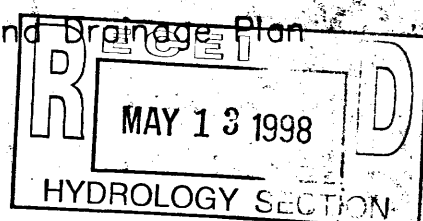


GRADING AND DRAINAGE PLAN FOR CVI LASER CORPORATION

DRAINAGE PLAN

The following items concerning the CVI Laser Grading and Drainage Plan are contained hereon:

1. Vicinity Map
2. Grading Plan
3. Calculations



The proposed improvements, as shown by the Vicinity Map, are located at the southeast corner of the intersection of Dorado Place SE and Cochiti Road SE. A grading plan was prepared for the site in April of 1986 by Tom Mann & Associates. The new plan will follow the guidelines established by the 1986 plan but use current standards. The site does not lie within a designated flood plain.

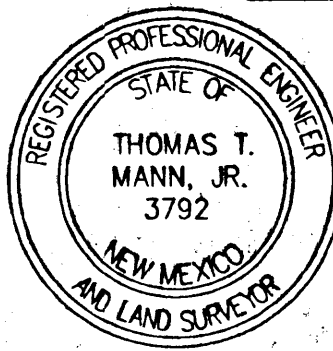
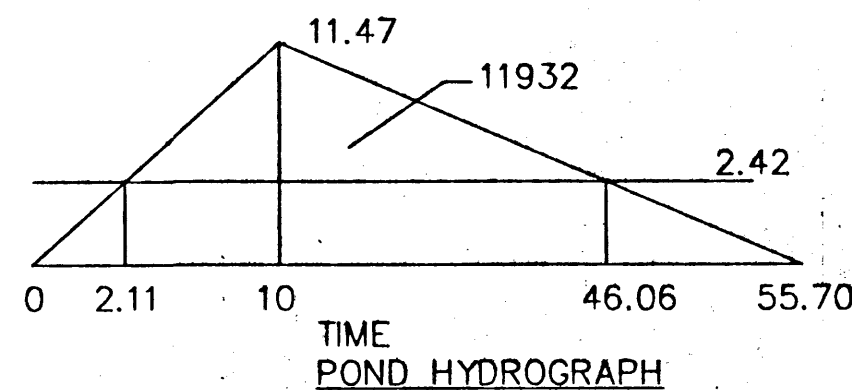
The site slopes from northeast to southwest at approximately 4 percent. The land to the east is higher, but a retaining wall has been constructed to retain flows on that site. The land to the south is developed and has been graded to drain away from this site. The site is higher than Dorado Place which is to the west. The site is parallel to Cochiti Road and the curb maintains the flows in the street. Therefore, offsite flows are minimal. The site is partially developed. Existing runoff is conveyed to a pond at the northwest corner of the site or to a pond near the south center of the site. Both ponds have controlled discharges to Dorado Place. Runoff from Basin 2-A discharges directly to Dorado Place.

The Grading Plan shows 1) existing and proposed grades, indicated by spot elevations and contours at 1'-0" intervals, 2) continuity between existing and proposed elevations, 3) the limit and character of existing improvements and 4) the limit and character of proposed improvements. The proposed improvements consist of a new building, additional parking and landscaping. The existing internal pond will be replaced by ponds at the southeast corner of the site, which will serve all of Basins 2-B-1 and 2-B-2. Emergency overflow from the ponds will route back into the parking lot and cascade to the lower pond or out the driveway. The runoff from Basins 1 and 2-A will not be altered. prior plan.

The Calculations, which appear below, analyze the existing and proposed conditions for the 6-hour, 100-year rainfall event. The analysis is in accordance with the City of Albuquerque Development Process Manual, Volume II. As shown by these calculations, the flows from Basins 1 and 2-A vary from the 1986 plan due to a change in the design criteria. The flows from Basin 2-B increase and will be mitigated by the drainage pond with controlled discharge. The new ponds will discharge to Dorado Place with a controlled rate of less than 0.1 cfs per acre.

CALCULATIONS

Precipitation Zone = 3
[1986 Report Values]
Existing Basin 1
Area = 0.81 acres
Land Treatment C = 42% D = 58%
 $E = 1.29 \times 0.42 + 2.36 \times 0.58 = 1.91$ inches
 $V = 1.91 \times 0.81 / 12 = 0.13$ acre feet [0.08 acft]
 $Q = (3.45 \times 0.42 + 5.02 \times 0.58) \times 0.81 = 3.53$ cfs [4.4 cfs]
Existing Basin 2A
Area = 0.94 acres
Land Treatment C = 18% D = 82%
 $E = 1.29 \times 0.18 + 2.36 \times 0.82 = 2.17$ inches
 $V = 2.17 \times 1.05 / 12 = 0.19$ acre feet [0.12 acft]
 $Q = (3.45 \times 0.18 + 5.02 \times 0.82) \times 1.05 = 4.97$ cfs [6.4 cfs]
Existing Basin 2B
Area = 2.42 acres
Land Treatment B = 69% D = 31%
 $E = 1.29 \times 0.69 + 2.36 \times 0.31 = 1.62$ inches
 $V = 1.62 \times 2.42 / 12 = 0.33$ acre feet [0.16 acft]
 $Q = (3.45 \times 0.69 + 5.02 \times 0.31) \times 2.42 = 9.53$ cfs [8.8 cfs]
Developed Basin 2-B-1
Area = 1.59 acres
Land Treatment C = 17% D = 83%
 $E = 1.29 \times 0.17 + 2.36 \times 0.83 = 2.18$ inches
 $V = 2.18 \times 1.59 / 12 = 0.29$ acre feet
 $Q = (3.45 \times 0.17 + 5.02 \times 0.83) \times 1.59 = 7.56$ cfs
Developed Basin 2-B-2
Area = 0.83 acres
Land Treatment C = 20% D = 80%
 $E = 1.29 \times 0.20 + 2.36 \times 0.80 = 2.15$ inches
 $V = 2.15 \times 0.83 / 12 = 0.15$ acre feet
 $Q = (3.45 \times 0.20 + 5.02 \times 0.80) \times 0.83 = 3.91$ cfs
From Basin 2B
Increased Rate of Runoff = $7.56 + 3.91 - 9.02 = 2.45$ cfs
Increased Volume of Runoff = $0.29 + 0.15 - 0.31 = 0.13$ acre feet

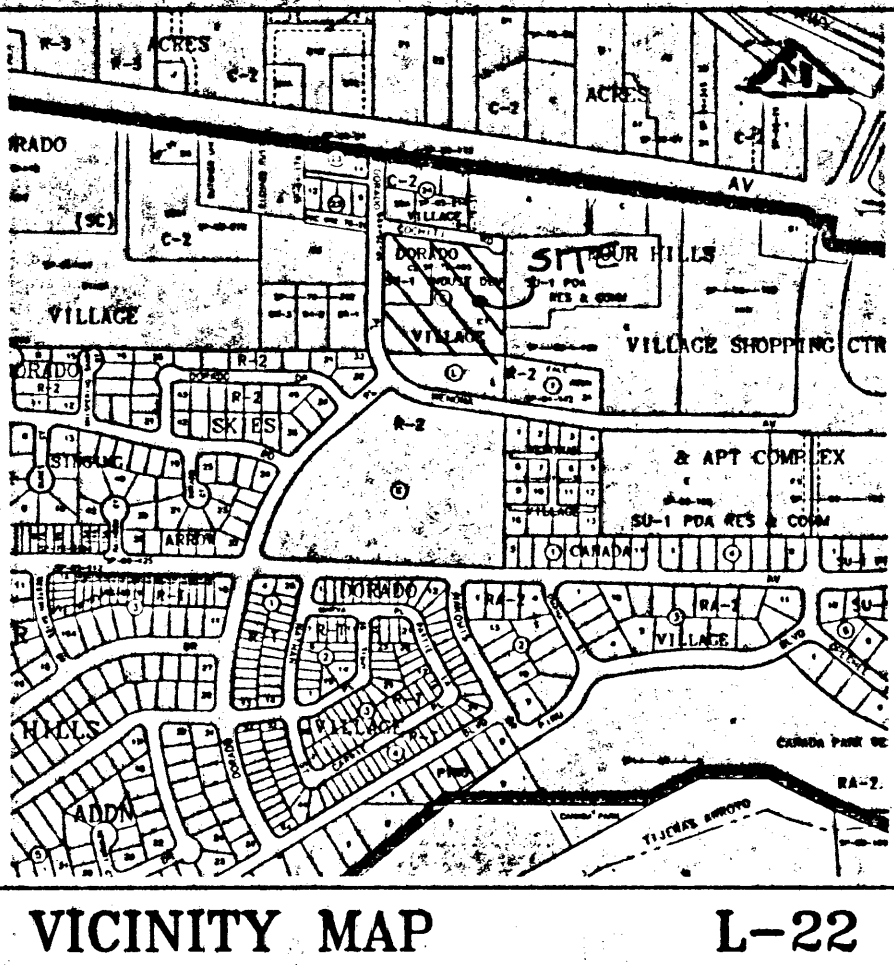


Engineering &
Surveying
Associates, Inc.

