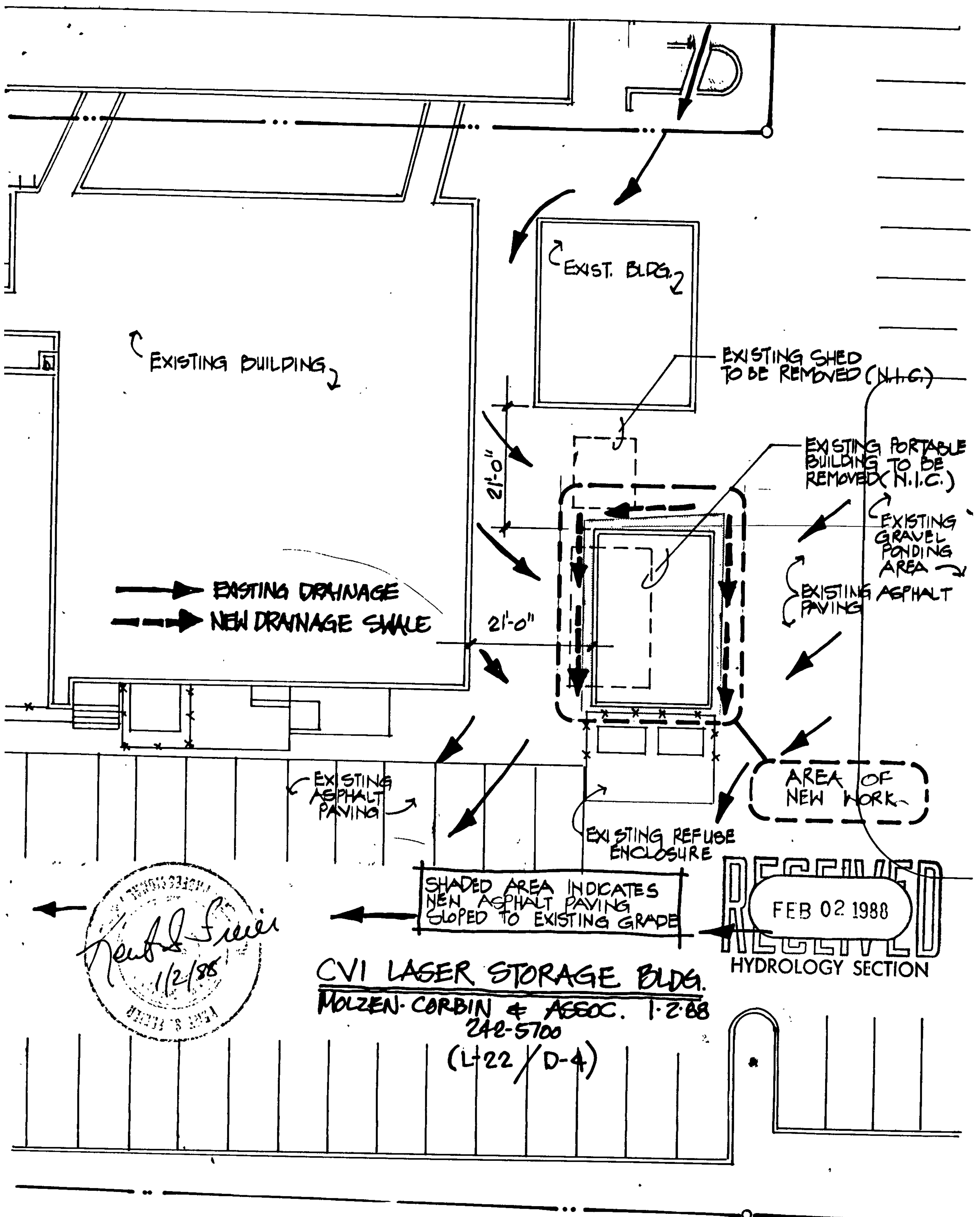
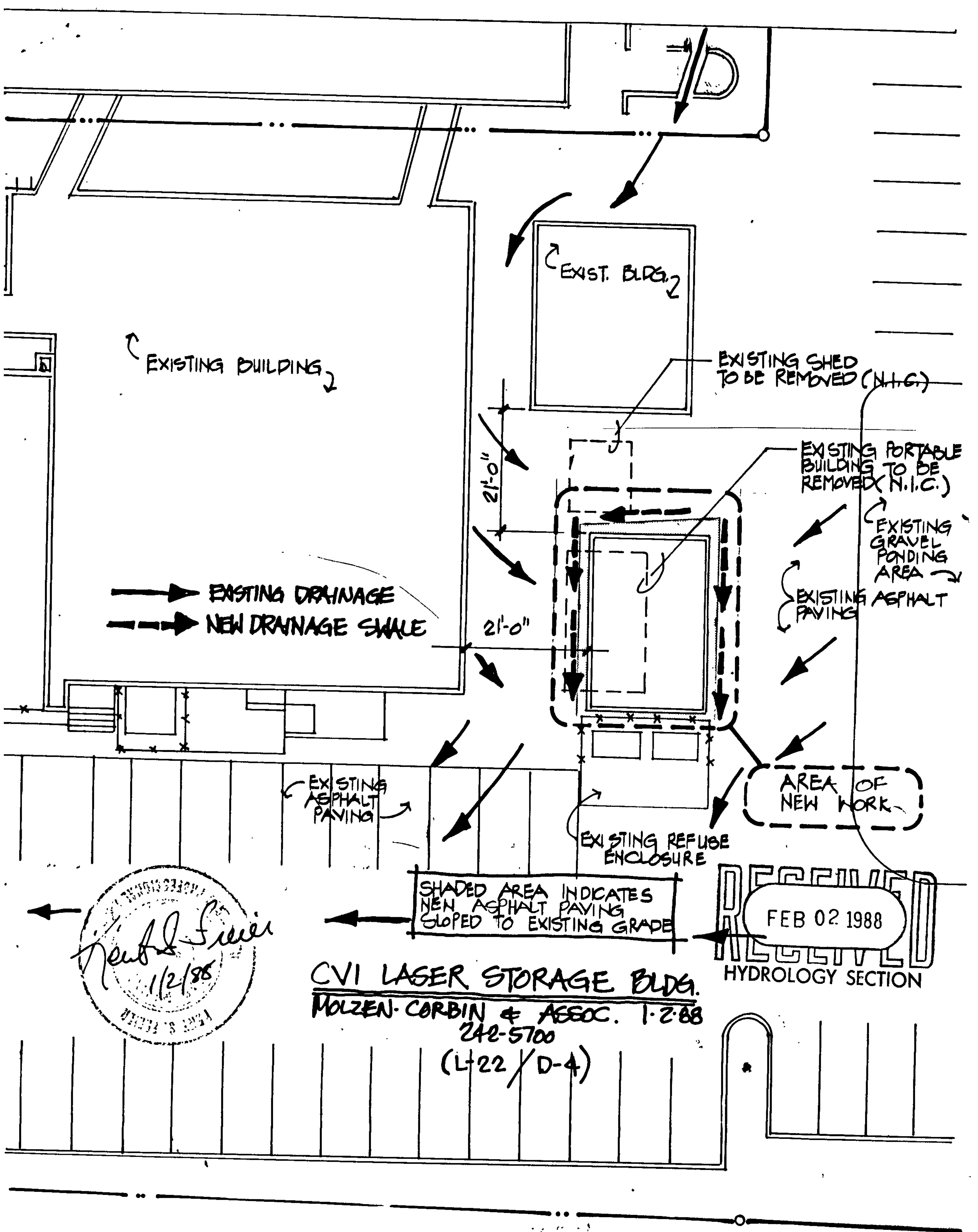






EXISTING BUILDING

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 PAVING

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

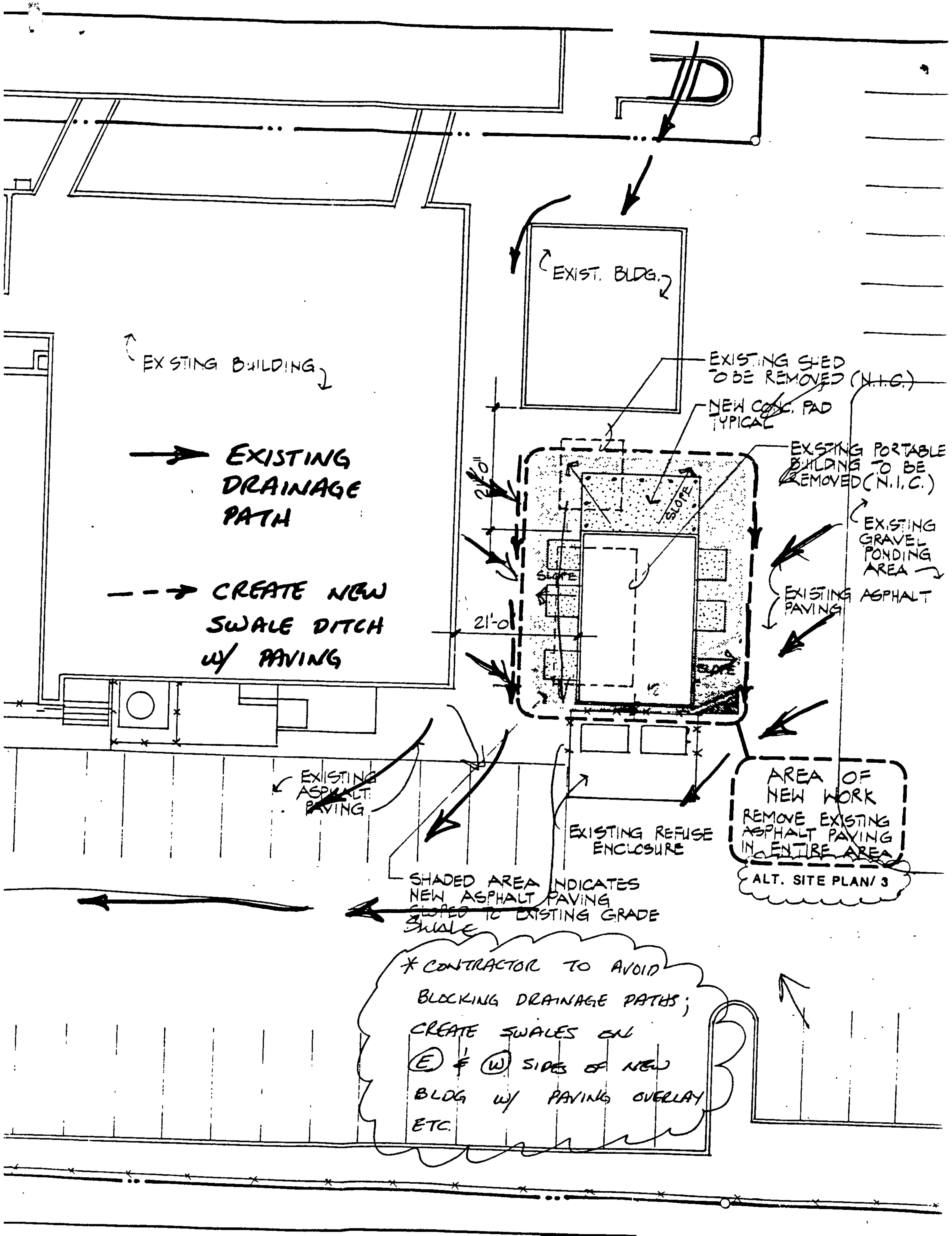
PUBLIC WORKS DEPARTMENT

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		C		
PART OF AN APPROVED REPORT	✓			
CONSTRUCTION PLANS ON MICRO-FILM	✓			
FIELD INSPECTION	✓			

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

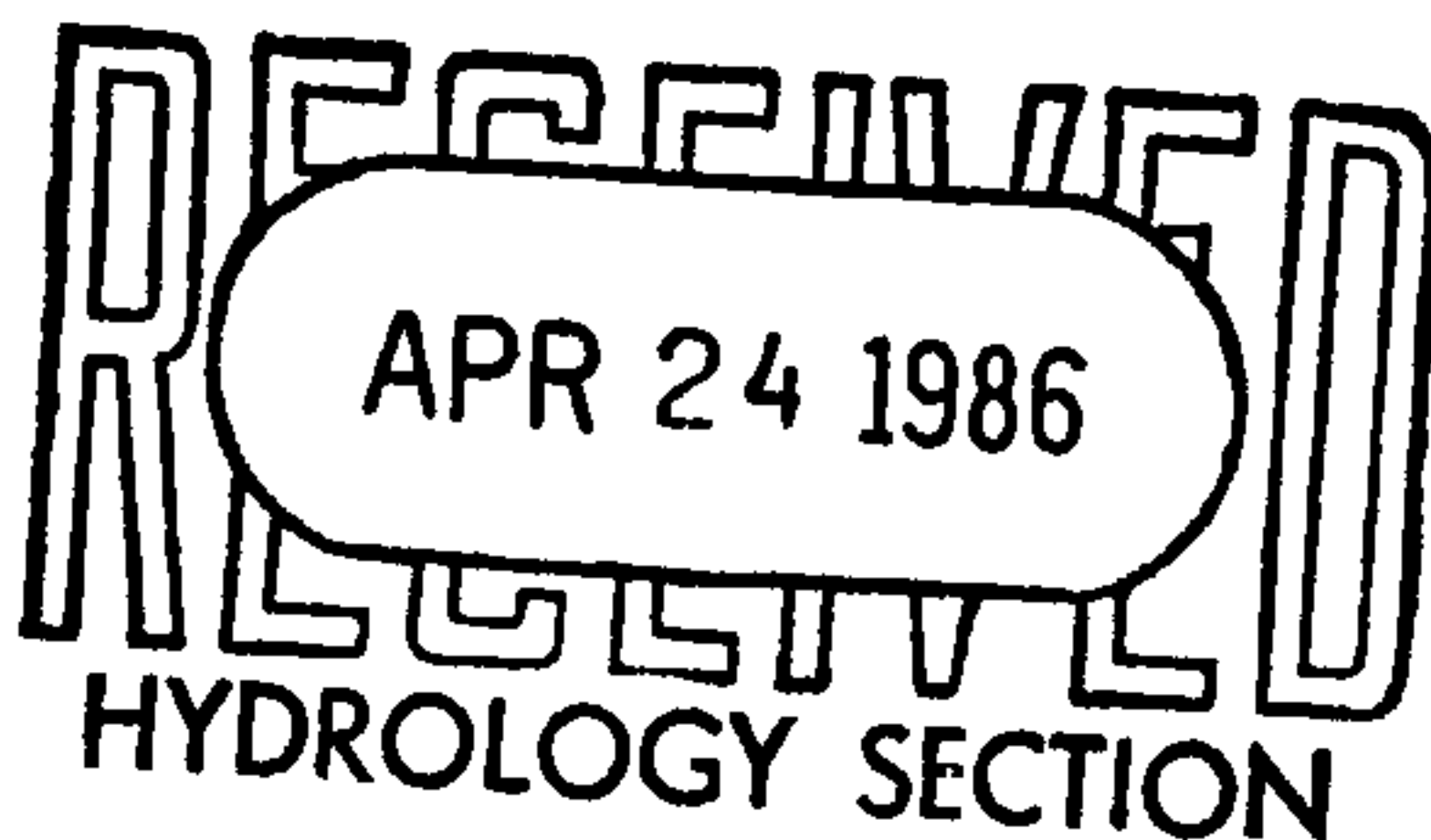
*Copy to
C.O.*

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: CLAYTON 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 PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

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

CHECK TYPE OF APPROVAL SOUGHT:

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

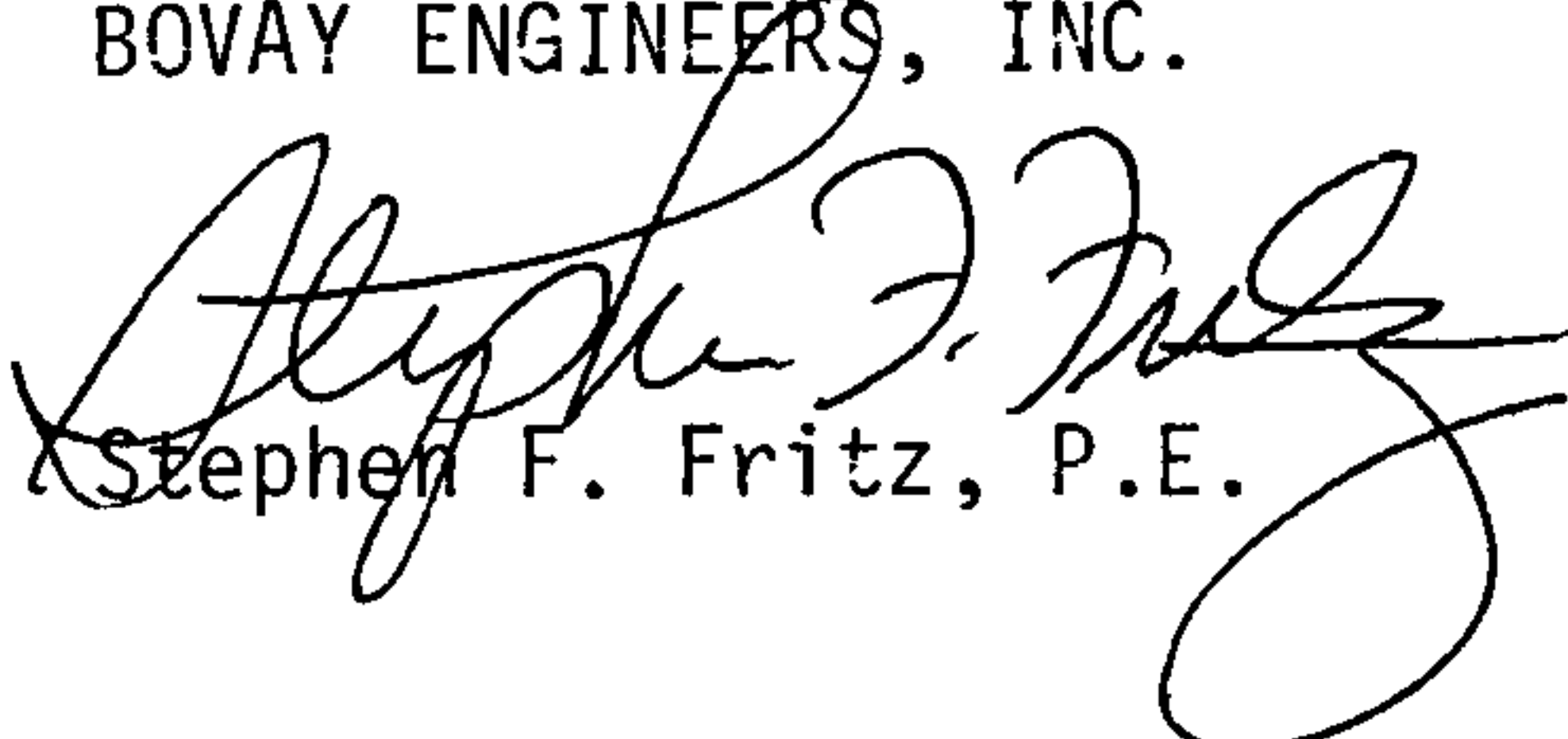
Dear Mr. Aguirre:

