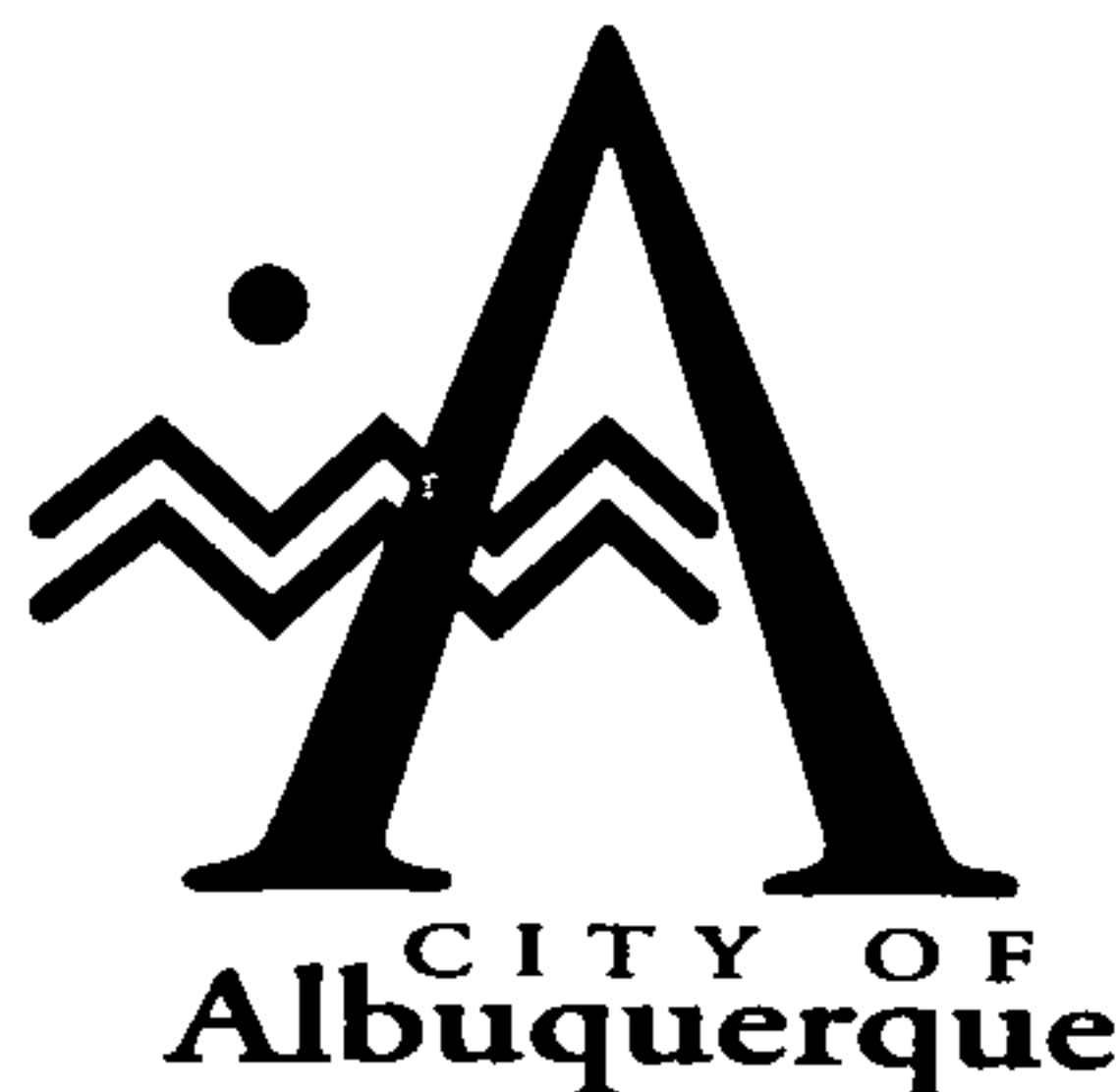
## CHECK TYPE OF APPROVAL SOUGHT:

\_\_\_\_ SKETCH PLAT APPROVAL  
 \_\_\_\_ PRELIMINARY PLAT APPROVAL  
☒ S. DEV. PLAN FOR SUB'D. APPROVAL (Lot Line Removal)  
☒ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL  
 \_\_\_\_ SECTOR PLAN APPROVAL  
 \_\_\_\_ FINAL PLAT APPROVAL  
 \_\_\_\_ FOUNDATION PERMIT APPROVAL  
 \_\_\_\_ BUILDING PERMIT APPROVAL  
 \_\_\_\_ CERTIFICATE OF OCCUPANCY APPROVAL  
 \_\_\_\_ GRADING PERMIT APPROVAL  
 \_\_\_\_ PAVING PERMIT APPROVAL  
 \_\_\_\_ S.A.D. DRAINAGE REPORT  
 \_\_\_\_ DRAINAGE REQUIREMENTS  
 \_\_\_\_ SUBDIVISION CERTIFICATION  
 \_\_\_\_ OTHER \_\_\_\_\_ (SPECIFY)

DATE SUBMITTED: 5/12/98

BY: Tom Mann





May 21, 1996

Martin J. Chávez, Mayor

Jeff Mortensen  
Jeff Mortensen & Associates  
6010-B Midway Park Blvd. NE  
Albuquerque, NM 87109

RE: DRAINAGE PLAN FOR CVI LASER CARPORTS (L22-D4) ENGINEER'S  
STAMP DATED 5/16/96.

Dear Mr. Mortensen:

Based on the information provided on your May 16, 1996 submittal, the above referenced site is approved for Building Permit.

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

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE  
Engineering Associate

BJM/dl

c: Andrew Garcia  
File



## DRAINAGE INFORMATION SHEET

PROJECT TITLE: CVI LASER CARPORTS ZONE ATLAS/DRNG. FILE #: 40375 422/D4

DRB #: \_\_\_\_\_ EPC #: \_\_\_\_\_ WORK ORDER #: \_\_\_\_\_

LEGAL DESCRIPTION: \_\_\_\_\_

CITY ADDRESS: 200 DORADO PL SE

ENGINEERING FIRM: JEFF MORTENSEN & ASSOC. CONTACT: JEFF MORTENSEN

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

OWNER: CVI LASER CONTACT: JAMES CHANES

ADDRESS: PO BOX 11308 PHONE: 294-9541 X-102

ARCHITECT: N/A CONTACT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

SURVEYOR: JEFF MORTENSEN & ASSOC CONTACT: JEFF MORTENSEN

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

CONTRACTOR: ALUMINUM SALES CONTACT: PAT

ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

## TYPE OF SUBMITTAL:

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

## PRE-DESIGN MEETING:

- ☒ YES (TELEPHONE CONV. w/ BEARIE MONTGOMERY)
- ☐ NO
- ☐ COPY PROVIDED

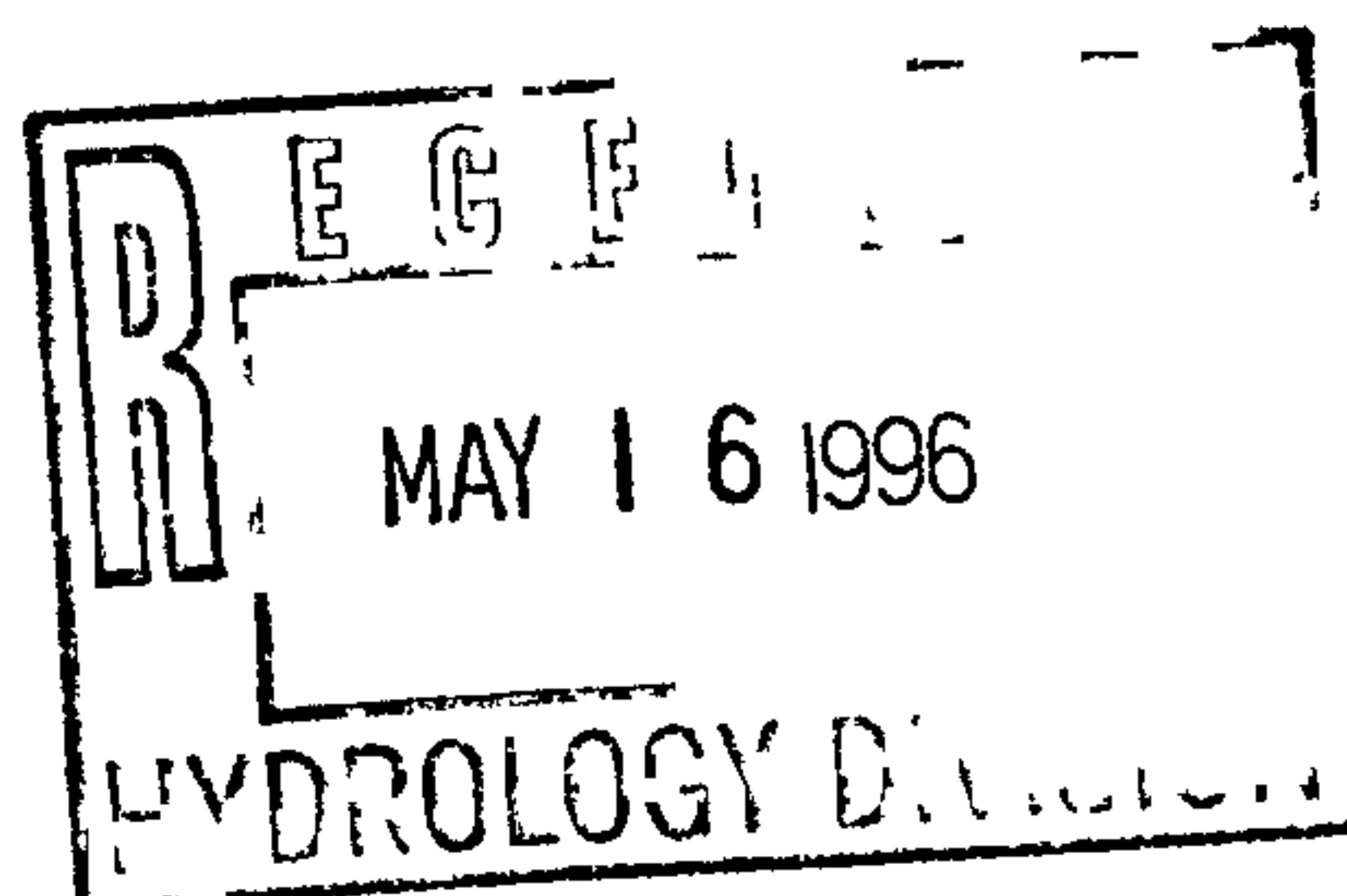
## CHECK TYPE OF APPROVAL SOUGHT:

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

DATE SUBMITTED:

05-16-96

BY:

JEFFREY G. MORTENSEN

MOLZEN-CORBIN & ASSOCIATES  
P. O. Box 3632  
ALBUQUERQUE, NEW MEXICO 87190

# LETTER OF TRANSMITTAL

(505) 242-5700

TO

Stuart Reeder P.E.  
C.E. Hydrology Section  
Old City Hall

|           |               |         |      |
|-----------|---------------|---------|------|
| DATE      | 1.21.88       | JOB NO. | 0718 |
| ATTENTION | Stuart Reeder |         |      |
| RE:       |               |         |      |
|           | CVI LASER     |         |      |
|           | STORAGE BLDG. |         |      |
|           |               |         |      |
|           |               |         |      |
|           |               |         |      |

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via \_\_\_\_\_ the following items:

- ☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications  
☐ Copy of letter ☐ Change order ☐ \_\_\_\_\_

| COPIES | DATE    | NO. | DESCRIPTION                   |
|--------|---------|-----|-------------------------------|
| 1      | 1.15.88 |     | Revised Drainage Plan L-22/D4 |
|        |         |     |                               |
|        |         |     |                               |
|        |         |     |                               |
|        |         |     |                               |
|        |         |     |                               |
|        |         |     |                               |
|        |         |     |                               |

THESE ARE TRANSMITTED as checked below:

- ☐ For approval ☐ Approved as submitted ☐ Resubmit \_\_\_\_\_ copies for approval  
☒ For your use ☐ Approved as noted ☐ Submit \_\_\_\_\_ copies for distribution  
☐ As requested ☐ Returned for corrections ☐ Return \_\_\_\_\_ corrected prints  
☐ For review and comment ☐ \_\_\_\_\_  
☐ FOR BIDS DUE \_\_\_\_\_ 19 \_\_\_\_\_ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

0840; 26 JAN 88 : CALLED JANET & REQUESTED A  
BLUE PRINT w/ STAMP. SHE SAID THEY WOULD SEND US  
ONE.

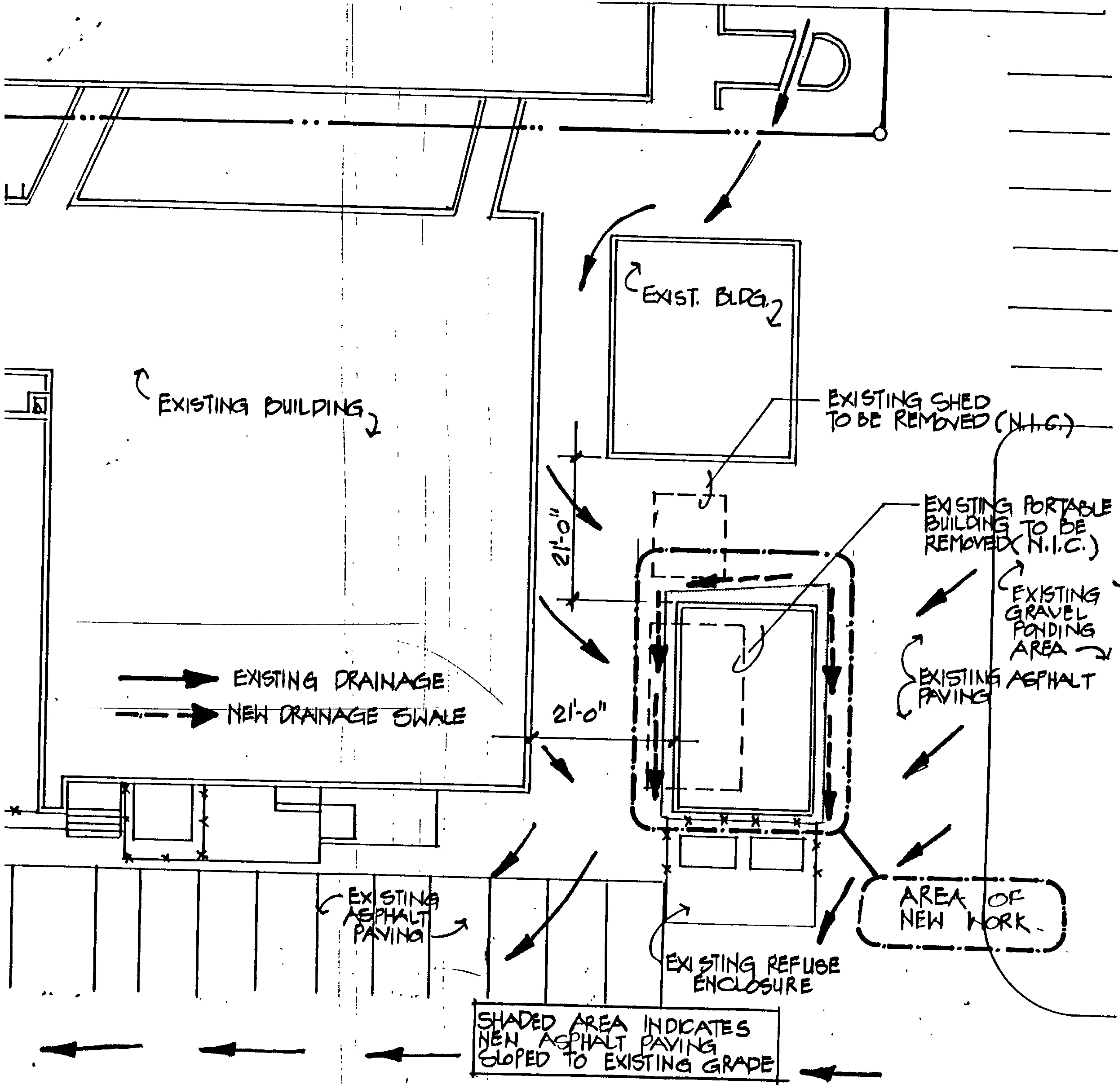
GSR

COPY TO

SIGNED:

Janet E Lacy

File  
L22-04



DRAINAGE REPORT  
FOR THE

CVI LASER CORPORATION  
SITE

PREPARED FOR

CVI LASER CORPORATION

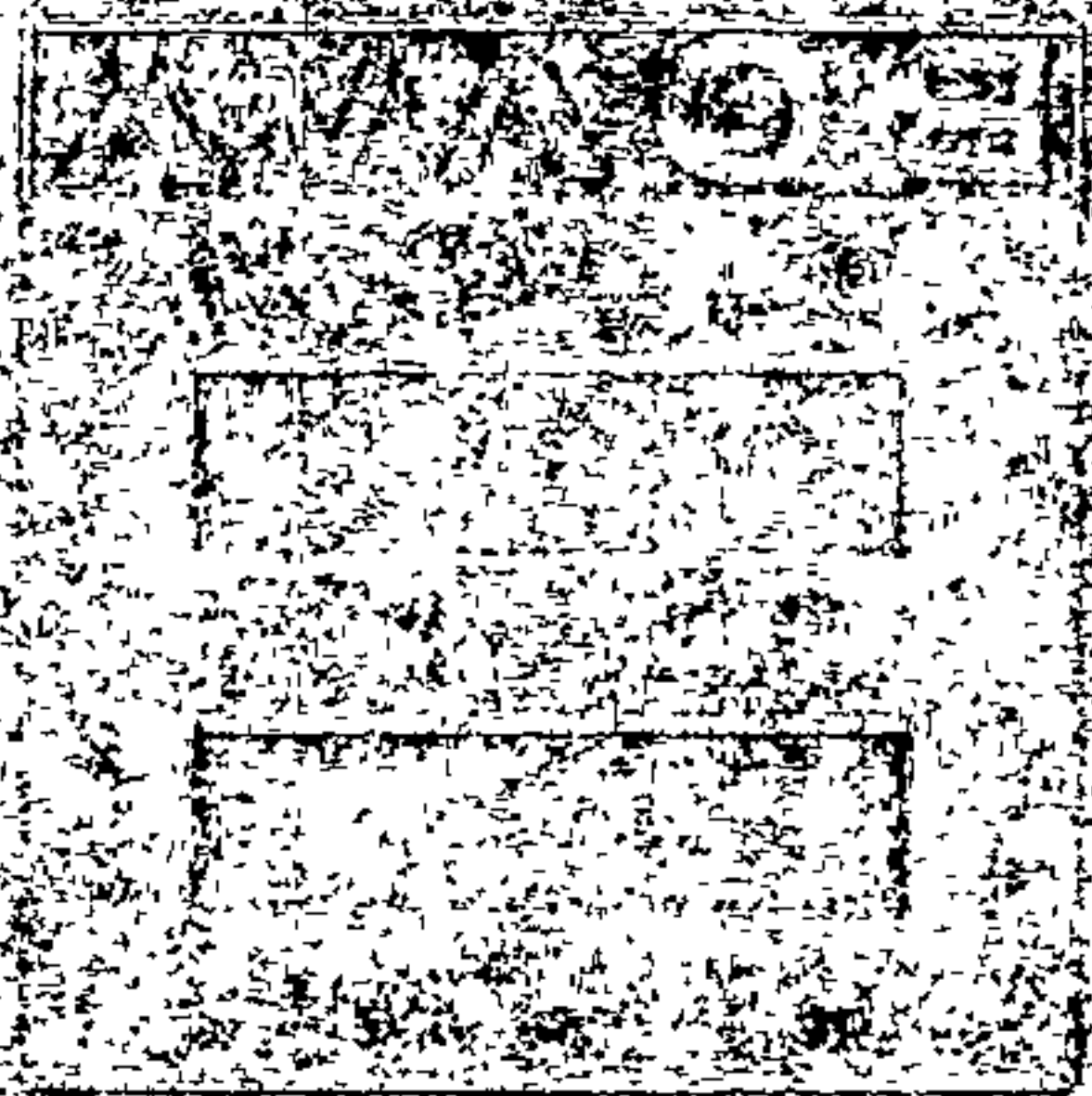
200 DORADO PLACE

ALBUQUERQUE, NEW MEXICO

JUNE 1981

BEI 6014-168

BOVAY ENGINEERS, INC.



# **Bovay Engineers, Inc.**

5619 Fannin Street  
P.O. Box 8098  
Houston, Texas 77004  
713/529-4921  
TWX 910-881-2538

10305 Airline Highway  
P.O. Box 15728  
Baton Rouge, Louisiana 70895  
504/293-3661  
TWX 510-993-3413

East 808 Sprague Avenue  
Spokane, Washington 99202  
509/838-4111  
TWX 510-773-1829

7800 Chevy Chase Two, Suite 401  
Austin, Texas 78752  
512/453-7322  
TWX 910-874-1350

Washington Building, Suite 601  
15th Street and New York, N.W.  
Washington, D.C. 20005  
202/638-0010

1747 Pennsylvania Avenue, N.W. Suite 702  
Washington, D.C. 20006  
202/223-1155

3125 Carlisle Blvd., N.E.  
P.O. Box 30088  
Albuquerque, New Mexico 87110  
505/344-3577  
TWX 910-989-1183

## **AFFILIATE FIRM**

Dunbar & Dickson, Inc.  
120 S. Parking Place  
P.O. Box 540  
Lake Jackson, Texas 77586  
713/297-3028



# BOVAY ENGINEERS, INC.

HOUSTON  
AUSTIN

SPOKANE  
ALBUQUERQUE

BATON ROUGE  
WASHINGTON, D. C.

RECEIVED

JUN 09 1981

CITY ENGINEER

June 8, 1981

Mr. Richard S. Heller, P.E.  
City Engineer  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, New Mexico 87103

Re: CVI Laser Corporation Site  
200 Dorado Place S.E.  
BEI No. 6014-168

Dear Mr. Heller:

Please find enclosed three copies of the Drainage Report for the project referenced above. We request that you review and approve this report.

If you should have any questions, please do not hesitate to call.

Sincerely,

BOVAY ENGINEERS, INC.

*Stephen F. Fritz* 6-8-81  
Stephen F. Fritz, P.E.  
NM P.E. No. 6804

SFF:cw

Encl.

**DRAINAGE REPORT**

**FOR THE**

**CVI LASER CORPORATION  
SITE**

**PREPARED FOR  
CVI LASER CORPORATION  
200 DORADO PLACE  
ALBUQUERQUE, NEW MEXICO**

**JUNE 1981**

**BEI 6014-168  
BOVAY ENGINEERS, INC.**



DRAINAGE REPORT

DATE: JUNE 5, 1981

ZONE ATLAS PAGE NO: L-22

PROJECT TITLE: 200 DORADO PLACE SE

SUBDIVISION: DORADO VILLAGE

LOTS: C-1 & C-2

ENGINEER: BOVAY ENGINEERS, INC.

CONTACT: STEPHEN F. FRITZ, P.E.

ADDRESS: P. O. BOX 30068

PHONE: 884-0700

ALBUQUERQUE, NM 87190

OWNER: CVI LASER CORPORATION

CONTACT: JOE BRANDIGER

P. O. BOX 11308

PHONE: 296-9541

ALBUQUERQUE, NM 87192

SURVEYOR: SANTIAGO GUTIERREZ, R.L.S.

PHONE: 877-2127

2004 DEL RIO SW

ALBUQUERQUE, NM 87105

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## PURPOSE

The purpose of this report is to present the supporting engineering data for the most feasible solution for the proposed storm drainage plan, consistent with DRAINAGE RESOLUTION 1972-2, ALBUQUERQUE METROPOLITAN FLOOD CONTROL AUTHORITY, and the criteria promulgated in the City Engineer's Interim Drainage Guidelines dated November, 1979.

## BACKGROUND

Prior to the construction of the second building on the project site, a drainage report prepared by Mr. Levi J. Valdez, P.E., was submitted to the City of Albuquerque for its approval. This drainage report was not approved by Mr. Bruno Conegliano, Assistant City Engineer - Hydrology on April 30, 1979. See TAB 1 for a copy of Mr. Conegliano's letter.

This letter expressed three areas of concern:

1. The grading of the site along Cochiti Road.
2. The handling of the off-site flows through the site.
3. The sufficiency of on-site ponding volumes.

In April 1981, the City notified CVI Laser Corporation that a Certificate of Occupancy would not be issued by the City pending approval of a drainage report. Subsequently, CVI Laser Corporation engaged Bovay Engineers, Inc. to prepare a drainage report that complied with the City's requirements.

On May 1, 1980 a meeting was held on-site between Messrs. Chuck Easterling

and Fred Aguirre from the City's Hydrology Engineering Division, Mr. Joe Brandiger from CVI Laser Corporation and Messrs. Steve Fritz and Dan Hogan from Bovay Engineers, Inc. to discuss the City's requirements. At this meeting, an additional concern was raised regarding the erosion caused by the roof drains on the east side of the second building. In addition, it was noted that not all of the ponding areas shown on the construction plans were built.

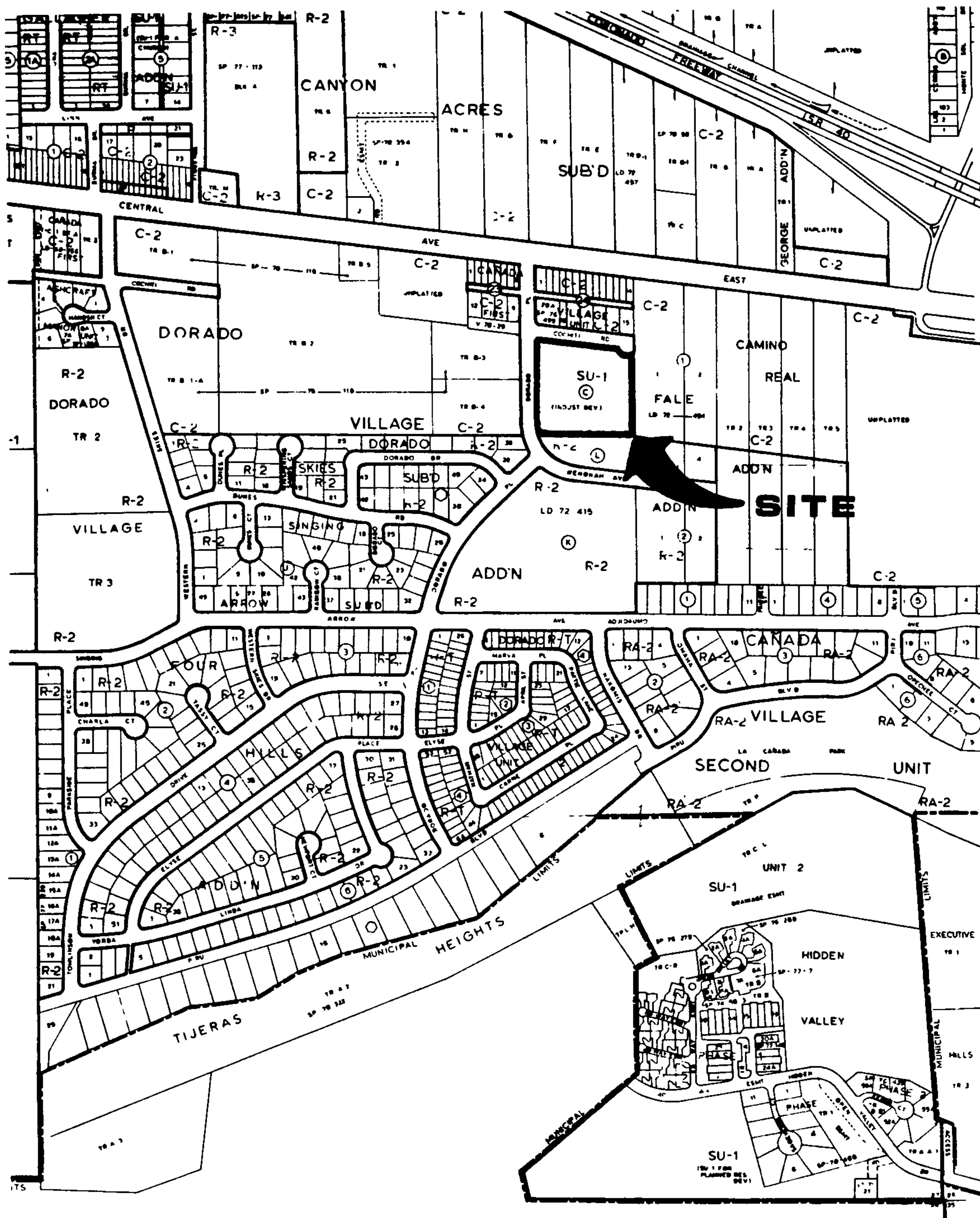
#### PROJECT LOCATION AND DESCRIPTION

CVI Laser Corporation occupies two buildings located at 200 Dorado Place SE. The original building constructed about 1972 is located on Lot C-1 of Dorado Village. The second building constructed in 1979 is located on a 0.9307 acre tract, Lot C-2 of Dorado Village. The area is located within the L-22 grid of the City of Albuquerque's Zone Atlas. A location map is shown on Drawing 1.

The project site, Lots C-1 and C-2, contains approximately 4.155 acres of land. The slope of the project site is generally from the northeast to the southwest at about a 3.75% grade. There is an elevation difference of 20 feet with the lowest elevation being approximately 5599 feet above mean sea level.

#### EXISTING DRAINAGE CONDITIONS

The project site is bounded by a paved, curbed and guttered street, Dorado Place, on the west, by an unimproved street to the north, Cochiti Road; by mostly undeveloped lands to the east; and by the Cholla Apartment Complex to the south. For photographs of the site, see the following pages.



0 100 200 300  
SCALE

LEGAL DESCRIPTION  
T 18 N  
R 4 E  
SEC 27

UNIFORM PROPERTY CODE  
1-007 056

MAP AMENDED THROUGH  
JANUARY 1975

**L-22-7**



## LEGAL DESCRIPTION

LOTS C-1 AND C-2  
DORADO VILLAGE

# LOCATION MAP

DRAWING 1

Bovay Engineers, Inc.



MAY  
81

Photo 1: Looking NE at southwestern landscaped area on front side of second building, Dorado Place in foreground.



MAY  
81

Photo 2: Looking east at existing pond on north side of parking for second building.