5312 Norton Drive NE • Albuquerque, NM 87111
(505) 298-4451

1

SHEET NO.



VICINITY MAP

L-22

SCALE 1" = 700'

ADDRESS

200 DORADO PLACE SE

LEGAL DESCRIPTION

LOTS C-1 & C-2, DORADO VILLAGE

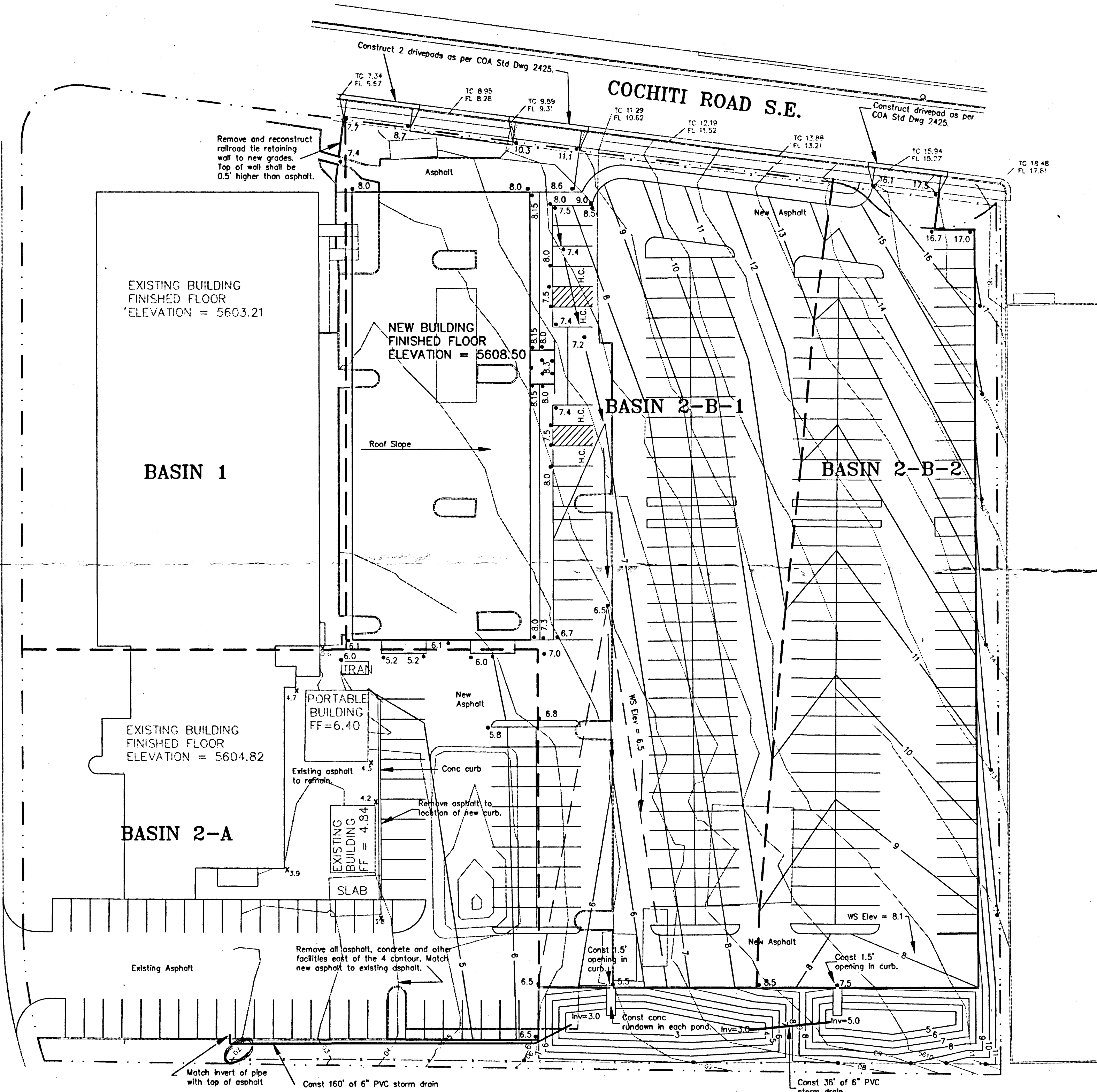
BENCHMARK

ACS BENCHMARK 2-L22 LOCATED 101.5' WEST OF TRAMWAY AND 5.5' NORTH OF THE CENTERLINE OF CENTRAL. ELEVATION = 5659.96.

LEGEND

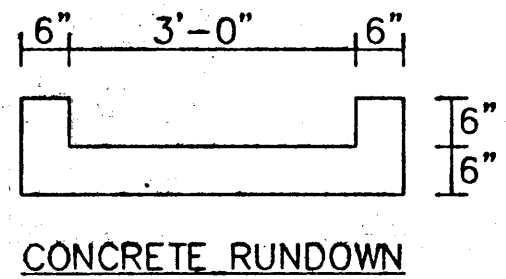
- 35.8 EXISTING SPOT ELEVATION
- 36.20 NEW SPOT ELEVATION
- 36 EXISTING CONTOUR
- 35 NEW CONTOUR
- SWALE
- VERIFIED ELEVATION
- 36.2 AS-BUILT ELEVATION
- BASIN BOUNDARY

DORADO PLACE S.E.

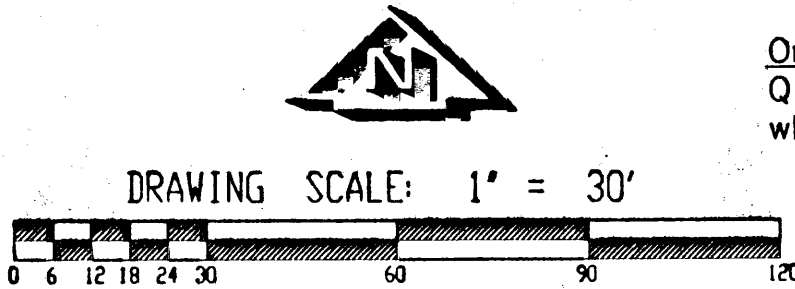


NOTE
ADJACENT PROPERTY IS ZONED
R-2 WHICH HAS A 15' SET BACK.