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
RECEIVED



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:

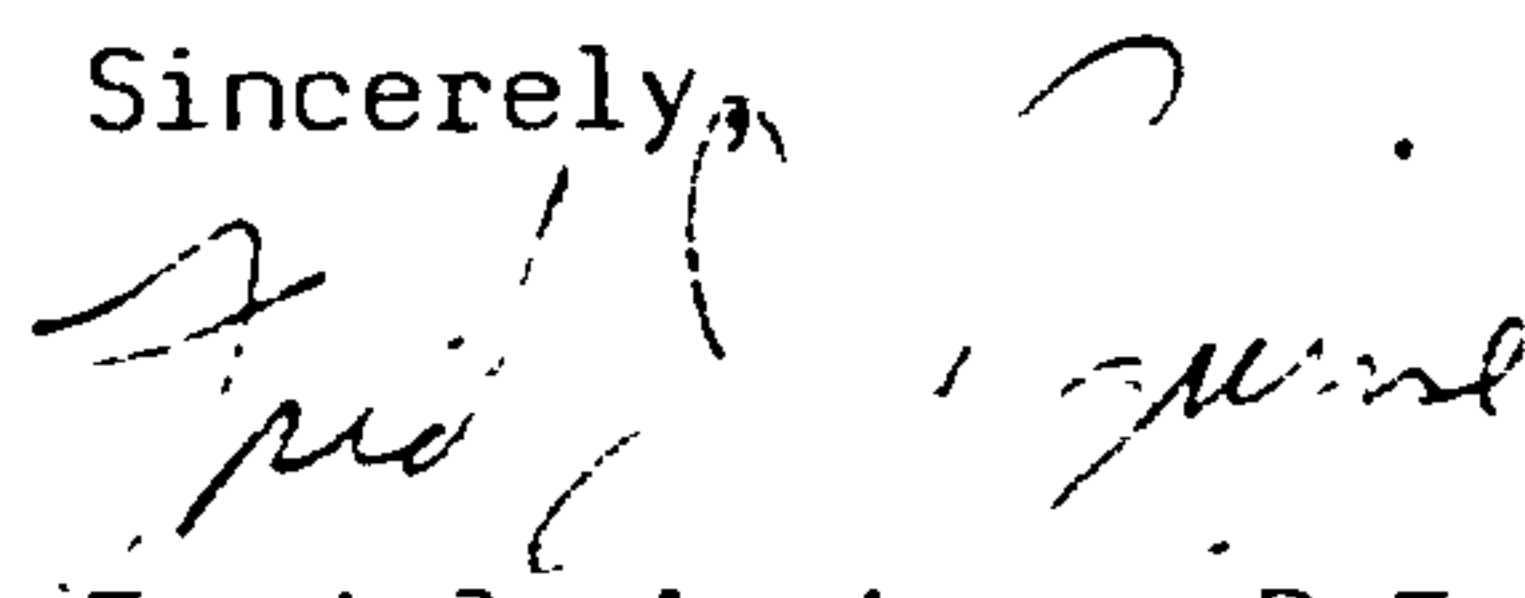
A review of our records indicates that this office has never given a final drainage approval at 180 Dorado Pl. S.E.. Further, I have noted that the building is being occupied without a Certificate of Occupancy which is contrary to Section 306 of the City Building Code.

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~~ ^{STORM} 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 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 ^{east of this} 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 ^{demonstrate} that ^{is balance} 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 ^{site} 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

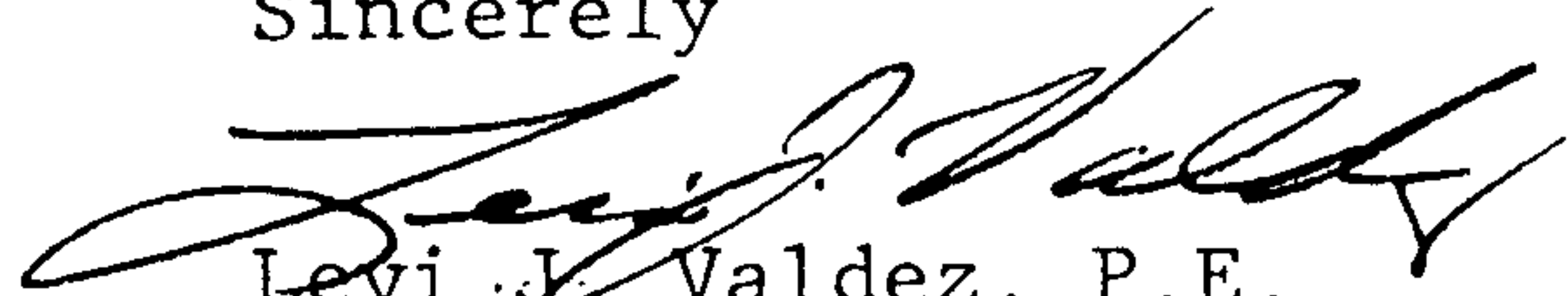
Re.: CVI Laser , Inc. Development Plan, Drainage
and Grading Plan

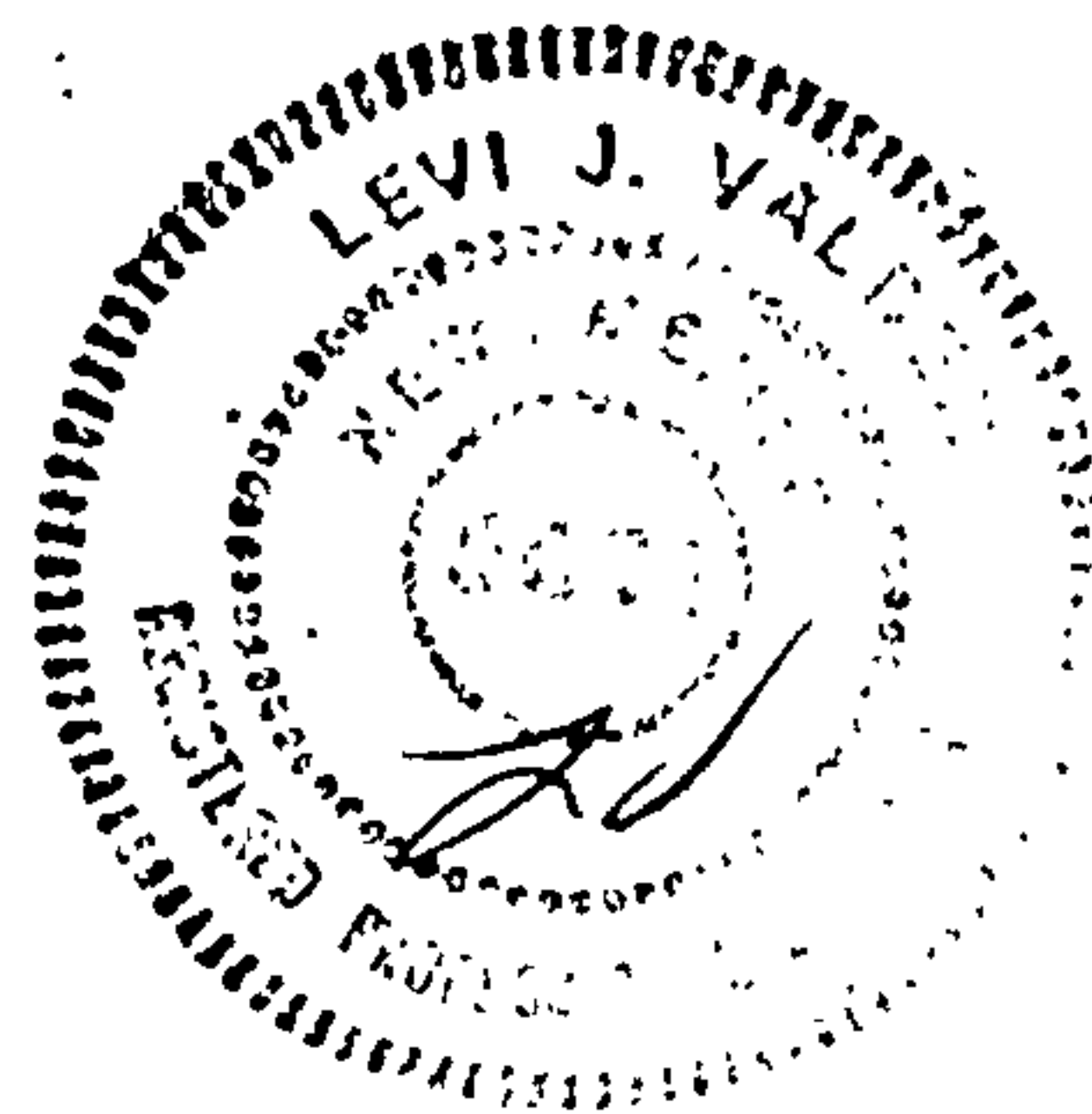
Dear Bob:

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:

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

$$\begin{aligned} \text{Impervious Area} &= \text{PK Lot} = 17114 \text{ s.f.} \\ &+ \text{Roof} = 6500 \text{ s.f.} \\ &+ \text{Sidewalk} = 40 \text{ s.f.} \\ &\underline{\hspace{1.5cm}} \\ &23,654 \text{ s.f.} \end{aligned}$$

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

$$C_I = 0.90$$

$$C_P = 0.40$$

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

$$\Delta H = 16'$$

$$L = 500' \pm$$

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

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

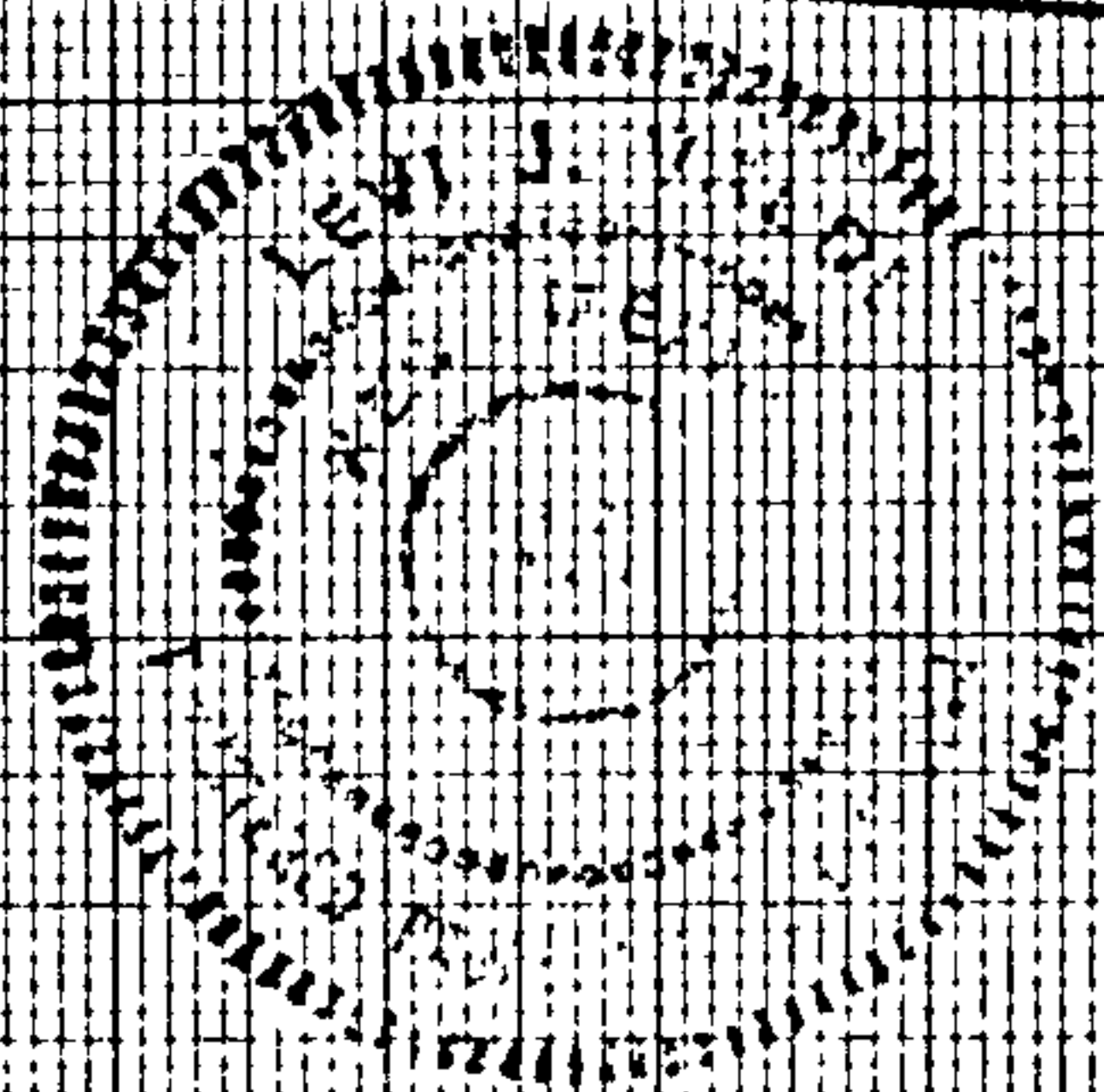
$$Q_I = 1.266 \text{ c.f.s.}$$

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

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

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

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



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.

$$Q = CIA = 0.90 \times 2.6 \times 90,000 = 4,834 \text{ c.f.s.}$$

$$\text{Volume} = 4,834 \times 3600 = 17,402 \text{ ft}^3$$

Undeveloped or Landscaped Areas:

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

$$C = 0.40$$

$$Q_L = CIA = 0.40 \times 2.6 \times 127,800 = 3,051 \text{ c.f.s.}$$

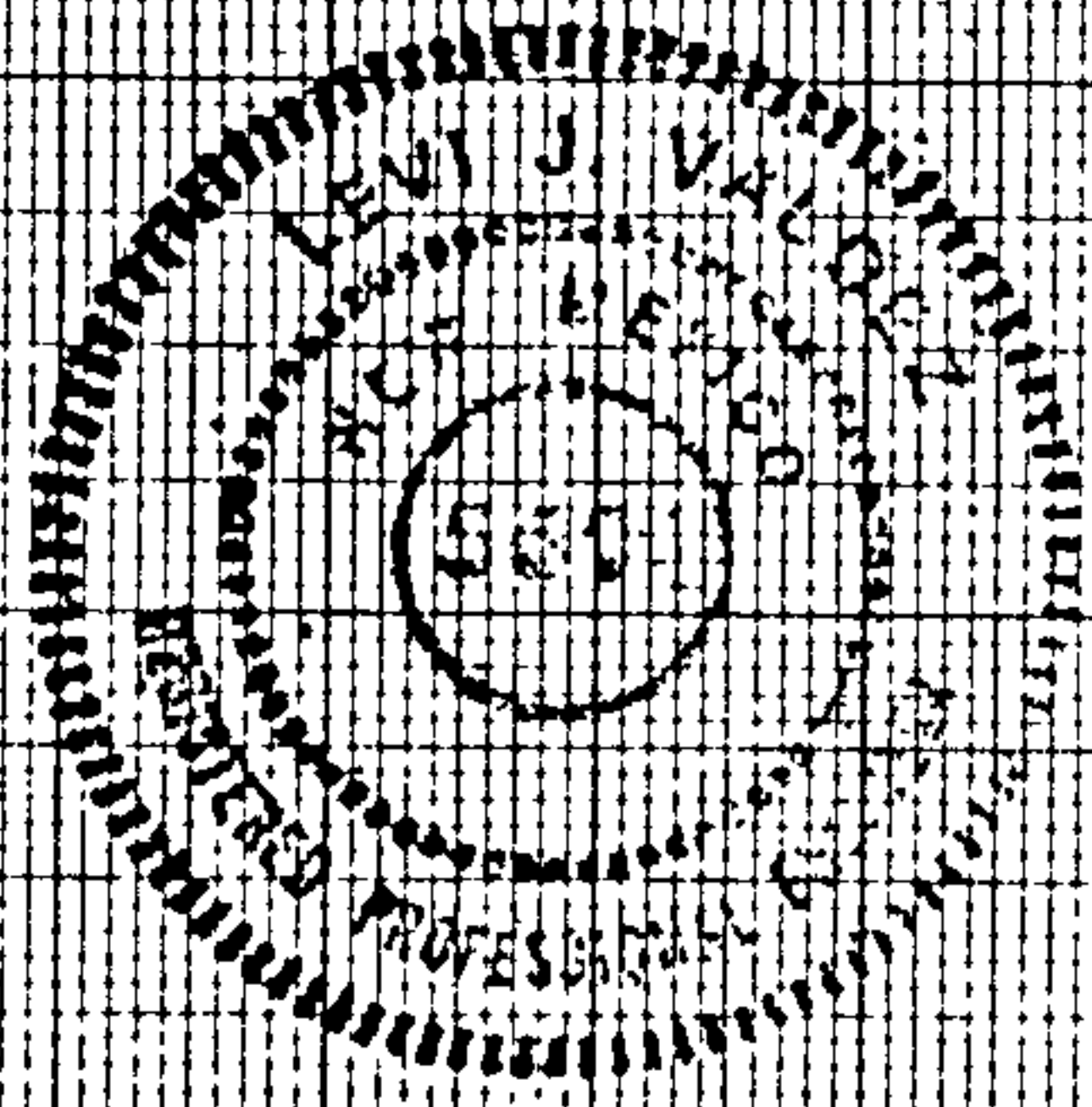
$$\text{Volume} = 3,051 \times 3600 = 10,984 \text{ ft}^3$$