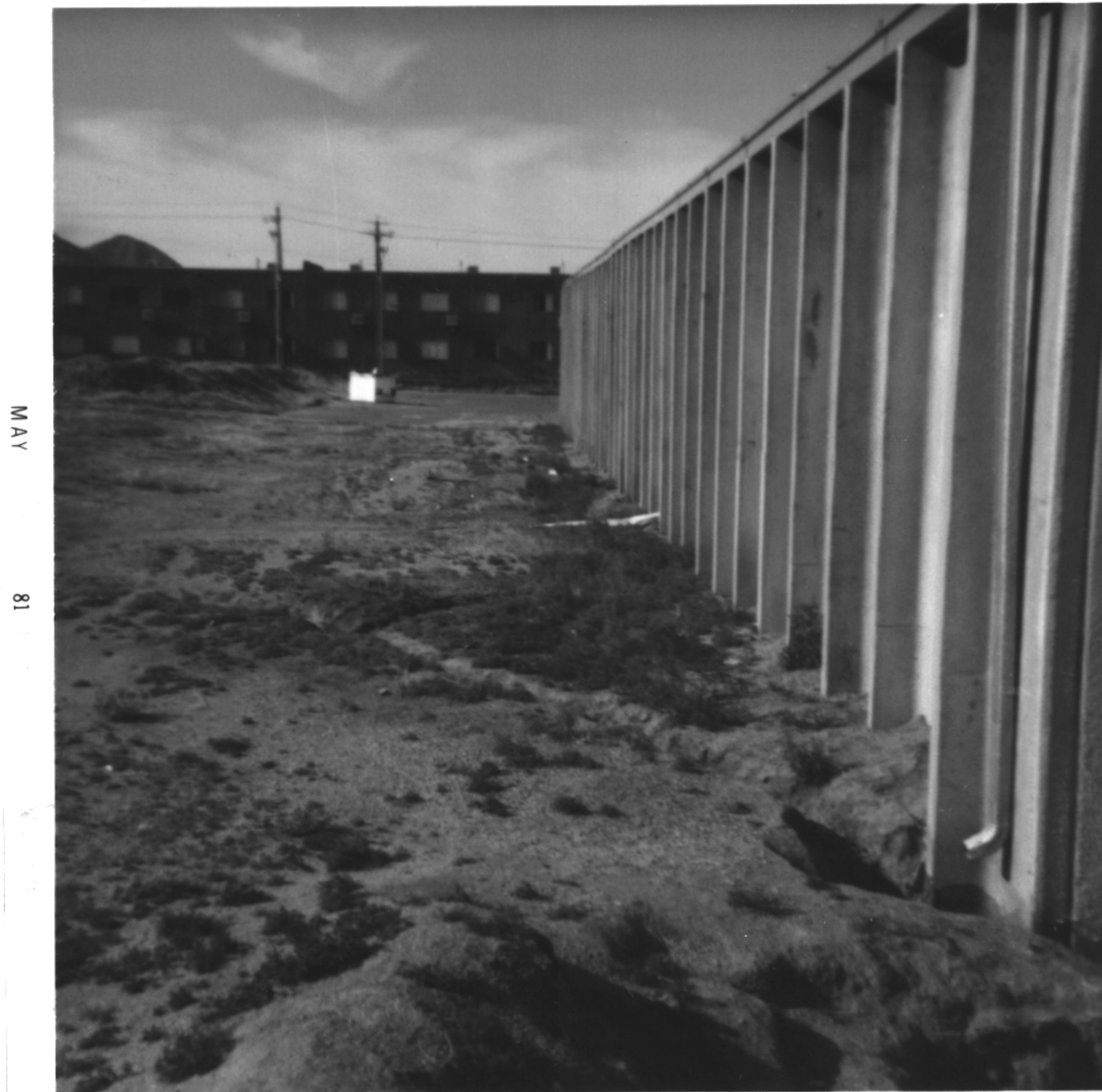


Photo 3: Looking south along back of second building at erosion from roof drains.

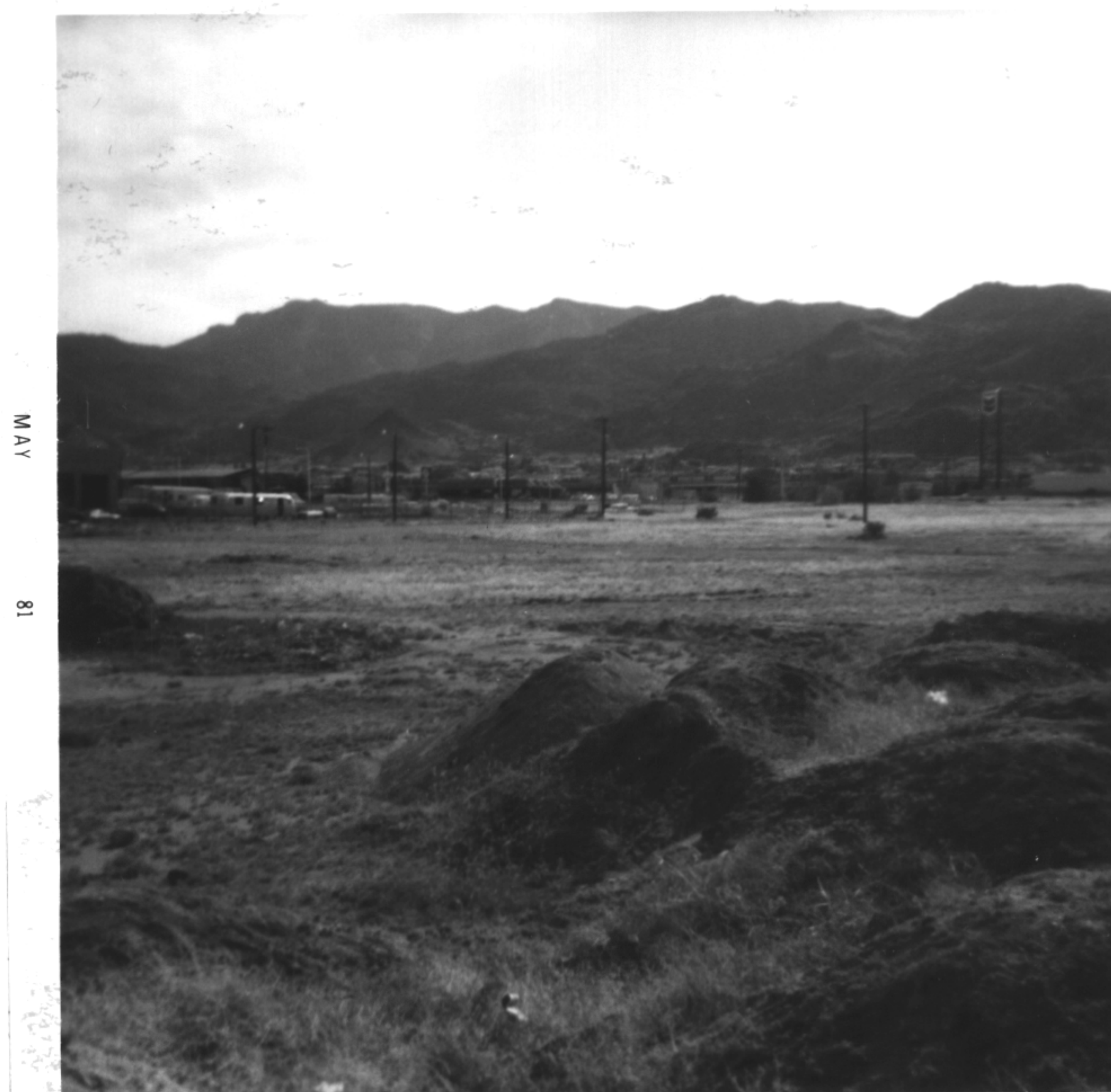


Photo 4: Looking ENE across undeveloped portion of Lot C-1 and at off-site drainage area.

Off-site storm water runoff enters the site from the east as overland sheet flow. Once on-site, the flow continues overland until it reaches a point just east of the two buildings. There part of the runoff flows along the toe of earthen mounds and exits onto the paved parking area, where it continues to flow through the parking lot until it flows into Dorado Place. The other portion of the runoff is trapped behind another set of earthen mounds, where it either infiltrates or evaporates.

Runoff from the original building roof, landscaped and parking areas flows into Dorado Place. There is no retention. A portion of the runoff from the second building roof, landscaped and parking areas is retained in an on-site pond. The remainder flows into Dorado Place.

#### COCHITI ROAD

Three existing ground cross-sections were plotted at Cochiti Road centerline stations 10+60, 11+00 and 11+50. A print of the plan and profile sheet for the proposed Cochiti Road improvements was obtained from the City Engineer's Office. The proposed road template was plotted on the cross section. Except between stations 11+00 and 11+70 the ground elevation at the right-of-way line is 0.33 feet above top of curb. Between stations 11+00 and 11+70 the slope has been regraded to achieve the required elevation. See TAB 2 for the location and plot of the cross sections.

#### SECOND BUILDING ON-SITE PONDING - DRAINAGE SOLUTION

The second building on Lot C-2 occupies approximately 35 percent of the development area, paved parking area 19 percent, gravel landscaped area 14

percent and the remaining area 32 percent.

The required ponding volume for this site (100 year developed volume - 100 year undeveloped volume) is 3907 cubic feet. The existing pond will hold 2741 cubic feet. Since the existing pond does not have enough capacity, it has been enlarged to contain at least a 10 year storm runoff volume (10 year developed volume - 10 year undeveloped volume). The difference between the required 100 year ponding volume and the pond capacity has been retained on the parking area. The existing bottom of the pond is below the existing street grade, therefore precluding draining of the pond.

The southwestern landscaped area (gravel and native shrubs) on the west side of the new building drains directly into Dorado Place at a rate of 0.70 cubic feet per second. This does not exceed the 5 year undeveloped discharge rate of 1.06 cubic feet per second. Except for this area, all other areas now drain or are graded to drain into the on-site retention pond.

To control the erosion from the second building roof drains, a trapezoidal earthen channel has been graded along the east side of the building to carry the runoff to the retention pond. The earthen channel cross section has been designed so as not to erode. The roof drains will be extended to the center-line of this channel.

#### OFF-SITE FLOWS - DRAINAGE SOLUTION

Once Cochiti Road is constructed runoff to the north of the site will be carried in the street. The off-site storm water runoff that enters the site

from the east as overland sheet flow has been intercepted by a trapezoidal channel, conveyed along the eastern and southern property lines where it has been discharged onto the paved parking area. An asphalt curb has been located along the southern and western edge of the parking area to ensure that the runoff enters Dorado Place through the driveway entrance.

The channel has been designed to carry the 100 year discharge, 25 cubic feet per second, from the partially developed upland drainage basin as it exists today. The SCS Bernalillo County Soil Survey Maps classify the on-site soils as TgB - Tijeras gravelly fine sandy loam. The hydrologic soil group classification is B which means the hazard of water erosion to this soil is moderate. An erosion resistant lining, consisting of a 3" graded coarse gravel, has been designed to protect the channel from the 5 year discharge, 14.6 cubic feet per second, from the partially developed upland drainage basin.

#### FUTURE DEVELOPMENT

The remaining undeveloped portion of Lot C-1 (2.5 acres) is intended for the future expansion of CVI Laser Corporation and the development of this portion of the site for any other purpose is not foreseen. CVI Laser Corporation does not have a master site development plan as future expansion is contingent upon the growth of the corporation.

Because a site development plan does not exist, no detailed site drainage computations were not performed and a grading plan was not prepared. However, the required 100 year ponding volume for this portion of the site was calculated

to be 10,655 cubic feet. The developed site ponding volume was based on the same runoff coefficient (0.80) as exists for the new building site, Lot C-2. The proposed location for the retention pond is shown at the southwestern corner of this site adjacent to the paved parking area. The five year positive discharge pipe and the emergency spillway would discharge directly onto the paved parking area. This would be the ideal location for the retention pond because the site now drains naturally to this corner.

The purpose of showing the pond location is so that future expansion plans can locate and grade the buildings and parking areas in such a way that the storm water runoff can get to the proposed pond location.

#### RECOMMENDATIONS AND CONCLUSIONS

The following recommendations are proposed:

1. Intercept and convey the off-site storm water runoff from the drainage area to the east of the property by means of a trapezoidal gravel-lined channel along the eastern and southern property lines. The capacity of the channel has been designed for the 100 year storm while the erosion resistant lining has been designed for the 5 year storm. This runoff is to be discharged onto the CVI Laser Corporation's southern paved parking area. Construct an asphalt curb along the southern and western edge of the parking area to ensure that the runoff will flow through the parking lot and out the driveway entrance into Dorado Place.
2. Intercept and convey the second building roof runoff by means of a

trapezoidal earthen channel along the eastern side of the building to the retention pond. Extend downspouts to centerline of ditch. Install concrete splash pads at end of downspout.

3. Enlarge the existing pond to contain at least the 10 year storm runoff volume (10 year developed volume - 10 year undeveloped volume). Retain the difference between the required 100 year ponding volume and the pond capacity on the northern parking area.

In accordance with the above recommendations, the offsite storm water runoff will be conveyed around the site in a manner that will not cause erosion.

For the second building, the required ponding volume of 3907 cubic feet will be provided, the discharge from the second building area site will not exceed the discharge rate for the 5 year undeveloped storm, and the erosion caused by the roof drain downspouts will be corrected. The proposed site grading along Cochiti Road is compatible with the proposed grades for Cochiti Road.

It is concluded that if the proposed recommendations are followed, this development will not have an adverse effect on areas downstream from the site.





# City of Albuquerque

P O BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR  
David Rusk

April 30, 1979

Mr. Levi J. Valdez, P.E.  
Valdez Engineering & Testing  
Rt. 1, Box 71  
Pojoaque Plaza  
Santa Fe, N.M.

Ref: CVI Laser, Inc. - Drainage Analysis Report

Dear Mr. Valdez:

I have reviewed the drainage report for the referenced project and my comments are as follows:

The report states that "no overhead water drain into the property." The enclosed copy of the Ortho-Topo map shows that at least ten acres of land east of this parcel drain across the property. The Site plan enclosed with the drainage report shows up to 12 feet of difference in elevation between Cochiti Rd. and the northernmost landscaping and ponding area. No information is supplied on how this difference in elevation will be taken care of. I call your attention to Section 40C of the Zoning Ordinance and to Section 10B of the Subdivision Ordinance: Sufficient grading information details must be supplied for the City Engineer's Office to grant approval to the Site development plan. You are also requested to obtain from the City Engineer's Office the proposed grades on Cochiti and prepare a grading plan in accordance with the grades provided by the mentioned office.

In regard to the internal drainage provisions for the Site, I note that the landscaping and ponding area has been estimated in 42,000 square feet versus the reported 127,800 square feet of the drainage report. The drainage report must clearly indicate which area drains into which pond and demonstrate that there is balance between the runoff volume and the corresponding ponding area.

This office is particularly concerned with the handling of the off-site flow through the property and the demonstration that the Site grading will not, in any way, affect the integrity of the ground of the adjacent properties.

The drainage report is therefore not approved.

