February 2, 1993

Frank Lovelady.
Lovelady & Associates
7408 Morrow Ave. NE
Albuquerque, NM 87110

RE: DRAINAGE PLAN FOR AN ADDITION TO CONTINENTAL MACHINING CO. (E17-D33)
ENGINEER'S STAMP DATED 1/22/93.

Dear Mr. Lovelady:

Based on the information provided on your January 22, 1993 submittal, the above referenced site is approved for Building Permit. Please advise your client that some type of plastic membrane will need to be placed at the bottom of the proposed swale.

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

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

Sincerely,

Bernie J. Montoya, CE
Engineering Assistant

BJM/dl/WPHYD/7485

xc: Alan Martinez
     Mark Harberts
     File

City of Albuquerque

P.O. BOX 1293   ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

March 3, 1987

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

RE: DRAINAGE PLAN FOR CONTINENTAL MANUFACTURING
     (E-17/D66) ENGINEER'S STAMP DATED FEBRUARY 26, 1987

Dear Jeff:

Based on the information provided on your submittal of February 26, 1987, the above referenced drainage plan is approved for Building Permit.

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

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

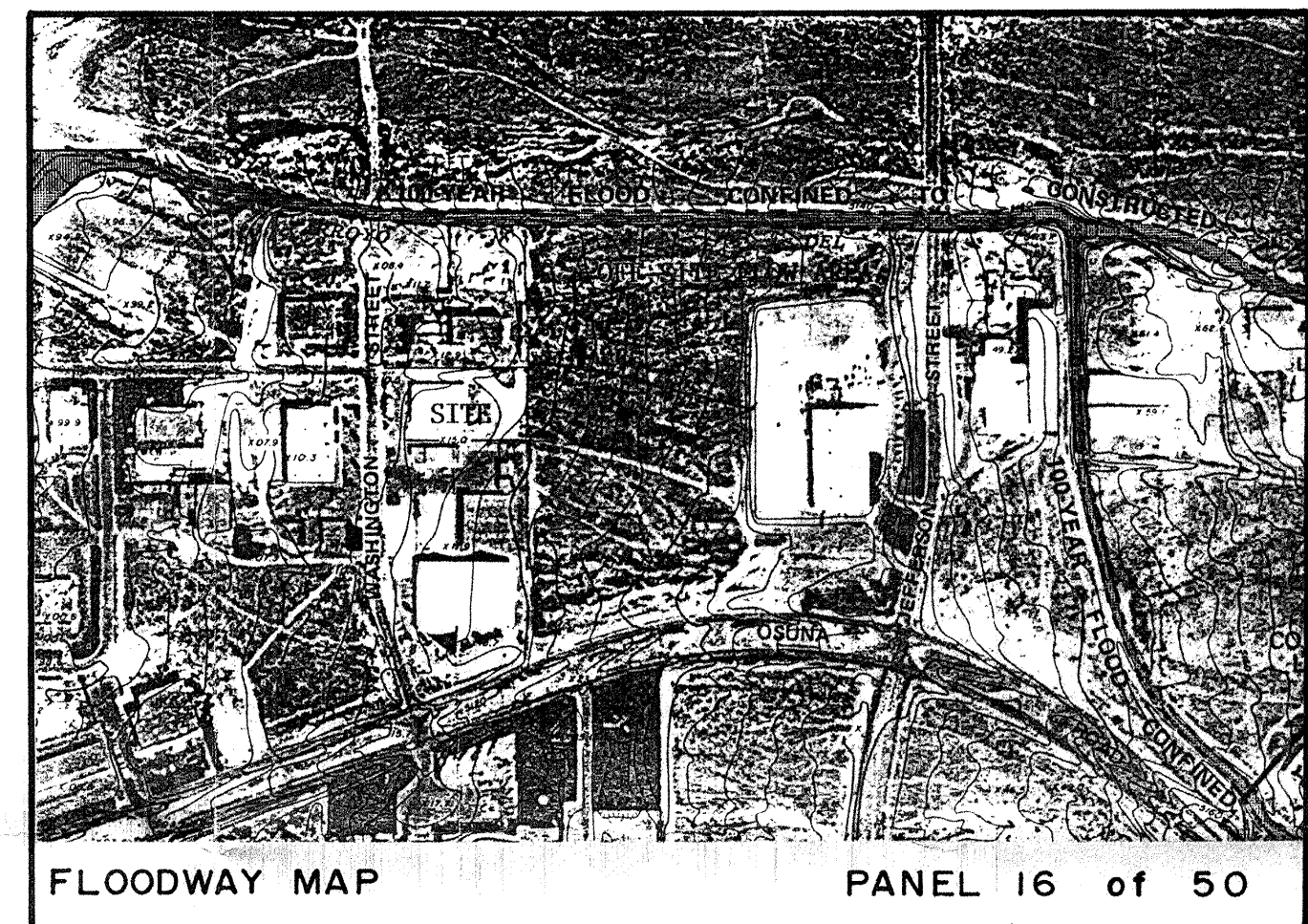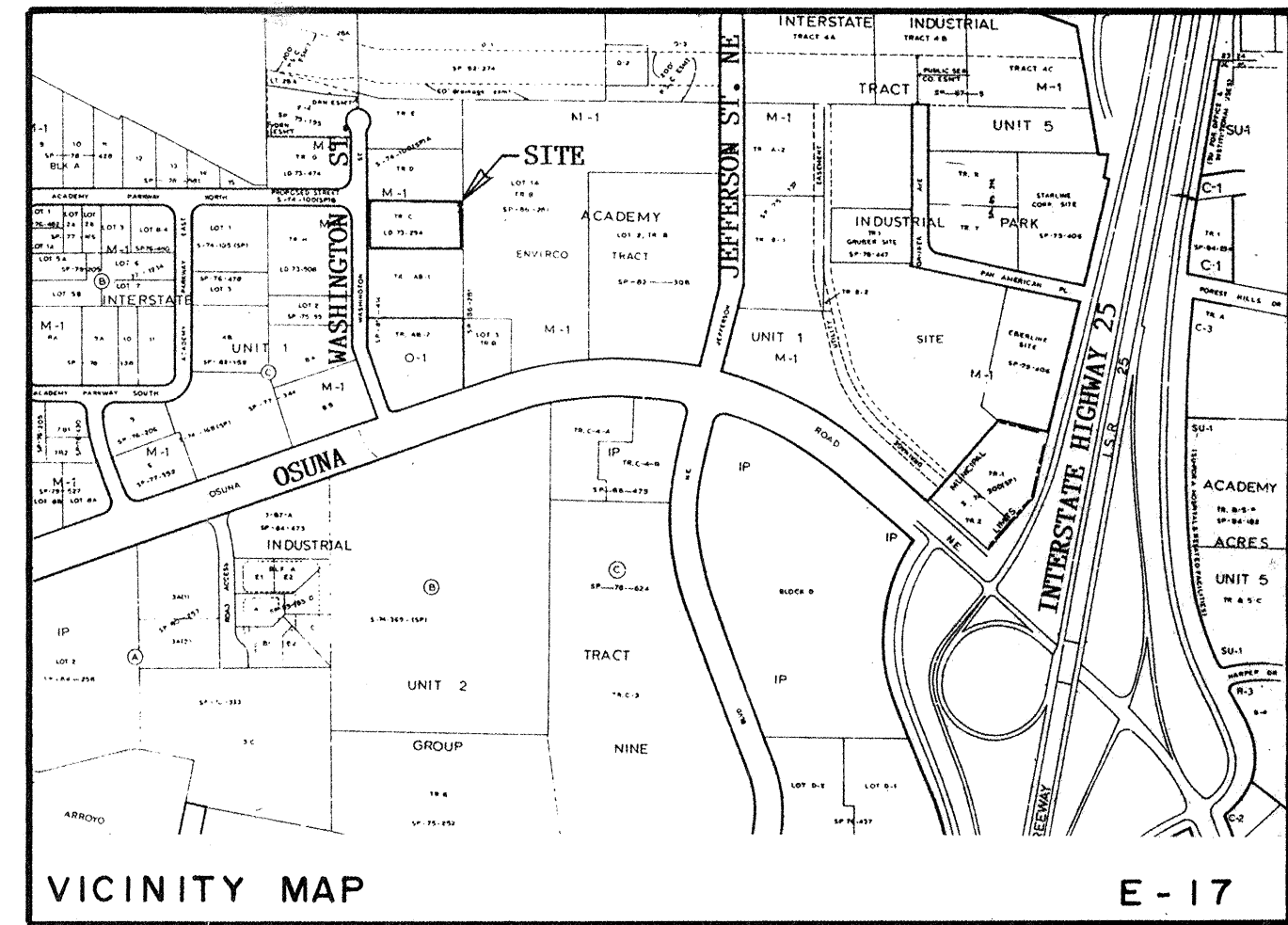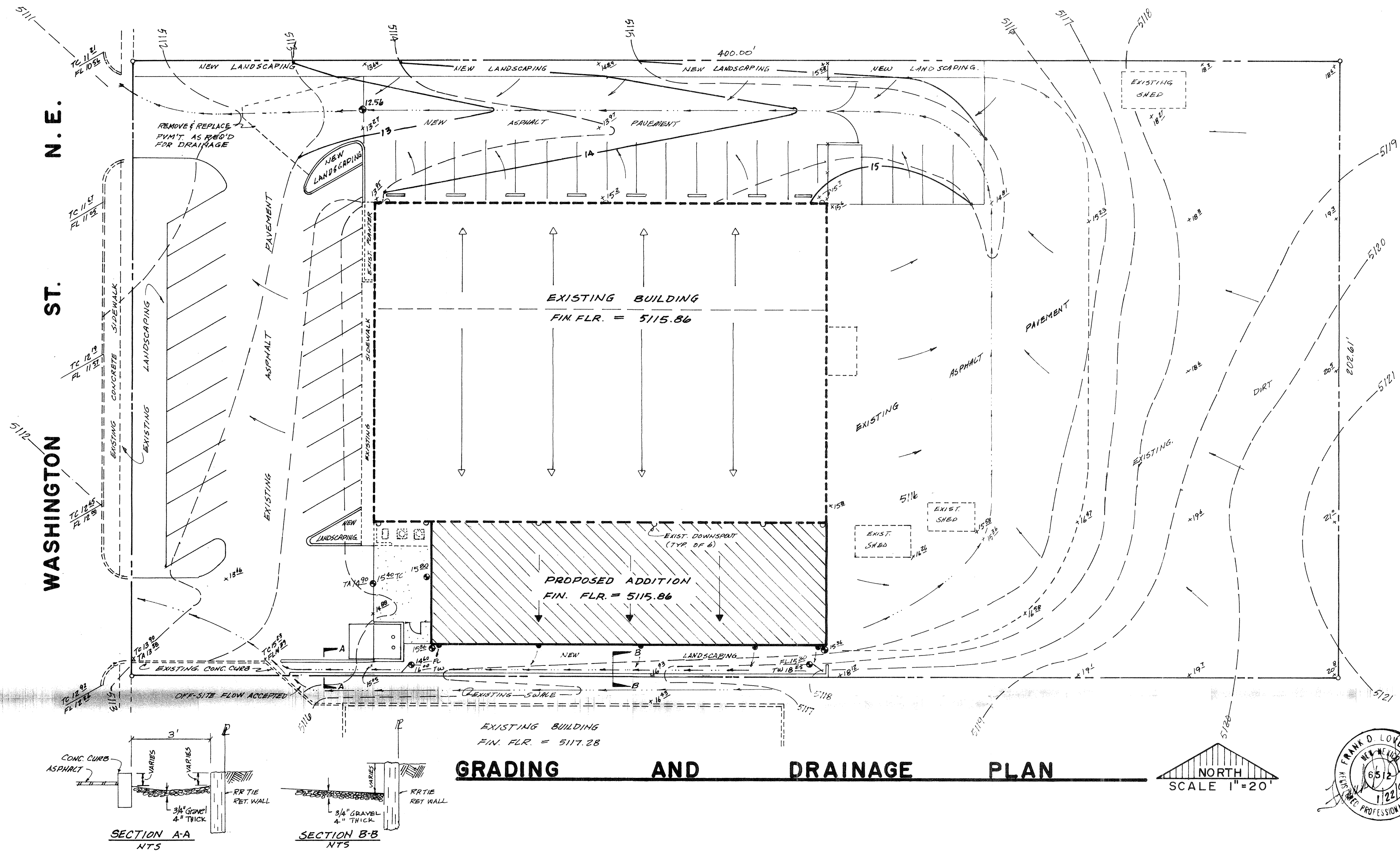for Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer   **ENGINEERING GROUP**   Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