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

III Conclusion:

Total Volume of Ponding Needed =

$$28,386 \text{ ft}^3 - 21,245 \text{ ft}^3 = 7,141 \text{ ft}^3$$



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

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

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

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

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

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

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

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

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

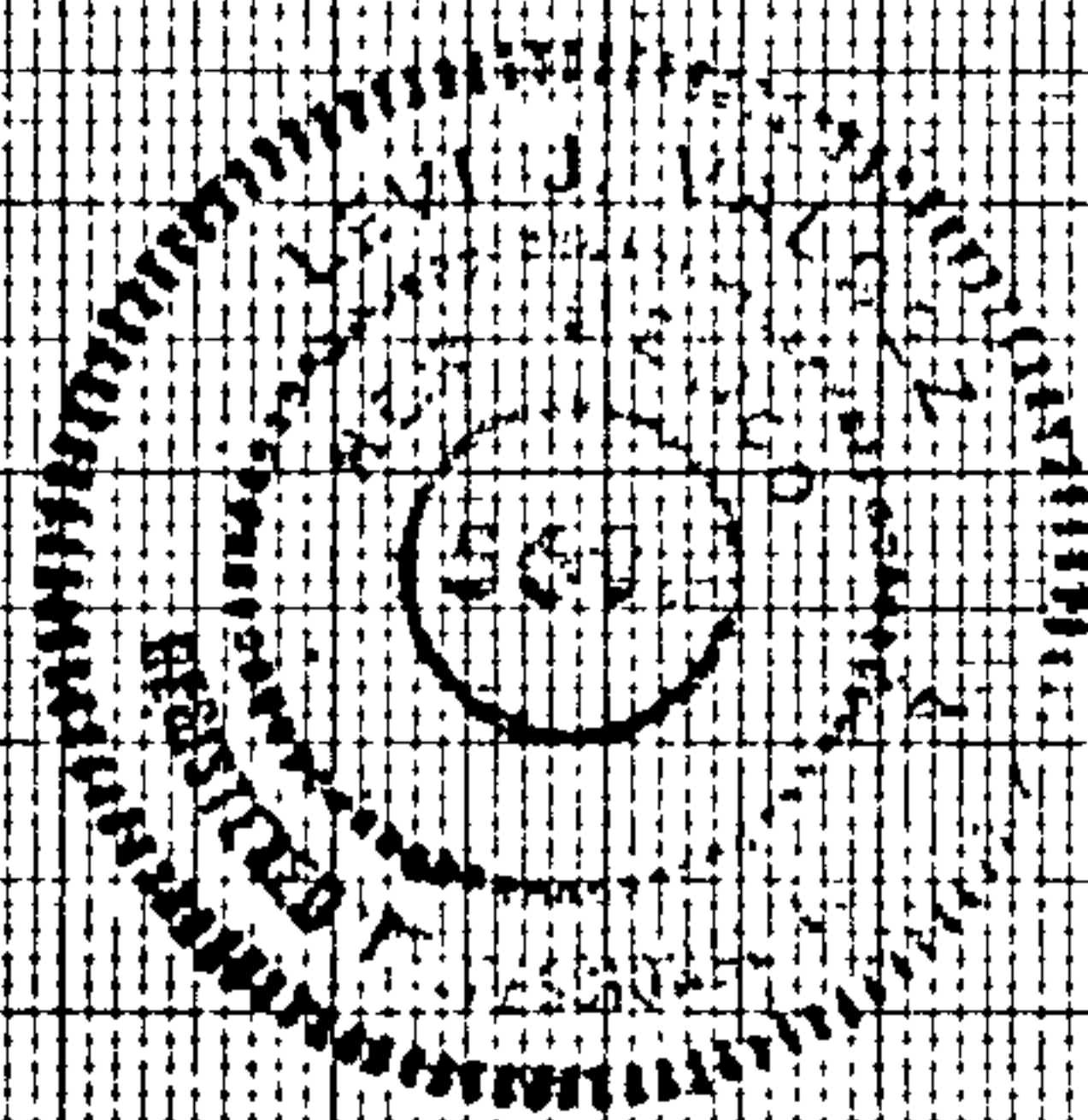
$$\text{Ponding Vol. } (V_9) = 70 \times 14 = 980 \text{ ft}^3$$

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

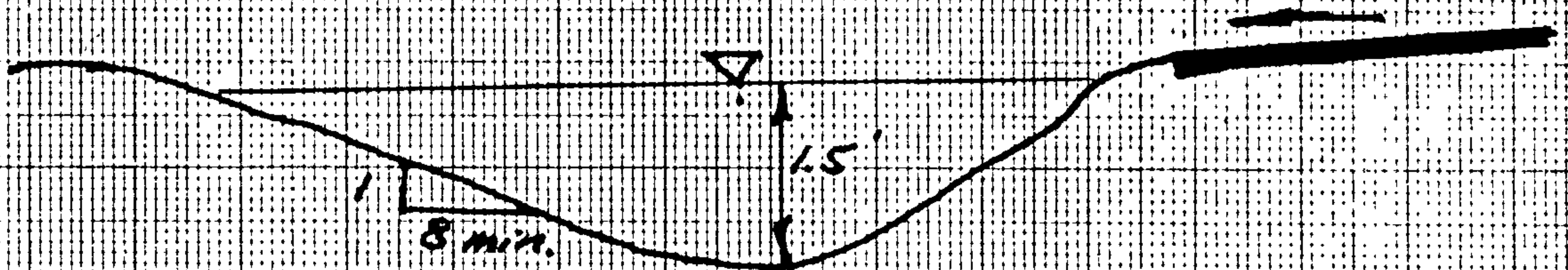
$$\text{Ponding Vol. } (V_{11}) = 15 \times 80 = 1200 \text{ ft}^3$$

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

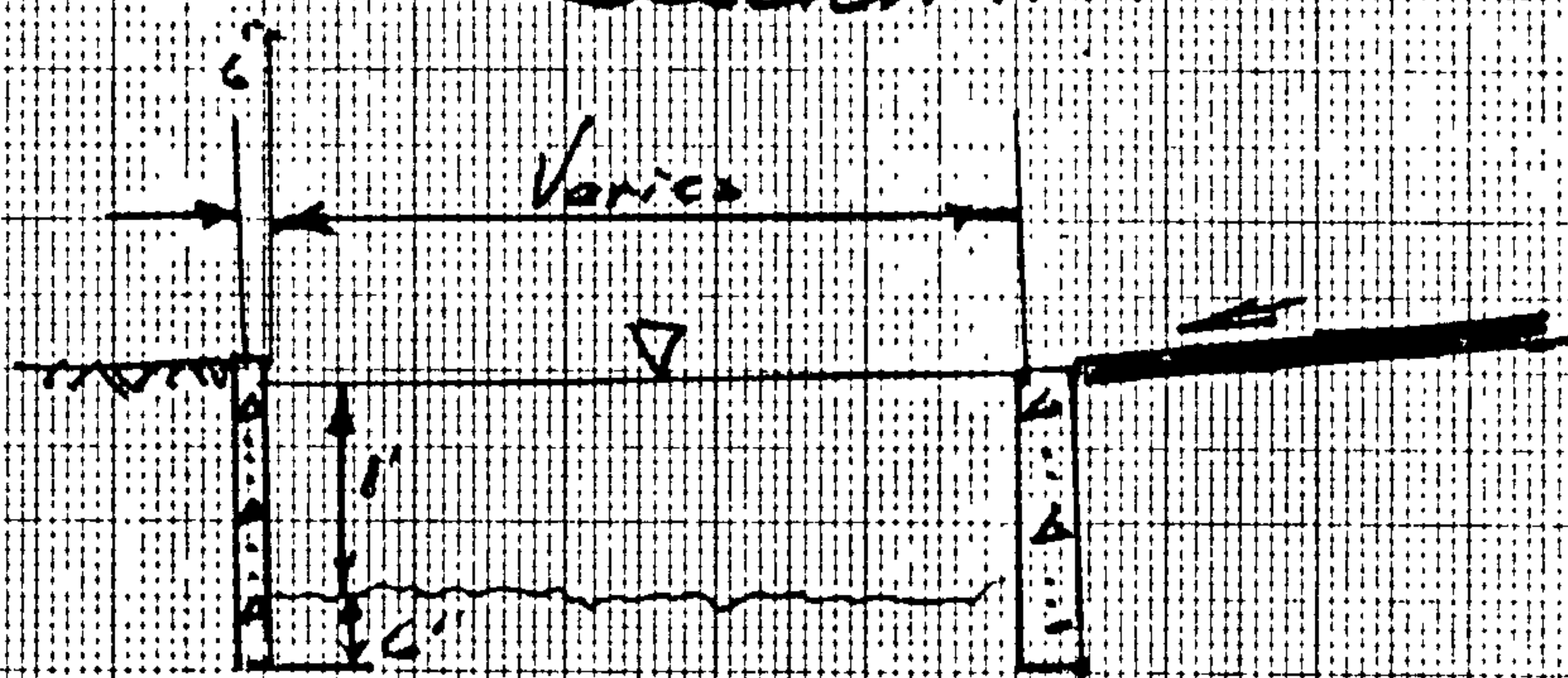
$$\boxed{\text{Total Vol.} = 29649 \text{ ft}^3}$$



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:

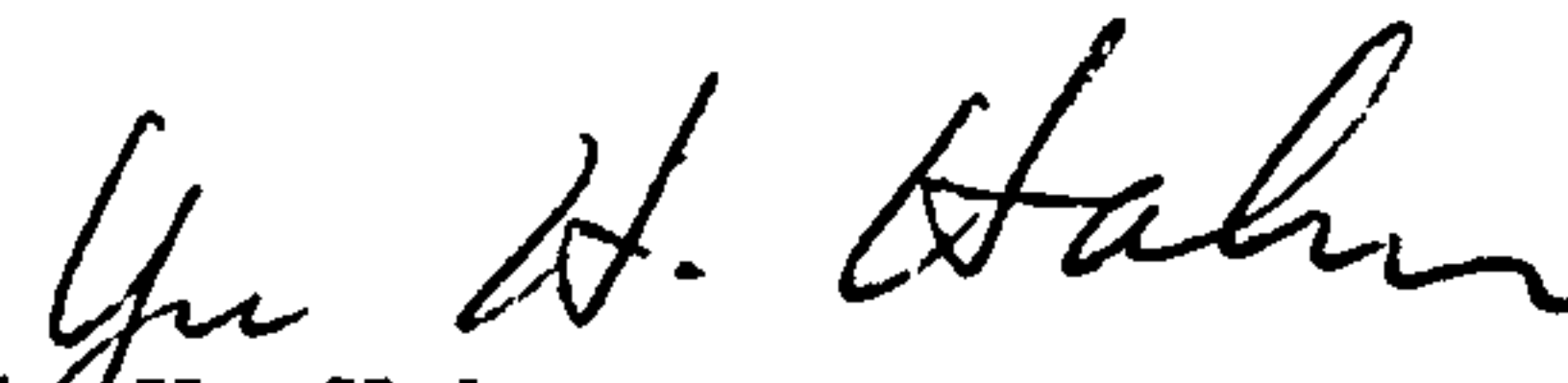
We have conferred with the architect on the above referenced project and offer the following information to clarify our position on the current problem.

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,


Yon 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



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Introduction	1
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Developed Conditions	2 - 4
Calculations	5 - 6
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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.

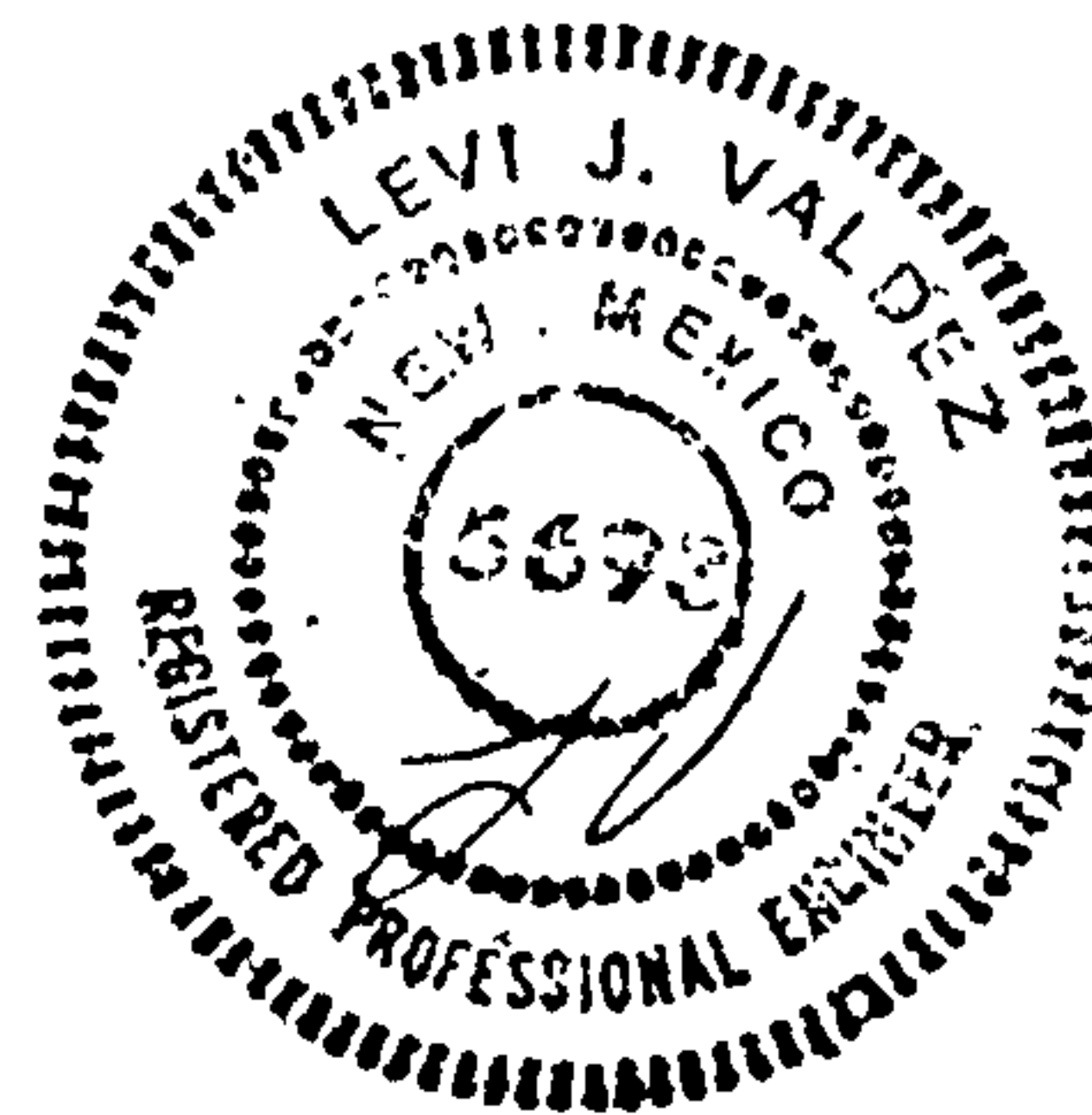
Side Slopes = 3:1

Q = 3.74

Water Depth = 0.50 ft.

Reference - Nomograph for flow in Triangular
Channels Chart No. 29, page 37.