Pond Volumes
Pond 2-B-1 Required = $19166 \times 0.29 / 0.44 = 7865$ cf
Pond 2-B-1 Actual = $(718 + 2 \times 1310 + 2 \times 1967 + 2730) / 2 + 1287 \times 0.17 + (4017 + 8310) \times 0.5 / 2 = 8301$ cf @ WS Elev = 6.5 > 7865 cf
Pond 2-B-2 Required = $19166 \times 0.15 / 0.44 = 4067$ cf
Pond 2-B-2 Actual = $(527 + 2 \times 964 + 2 \times 1457 + 2024) / 2 + 1094 \times 0.17 + 3118 \times 0.1 = 4194$ cf @ WS Elev 8.1 > 4067 cf
Orifice Calculation
 $Q = CA(2gh)^{0.5}$
where $d=6"$, $h=3.5'$, $Q=2.25$ cfs

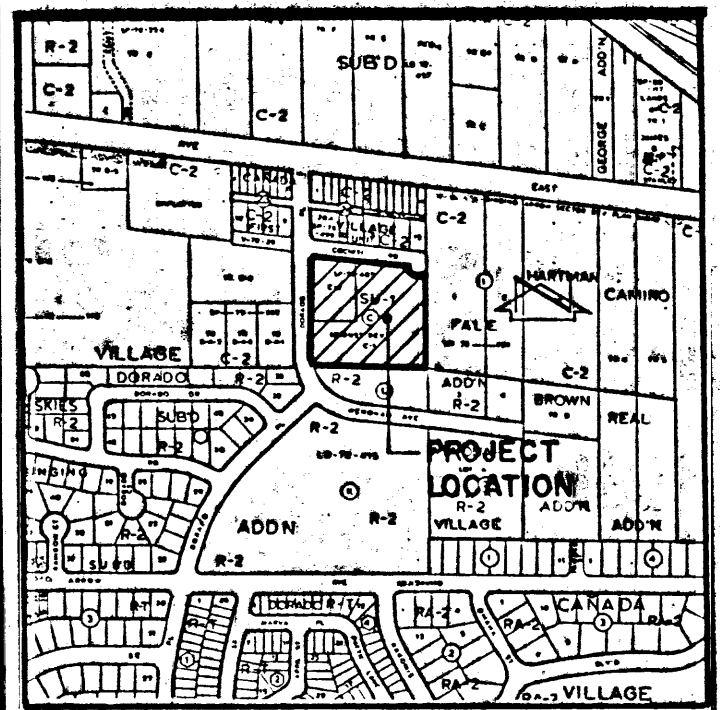


Splash Pad
@ Base?



LEGEND

- PROPOSED SPOT ELEV.
- EXISTING SPOT ELEV.
- PROPERTY LINE
- BASIN BOUNDARY LINE
- SWALE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- TC 51.56 TOP OF CURB
- FL 51.00 FLOW LINE



VICINITY MAP L-22
SCALE: 1" = 800'

DRAINAGE PLAN UPDATE

Sheet 1 of 2 shows the construction of two carports within the existing East Parking Lot of CVI Laser. This will involve the construction of new impervious area over existing impervious area. This will represent no change in the hydrology of the site. Because of this, no additional calculations are provided with this submittal. The plan has also been updated to show as-built locations of existing planters which were added to the project but not reflected on the previously approved plan.

DRAINAGE PLAN

The following items concerning the CVI Drainage Plan are contained on these two sheets:

1. Vicinity Map
2. Grading Plan
3. Calculations

As shown by the Vicinity Map, the site is located at the southeast corner of the intersection of Dorado Place S.E. and Cochiti Road S.E. At present, the site is developed with existing buildings and paved parking. The proposed improvements will consist of the construction of a building addition within the existing paved area and the construction of a new parking lot area.

As shown by Plate L-22 of the Albuquerque Master Drainage Study, this site does not lie within a designated Flood Hazard Zone. At present, this site drains from east to west and discharges its runoff onto Dorado Place S.E. Dorado Place S.E. drains in a southerly direction to its intersection with Tomlinson Drive S.E. At this point, the runoff turns and flows in a southwesterly direction to the intersection with Piru Boulevard S.E. At this point, the runoff carried by the street enters an existing concrete runoff which discharges to the Tijeras Arroyo. Although this plate does not identify any downstream flooding, downstream flooding has been identified by the City of Albuquerque along Tomlinson Drive S.E. The flooding problem exists downstream from this site due to extremely flat grades on residential streets. It is because of this, that the newly generated runoff from this site will be detained to minimize its downstream impact. The adjacent site to the east is the Four Hills Shopping Center. This development controls its discharge to a rate of 1 cfs/acre. This discharge rate was determined by the Drainage Report for the Four Hills Shopping Center (L22-033) as being the allowable rate of discharge for this watershed. The Four Hills Shopping Center further serves to divert all offsite flows around this site. Hence, offsite flows are not a concern to this site.

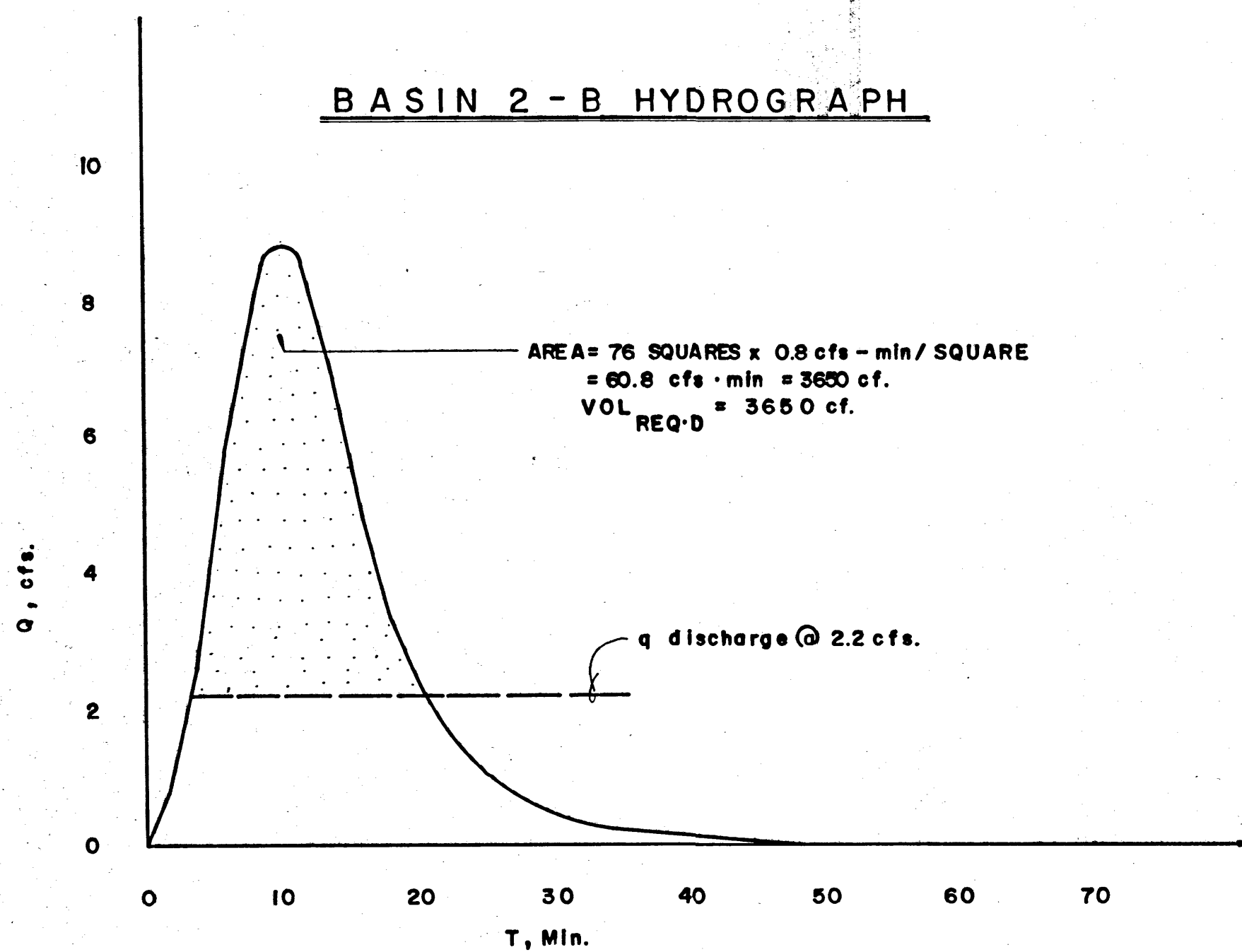
The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, and 4) continuity between existing and proposed grades. As shown by this plan, the proposed improvements consist of a building addition and an expansion of the existing parking lot. The proposed building addition, as previously mentioned, will involve the removal and disposal of existing asphalt paving and the construction of the addition within that area. This construction will not increase the amount of runoff generated by Basin 1 in which the addition lies. This building addition will drain to the existing retention pond located at the northwest corner of the site. This pond presently does not drain. In order to drain as much of this pond as possible, a 4" PVC pipe has been added to relieve excessive amounts of accumulated runoff. The maximum water surface level for this pond due to the overflow pipe will be 5602.0 This will result in the ponding of approximately 6" of runoff within 10 - 15 feet of the structure. According to the Soils Report for this site prepared by Western Technologies, this incidence will not create any adverse problems for the proposed addition.