Very truly yours,

Bruno Conegliano  
Assistant City Engineer-Hydrology

BC/ms

cc - Richard Heller, City Engineer

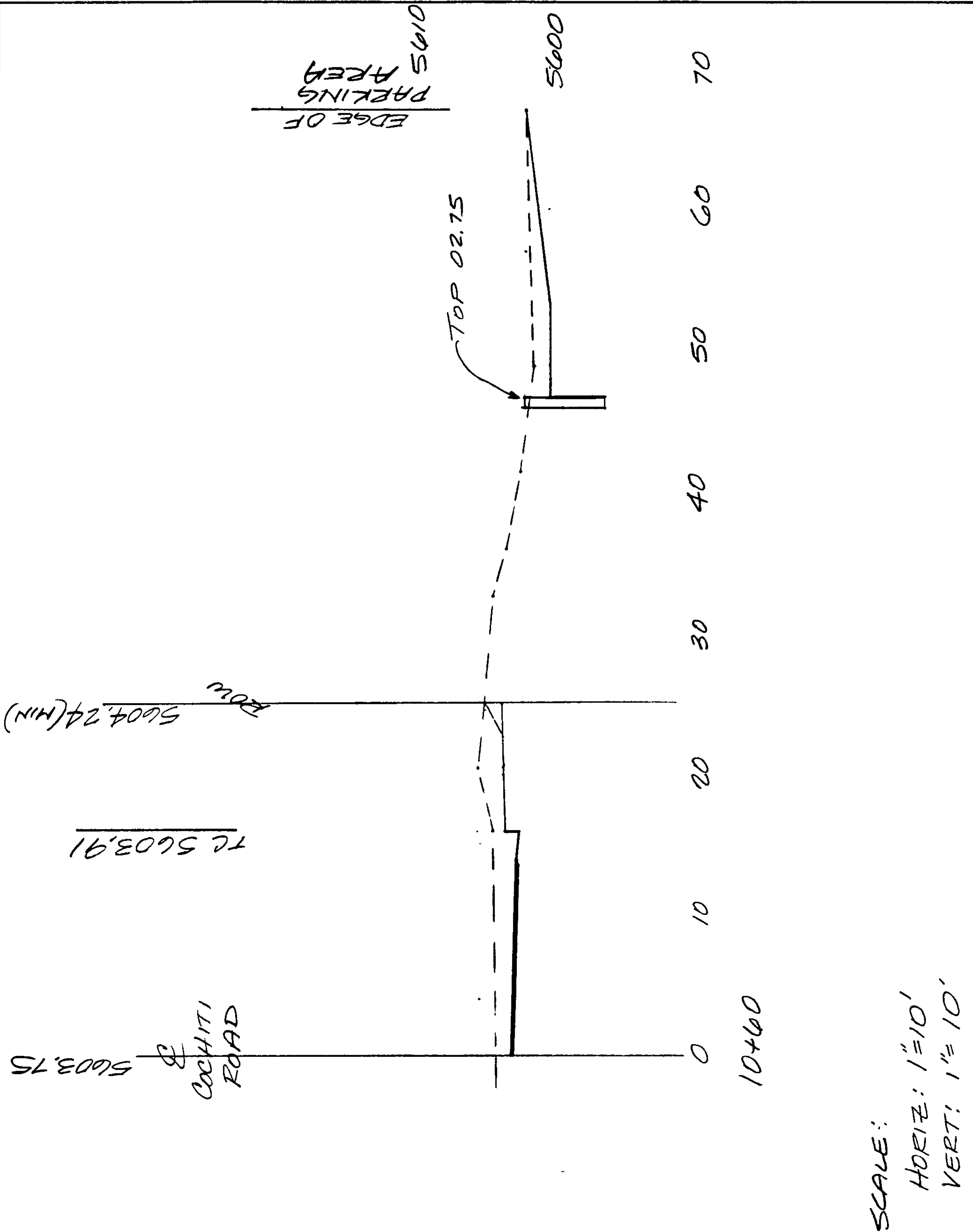
Bob Kielich, Design

Rich Leonard, AMAECAN EQUAL OPPORTUNITY EMPLOYER

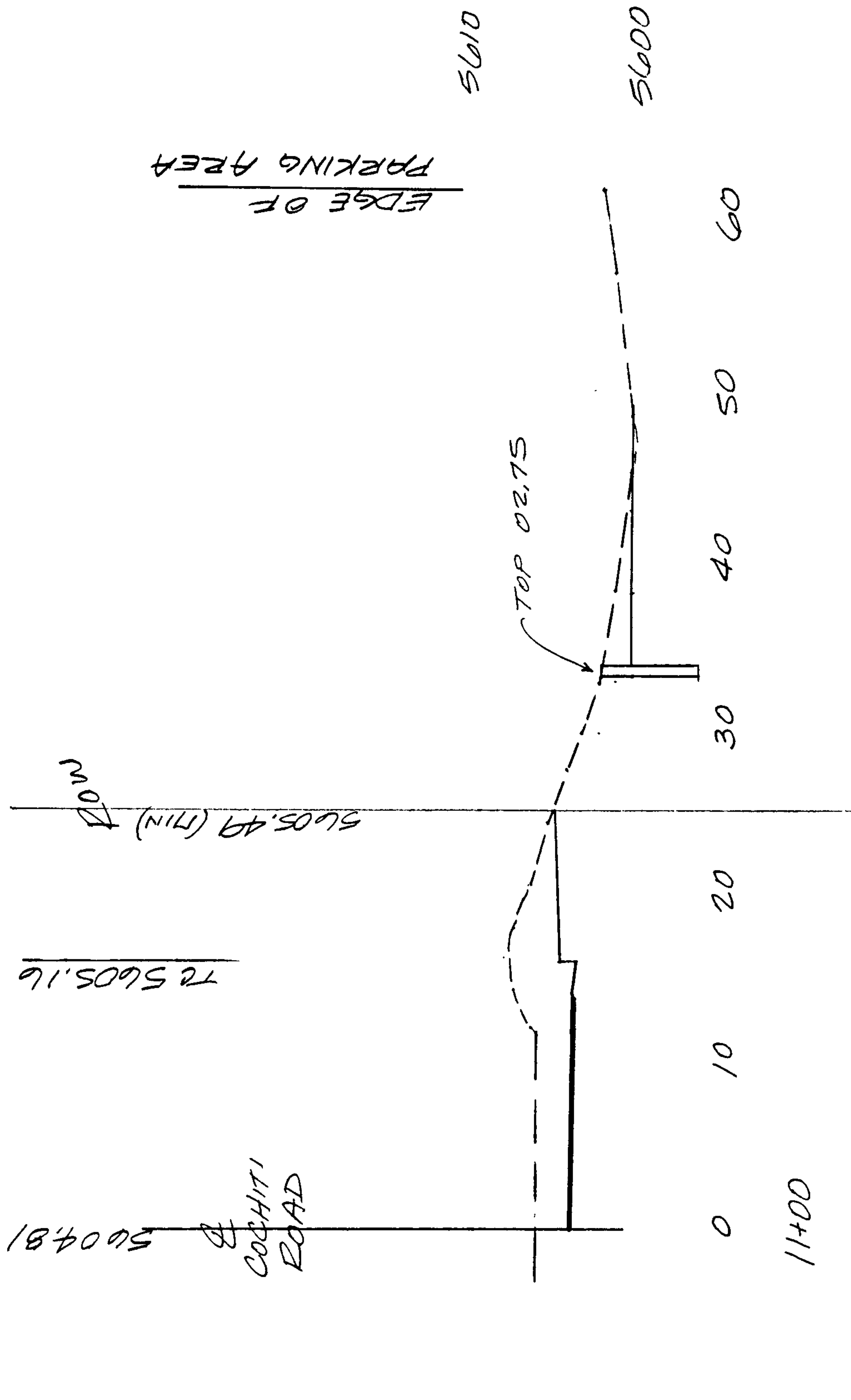
Drainage File



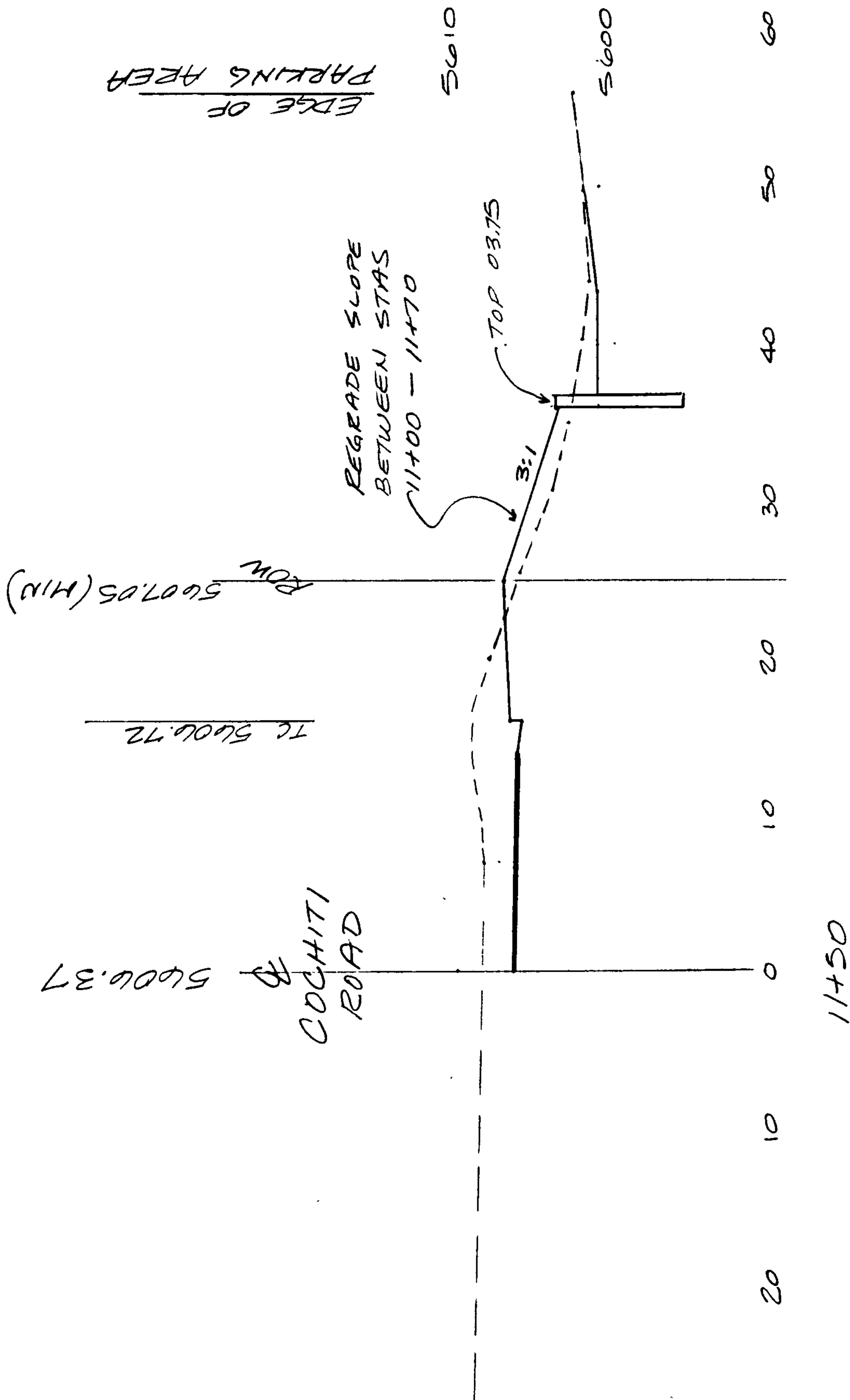




FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT SKETCH  
 DESIGNED SFP DATE 6-3-81 CHECKED \_\_\_\_\_ DATE \_\_\_\_\_ FILE NO 6014-168 SHEET 1 OF 2



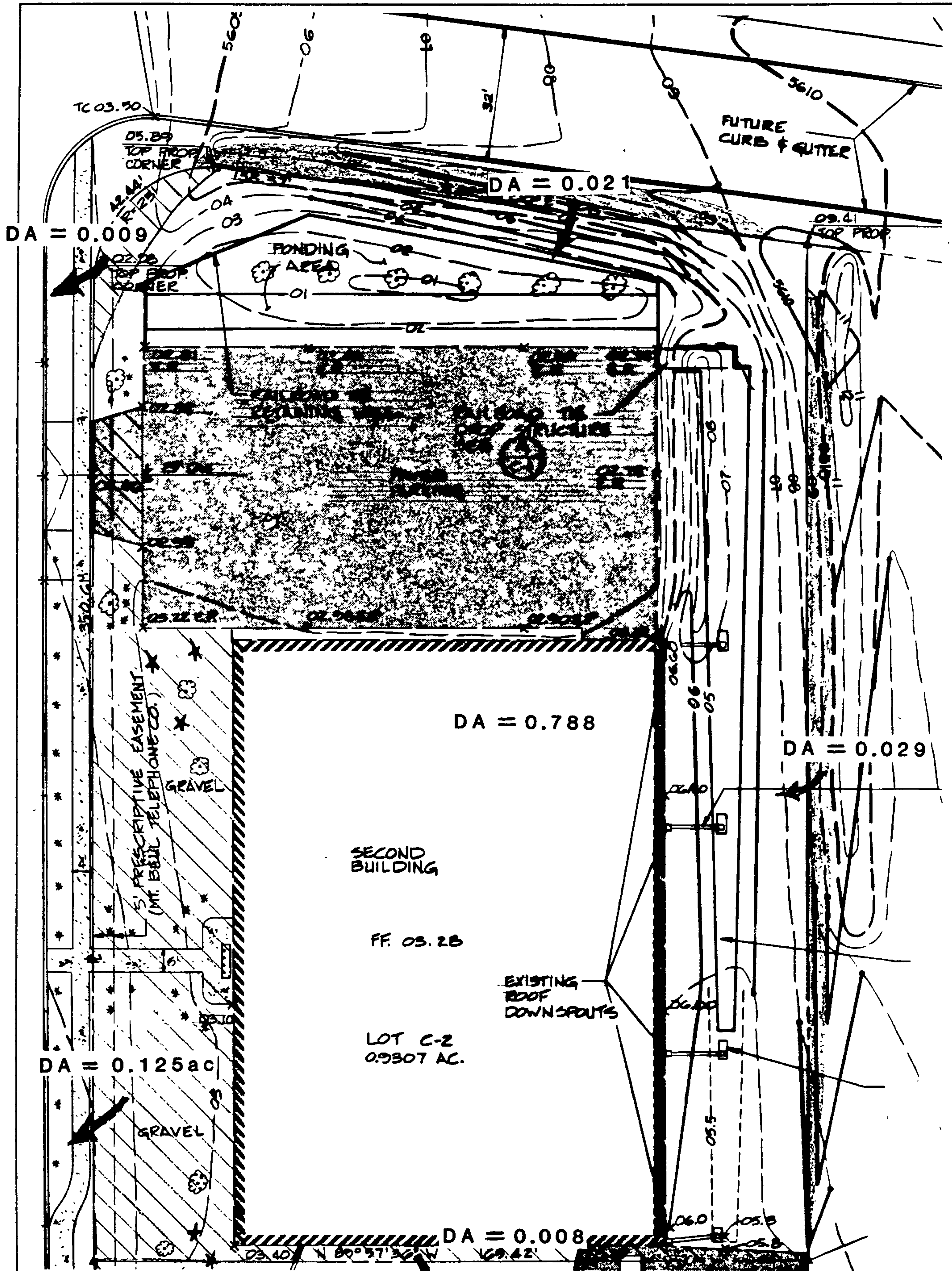
FOR CUI LASER CORP DESCRIPTION DRAINAGE REPORT SKETCH  
 DESIGNED SFF DATE 6-3-81 CHECKED \_\_\_\_\_ DATE \_\_\_\_\_ FILE NO. 6014-168 SHEET 2 OF 3



SCALE:  
HORIZ: 1"=10'  
VERT: 1"=10'

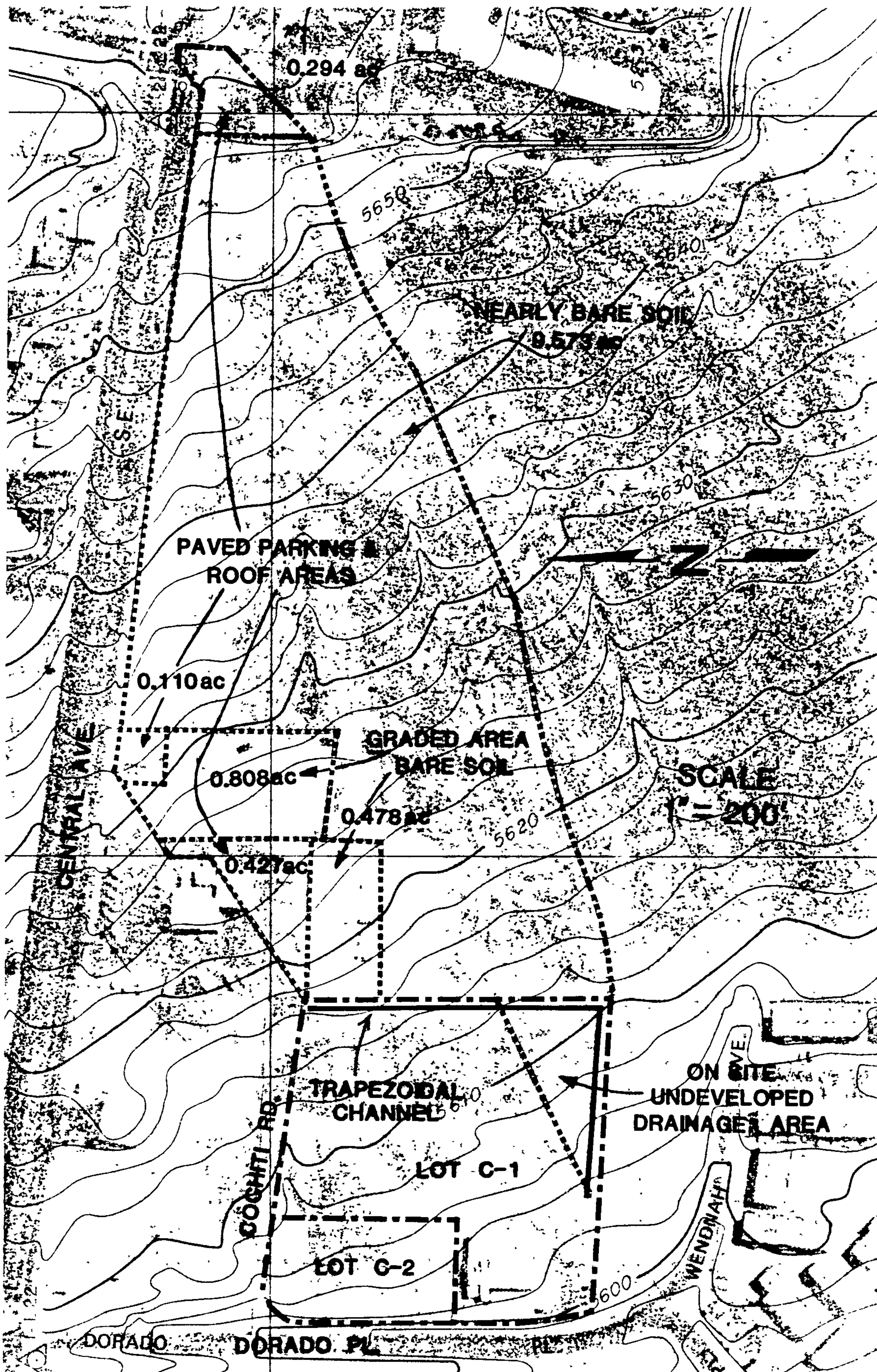
FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT SKETCH  
DESIGNED SFF DATE 6-3-81 CHECKED      DATE      FILE NO. 6014168 SHEET 3 OF 3