NEW LANDSCAPING — NEW LANDSCAPING — NEW LANDSCAPING — NEW LANDSCAPING

400.00'

EXISTING SHED

REMOVE & REPLACE
PVM'T. AS REQ'D
FOR DRAINAGE

NEW LANDSCAPING

NEW ASPHALT PAVEMENT

NEW LANDSCAPING

EXISTING BUILDING
FIN. FLR. = 5115.86

PAVEMENT

ASPHALT

EXISTING

EXIST. DOWNSPOT
(TYP OF 6)

EXIST.
SHED

EXIST.
SHED

PROPOSED ADDITION
FIN. FLR. = 5115.86

NEW LANDSCAPING

EXISTING SWALE

EXISTING BUILDING
FIN. FLR. = 5117.28

OFF-SITE FLOW ACCEPTED

GRADING AND DRAINAGE PLAN

NORTH
SCALE 1" = 20'

SECTION A-A
NTS

CONC. CURB
ASPHALT

SECTION B-B
NTS

RR TIE RET. WALL

3/4" GRAVEL 4" THICK

DRAINAGE CALCULATIONS

EXISTING CONDITIONS:

The site is located on the east side of Washington Street, N.E., approximately 700' north of Osuna Road, N.E. There is an existing 15,750 SF building on the site with a paved parking lot in the front of the building. There is some asphalt pavement at the rear of the building which is swaled to drain around the north side of the building. The north side of the building is presently unpaved. The south side of the building is also presently unpaved. The ground at the south property line is high so that drainage from the property to the south does not enter the site until it flows west and is intercepted by the existing concrete curb which channels it into the parking lot for this site. This off-site flow is accepted.

PROPOSED CONDITIONS:

Conditions in the front parking lot are proposed to remain essentially unchanged. Runoff from the new building addition will be taken by a gravel swale into the front parking lot and out through the south drive pad. Runoff from the north parking lot will drain out through the north drive pad. Runoff from the south roof of the existing building will run onto the roof of the proposed addition and discharge by gutters and downspouts.

SOIL INFORMATION:

(Refer to "Soil Survey of Bernalillo County, June 1977). Soil is EmB, Embudo gravelly fine sandy loam, 0 to 5 percent slopes, hydrologic soil group "B".

FLOODWAY MAP:

The floodway map inset shows the site depicted on the FEMA Floodway Map. The site does not lie within or adjacent to any designated flood zone.

RAINFALL, 100-YEAR, 6-HOUR:

(Refer to D.P.M., Plate 22.2 D-1). $R_6 = 2.2$ inches.

TIME OF CONCENTRATION:

(Use ten (10) minutes, minimum time of concentration).

RAINFALL INTENSITY:

(Refer to D.P.M., Plate 22.2 D-2).
$I = R_6 \times 6.84 \times Tc^{-0.51} = 2.2 \times 6.84 \times 10^{-0.51} = 4.65$ inches per hour.

SITE IMPERVIOUSNESS:

Surface Type	"C"	"CN"	Direct Runoff	Site Areas (Sq. Ft.) Existing	Developed
Building	0.90	98	2.00	15750	20950
Asphalt/Concrete	0.95	98	2.00	22750	31150
Gravel or Dirt	0.40	82	0.85	40744	24244
Landscaping	0.25	61	0.20	1800	4700
Totals				81044	81044

WEIGHTED "C" FACTOR:

Existing Conditions:

$$C_W = \frac{(15750 \times 0.90 + 22750 \times 0.95 + 40744 \times 0.40 + 1800 \times 0.25)}{81044} = 0.65$$

Proposed Conditions:

$$C_W = \frac{(20950 \times 0.90 + 31150 \times 0.95 + 24244 \times 0.40 + 4700 \times 0.25)}{81044} = 0.73$$

WEIGHTED DIRECT RUNOFF:

Existing Conditions:

$$DR_W = \frac{(15750 + 22750)2.00 + 40744 \times 0.85 + 1800 \times 0.20)}{81044} = 1.38$$

Proposed Conditions:

$$DR_W = \frac{(20950 + 31150)2.00 + 24240 \times 0.85 + 4700 \times 0.20)}{81044} = 1.55$$

PEAK DISCHARGE, 100-YEAR AND 10-YEAR:

Use Rational Method: $Q_{100} = C_W I A$

Existing Conditions:

$Q_{100} = 0.65 \times 4.65 \times (81044 / 43560) = 5.62$ cfs
$Q_{10} = 0.657 \times 5.62 = 3.69$ cfs

Proposed Conditions:

$Q_{100} = 0.73 \times 4.65 \times 1.86 = 6.31$ cfs
$Q_{10} = 0.657 \times 6.31 = 4.14$ cfs