Basin 2 consists of two subbasins - Basin 2-A and Basin 2-B. Basin 2-A consists primarily of an existing building and existing asphalt paving. Some additional paving is to be added to this basin, however will not significantly increase the runoff from this portion of the site, and hence it will be freely discharged to Dorado Place S.E. via existing paved surfaces and the existing driveway. Basin 2-B, on the other hand, will detain its runoff and discharge it at a controlled rate to Dorado Place S.E. via two 6" PVC drain lines. These drain lines will discharge into a proposed sidewalk culvert which will allow the runoff to enter the street in accordance with City of Albuquerque Standards. The pond will be landscaped and will have a maximum depth of 18". The side slopes will not exceed 3:1, thereby keeping the pond in compliance with accepted criteria for ponds. Lastly, the undeveloped portion of Basin 2-B will remain undeveloped at this time. The pond outlet has been sized for ultimate development and the pond has been oversized for the amount of work proposed at this time. It is fully realized that an updated plan will be required at such time as further construction is to be undertaken for the remainder of this parcel.

The Calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The SCS Method has been used for this analysis in accordance with the City of Albuquerque Development Process Manual, Volume II. These calculations have been performed for the drainage basins and subbasins previously mentioned. The allowable discharge from the site has been calculated at 1 cfs/acre. The pond discharge rate has been calculated based upon the Orifice Equation. Lastly, the pond volume has been determined based upon the average end area method. As shown by these calculations, negligible increases in runoff are anticipated from Basin 1 and Basin 2-A. Basin 2-B will experience the most significant increase in runoff and due to its composition of entirely new development, its runoff will be ponded on an interim basis and discharged from the site at a controlled rate.

Cochiti Road S.E. lies along the north boundary of this site. At present, Cochiti Road S.E. is not developed to present City Standards. A design is in progress for this road under City Project No. 2652. Conversations with the City of Albuquerque Public Works Design Section reveals that this project has received preliminary review and comment from the Design Review Committee, however, final approval has not yet been obtained. Because this site does not drain to this road and does not use this road for access, it is appropriate to grant building permit approval for this site with City approved street grades being a condition for Certificate of Occupancy approval only.

BASIN 2 - B HYDROGRAPH



HYDROGRAPH COMPUTATION WORKSHEET

DATE 04-15-86
COMPUTED BY JGM
CHECK BY JGM

TMA PROJ. NO. 60372

PROJECT CVI LASER

LOCATION BASIN 2B

ANALYSIS POINT # N/A

(DR. AREA) A = 2.42 ACRES

Tc 10 MIN

POINT RAINFALL 2.48 IN. FROM PLATE 22.2 D-1

CN = 79 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = N/A IN. FROM PLATE 22.2 C-4

COMPUTED Tp = 10 MIN. Tp = Tc (Rounded to even minute)

qp = 45.4A / Tp = 10.99 CFS./INCH OF RUNOFF

(R x qp) = Qpeak = 8.8 CFS

t(COLUMN) = (t/Tp) t = Tp(t/Tp)

y = Q / Qpeak Q = y(Qpeak)

	(t/Tp)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1	.03	0.26
3	.2	2	.10	0.88
4	.3	3	.19	1.67
5	.4	4	.30	2.73
6	.5	5	.47	4.14
7	.6	6	.66	5.81
8	.7	7	.82	7.22
9	.8	8	.93	8.18
10	.9	9	.99	8.71
11	1.0	10	1.00	8.8
12	1.1	11	.99	8.7
13	1.2	12	.93	8.2
14	1.3	13	.82	7.22
15	1.4	14	.78	6.9
16	1.5	15	.68	6.0
17	1.6	16	.56	4.9
18	1.7	17	.46	4.0
19	1.8	18	.39	3.4
20	1.9	19	.33	2.9
21	2.0	20	.28	2.4
22	2.2	22	.20	1.8
23	2.4	24	.14	1.3
24	2.6	26	.10	0.9
25	2.8	28	.07	0.7
26	3.0	30	.05	0.5
27	3.2	32	.04	0.35
28	3.4	34	.029	0.26
29	3.6	36	.021	0.18
30	3.8	38	.015	0.13
31	4.0	40	.011	0.10
32	4.5	45	.005	0.04
33	5.0	50	.000	0

Ground Cover Information

From SCS Bernalillo County Soil Survey,
Plate: 32: TgB - Tijeras Gravelly Fine Sandy Loam
Hydrologic Soil Group: B
Existing Pervious CN = 70 (DPM Plate 22.2 C-2)
Pasture or Range Land: fair condition
Developed Pervious CN = 61 (DPM Plate 22.2 C-2; Open space: good condition)

Time of Concentration/Time to Peak

Tc = 0.0078 L^0.77 / S^0.385 (Kirpich Equation)
Tp = Tc = 10 min.

Point Rainfall

P6 = 2.48 in. (DPM Plate 22.2 D-1)

Existing Condition

1. Basin 1
Atotal = 34,900 sf = 0.80 Ac
Aimp = 23,200 sf; % impervious = 66 %
Composite CN = 85 (DPM Plate 22.2 C-3)
DRO = 1.2 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 3.63 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 4.4 cfs
V100 = 3630 (DRO)A = 3480 cf

2. Basin 2-A
Atotal = 40,900 sf = 0.94 Ac
Aimp = 30,900 sf; % impervious = 76 %
Composite CN = 88 (DPM Plate 22.2 C-3)
DRO = 1.5 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 4.27 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 6.4 cfs
V100 = 3630 (DRO)A = 5120 cf

3. Basin 2-B
Atotal = 105,200 sf = 2.42 Ac
Aimp = 0 sf; % impervious = 0 %
Composite CN = 70 (DPM Plate 22.2 C-3)
DRO = 0.5 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 10.99 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 5.5 cfs
V100 = 3630 (DRO)A = 4390 cf

Developed Condition

1. Basin 1
Atotal = 34,900 sf = 0.80 Ac
Aimp = 24,050 sf; % impervious = 69 %
Composite CN = 86 (DPM Plate 22.2 C-3)
DRO = 1.25 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 3.63 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 4.5 cfs
V100 = 3630 (DRO)A = 3630 cf

2. Basin 2-A
Atotal = 40,900 sf = 0.94 Ac
Aimp = 36,000 sf; % impervious = 88 %
Composite CN = 93 (DPM Plate 22.2 C-3)
DRO = 1.75 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 4.27 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 7.5 cfs
V100 = 3630 (DRO)A = 5970 cf
qallow = (1.0 cfs/Ac) (0.94 Ac) = 0.9 cfs
qallow = Q100; no ponding required.

3. Basin 2-B
Atotal = 105,200 sf = 2.42 Ac
Aimp = 34,300 sf; % impervious = 33 %
Composite CN = 79 (DPM Plate 22.2 C-3)
DRO = 0.8 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 10.99 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 8.8 cfs
V100 = 3630 (DRO)A = 7030 cf

qallow = (1.0 cfs/Ac) (2.42 Ac) = 2.4 cfs
qallow = CA V2 gh = 1.1 cfs

where C = 0.6
A = 0.1963 sf (6" dia pipe)
g = 32.2 ft/sec²
h = 5 - 3.5 - 0.5/2 = 1.25'

pipes = qallow/q6" = 2

Install 2 - 6" pipes

qdischarge = 2(1.1) = 2.2 cfs < qallow

Vpond = 2(Lavg x Wavg) = 1.5 (80 x 35) = 4200 cf

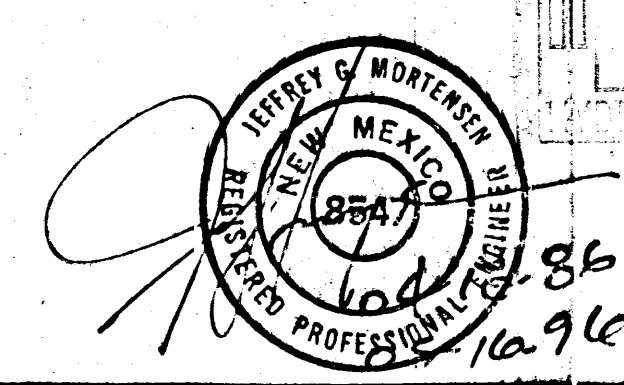
By hydrograph analysis, Vreq'd = 3650 cf