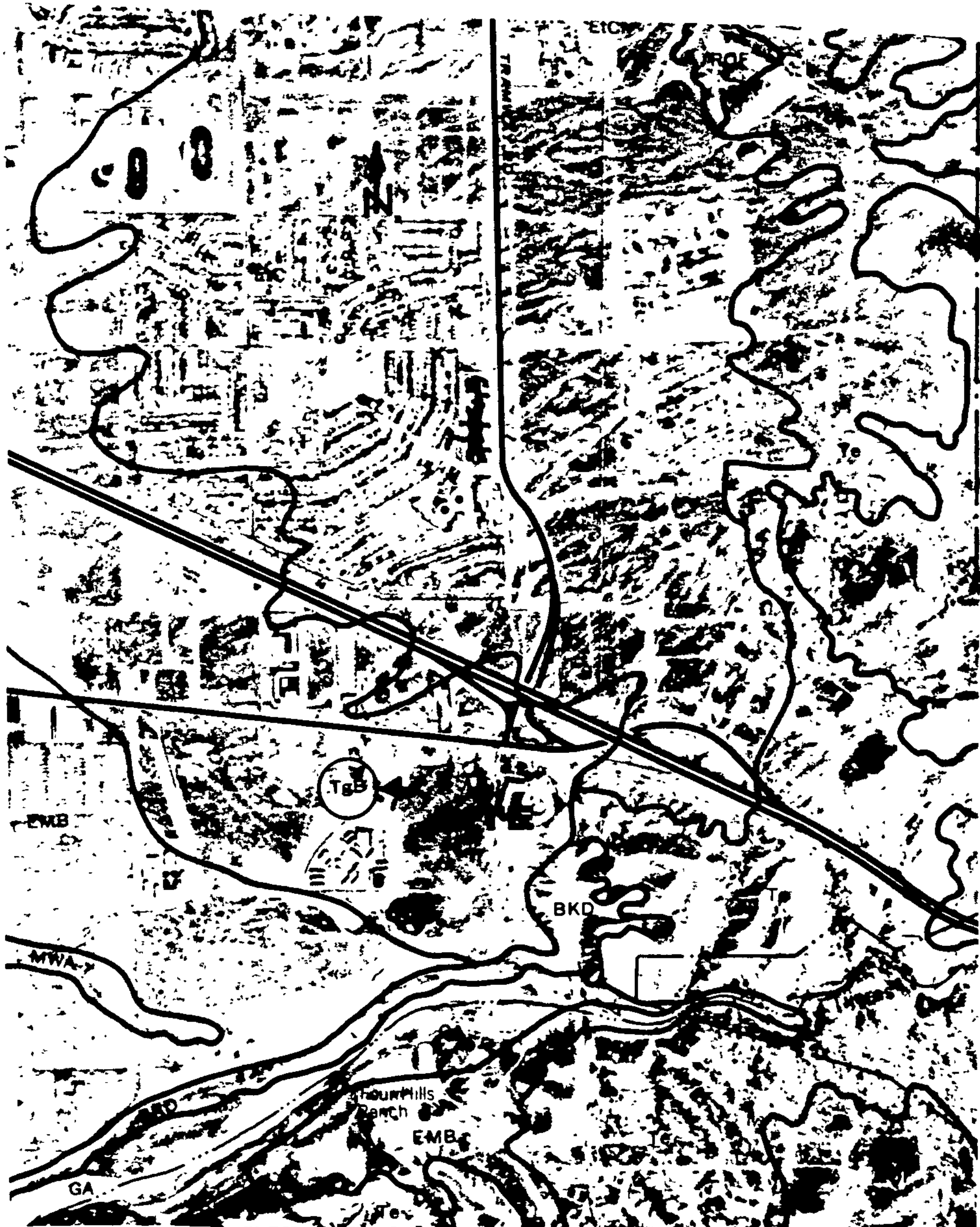


FOR CVI L&P Corp DESCRIPTION 6014-103 Report Comp

DESIGNED DWH DATE 6-8-91 CHECKED \_\_\_\_\_ DATE \_\_\_\_\_ FILE NO. 6014-103 SHEET 1 OF 1



FOR CVILASER CORP DESCRIPTION DRAINAGE REPORT  
 DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 1 OF 1



FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT  
DESIGNED SEA DATE 6-2-81 CHECKED \_\_\_\_\_ DATE \_\_\_\_\_ FILE NO. 6014-162 SHEET 1 OF 1

# DEVELOP INTENSITY - DURATION - FREQUENCY CURVE FOR THE CVI LASER CORPORATION SITE

From the USGS Albuquerque East Quad Map

SITE Location

106° 30'

35° 04'

From NOAA Atlas 2 Volume IV - New Mexico

$$x_1 = 2 \text{ yr, 6 hr value} = 1.20 \checkmark$$

$$x_2 = 2 \text{ yr, 24 hr value} = 1.42 \checkmark$$

$$x_3 = 100 \text{ yr, 6 hr value} = 2.57 \checkmark$$

$$x_4 = 100 \text{ yr, 24 hr value} = 3.20 \checkmark$$

Equation for estimating 1 hr values in New Mexico  
west of generalized Crest of Sangre De Cristo Range and  
Sacramento Mountains (From pg 15 NOAA Atlas)

$$y_2 = -0.011 + 0.942[(x_1)(x_1/x_2)] \checkmark$$

$$y_{100} = 0.494 + 0.755[(x_3)(x_3/x_4)] \checkmark$$

$$y_2 = -0.011 + 0.942[1.20(1.20/1.42)] = 0.94 \text{ 2yr 1hr estimated value} \checkmark$$

$$y_{100} = 0.494 + 0.755[2.57(2.57/3.20)] = 2.05 \text{ 100y 1hr estimated value} \checkmark$$

Use Figure 6 Nomograph on page 6 of NOAA Atlas  
to determine Precip-Freq. Values for return periods  
between 2-100 yrs

|       |                               |   |      |   |
|-------|-------------------------------|---|------|---|
| 5 yr  | Return period - precipitation | - | 1.21 | ✓ |
| 10 yr | "                             | - | 1.40 | ✓ |
| 25 yr | "                             | - | 1.62 | ✓ |
| 50 yr | "                             | - | 1.85 | ✓ |

Adjustment Factors to Obtain estimates for durations less  
than 1 hr (from Table 12 NOAA Atlas)

|                |     |     |     |     |
|----------------|-----|-----|-----|-----|
| Duration (min) | 5   | 10  | 15  | 20  |
|                | .29 | .45 | .57 | .79 |

Drainage area less than 10 sq mi - Areal reduction factor not applied ✓

FOR CVI LASER CORP. DESCRIPTION Drainage Report Comp  
DESIGNED DWH DATE 5-21-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 1 OF 25

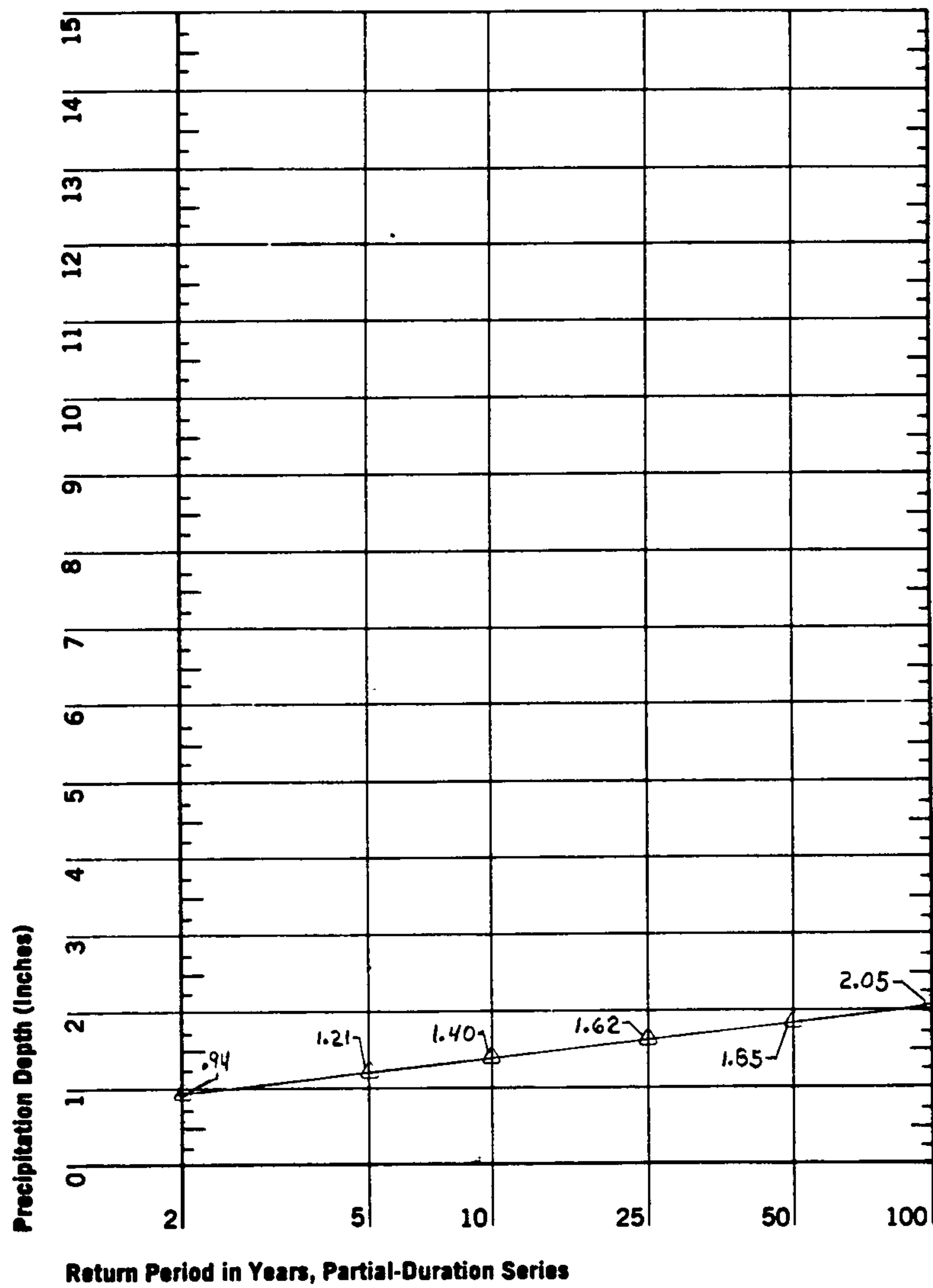
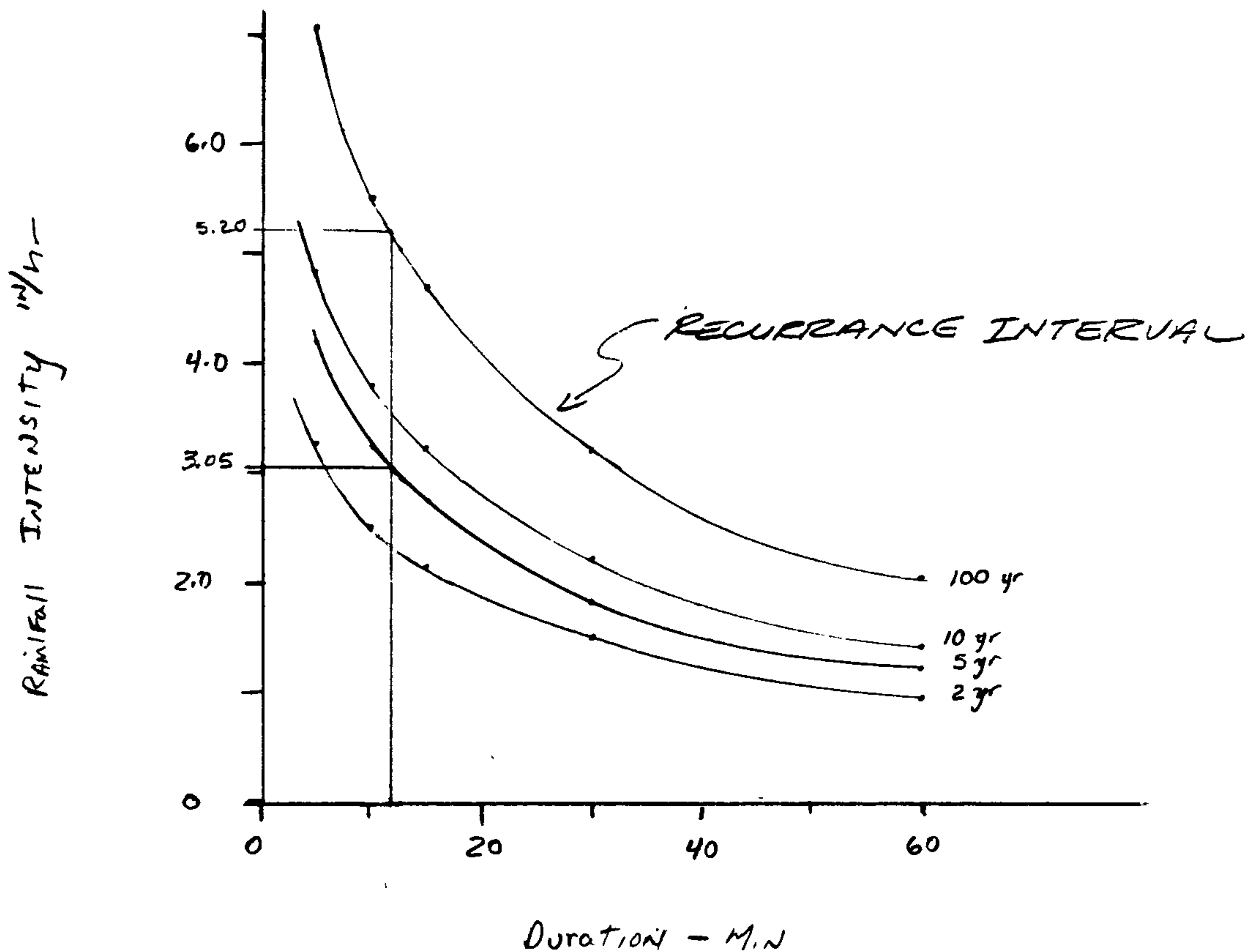


Figure 6. Precipitation depth versus return period for partial-duration series.