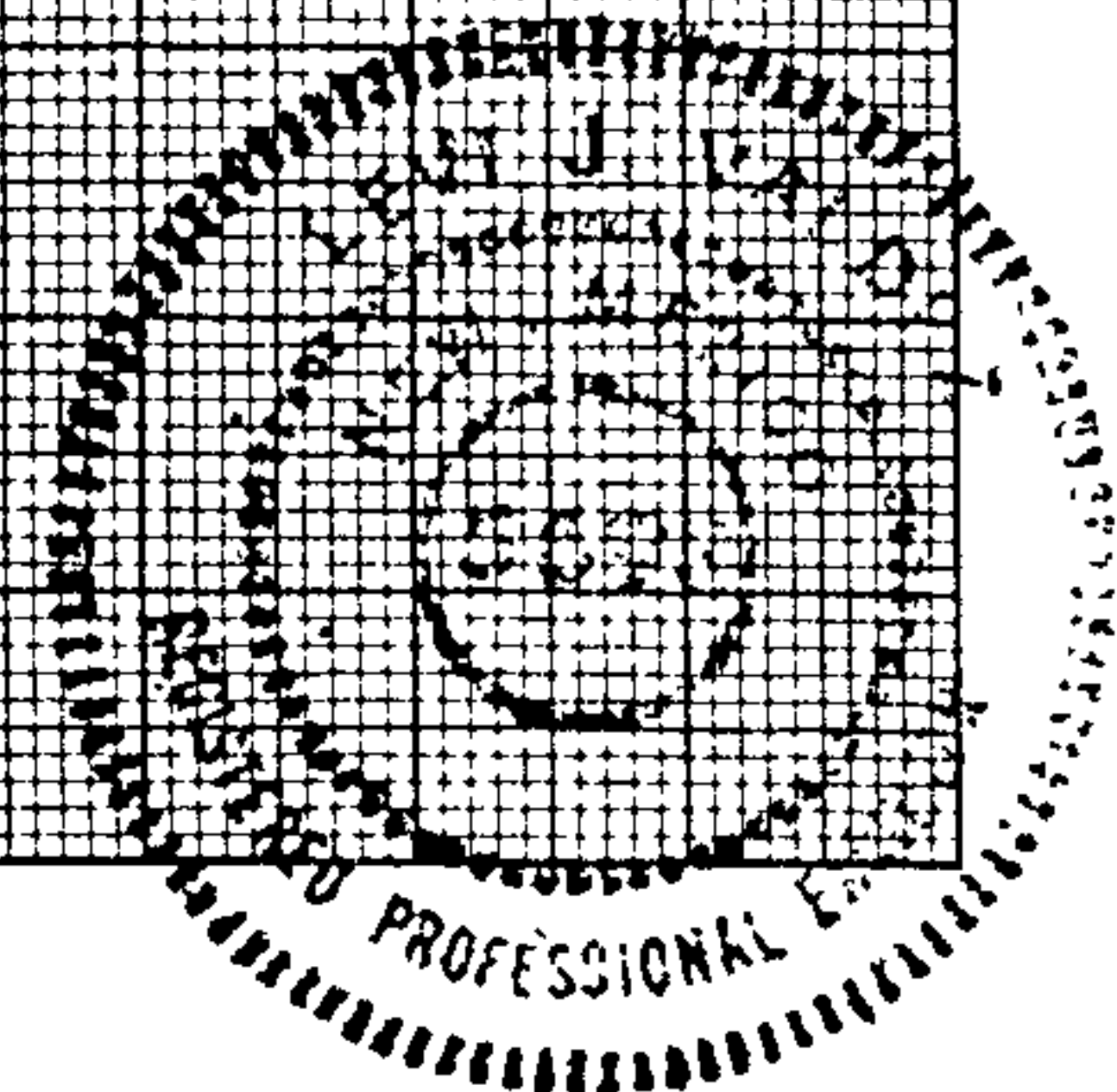
Design for open channel flow, Hydraulic Design
Series No. 3

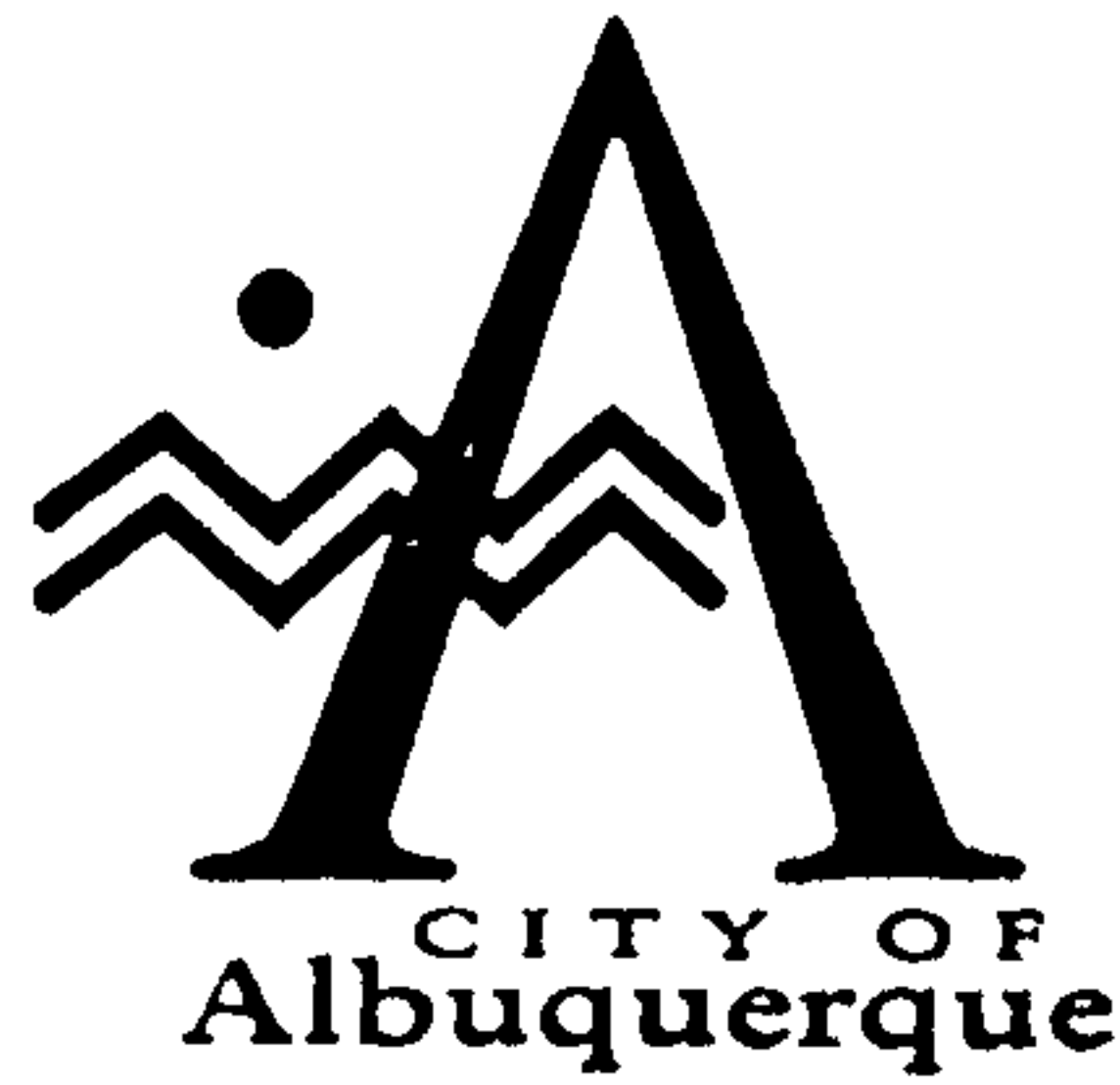


7


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

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.**

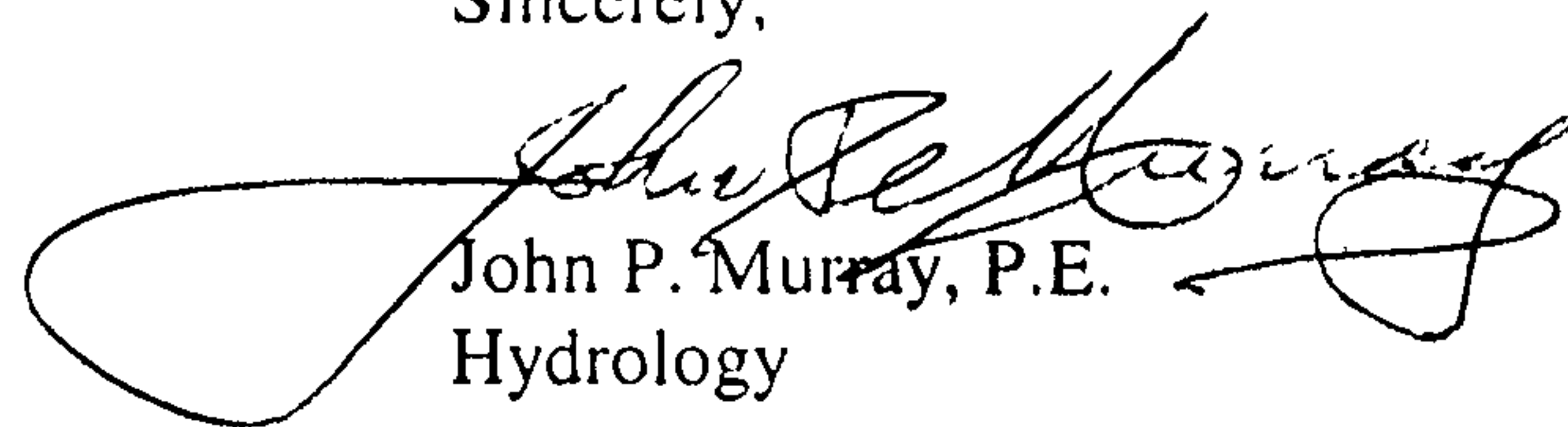
Dear Mr. Mann:

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:

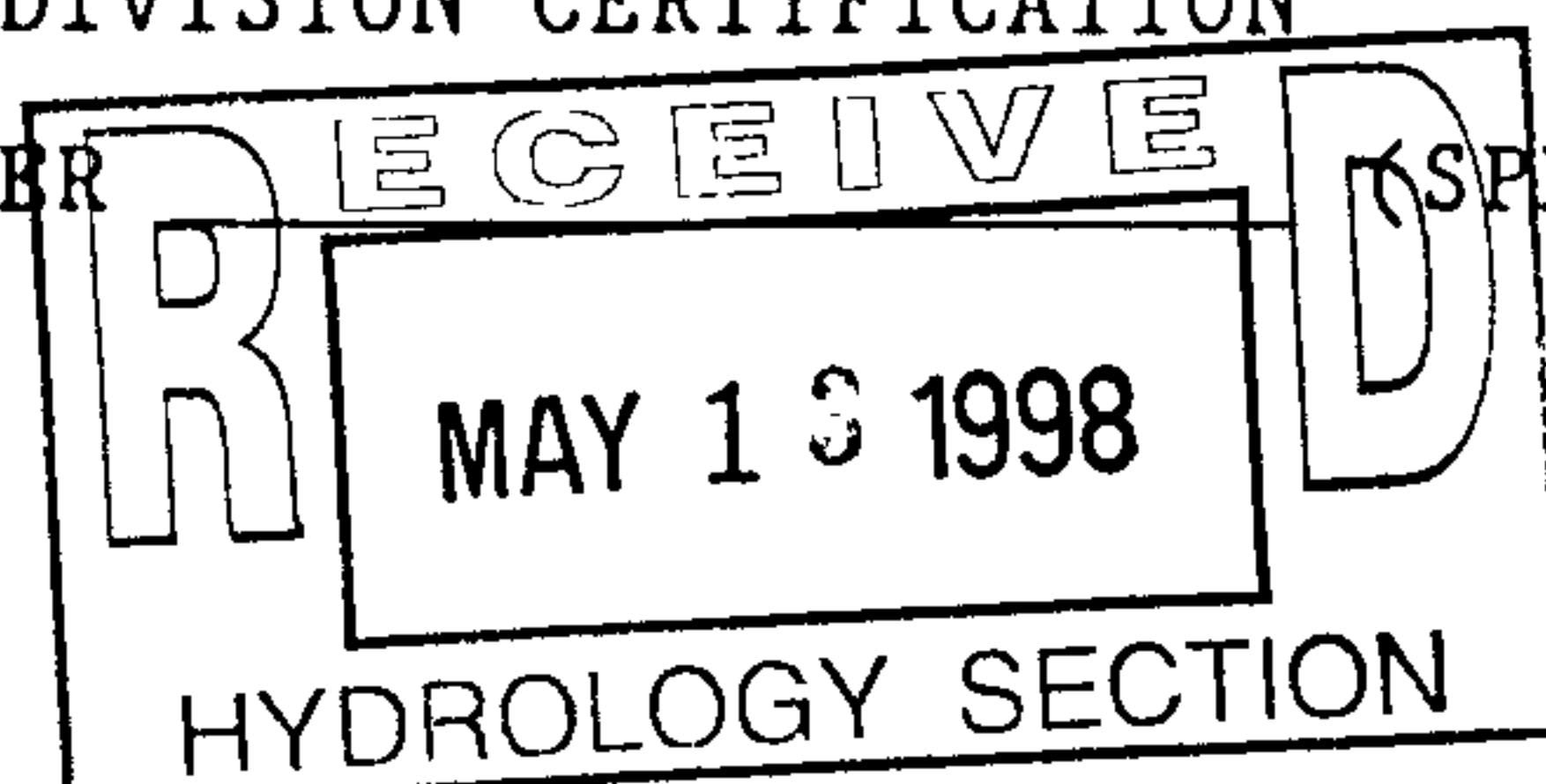
____ YES
☒ NO
 ____ COPY PROVIDED

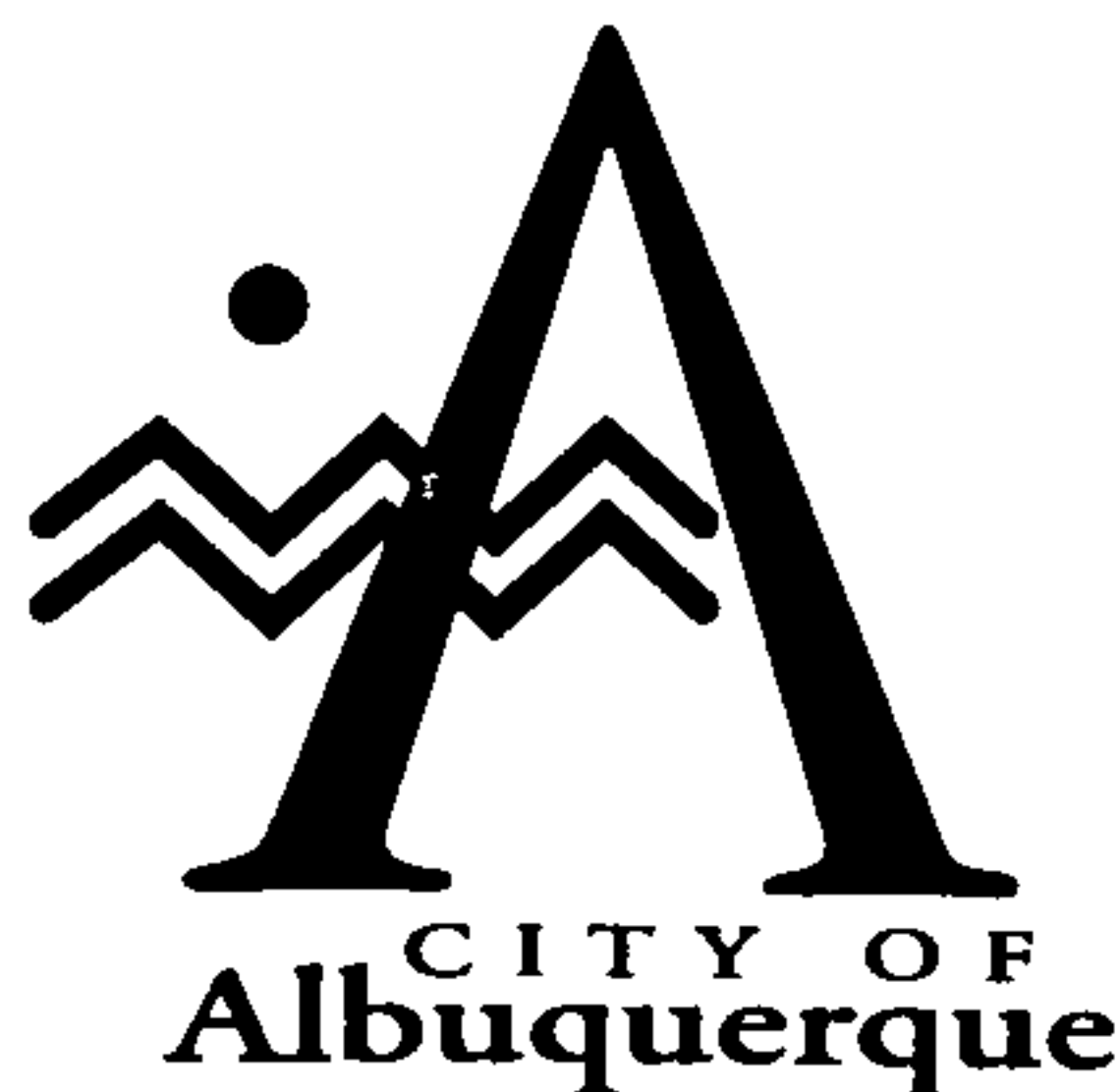
CHECK TYPE OF APPROVAL SOUGHT:

____ 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 87192 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

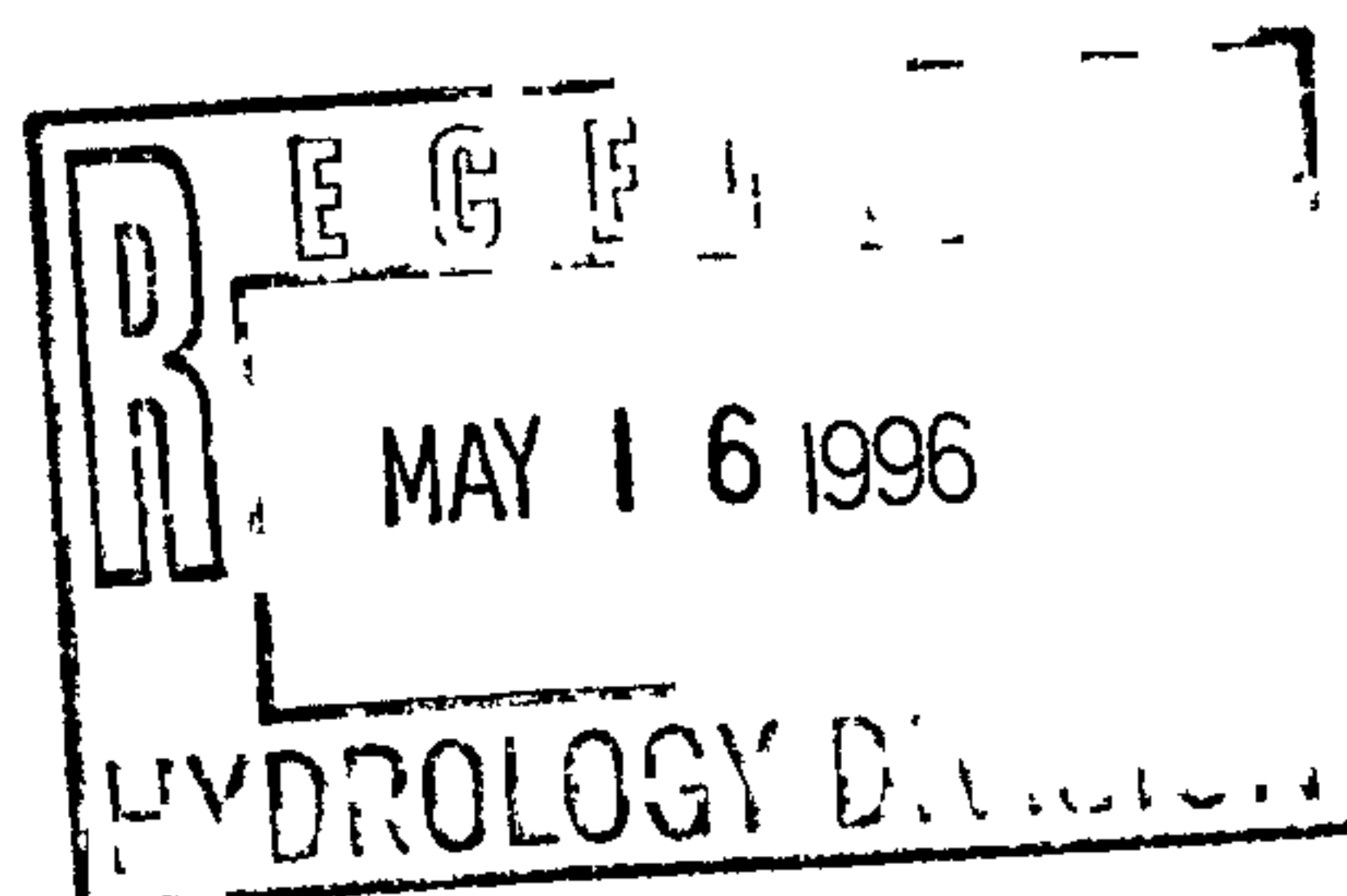
CHECK TYPE OF APPROVAL SOUGHT:

- ☐ 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.