Vreq'd < Vpond

Comparison
1. Basin 1
Δ Q100 = 4.5 - 4.4 = 0.1 cfs (increase)
Δ V100 = 3630 - 3480 = 150 cf (increase)

2. Basin 2-A
Δ Q100 = 7.5 - 6.4 = 1.1 cfs (increase)
Δ V100 = 5970 - 5120 = 850 cf (increase)

3. Basin 2-B
Δ Q100 = 8.8 - 5.5 = 3.3 cfs (increase)
Δ V100 = 7030 - 4390 = 2640 cf (increase)



RECEIVED
MAY 16 1986

JEFF MORTENSEN & ASSOCIATES, INC.
6010 S. MIDWAY PARK BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87109
ENGINEERS & SURVEYORS (505) 345-4258

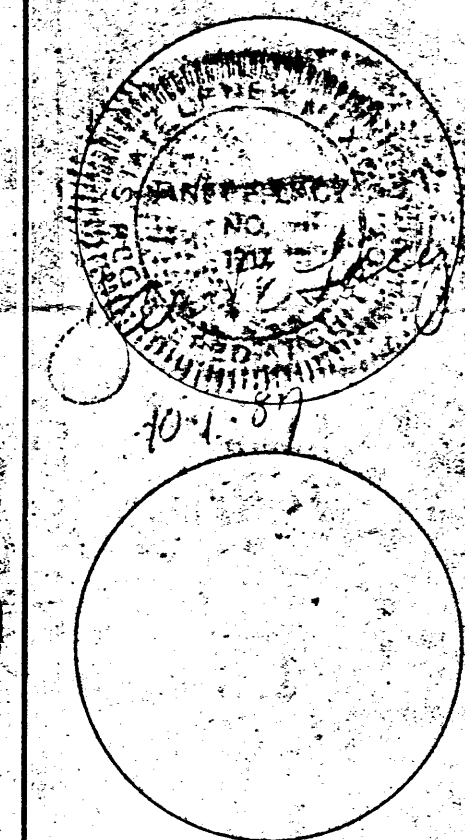
NO.	DATE	BY	REVISIONS
1	5/1/86	JGM	DRAINAGE PLAN UPDATE

DESIGNED BY: J.G.M.
DRAWN BY: J.M.A.
APPROVED: J.G.M.

TEXT & CALCULATIONS
CVI LASER

JOB NO. 60375
DATE 5-96
SHEET 2 OF 2

CIVIL ASER STORAGE BUILDING

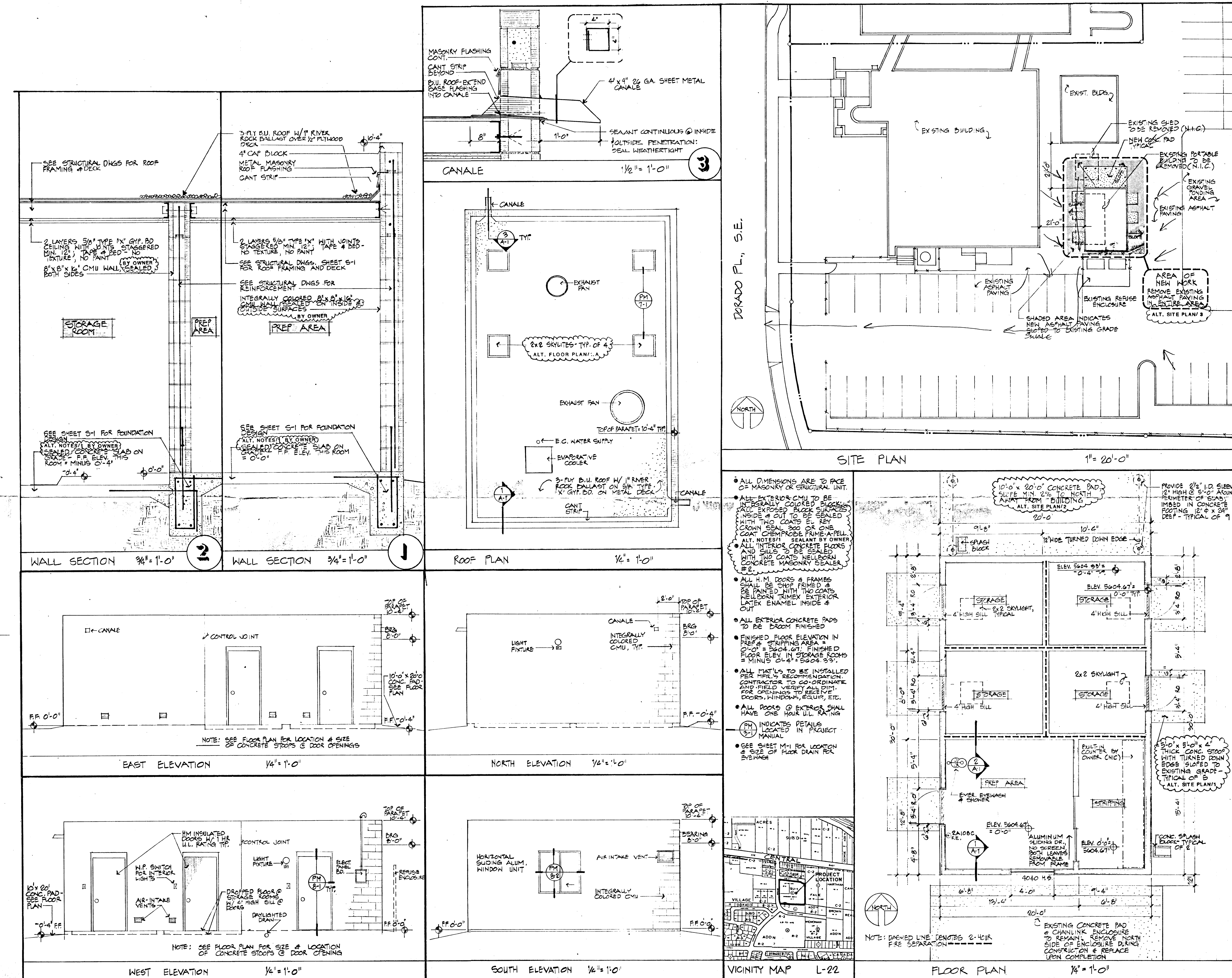


MOLZEN-CORBIN & Associates

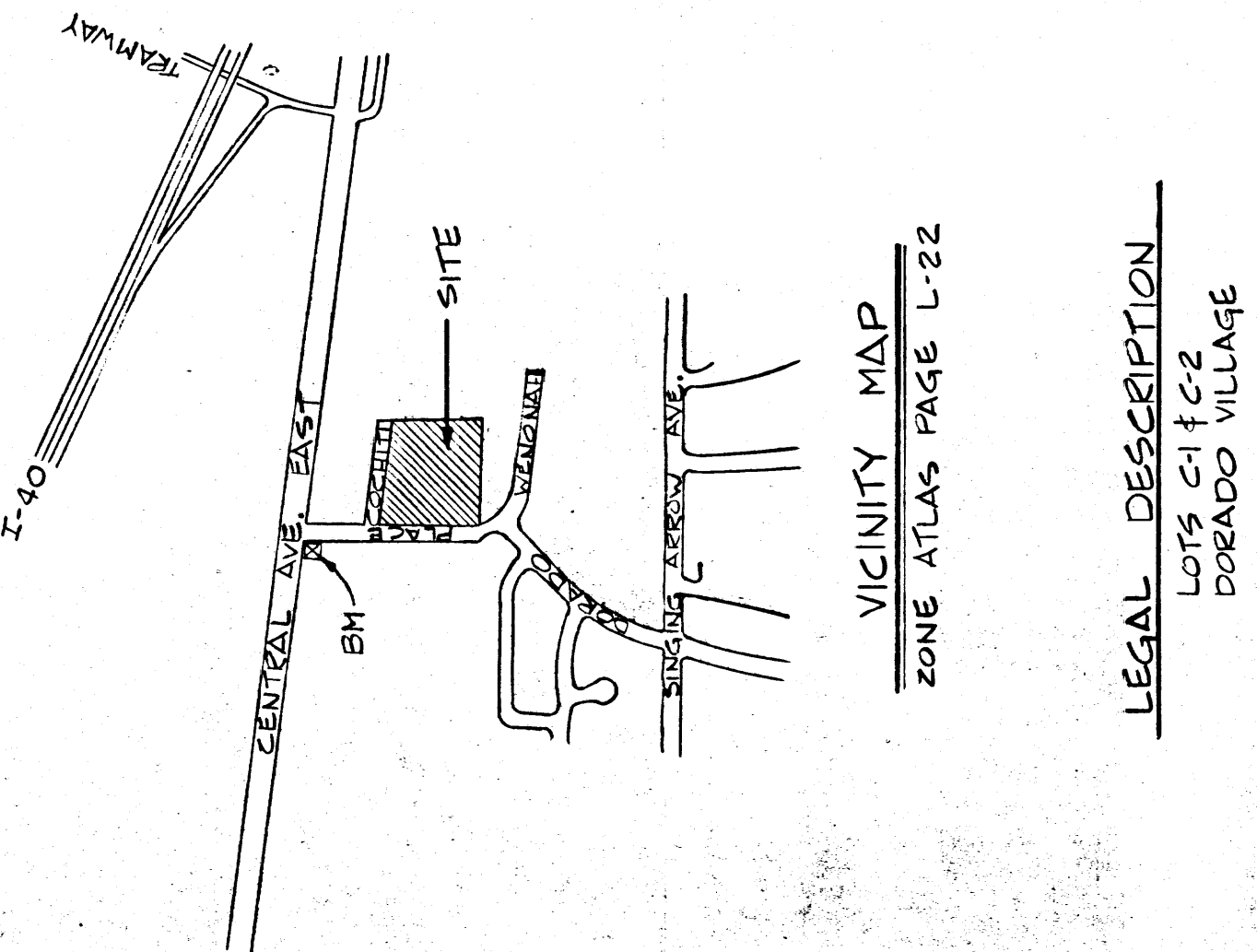
& Associates
ENGINEERS ARCHITECTS PLANNERS
2701 MILES ROAD SE
ALBUQUERQUE, NEW MEXICO 87106