FOR CVI LASER CORP. DESCRIPTION Drainage Report  
 DESIGNED DWH DATE 5-21-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 2 OF 25

| FREQ<br>DURAT | 2 YEARS |       | 5 YEARS |       | 10 YEARS |       | 100 years |       |
|---------------|---------|-------|---------|-------|----------|-------|-----------|-------|
|               | IN      | IN/HR | IN      | IN/HR | IN       | IN/HR | IN        | IN/HR |
| 5 min         | .27     | 3.24  | .35     | 4.20  | .41      | 4.92  | .59       | 7.08  |
| 10 min        | .42     | 2.52  | .54     | 3.24  | .63      | 3.78  | .92       | 5.52  |
| 15 min        | .54     | 2.16  | .69     | 2.76  | .80      | 3.20  | 1.17      | 4.68  |
| 30 min        | .74     | 1.48  | .96     | 1.92  | 1.11     | 2.22  | 1.62      | 3.24  |
| 1 hr          | 0.94    |       | 1.21    |       | 1.40     |       | 2.05      |       |
| 6 hr          | 1.20    | .20   | 1.50    | .25   | 1.73     | .29   | 2.57      | .43   |
| 24 hr         | 1.42    | .06   | 1.88    | .08   | 2.18     | .09   | 3.20      | .13   |



FOR CVI LASER CORP. DESCRIPTION Drainage Report Comps  
 DESIGNED DWH DATE 5-21-81 CHECKED SFF DATE 6-2-81 FILE NO. 6019-168 SHEET 3 OF 25

# DETERMINE VOLUME OF EXISTING POND

Pond volume (Average End Area using plates) PLANIMETER  
CONTOUR LINES - SEE SHEET 5

|                              | Elev.   | Area (sq ft) | volume (cu ft) |
|------------------------------|---------|--------------|----------------|
| BOTTOM                       | 5600.90 | —            | 5              |
|                              | 5601.00 | 92           | 778            |
|                              | 5602.00 | 1464         | 951            |
|                              | 5602.50 | 2340         | 1007           |
| OVER-flow in parking<br>AREA | 5602.75 | 5716         |                |
|                              |         |              | 2741 cu ft.    |

## DETERMINE WEIGHTED RUNOFF COEFFICIENT FOR LOT C-2 - DEVELOPED

| A            | C      | AC     | Description                          |
|--------------|--------|--------|--------------------------------------|
| Area (sq ft) | factor |        |                                      |
| 7,830        | .95    | 7439.  | PAVED PARKING AREA                   |
| 5,790        | .95    | 5501.  | GRAVEL LANDSCAPED<br>AREA & DRIVEWAY |
| 5,460        | .40    | 2184.  | FLAT slope                           |
| 4,220        | .70    | 2954.  | STEEP slope                          |
| 3,240        | .35    | 1134.  | pond Area                            |
| 14,000       | .95    | 13,300 | Roof Area.                           |
| 40,540       | —      | 32,512 | Totals                               |

$$C = \frac{AC}{A} = \frac{32,512}{40,540} = .802 \text{ USE } .80 \text{ WEIGHTED COEF.}$$

## DETERMINE REQUIRED PONDING VOLUME FOR LOT C-2 (100YR DEVELOPED VOLUME - 100 YEAR UNDEVELOPED VOLUME)

$$\begin{aligned} \text{VOL}_{100\text{YR}} &= 2.57 \text{ in/12 in/ft} (0.35)(0.9307 \text{ AC})(43,560 \text{ SF/AC}) \\ &= 3039 \text{ CF} \end{aligned}$$

$$\begin{aligned} \text{VOL}_{100\text{YR}} &= 2.57 \text{ in/12 in/ft} (0.80)(0.9307 \text{ AC})(43,560 \text{ SF/AC}) \\ &= 6946 \text{ CF} \end{aligned}$$

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS

DESIGNED DWH DATE 5-19-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 4 OF 25



# REQUIRED PONDING VOLUME

$$6946 - 3039 = \underline{3907 \cdot CF}$$

EXIST POND DOES NOT HAVE ENOUGH CAPACITY. PONDING VOLUME HAS TO BE INCREASED.

THE EXISTING POND BOTTOM ELEVATION IS BELOW THE GUTTER FLOW LINE ELEVATION IN DORADO PLACE. RUNOFF WILL HAVE TO INFILTRATE AND/OR EVAPORATE.

THE POND WILL BE ENLARGED TO CONTAIN AT LEAST THE 10 YEAR VOLUME (10 YEAR DEVELOPED - 10 YEAR UNDEVELOPED)

$$VOL_{10YR} = \frac{1.73 \text{ IN}}{12 \text{ IN/FT}} (0.35) (0.9307 \text{ AC}) (43,560 \text{ SF/AC})$$

GHR  
UNDEVEL

$$= 2046 \cdot CF$$

$$VOL_{10YR} = \frac{1.73 \text{ IN}}{12 \text{ IN/FT}} (0.80) (0.9307 \text{ AC}) (43,560 \text{ SF/AC})$$

GHR  
DEVEL

$$= 4676 \cdot CF$$

10 YEAR PONDING VOLUME

$$4676 - 2046 = 2630 \cdot CF$$

## DETERMINE VOLUME OF PROPOSED POND

POND VOLUME (AVERAGE END AREA USING PLATES). PLANIMETER CONTOUR LINES.

|                             | ELEV.   | AREA (SF) | VOL (CF) |
|-----------------------------|---------|-----------|----------|
| BOTTOM                      | 5601.0  | 1250      | 1726.    |
|                             | 5602.0  | 2202      |          |
| EDGE OF POND                | 5602.5  | 2678      | 1220.    |
|                             | 5602.75 | 5782      | 1058.    |
| OVERFLOW IN<br>PARKING AREA |         |           |          |
| TOTAL                       |         |           | 4004 CF  |

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED DWH DATE 6-2-81 CHECKED SFF DATE 6-4-81 FILE NO. 014-168 SHEET 6 OF 25  
DWH 6-4-81

POND CAPACITY -

$$1726 + 1220 = 2946 \text{ CF}$$

THIS IS GREATER THAN THE 10 YEAR  
PONDING VOLUME, OK

---

UNTIL COCHITI ROAD IS BUILT, AND  
THE UNDEVELOPED PORTION OF LOT C-1  
IS DEVELOPED, THERE IS A SMALL  
AREA FROM EACH THAT CONTRIBUTES  
RUNOFF TO THE RETENTION POND

ADDITIONAL VOLUME TO BE PONDED

$$\begin{array}{l} \text{VOL}_{100\text{YR}} \\ \text{6HR} \\ \text{UNDEVEL} \end{array} = 2.57 \text{ in} / 12 \text{ in} / \text{FT} (0.35) (2487 \text{ \#}) = 186 \text{ CF}$$

$$\begin{array}{l} \text{VOL}_{100\text{YR}} \\ \text{6HR} \\ \text{DEVEL} \end{array} = 2.57 \text{ in} / 12 \text{ in} / \text{FT} (0.50) (2487 \text{ \#}) = 266 \text{ CF}$$

$$\text{DIFF} = 266 - 186 = 80 \text{ CF}$$

|                              |                             |
|------------------------------|-----------------------------|
| TOTAL VOLUME<br>TO BE PONDED | 3907<br>80<br><hr/> 3987 CF |
| PONDING VOLUME               | 4004 CF                     |

17 CF EXCESS OK

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
DESIGNED DWH DATE 6-2-81 CHECKED SFF DATE 6-4-81 FILE NO. 6014-168 SHEET 7 OF 25



DETERMINE POSITIVE DISCHARGE =  $Q_5$  UNDEVELOPED  
TO STREET FOR LOT C-2

Time of concentration for small upland  
watersheds where overland flow exists

$$t_c = \frac{L}{60 \text{ sec/min } V}$$

where:

$t_c$  = time of concentration in minutes

$L$  = length of watercourse in feet

$V$  = velocity in feet per second.

$$\text{Average slope} = H/L$$

$$\text{Elev. difference} = 109.0 - 102.0 = 7 \text{ ft}$$

$$\text{Length} = 190'$$

$$S_{\text{average}} = 7/190 = .0368 \text{ ft/ft}$$

$$V = 1.9 \text{ ft/sec}$$

From: Fig 2.3, Peak Rates of  
Discharges for Small watersheds,  
USDA-SCS, Nearly Bare and  
untilled (overland flow)

$$t_c = \frac{190 \text{ ft}}{60 \text{ sec/min } (1.9 \text{ ft/sec})} = 1.67 \text{ min}$$

USE 10 MIN AS MINIMUM  
Time of Concentration

BECAUSE THE SITE IS ALREADY DEVELOPED  
VERIFY THAT THE 100 YEAR DEVELOPED  
RUNOFF IS LESS THAN THE 5 YEAR  
UNDEVELOPED RUNOFF

FOR CVI LASER CORP. DESCRIPTION Drainage Report Computations  
DESIGNED DWH DATE 5-20-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-163 SHEET 9 OF 25

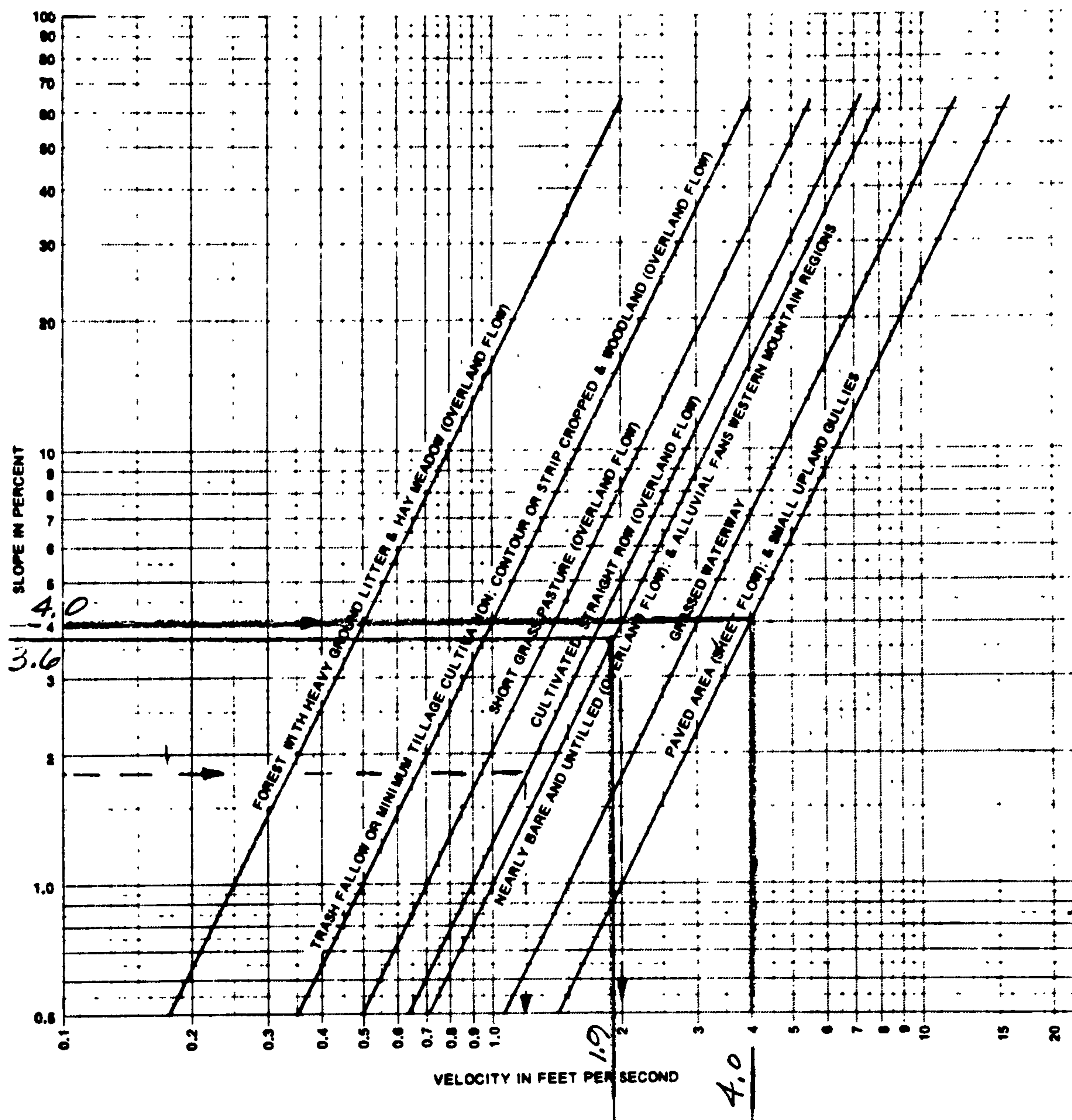


Figure 2-3 -Velocities for upland method of estimating  $T_c$

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED DWH DATE 5-20-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014168 SHEET 10 OF 25

- Determine Discharge that flows from the Developed site without being detained. This is the Area landscaped with gravel along Dorado Pl. and a portion of the driveway to the same street.

Time of Concentration - less than 10 min  
therefore use Min  $t_c = 10$  min.  $i_{100} = 5.52$  in/hr

| A           | C    | AC          |
|-------------|------|-------------|
| 5429        | 0.95 | 5158        |
| 396         | 0.40 | 158         |
| 347         | 0.15 | 260         |
| <u>6172</u> |      | <u>5576</u> |

$$C = \frac{AC}{A} = \frac{5576}{6172} = 0.90$$

$$Q_{100} = C i_{100} A$$

$$= .90 (5.52 \text{ in/hr}) (6172 \text{ sq ft}) / (43560 \text{ sq ft/Acre})$$

$$Q_{100} = \underline{0.70 \text{ CFS}}$$

- Determine the  $Q_5$  for the undeveloped site

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

$$A = .9307 \text{ Acre}$$

$$C = .35$$

$$i_5 = 3.24 \text{ in/hr}$$

$$Q_5 = C i_5 A$$

$$= .35 (3.24 \text{ in/hr}) (.9307)$$

$$Q_5 = \underline{1.06 \text{ CFS}}$$

THE  $Q_{100}$  DEVELOPED RUNOFF OF 0.70 CFS IS LESS THAN THE  $Q_5$  UNDEVELOPED RUNOFF OF 1.06 CFS. THIS IS ACCEPTABLE

FOR CVI LASER CORP. DESCRIPTION Drainage Report Comp  
DESIGNED DWH DATE 5-20-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 11 OF 25

DETERMINE THE DISCHARGE RATE FOR THE 5 YEAR AND 100YR OFFSITE FLOWS THAT ENTER THE PROJECT SITE

DETERMINE WEIGHTED RUNOFF COEFFICIENT

| DESCRIPTION                         | A                      | C             | AC           |
|-------------------------------------|------------------------|---------------|--------------|
| PAVED PARKING & ROOF AREAS          | 0.831                  | 0.95          | 0.789        |
| GRADED AREAS-BARE SOIL              | 1.286                  | 0.50          | 0.643        |
| NEARLY BARE                         | 9.573                  | 0.35          | 3.351        |
|                                     | <u>11.690</u>          |               | <u>4.783</u> |
| WEIGHTED COEF. "C" = $\frac{AC}{A}$ | $\frac{4.783}{11.690}$ | = <u>0.41</u> |              |

Time of Concentration

$$t_c = \frac{L}{60 \frac{\text{sec}}{\text{min}} V}$$

where:

$t_c$  = time of concentration (minutes)  
 $L$  = Length of Watercourse (feet)  
 $V$  = velocity (ft/sec)

Average slope =  $\frac{H}{L}$

Elev. difference =  $5657 - 5611 = 46'$

Length = 1280

Saverage =  $\frac{46}{1280} = 0.036\%$

$V = 1.9 \text{ ft/sec}$

$$t_c = \frac{1280 \text{ FT}}{60 \text{ sec/min} (1.9 \text{ ft/sec})} = 11.2 \text{ MIN}$$

From Fig 2.3, Peak Rates of Discharges for small water-sheds, USCA-SCS, nearly bare and unutilized (overland flow)

ELEVATION DIFFERENCE  $5662 - 5657 = 5$

LENGTH 125'

SAVE. =  $\frac{5}{125} = 0.04\%$

$V = 4 \text{ FT/SEC}$

PAVED AREA - SHEET FLOW

$$t_c = \frac{125'}{60 \text{ SEC/MIN} (4.0 \text{ FT/SEC})} = 0.5 \text{ MIN}$$

TOTAL  $t_c = 11.2 + 0.5 = 11.7 \text{ MIN}$

FOR CVI LASER CORP DESCRIPTION Drainage Report Computations  
 DESIGNED D.J.H. DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6314-169 SHEET 12 OF 25

Q5

$$t_c = 11.7 \text{ MIN}$$

$$A = 11.690 \text{ AC}$$

$$C = 0.41$$

$$i_5 = 3.05 \text{ in/hr} \quad (\text{SEE SHEET 3})$$

$$Q_5 = C i_5 A$$

$$= 0.41 (3.05 \text{ in/hr}) (11.690 \text{ AC})$$

$$= 14.6 \text{ CFS}$$

Q100

$$t_c = 11.7 \text{ MIN.}$$

$$A = 11.690 \text{ AC}$$

$$C = 0.41$$

$$i_{100} = 5.20 \text{ in/hr} \quad (\text{SEE SHEET 3})$$

$$Q_{100} = C i_{100} A$$

$$= 0.41 (5.20 \text{ in/hr}) (11.690 \text{ AC})$$

$$= 25 \text{ CFS}$$

THE OFFSITE OVERLAND FLOWS WILL BE INTERCEPTED BY A CHANNEL AND CONVEYED ALONG THE EASTERN AND SOUTHERN PROPERTY LINES AND THEN RELEASED ONTO THE PAVED PARKING AREA. THE CHANNEL CAPACITY WILL BE BASED ON Q100 FLOW.