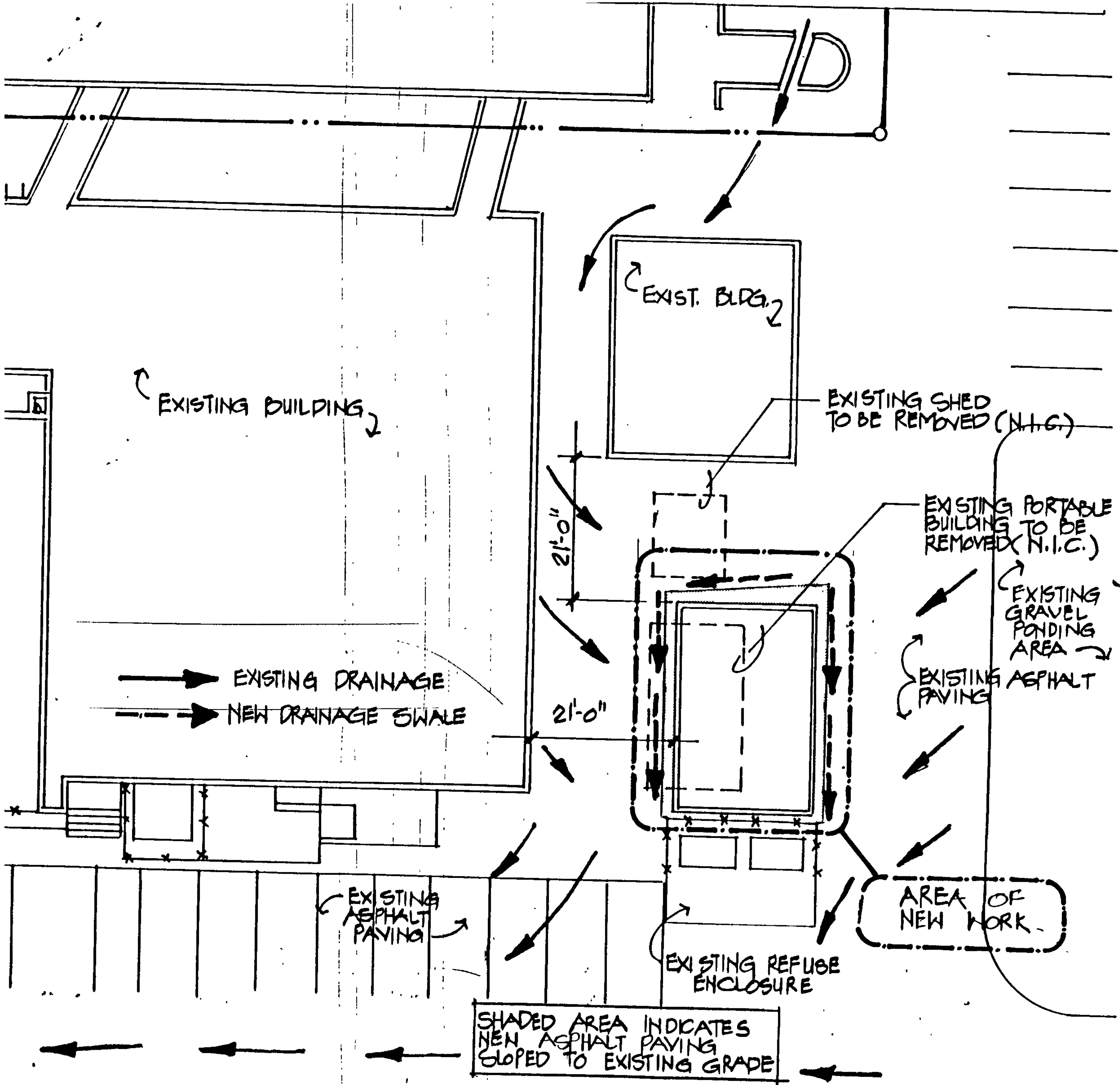
GSR

COPY TO

SIGNED:

Janet E Lacy

File
L22-04



DRAINAGE REPORT
FOR THE

CVI LASER CORPORATION
SITE

PREPARED FOR

CVI LASER CORPORATION

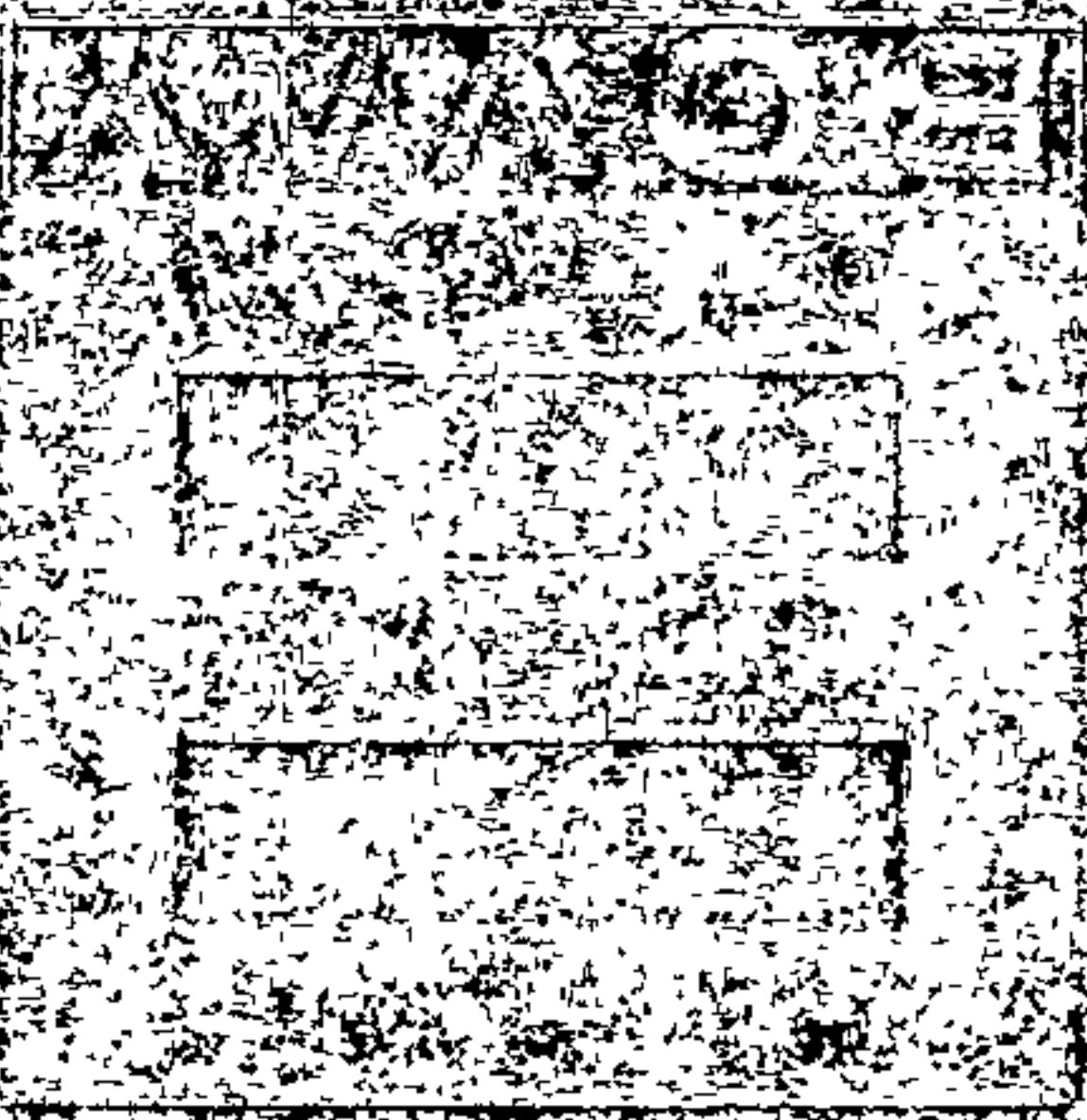
200 DORADO PLACE

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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DATED APRIL 30, 1979	
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LOCATION AND PLOT OF CROSS SECTIONS ALONG COCHITI ROAD	
TAB 3	
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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.

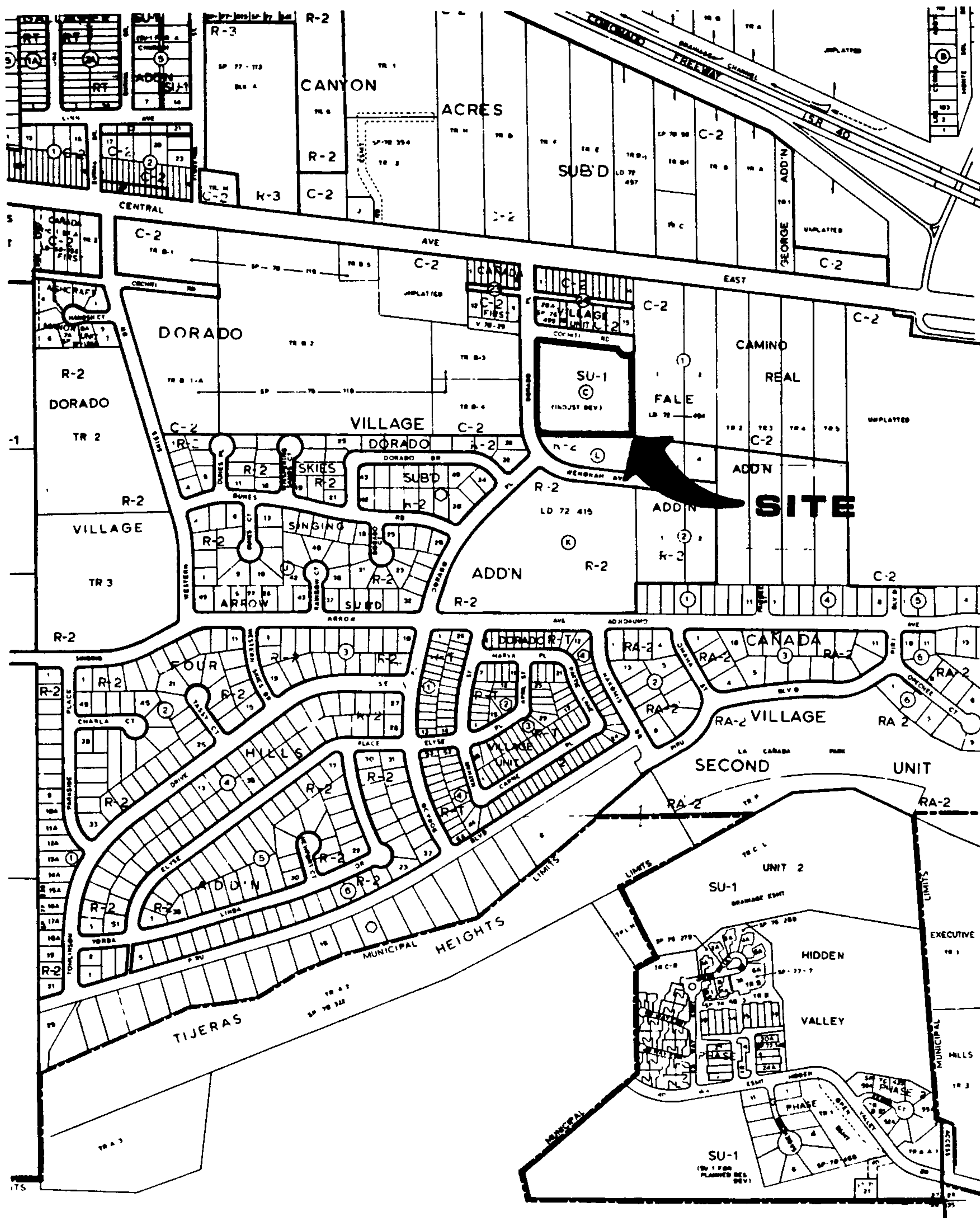
PROJECT LOCATION AND DESCRIPTION

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.

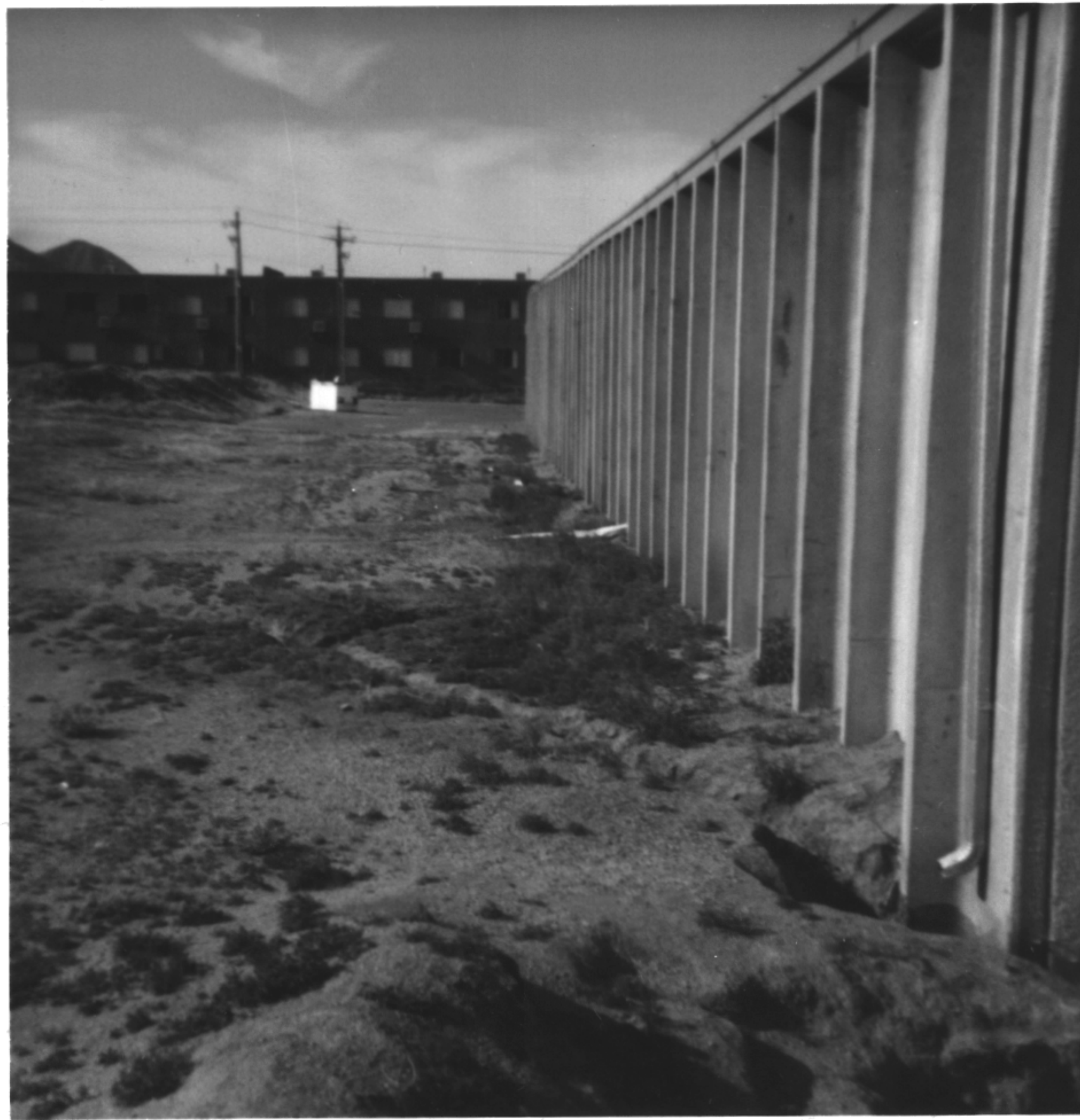


Photo 3: Looking south along back of second building at erosion from roof drains.