MOLZEN-CORBIN

SHEET NO
A-

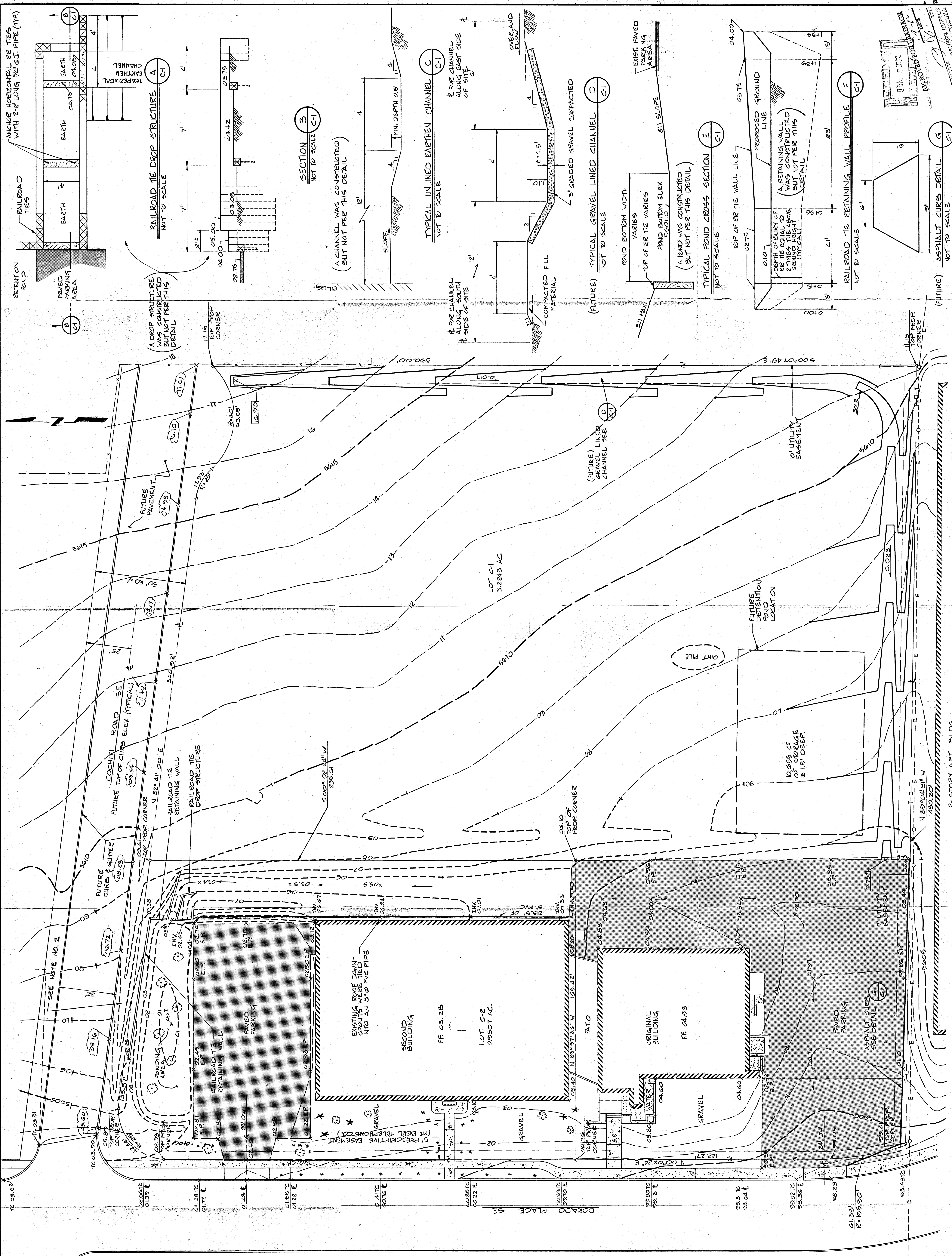


- NOTES**
- CITY OF STATION 1122, 1978 ACS BRASS CAP AT SW CORNER OF CENTRAL & DORADO ELEV. 5000.421
 - THE PROPOSED DRAINAGE SYSTEM IS TO BE CONSTRUCTED IN A MANNER WHICH PRESERVES THE STABILITY OF THE FILL. CONSTRUCTION EMBANKMENT IN UNIFORM 3" LAYERS. EACH LAYER OF EMBANKMENT SHALL BE COMPLETED TO THE PROPER WIDTH, LEVELLED AND COMPACTED AT A PROPER MOISTURE CONTENT BEFORE THE SUCCEEDING LAYER IS PLACED.
- LEGEND**
- | | |
|---------------------------|----------------|
| EXISTING | NEW |
| PROPERTY LINE | CONTOUR |
| CONTOUR | SPOT ELEVATION |
| SPOT ELEVATION | |
| CONCRETE | |
| ASPHALT PAVEMENT | |
| OVERHEAD POWER & FIBRE | |
| UNDERGROUND TELEPHONE BOX | |



RECORD DRAWING NOTES

- THE ROOF DOWNSPOUTS FROM THE SECOND BUILDING NON DISCHARGE THE RUNOFF INTO AN 8" P.C. PIPE. THIS 8" P.C. PIPE CONVEYS THE RUNOFF TO THE DETENTION POND. THIS ELIMINATES THE PROBLEM PREVIOUSLY CAUSED BY THE ROOF DRAINS.