AN EROSION RESISTANT LINING WILL BE DESIGNED TO PROVIDE PROTECTION FROM THE Q5 FLOW IF REQUIRED

PRIOR TO THE UNDEVELOPED PORTION OF LOT C-1 BEING DEVELOPED A PORTION OF THE ON-SITE FLOW WILL BE INTERCEPTED BY THE CHANNEL ALONG THE SOUTHERN PROPERTY LINE.

FOR CVI LASER CORP. DESCRIPTION DRAINAGE REPORT COMPS.  
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 13 OF 25  
CWH 6-5-81

# ONSITE RUNOFF

ON-SITE DRAINAGE AREA = 19,383 SF = 0.445 AC

TRAVEL TIME IN CHANNEL

$$t_c = \frac{L}{60 \text{ SEC/MIN} V}$$

$$L = 250$$

FROM BEND TO  
PAVED PARKING  
LOT

USE  $V_5 = 4.3 \text{ FPS}$   
 $V_{100} = 5.2 \text{ FPS}$  } BASED ON PRELIMINARY TRIALS

$$t_{c5} = \frac{250}{60(4.3)} = 1.0 \cdot \text{TOTAL } T_c = 11.7 + 1.0 = 12.7 \text{ MIN.}$$

$$t_{c100} = \frac{250}{60(5.2)} = 0.8 \cdot \text{TOTAL } T_c = 11.7 + 0.8 = 12.5 \text{ MIN.}$$

$$i_5 = 2.95 \text{ in/hr.}$$

$$i_{100} = 5.04 \text{ in/hr.}$$

$$\begin{aligned} Q_5 &= C i_5 A \\ &= [11.690(0.41) + 0.445(0.35)] 2.95 \\ &= 14.6 \text{ CFS.} \end{aligned}$$

$$\begin{aligned} Q_{100} &= C i_{100} A \\ &= [11.690(0.41) + 0.445(0.35)] 5.04 \\ &= 25 \text{ CFS.} \end{aligned}$$

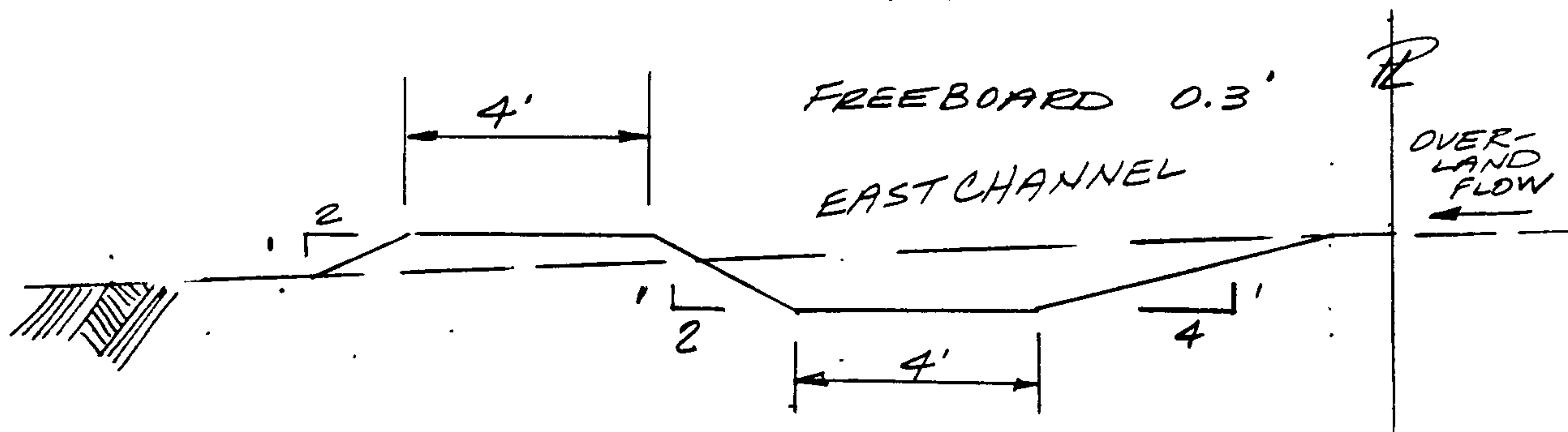
FOR CVI LASER CORP. DESCRIPTION DRAINAGE REPORT COMPS

DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014168 SHEET 14 OF 25

DWH

6-5-81

USE THE FOLLOWING CHANNEL TEMPLATE



SOIL CLASSIFICATION - TJB

TIJERAS GRAVELY FINE SANDY LOAM

HYDROLOGIC GROUP - B

$n = 0.020$

TABLE 7-806.6 { NMSHD INSTR  
MANUAL

$V_{max} = 2.5 \text{ fps}$

TABLE 7-806.8

THE MAXIMUM DEPTH OF FLOW FOR UNLINED CHANNELS (BARE SOIL) IS TAKEN FROM DESIGN OF STABLE CHANNELS WITH FLEXIBLE LININGS, HEC 15 USDOT FHWA

EASTERN CHANNEL SLOPE .017 %

SOUTHERN CHANNEL SLOPE .023

FOR BOTH CHANNELS MAX FLOW DEPTH IS LESS THAN 0.1' (CHART 2) USE 0.1'

$$AREA = \left( \frac{.2 \times .1}{2} \right) + (.1 \times 4) + \left( \frac{.4 \times .1}{2} \right) = 0.43 \text{ SF}$$

$$WP = \sqrt{(.2)^2 + (.1)^2} + 4 + \sqrt{(.4)^2 + (.1)^2} = 4.64 \text{ FT.}$$

$$R = \frac{A}{WP} = \frac{0.43}{4.64} = 0.09$$

$$V = 22.81 R^{0.591} S_o^{0.288} \quad (\text{CHART 3})$$

$$\text{FOR EAST CH. } V = 22.81 (0.09)^{0.591} (0.017)^{0.288} = 1.70 \text{ fps}$$

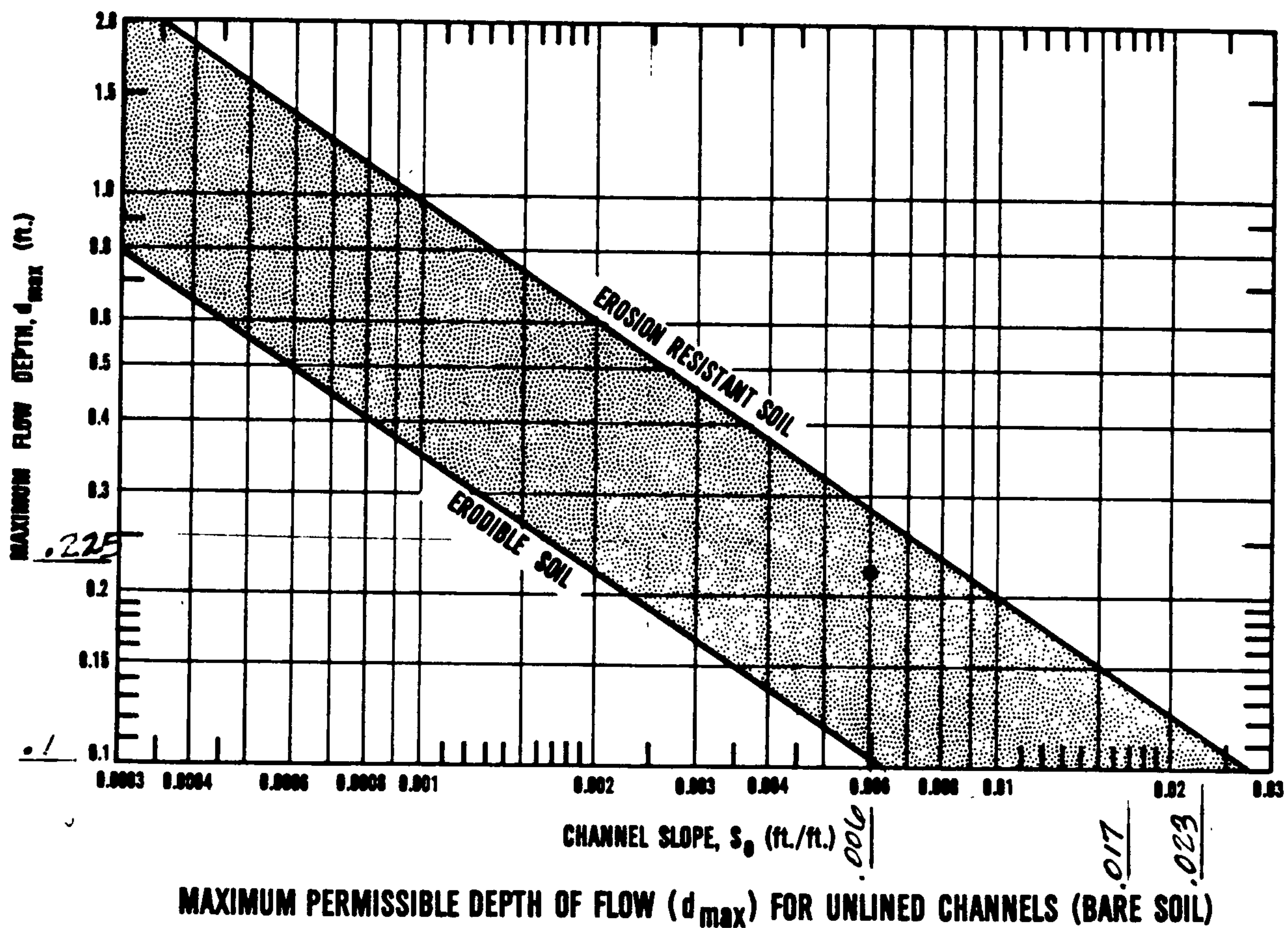
$$\text{FOR SOUTH CH. } V = 22.81 (0.09)^{0.591} (0.023)^{0.288} = 1.85 \text{ fps}$$

$Q = VA$  THIS IS THE ALLOWABLE DISCHARGE THAT AN EARTHEN CHANNEL COULD CARRY WITHOUT CAUSING EROSION

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS

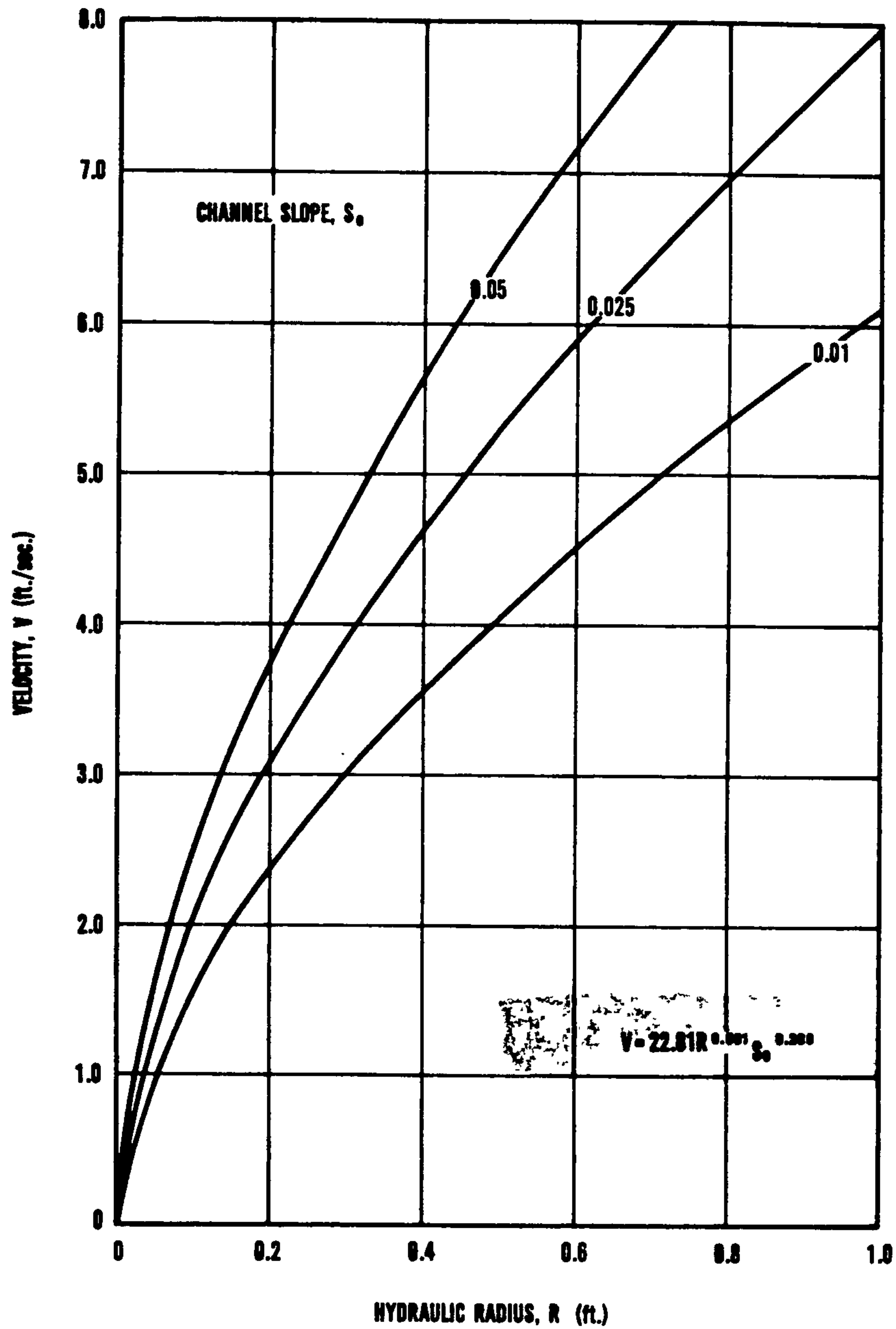
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014168 SHEET 15 OF 25

Chart 2



FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED DW14 DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014168 SHEET 16 OF 25

Chart 3



FLOW VELOCITY FOR UNLINED CHANNELS (BARE SOIL)

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FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 0014168 SHEET 17 OF 25

FOR EAST CHAN  $Q = 1.70 (0.43) = 0.7 \text{ CFS}$   
FOR SOUTH CHAN  $Q = 1.85 (0.43) = 0.8 \text{ CFS}$

THE ALLOWABLE DISCHARGE FOR EITHER EARTHEN CHANNEL IS MUCH LESS THAN BOTH THE  $Q_5$  AND  $Q_{100}$  FLOWS. THEREFORE THE CHANNEL WILL HAVE TO BE LINED. THE DEPTH OF THE CHANNEL WILL BE BASED ON THE  $Q_{100}$  NORMAL DEPTH OF FLOW PLUS FREEBOARD. A COARSE GRAVEL LINING WILL BE PROVIDED TO RESIST EROSION FROM THE  $Q_5$  FLOW.