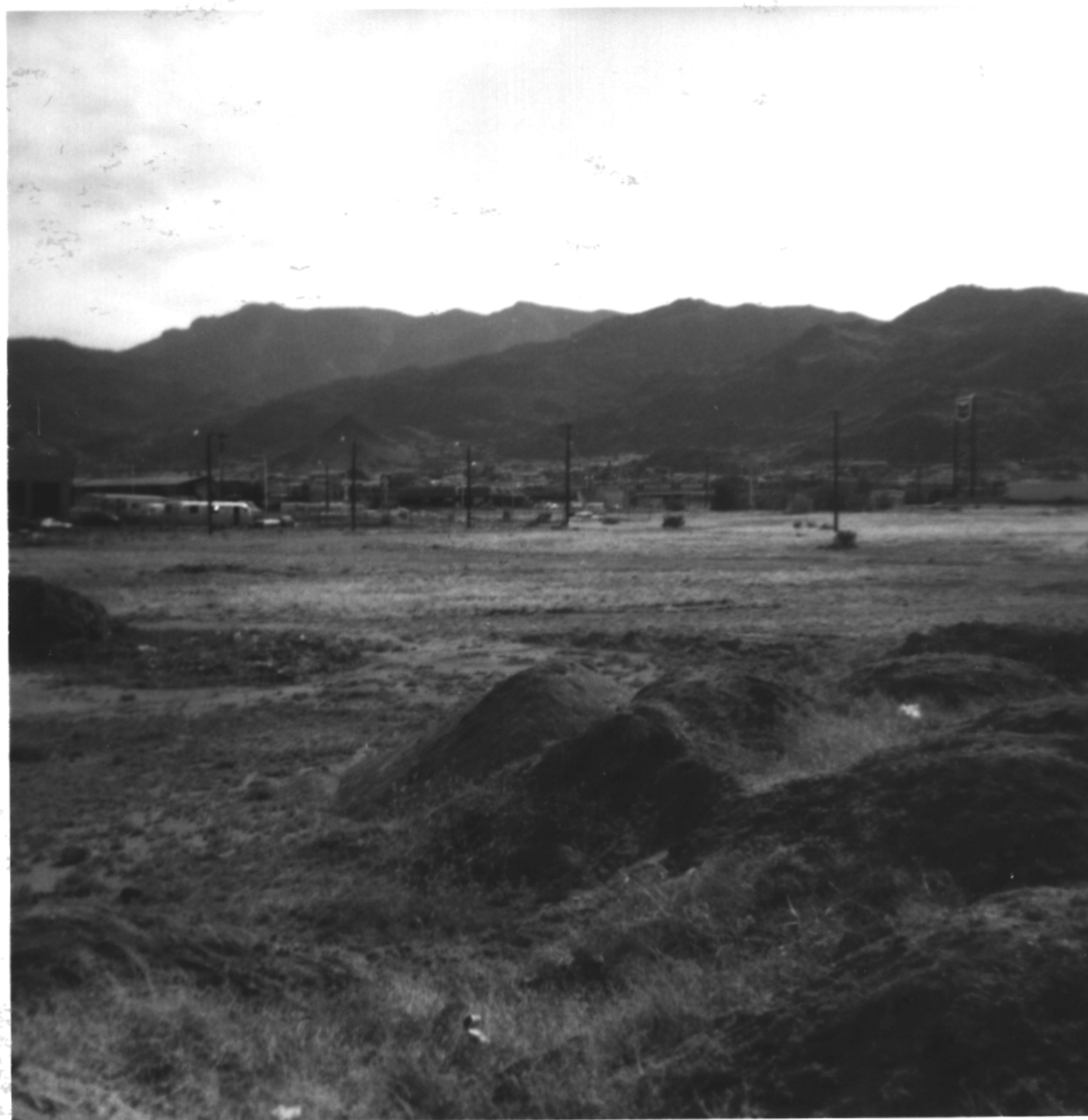


Photo 4: Looking ENE across undeveloped portion of Lot C-1 and at off-site drainage area.

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

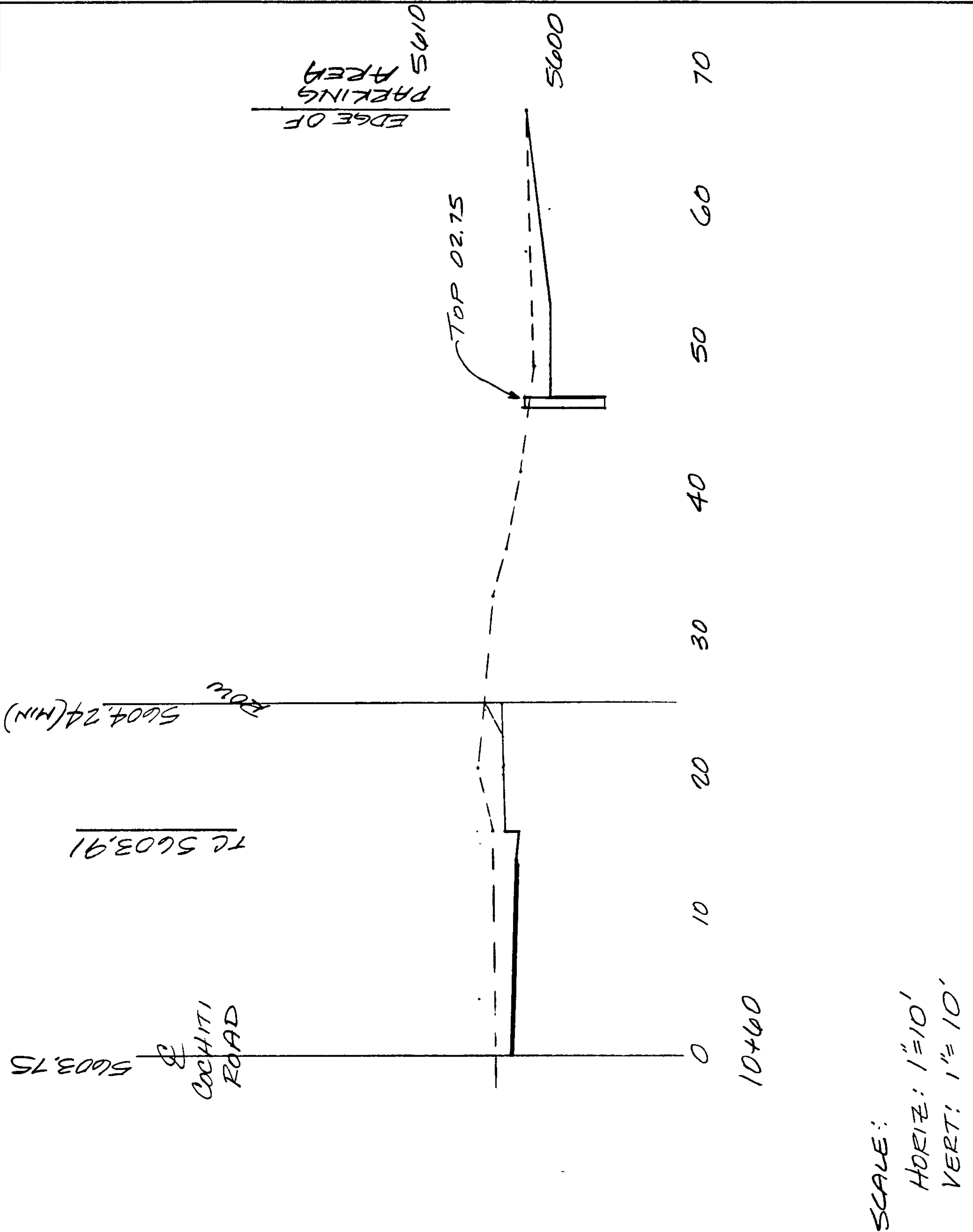
BC/ms

cc - Richard Heller, City Engineer

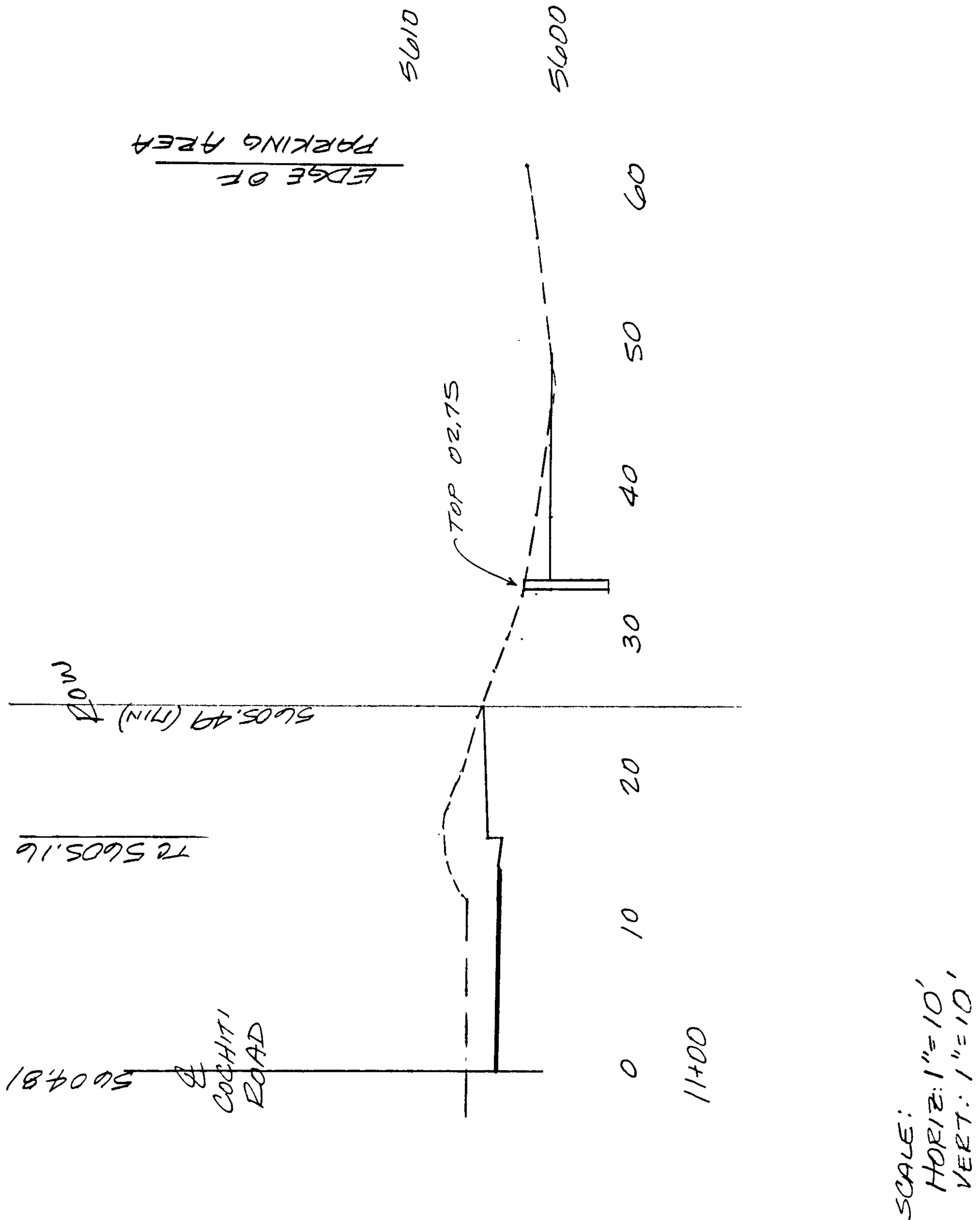
Bob Kielich, Design

Rich Leonard, AMAECAN EQUAL OPPORTUNITY EMPLOYER

Drainage File

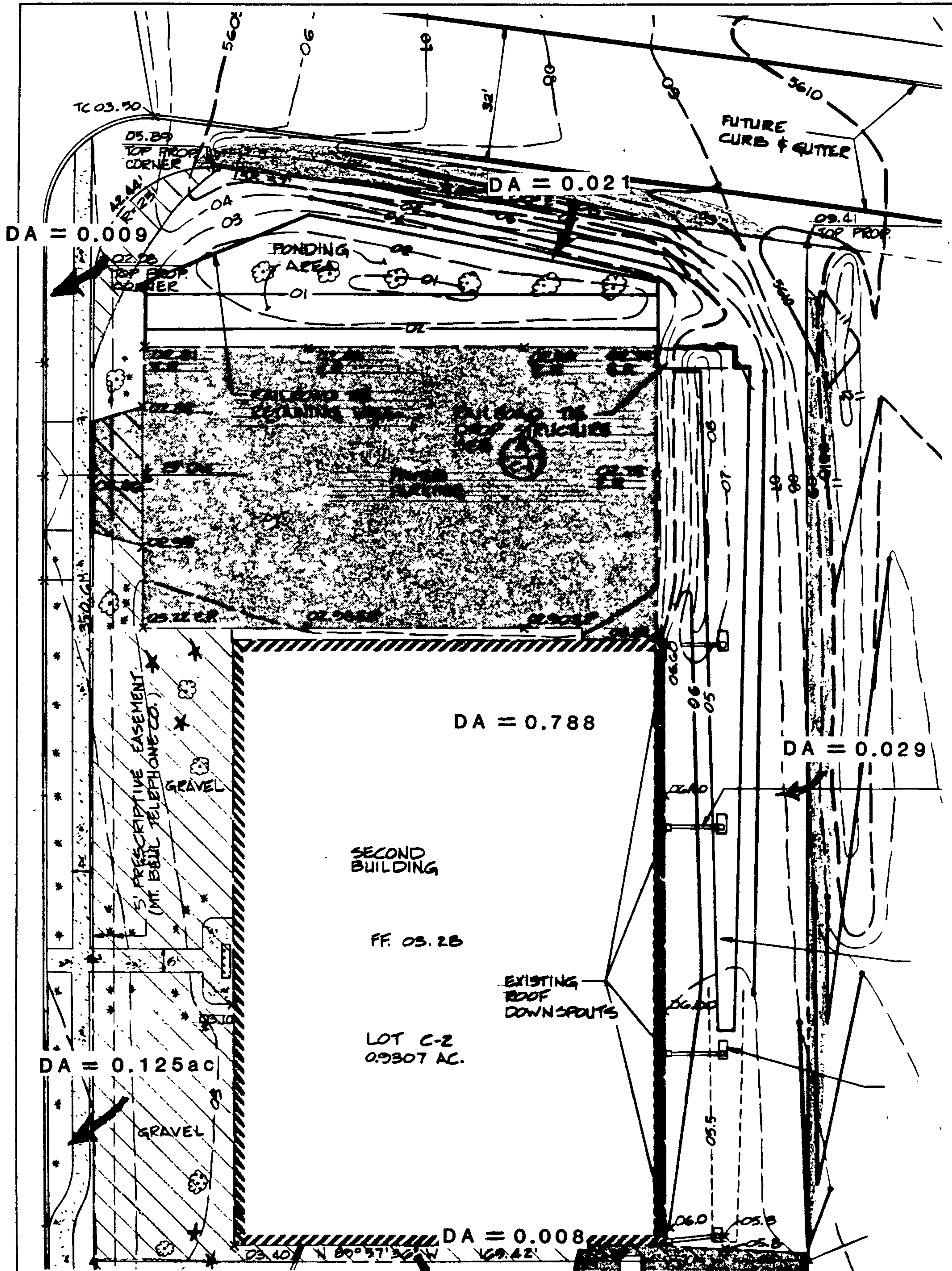


FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT SKETCH
 DESIGNED SFP DATE 6-3-81 CHECKED _____ DATE _____ FILE NO 6014-168 SHEET 1 OF 2

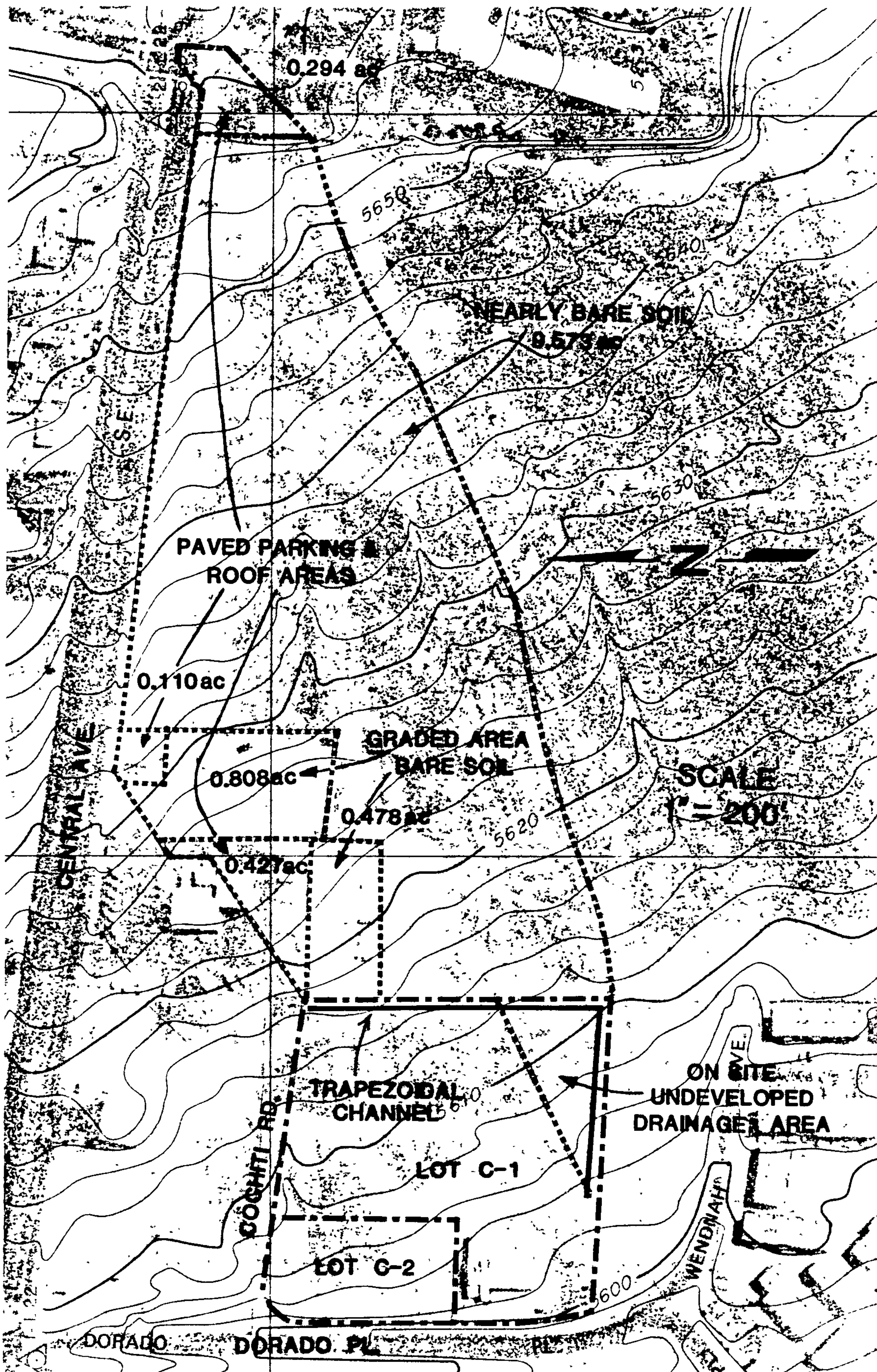


SCALE:
HORIZ: 1"=10'
VERT: 1"=10'