REVISIONS

NO.	RECORD DRAWING	REVISIONS
1	1-4-82	1-4-82

BOVAY ENGINEERS, INC.
200 DORADO PLACE SE
ALBUQUERQUE, NEW MEXICO

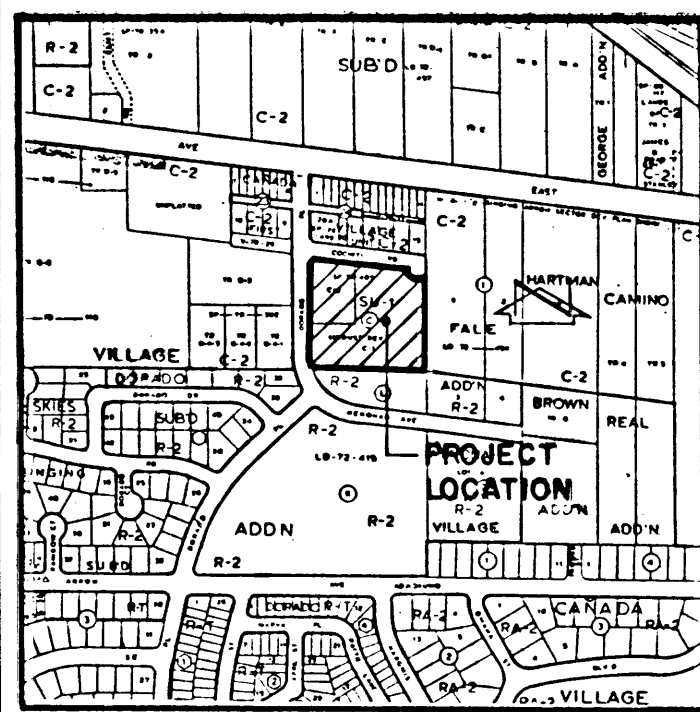
CVI LASER CORPORATION
200 DORADO PLACE SE
ALBUQUERQUE, NEW MEXICO

GRADING AND DRAINAGE PLAN
SCALE: 1"=20'

I, STEPHEN F. FRITZ, PE, CERTIFY THAT THE INFORMATION HEREON WAS OBTAINED FROM A VISUAL SURVEY OF THE SITE AND FROM A REVIEW OF THE RECORD DRAWINGS. I AM NOT PROVIDING ANY GUARANTEE OR WARRANTY FOR THE ACCURACY OF THE INFORMATION HEREON.

DATE: 1-4-82
STEPHEN F. FRITZ, PE
NM PE NO. 6804

LEGEND
PROPOSED SPOT ELEV.
EXISTING SPOT ELEV.
PROPERTY LINE
BASIN BOUNDARY LINE
SWALE
5G PROPOSED CONTOUR
5156 EXISTING CONTOUR
T.C. 5156 TOP OF CURB
F.L. 5106 FLOW LINE



VICINITY MAP
SCALE 1" = 800'

L-22

DRAINAGE PLAN

The following items concerning the CVI Drainage Plan are contained on these two sheets:

1. Vicinity Map
2. Grading Plan
3. Calculations

As shown by the Vicinity Map, the site is located at the southeast corner of the intersection of Dorado Place S.E. and Cochiti Road S.E. At present, the site is developed with existing buildings and paved parking. The proposed improvements will consist of the construction of a building addition within the existing paved area and the construction of a new parking lot area.

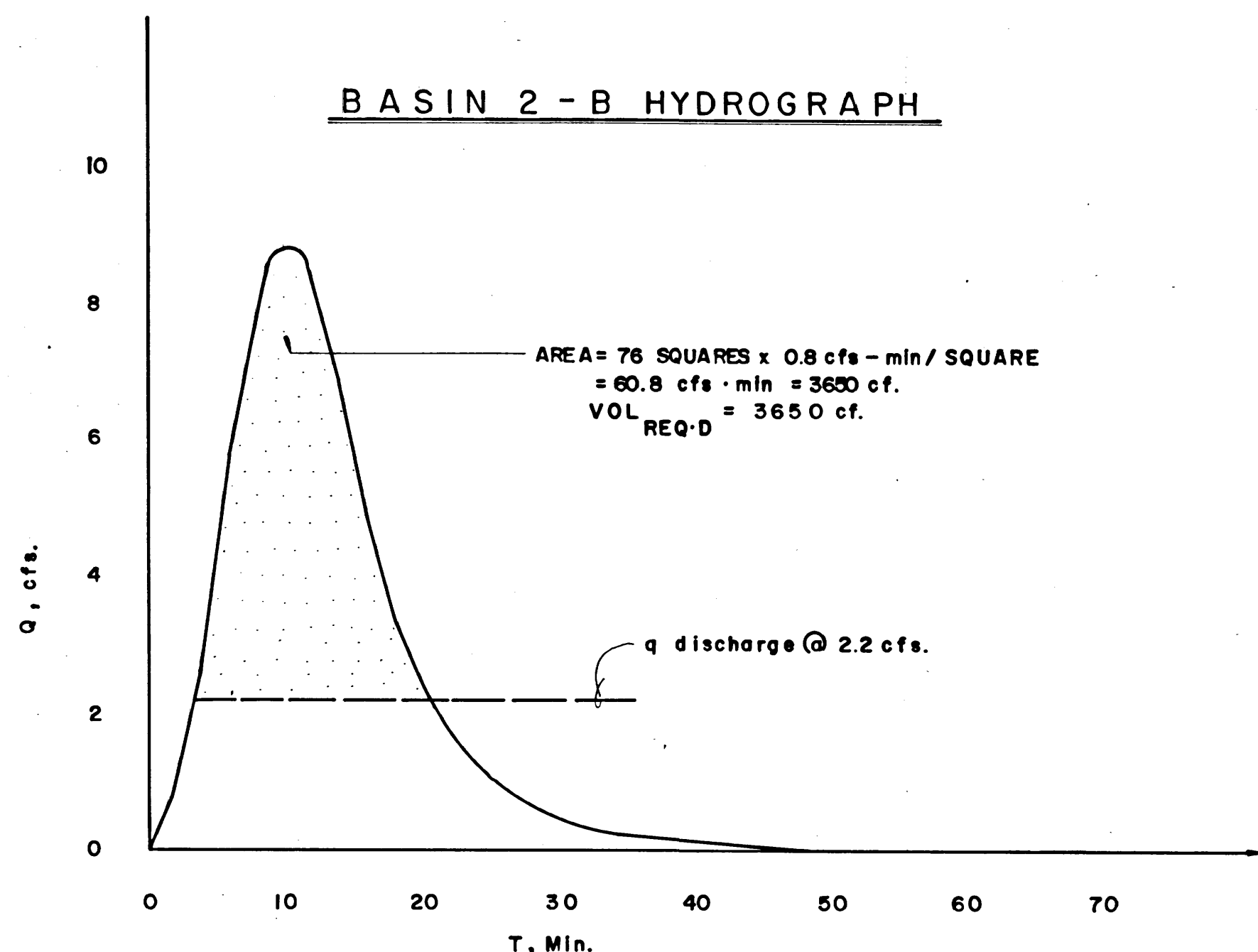
As shown by Plate L-22 of the Albuquerque Master Drainage Study, this site does not lie within a designated Flood Hazard Zone. At present, this site drains from east to west and discharges its runoff onto Dorado Place S.E. Dorado Place S.E. drains in a southerly direction to its intersection with Tomlinson Drive S.E. At this point, the runoff turns and flows in a southwesterly direction to the intersection with Piru Boulevard S.E. At this point, the runoff carried by the street enters an existing concrete runoff which discharges to the Tijeras Arroyo. Although this plate does not identify any downstream flooding, downstream flooding has been identified by the City of Albuquerque along Tomlinson Drive S.E. The flooding problem exists downstream from this site due to extremely flat grades on residential streets. It is because of this, that the newly generated runoff from this site will be detained to minimize its downstream impact. The adjacent site to the east is the Four Hills Shopping Center. This development controls its discharge to a rate of 1 cfs/acre. This discharge rate was determined by the Drainage Report for the Four Hills Shopping Center (L22-D33) as being the allowable rate of discharge for this watershed. The Four Hills Shopping Center further serves to divert all offsite flows around this site. Hence, offsite flows are not a concern to this site.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, and 4) continuity between existing and proposed grades. As shown by this plan, the proposed improvements consist of a building addition and an expansion of the existing parking lot. The proposed building addition, as previously mentioned, will involve the removal and disposal of existing asphalt paving and the construction of the addition within that area. This construction will not increase the amount of runoff generated by Basin 1 in which the addition lies. This building addition will drain to the existing retention pond located at the northwest corner of the site. This pond presently does not drain. In order to drain as much of this pond as possible, a 4" PVC pipe has been added to relieve excessive amounts of accumulated runoff. The maximum water surface level for this pond due to the overflow pipe will be 5602.0 This will result in the ponding of approximately 6" of runoff within 10 - 15 feet of the structure. According to the Soils Report for this site prepared by Western Technologies, this incidence will not create any adverse problems for the proposed addition.