DESIGN EROSION-RESISTANT LINING FOR  $Q_5$  FLOW. BY TRIAL AND ERROR THE MEAN STONE SIZE OF  $D_{50} = 2"$  WAS SELECTED.

$$n = 0.0395 D_{50}^{1/6} \text{ FOR } D_{50} = 2" \Rightarrow .17' \quad n = 0.029.$$

USING  $D_{50} = 2"$ ;  $n = 0.029$ ;  $Q_5 = 14.6 \text{ CFS}$   
FIND NORMAL DEPTH OF FLOW AND VELOCITY.

AS SHOWN ON THE FOLLOWING SHEET FOR THE EASTERN CHAN.

$$d_n = 0.64'$$

$$V_n = 3.88 \text{ fps}$$

SOUTHERN CHAN

$$d_n = 0.59'$$

$$V_n = 4.34'$$

THE MAXIMUM PERMISSIBLE DEPTH OF FLOW FOR CHANNELS LINED WITH STONE IS EXPRESSED BY THE EQUATION

$$d_{\max} = \frac{5 S_0}{\gamma S_0}$$

$\gamma$  = UNIT WT OF WATER  
 $S_0$  = CHANNEL SLOPE

FOR EASTERN CHANNEL

$$d_{\max} = \frac{5(0.17)}{62.4(0.017)} = 0.80 \geq 0.64 \text{ OK.}$$

FOR SOUTHERN CHANNEL

$$d_{\max} = \frac{5(0.17)}{62.4(0.023)} = 0.59 \geq 0.59 \text{ OK.}$$

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
DESIGNED DWH DATE 5-22-81 CHECKED SF DATE 6-2-81 FILE NO. 6014168 SHEET 18 OF 25

$D_{50} = 2'$ 

## EASTERN CHANNEL

JOB  
6014.1684  
STH  
1.0000  
PUT  
1 IF TRAPEZOID  
2 IF CIRCLE  
3 IF PARABOLA  
4 IF IRREGULAR  
1.0000  
B  
4.0000  
LT SD SLP  
4.0000  
RT SD SLP  
2.0000  
D  
1.2000  
CHAN E  
0.0174  
CHAN B  
0.0290  
PUT  
1 IF C=  
2 IF I=  
3 IF C+I  
1.0000  
U  
14.0000  
D  
0.607  
V  
3.978

 $D_{50} = 2''$ 

## SOUTHERN CHANNEL

JOB  
6014.1684  
STH  
2.0000  
PUT  
1 IF TRAPEZOID  
2 IF CIRCLE  
3 IF PARABOLA  
4 IF IRREGULAR  
1.0000  
B  
4.0000  
LT SD SLP  
4.0000  
RT SD SLP  
2.0000  
D  
1.3000  
CHAN E  
0.0234  
CHAN B  
0.0290  
PUT  
1 IF C=  
2 IF I=  
3 IF C+I  
1.0000  
U  
14.6000  
D  
0.516  
V  
4.33

## MAXIMUM STONE SIZE

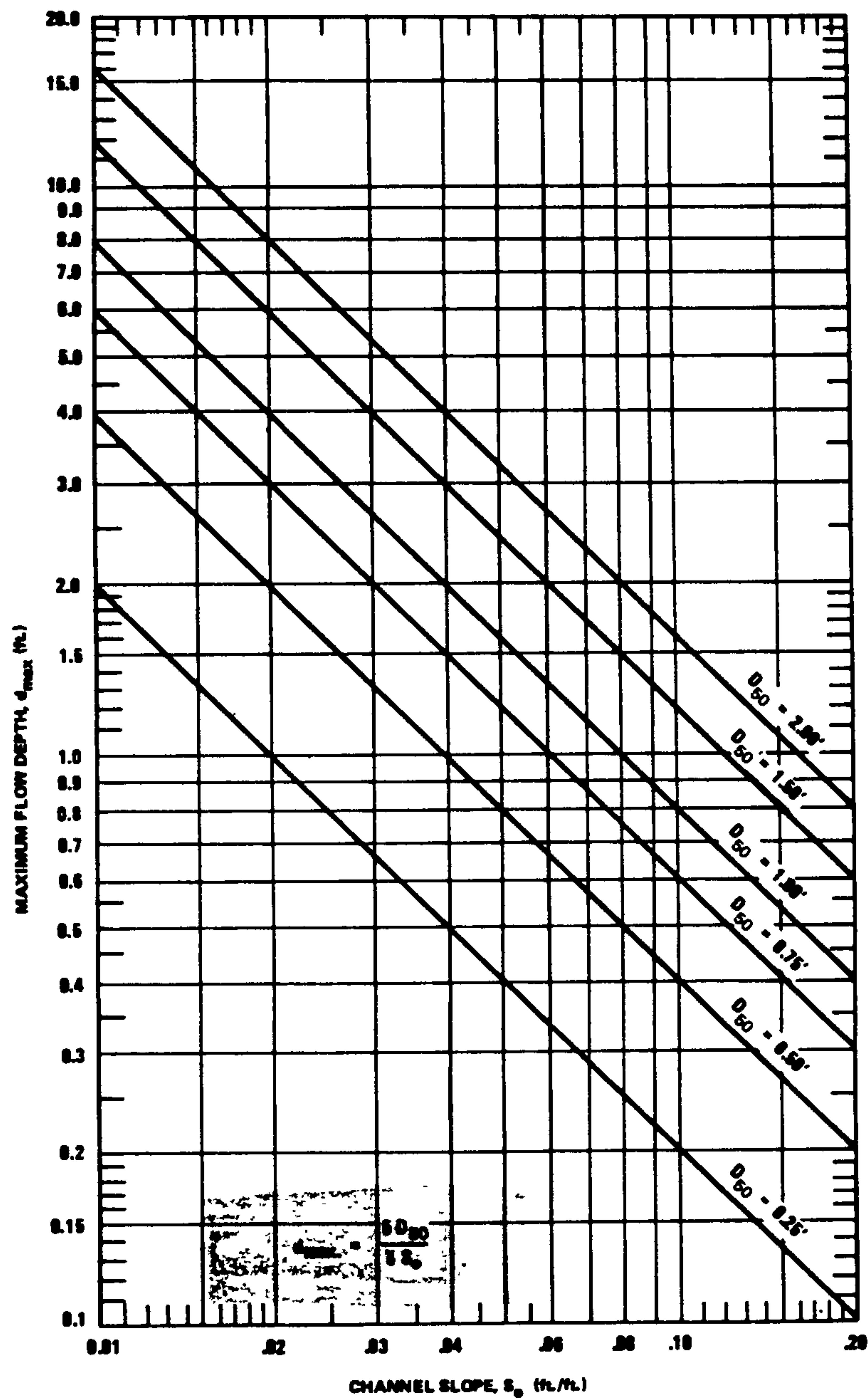
$$D_{MAX} = 1.5 D_{50} = 1.5 \times 2'' = 3''$$

## THICKNESS OF COARSE GRAVEL LAYER

$$t = 1.5 D_{MAX} = 1.5 \times 3'' = 4.5''$$

FOR CVI LAKER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 19 OF 25  
DWH 6-5-81

Chart 27



MAXIMUM PERMISSIBLE DEPTH OF FLOW ( $d_{max}$ )  
FOR CHANNELS LINED WITH ROCK RIPRAP

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FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6214168 SHEET 20 OF 25

# DETERMINE DEPTH OF CHANNEL

USING  $D_{50} = 2 \text{ in.}$ ;  $n = 0.029$ ;  $Q_{100} = 25 \text{ cfs}$

FIND NORMAL DEPTH OF FLOW AND VELOCITY

## EASTERN CHANNEL

JOB

6014.168\*

STA

1.0000\*

PUT

1 IF TRAPEZOID

2 IF CIRCLE

3 IF PARABOLA

4 IF IRREGULAR

1.0000\*

B

4.0000\*

LT SD SLP

4.0000\*

RT SD SLP

2.0000\*

D

1.3000\*

CHAN 1

0.017

CHAN 1

0.029

PUT

1 IF T=

2 IF I=

3 IF C+D

1.0000

Q

25.0000

D

0.767

V

4.626

## SOUTHERN CHANNEL

JOB

6014.168\*

STA

2.0000\*

PUT

1 IF TRAPEZOID

2 IF CIRCLE

3 IF PARABOLA

4 IF IRREGULAR

1.0000\*

B

4.0000\*

LT SD SLP

4.0000\*

RT SD SLP

2.0000\*

D

1.3000\*

CHAN 1

0.023

CHAN 1

0.029\*

PUT

1 IF T=

2 IF I=

3 IF C+D

1.0000\*

Q

25.0000\*

D

0.767

V

5.173

TOTAL DEPTH OF CHANNEL TO EQUAL  
NORMAL DEPTH OF FLOW PLUS FREEBOARD

$$D = 0.83 + 0.30 = 1.13$$

$$D = 0.77 + 0.30 = 1.07$$

USE 1.10'

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS

DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 21 OF 25

DWH 6-5-81

DETERMINE MINIMUM RADIUS FOR CHANNEL  
CURVE @ SE CORNER OF PROPERTY

USE Q100 FLOW

$$R_m = \frac{4V^2W}{gy}$$

W = CHANNEL WIDTH @  
WATER SURFACE = 8.98'

$$y = d_n = 0.83'$$

$$V = 4.63 \text{ FPS}$$

$$= \frac{4(4.63)^2(8.98)}{32.2(0.83)} = 28.8' \quad \text{USE } 30'$$

DETERMINE RISE OF WATER IN CURVE

$$\Delta y = C \frac{V^2W}{gR}$$

$$C = 1.0$$

$$\Delta y = \frac{1.0(4.63)^2(8.98)}{32.2(30)} = 0.20'$$

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS.  
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 22 OF 25  
DWH 6-5-81

ESTIMATE THE REQUIRED 100 YEAR PONDING  
VOLUME FOR UNDEVELOPED PORTION OF LOT C-1

$$\begin{aligned} \text{Vol}_{100 \text{ yr}} &= 2.57 \frac{\text{in}}{12 \frac{\text{in}}{\text{ft}}} (.35) (110,565 \text{ sq ft}) \\ &\quad \begin{matrix} 6 \text{ hr} \\ \text{under} \end{matrix} \\ &= 8288 \text{ CF} \end{aligned}$$

$$\begin{aligned} \text{Vol}_{100 \text{ yr}} &= 2.57 \frac{\text{in}}{12 \frac{\text{in}}{\text{ft}}} (.80) (110,565 \text{ sq ft}) \\ &\quad \begin{matrix} 6 \text{ hr} \\ \text{dev} \end{matrix} \\ &= 18,943 \text{ CF} \end{aligned}$$

$$\text{EST. FUTURE PONDING VOL.} = 18,943 - 8288 = \underline{\underline{10,655 \text{ CF}}}$$

THE ESTIMATED 100 YEAR DEVELOPED  
VOLUME IS BASED ON THE WEIGHTED RUNOFF  
COEFFICIENT BEING THE SAME AS FOR LOT C-1

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014-168 SHEET 23 OF 25

DETERMINE  $Q_{100}$  FROM NEW BUILDING ROOF  
AREA AND AREA TO EAST OF BUILDING  
TO SIZE CHANNEL TO POND

### DRAINAGE AREA

ROOF 14,000 SF  
FLAT SLOPES 6,353 SF  
STEEP SLOPES 1,225 SF (FM LOT C-1)

WEIGHTED "C"

| A             | C    | AC            |
|---------------|------|---------------|
| 14,000        | 0.95 | 13,300        |
| 6,353         | 0.40 | 2,541         |
| 1,225         | 0.70 | 858           |
| <u>21,578</u> |      | <u>16,699</u> |

$$"C" = \frac{AC}{A} = \frac{16,699}{21,578} = 0.77$$

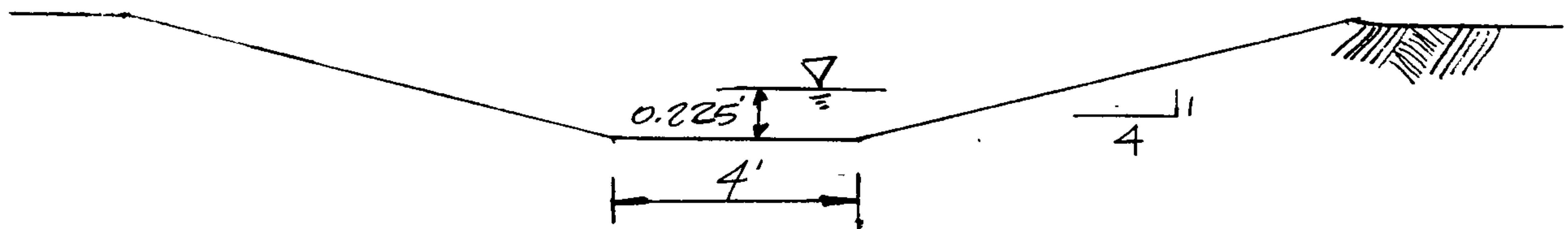
TIME OF CONCENTRATION USE  $T_C = 10 \text{ min}$

$$i_{100} = 5.52 \text{ in/hr.}$$

$$Q_{100} = C i_{100} A = 0.77 (5.52 \text{ in/hr}) \left( \frac{21,578 \text{ SF}}{43,560 \text{ SF/AC}} \right) = 2.11 \text{ CFS.}$$

THE MAXIMUM PERMISSIBLE DEPTH OF FLOW  
FOR UNLINED CHANNELS (BARE SOIL) FOR  
A SLOPE OF 0.006', IS  $d_{\text{max}} = 0.225$  (CHART 2).

BY TRIAL AND ERROR USE THE FOLLOWING  
CHANNEL TEMPLATE



$$\text{AREA} = \frac{(0.225 \times 0.90)^2}{2} + 4 \times 0.225 = 1.10 \text{ SF.}$$

$$\text{WP} = 2 \left( \sqrt{(0.225)^2 + (0.90)^2} \right) + 4 = 5.86 \text{ FT.}$$

$$R = \frac{A}{\text{WP}} = \frac{1.10}{5.86} = 0.19$$

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
DESIGNED SEF DATE 6-3-81 CHECKED DWH DATE 6-5-81 FILE NO. 6014-168 SHEET 24 OF 25

$$V = 22.81 R^{0.591} S_0^{0.288} \quad (\text{CHART 3})$$

$$V = 22.81 (0.19)^{0.591} (0.006)^{0.288} = 1.96 \text{ fps.}$$

$$Q_{\text{ALLOW}} = VA = 1.96 (1.10) = 2.16 \text{ CFS} \geq Q_{\text{DESIGN}}$$

OK

TOTAL DEPTH OF CHANNEL IS  $d_{\text{MAX}} + \text{FREEBOARD}$   
 $0.225 + 0.3 = 0.525$  USE 0.5'

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS  
 DESIGNED SEF DATE 6-3-81 CHECKED DWH DATE 6-5-81 FILE NO. 6014-162 SHEET 25 OF 25