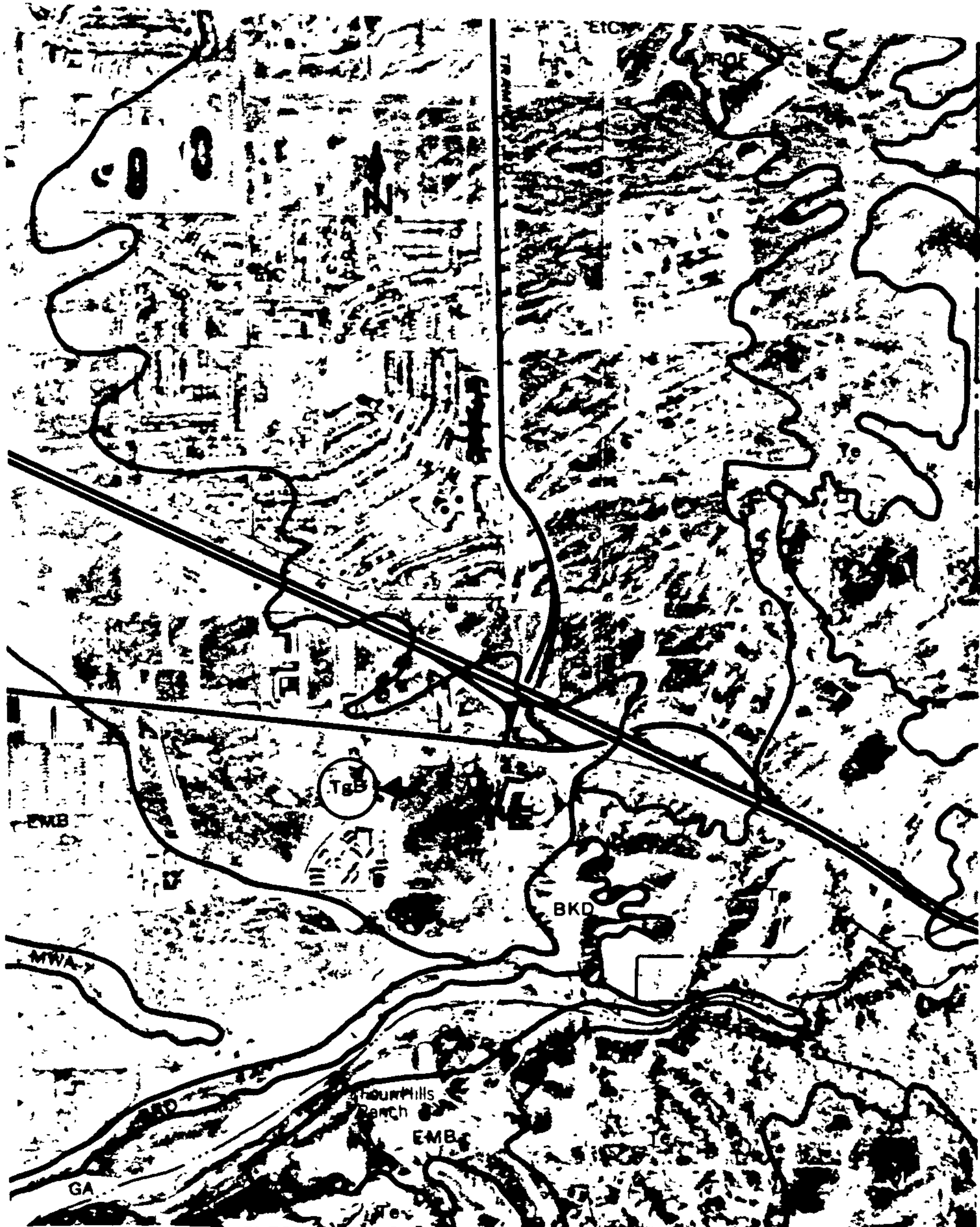
FOR CUI LASER CORP DESCRIPTION DRAINAGE REPORT SKETCH
DESIGNED SFF DATE 6-3-81 CHECKED _____ DATE _____ FILE NO. 6014-168 SHEET 2 OF 3



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

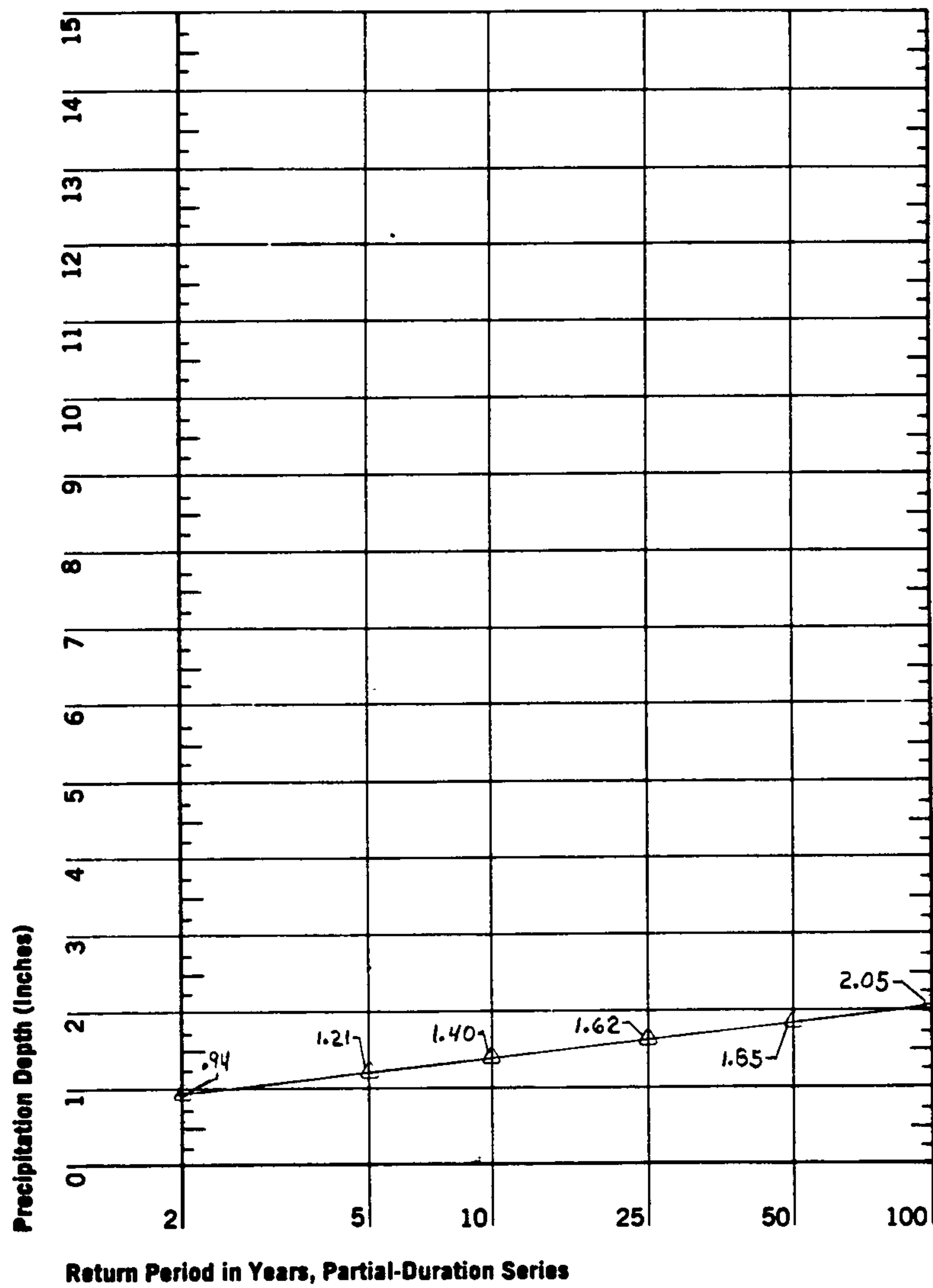
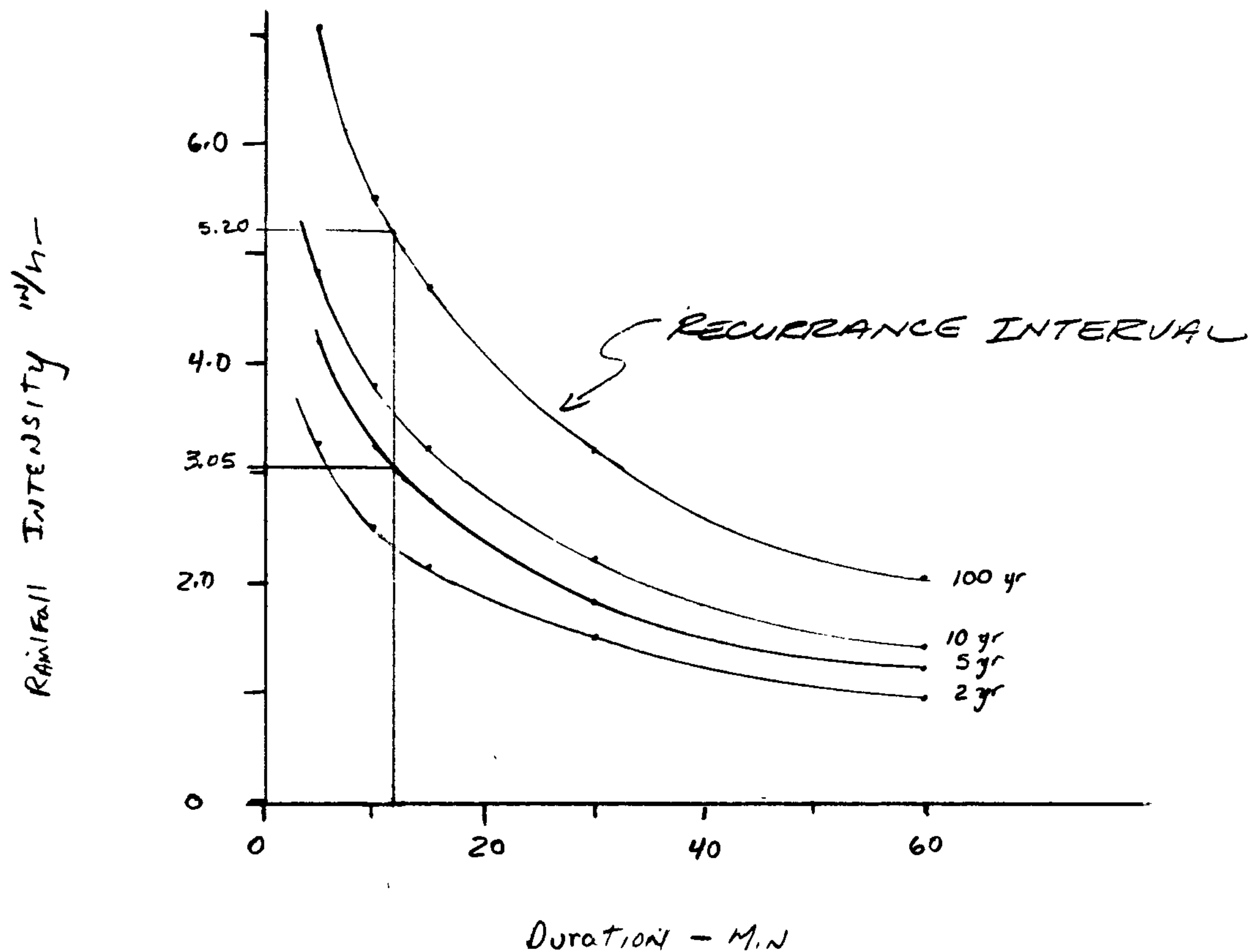


Figure 6. Precipitation depth versus return period for partial-duration series.

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 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 AREA	5602.75	5716	
			2741 cu ft.

DETERMINE WEIGHTED RUNOFF COEFFICIENT FOR LOT C-2 - DEVELOPED

A Area (sq ft)	C factor	AC	Description
7,830	.95	7439.	PAVED PARKING AREA
5,790	.95	5501.	GRAVEL LANDSCAPED 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

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

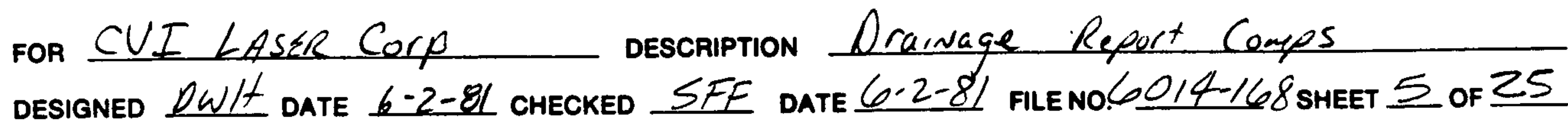
DETERMINE REQUIRED PONDING VOLUME FOR LOT C-2 (100YR DEVELOPED VOLUME - 100 YEAR UNDEVELOPED VOLUME)

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

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

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
10/14 6-4-81



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	1058.
	5602.75	5782	
OVERFLOW IN 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

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

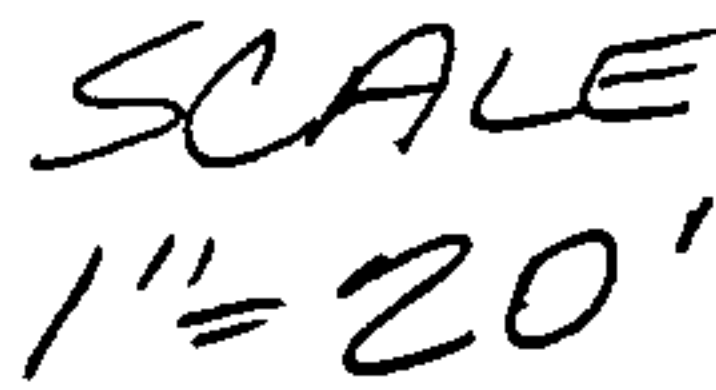
$$\begin{array}{l} \text{VOL}_{100\text{YR}} \\ \text{6HR} \\ \text{DEVEL} \end{array} = 2.57 \text{ in} / 12 \text{ in} / \text{FT} (0.50) (2487 \text{ \#}) = 266 \text{ CF}$$

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

TOTAL VOLUME TO BE PONDED	$\begin{array}{r} 3907 \\ 80 \\ \hline 3987 \text{ CF} \end{array}$
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



BOVAY ENGINEERS, INC.