Basin 2 consists of two subbasins - Basin 2-A and Basin 2-B. Basin 2-A consists primarily of an existing building and existing asphalt paving. Some additional paving is to be added to this basin, however will not significantly increase the runoff from this portion of the site, and hence it will be freely discharged to Dorado Place S.E. via existing paved surfaces and the existing drivepad. Basin 2-B, on the other hand, will detain its runoff and discharge it at a controlled rate to Dorado Place S.E. via two 6" PVC drain lines. These drain lines will discharge into a proposed sidewalk culvert which will allow the runoff to enter the street in accordance with City of Albuquerque Standards. The pond will be landscaped and will have a maximum depth of 18". The side slopes will not exceed 3:1, thereby keeping the pond in compliance with accepted criteria for ponds. Lastly, the undeveloped portion of Basin 2-B will remain undeveloped at this time. The pond outlet has been sized for ultimate development and the pond has been oversized for the amount of work proposed at this time. It is fully realized that an updated plan will be required at such time as further construction is to be undertaken for the remainder of this parcel.

The Calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The SCS Method has been used for this analysis in accordance with the City of Albuquerque Development Process Manual, Volume II. These calculations have been performed for the drainage basins and subbasins previously mentioned. The allowable discharge from the site has been calculated at 1 cfs/acre. The pond discharge rate has been calculated based upon the Orifice Equation. Lastly, the pond volume has been determined based upon the average end area method. As shown by these calculations, negligible increases in runoff are anticipated from Basin 1 and Basin 2-A. Basin 2-B will experience the most significant increase in runoff and due to its composition of entirely new development, its runoff will be ponded on an interim basis and discharged from the site at a controlled rate.

Cochiti Road S.E. lies along the north boundary of this site. At present, Cochiti Road S.E. is not developed to present City Standards. A design is in progress for this road under City Project No. 2652. Conversations with the City of Albuquerque Public Works Design Section reveals that this project has received preliminary review and comment from the Design Review Committee, however, final approval has not yet been obtained. Because this site does not drain to this road and does not use this road for access, it is appropriate to grant building permit approval for this site with City approved street grades being a condition for Certificate of Occupancy approval only.



HYDROGRAPH COMPUTATION WORKSHEET

22.2

DATE 04-15-86

COMPUTED BY JGM

CHECK BY JGM

TMA PROJ. NO. 60372

PROJECT CVI LASER

LOCATION BASIN 2B

ANALYSIS POINT # N/A

(DR. AREA) A = 2.42 ACRES

Tc 10 MIN

POINT RAINFALL 2.48 IN. FROM PLATE 22.2 D-1

CN = 79 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = N/A IN. FROM PLATE 22.2 C-4

COMPUTED Tp = 10 MIN. Tp = Tc

(Rounded to even minute)

qp = 45.4A / Tp = 10.99 CFS./INCH OF RUNOFF

(R X qp) = Qpeak = 8.8 CFS

t(COLUMN) = (t/Tp) t = Tp(t/Tp)

y = Q / Qpeak Q = y(Qpeak)

	(t/Tp)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1	.03	0.26
3	.2	2	.10	0.88
4	.3	3	.19	1.67
5	.4	4	.31	2.73
6	.5	5	.47	4.14
7	.6	6	.66	5.81
8	.7	7	.82	7.22
9	.8	8	.93	8.18
10	.9	9	.99	8.71
11	1.0	10	1.00	8.8
12	1.1	11	.99	8.7
13	1.2	12	.93	8.2
14	1.3	13	.86	7.6
15	1.4	14	.78	6.9
16	1.5	15	.68	6.0
17	1.6	16	.56	4.9
18	1.7	17	.46	4.0
19	1.8	18	.39	3.4
20	1.9	19	.33	2.9
21	2.0	20	.28	2.5
22	2.2	22	.20	1.8
23	2.4	24	.14	1.3
24	2.6	26	.10	0.9
25	2.8	28	.07	0.7
26	3.0	30	.05	0.5
27	3.2	32	.04	0.35
28	3.4	34	.029	0.26
29	3.6	36	.021	0.18
30	3.8	38	.015	0.13
31	4.0	40	.011	0.10
32	4.5	45	.005	0.04
33	5.0	50	.000	0

Ground Cover Information

From SCS Bernalillo County Soil Survey, Plate 32: TgB - Tijeras Gravelly Fine Sandy Loam Hydrologic Soil Group: B
Existing Pervious CN = 70 (DPM Plate 22.2 C-2 Pasture or Range Land: fair condition)
Developed Pervious CN = 61 (DPM Plate 22.2 C-2; Open space: good condition)

Time of Concentration/Time to Peak

Tc = 0.0078 L^{0.77}/S^{0.385} (Kirpich Equation)
Tp = Tc = 10 min.

Point Rainfall

Pg = 2.48 in. (DPM Plate 22.2 D-1)

Existing Condition

1. Basin 1
Atotal = 34,900 sf = 0.80 Ac
Aimp = 23,200 sf; % impervious = 66 %
Composite CN = 85 (DPM Plate 22.2 C-3)
DRO = 1.2 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 3.63 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 4.4 cfs
V100 = 3630 (DRO)A = 3480 cf

2. Basin 2-A

Atotal = 40,900 sf = 0.94 Ac
Aimp = 30,900 sf; % impervious = 76 %
Composite CN = 88 (DPM Plate 22.2 C-3)
DRO = 1.5 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 4.27 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 6.4 cfs
V100 = 3630 (DRO)A = 5120 cf

3. Basin 2-B

Atotal = 105,200 sf = 2.42 Ac
Aimp = 0 sf; % impervious = 0 %
Composite CN = 70 (DPM Plate 22.2 C-3)
DRO = 0.5 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 10.99 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 5.5 cfs
V100 = 3630 (DRO)A = 4390 cf

Developed Condition

1. Basin 1
Atotal = 34,900 sf = 0.80 Ac
Aimp = 24,050 sf; % impervious = 69 %
Composite CN = 86 (DPM Plate 22.2 C-3)
DRO = 1.25 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 3.63 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 4.5 cfs
V100 = 3630 (DRO)A = 3630 cf

2. Basin 2-A

Atotal = 40,900 sf = 0.94 Ac
Aimp = 36,000 sf; % impervious = 88 %
Composite CN = 93 (DPM Plate 22.2 C-3)
DRO = 1.75 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 4.27 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 7.5 cfs

V100 = 3630 (DRO)A = 5970 cf
qallow = (1.0 cfs/Ac) (0.94 Ac) = 0.9 cfs
qallow = Q100? no ponding required.

3. Basin 2-B

Atotal = 105,200 sf = 2.42 Ac
Aimp = 34,300 sf; % impervious = 33 %
Composite CN = 79 (DPM Plate 22.2 C-3)
DRO = 0.8 in (DPM Plate 22.2 C-4)
qp = 45.4 A/Tp = 10.99 cfs/in runoff

Q100 = Qpeak = qp (DRO) = 8.8 cfs
V100 = 3630 (DRO)A = 7030 cf

qallow = (1.0 cfs/Ac) (2.42 Ac) = 2.4 cfs

qg = CA / 2 gh = 1.1 cfs

where C = 0.6

A = 0.1963 sf (6" dia pipe)

g = 32.2 ft/sec²

h = 5 - 3.5 - 0.5/2 = 1.25'

pipes = qallow/qg = 2

Install 2 - 6" pipes

qdischarge = 2(1.1) = 2.2 cfs < qallow

Vpond = D(Lavg x Wavg) = 1.5 (80 x 35) = 4200 cf

By hydrograph analysis, Vreq'd = 3650 cf

Vreq'd < Vpond

Comparison

1. Basin 1

Δ Q100 = 4.5 - 4.4 = 0.1 cfs (increase)

Δ V100 = 3630 - 3480 = 150 cf (increase)

2. Basin 2-A

Δ Q100 = 7.5 - 6.4 = 1.1 cfs (increase)

Δ V100 = 5970 - 5120 = 850 cf (increase)

3. Basin 2-B

Δ Q100 = 8.8 - 5.5 = 3.3 cfs (increase)

Δ V100 = 7030 - 4390 = 2640 cf (increase)



811 DALLAS, N.E. - ALBUQUERQUE - NEW MEXICO - 87110
ENGINEERS

NO.	DATE	BY	REVISIONS

DESIGNED BY: J.G.M.

DRAWN BY: R.A.R.

APPROVED: J.G.M.

JOB NO.

60372

DATE

4-86

TEXT & CALCULATIONS

CVI LASER

CVI LASER

200 DORADO, S.E.

ALBUQUERQUE, NEW MEXICO