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

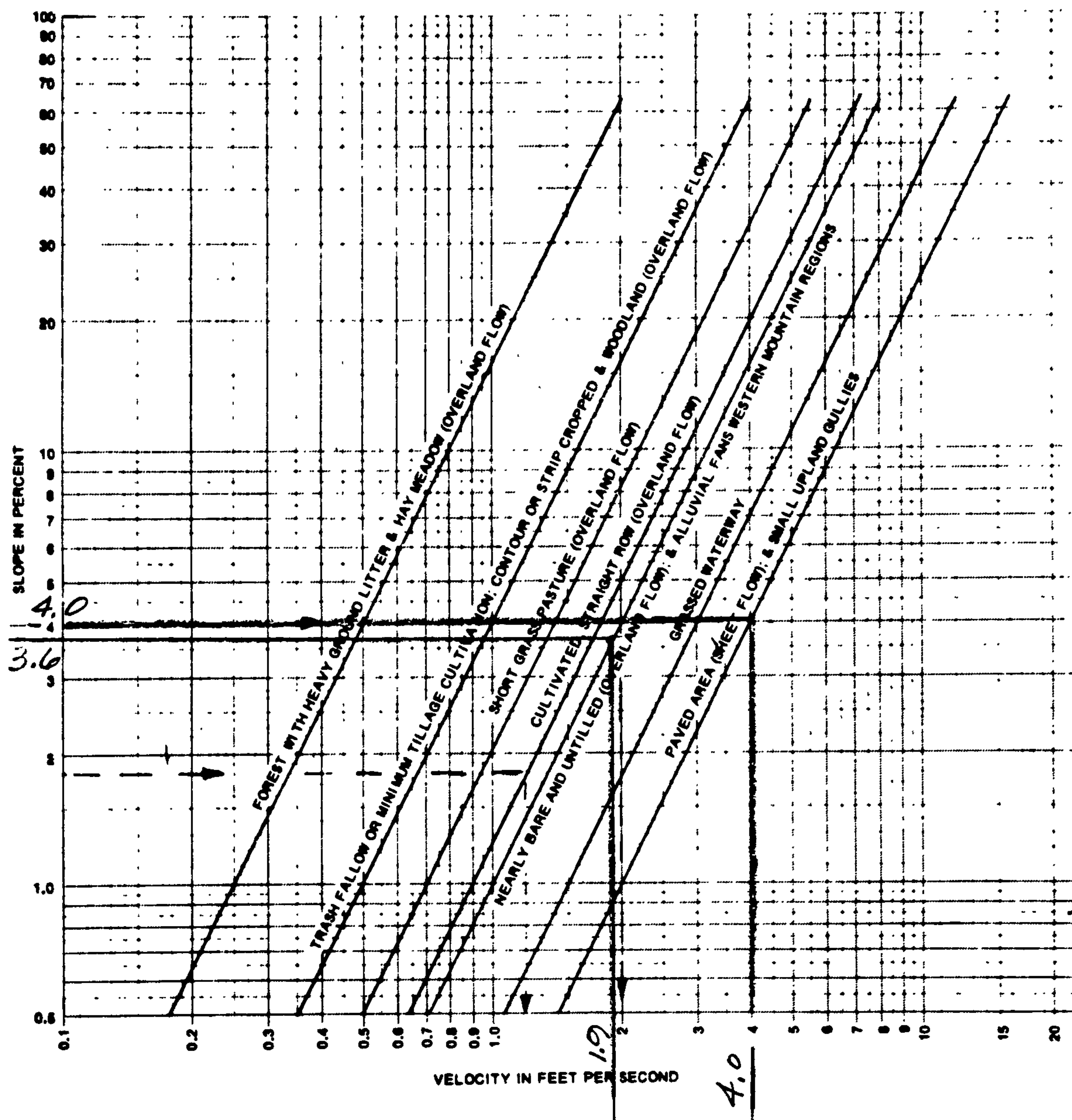


Figure 2-3 -Velocities for upland method of estimating T_c

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, USCS-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

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

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

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

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

$$Q_5 = C i_5 A$$

$$= [11.690(0.41) + 0.445(0.35)] 2.95$$

$$= 14.6 \text{ CFS.}$$

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

$$= [11.690(0.41) + 0.445(0.35)] 5.04$$

$$= 25 \text{ CFS.}$$

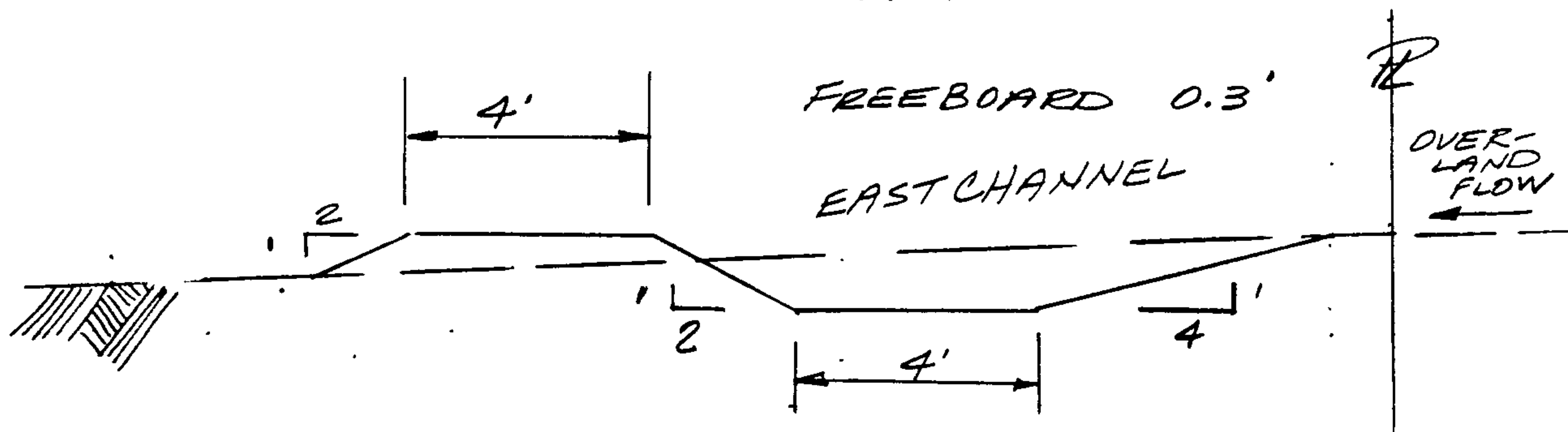
FOR CVI LASER CORP. DESCRIPTION DRAINAGE REPORT COMPS

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

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

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

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

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

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

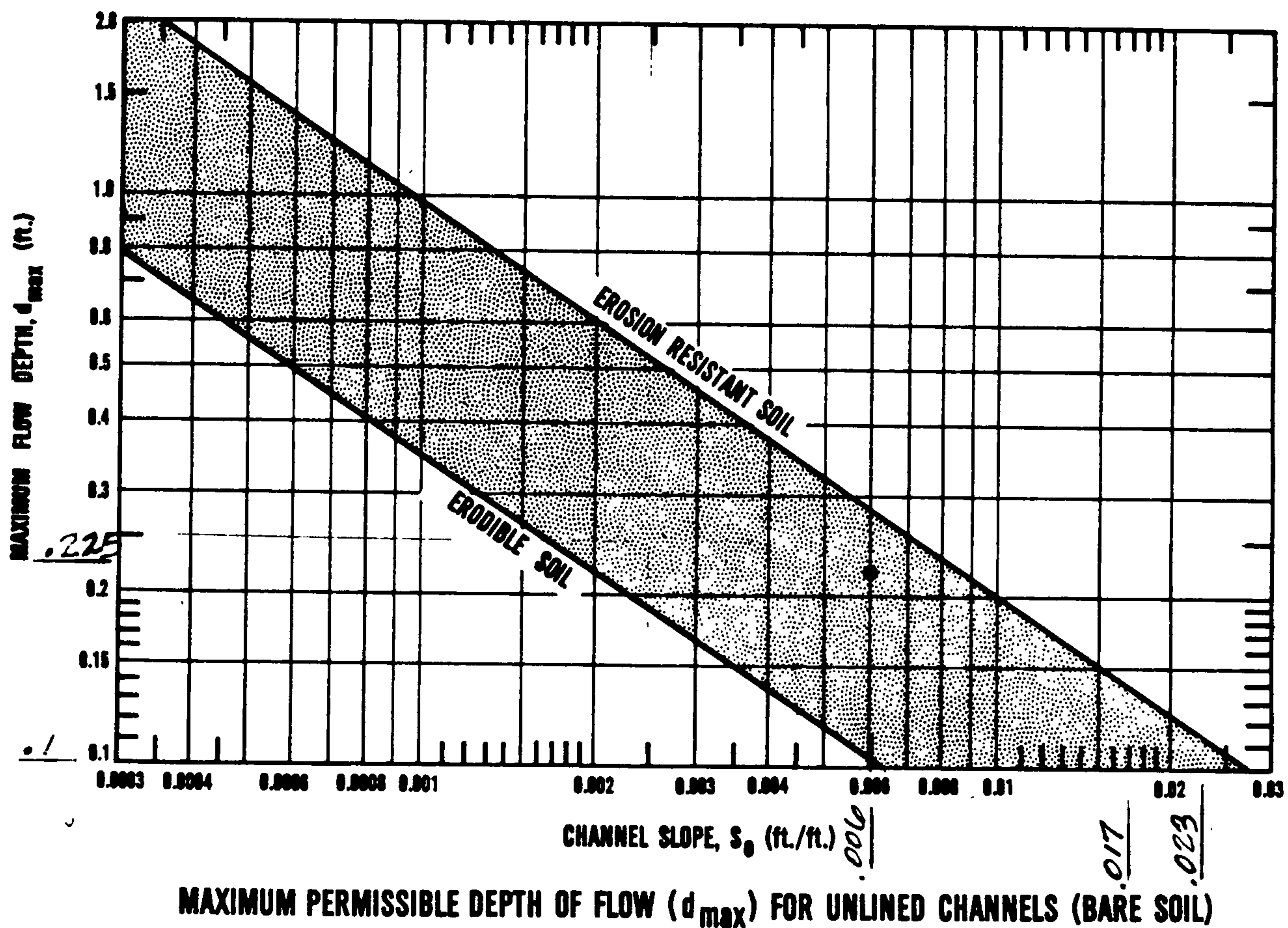
FOR SOUTH CH. $V = 22.81 (0.09)^{0.591} (0.023)^{0.288} = 1.85 \text{ fps}$

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

FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS

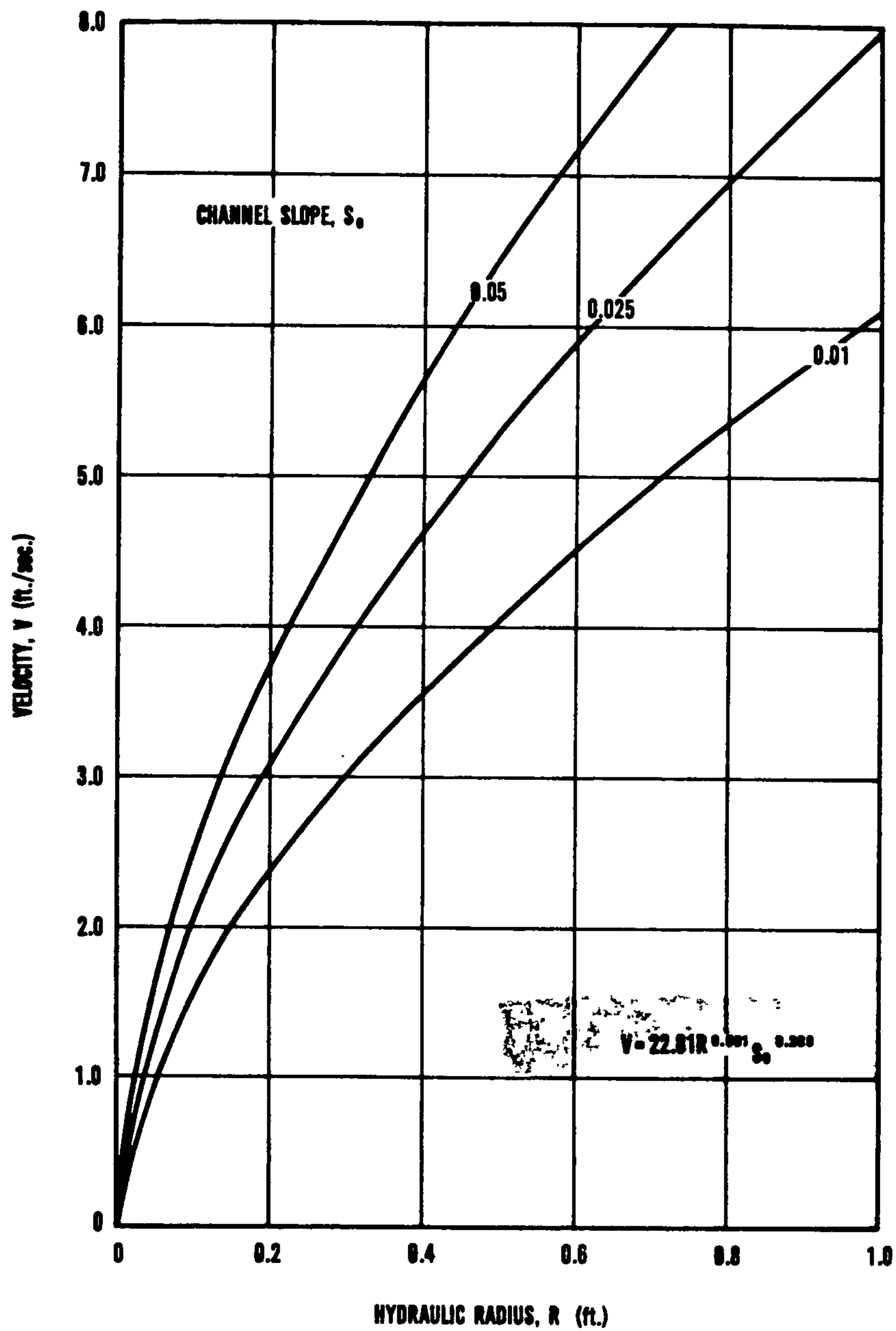
DESIGNED DWH DATE 5-22-81 CHECKED SFF DATE 6-2-81 FILE NO. 6014168 SHEET 15 OF 25

Chart 2



FOR CVI LASER CORP DESCRIPTION DRAINAGE REPORT COMPS
 DESIGNED DW/H 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

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

γ = 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
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$$D_{50} = 2'$$

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 L=
3 IF C+D
1.0000
U
14.0000
D
8.607
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 L=
3 IF C+D
1.0000
U
14.6000
D
0.516
V
4.33

MAXIMUM STONE SIZE

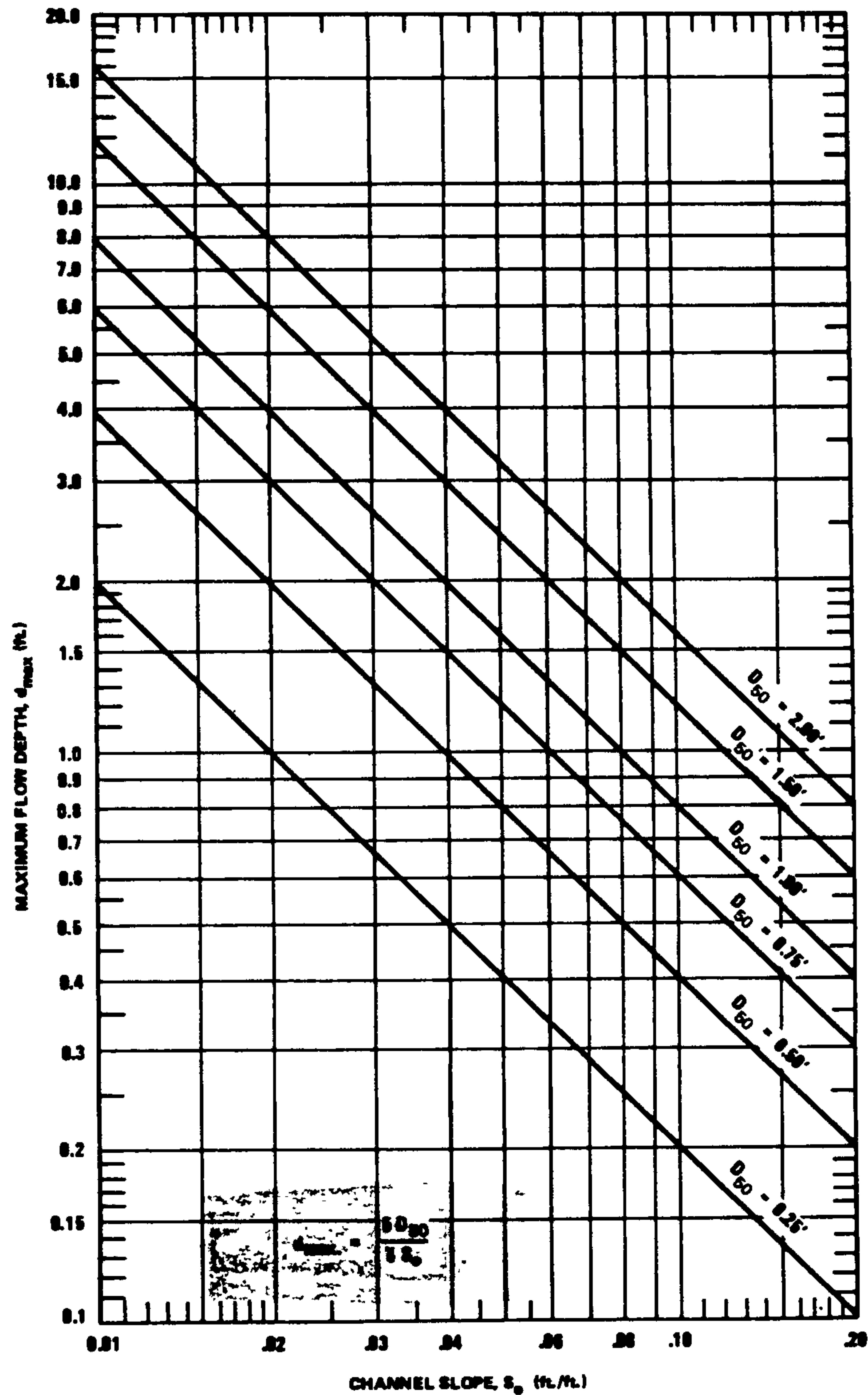
$$D_{MAX} = 1.5 D_{50} = 1.5 \times 2'' = 3''$$

THICKNESS OF COARSE GRAVEL LAYER

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

FOR CVI LAKER CORP DESCRIPTION DRAINAGE REPORT COMPS
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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
1.2000*

CHAN S
0.017

CHAN I
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
1.2000*

CHAN S
0.023

CHAN I
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>

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

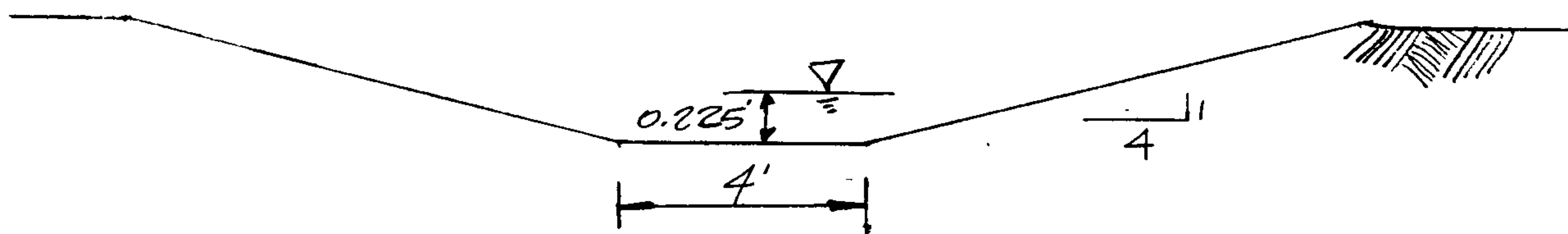
TIME OF CONCENTRATION USE $T_C = 10 \text{ min}$

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

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

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