VOLUME 100-YEAR AND 10-YEAR, 6-HOUR:

V_{100} = (Weighted Direct Runoff $\times$ Area) / 12

Existing Conditions:

$V_{100} = (1.38 \times 81044) / 12 = 9320$ cf
$V_{10} = 0.657 \times 9320 = 6123$ cf

Proposed Conditions:

$V_{100} = (1.55 \times 81044) / 12 = 10468$ cf
$V_{10} = 0.657 \times 10468 = 6877$ cf

OFF-SITE FLOW:

Area is approximately 1.4 acres and enters the site by sheet flow. The entire area is undeveloped. There is no indication that any flow is actually entering the property at this time.

$$Q_{100} = CIA = 0.40 \times 4.65 \times 1.40 = 2.6 \text{ cfs}$$

SWALE AT SOUTH PROPERTY LINE:

Building = 10500 + 5200 = 15700 sf; Landscaping = 1,400 sf; Total = 17100 sf

$$C_W = \frac{(15700 \times 0.90 + 1400 \times 0.25)}{17100} = 0.85$$

Q = CIA = 0.85 X 4.65 X (17100 / 43560) = 1.55 cfs Calculate the capacity of the channel between the refuse enclosure and the RR tie retaining wall by Manning's Equation. 3' wide channel, 6" deep. Slope = 0.0050 ft./ft.
N = 0.035 Vertical sides, A = 3 X 0.5 = 1.5 sf; P = 0.5 + 3.0 + 0.5 = 4.0'
R = A/P = 1.5 / 4 = 0.375
$V = (1.486 / 0.035)(0.375)^{2/3}(0.0050)^{1/2} = 1.56$ fps.
Q = AV = 1.5 X 1.56 = 2.34 cfs > 1.55 cfs capacity is adequate by Manning's Equation. Check Weir Equation at entrance. $Q = CLh^{3/2}$ C = 2.65 I = 3.0
$Q = 2.65 \times 3.0 \times 0.5^{2/3} = 2.81$ cfs

VICINITY MAP
E-17

FLOODWAY MAP
PANEL 16 of 50

LEGEND:

EXISTING	NEW	DESCRIPTION
5119	19	CONTOUR (N/A)
x 208	15 34	SPOT ELEVATION
		SHEET FLOW
		ROOF DRAINAGE
		SWALE / GUTTER
		DOWNSPOUT
		PROPERTY LINE
TA		TOP OF ASPHALT
TC		TOP OF CONCRETE
FL		FLOWLINE

BENCH MARK:

Station 10-D17 located along an electric transmission line, in an open field, 0.65 miles west of Highway I-25, and on the projected centerline of San Antonio Drive, N.E.
Elevation = 5109.28

LEGAL DESCRIPTION:

Tract C, Interstate Industrial Park, Unit 1, Section 26, T 11 N, R 3 E, Elena Gallegos Grant, Bernalillo County, New Mexico.

EROSION CONTROL NOTES:

The contractor shall be responsible for compliance with the following:
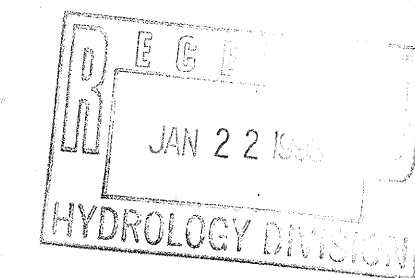
1. No sediment-bearing water shall be allowed to discharge from the site during construction.

2. During grading operations and until the project has been completed. All adjacent property, rights-of-way, and easements shall be protected from flooding by runoff from the site.

3. Should the contractor fail to prevent sediment-bearing water from entering public right-of-way, he shall promptly remove from the public right-of-way, any and all sediment originating from the site.

4. Control of sediment-laden waters will be accomplished by use of a compacted earth berm of adequate height. The berm shall be located along the downstream perimeter of the property.

AN ADDITION TO
CONTINENTAL MACHINING CO.

6824 WASHINGTON STREET, N.E.
ALBUQUERQUE, NEW MEXICO

Description

Date

Sheet

JAN 2 2
HYDROLOGY DIVISION

LEGAL DESCRIPTION

TRACT C, ACADEMY INDUSTRIAL PARK, UNIT I

T.B.M.

TOP OF EXIST. MANHOLE ON WASHINGTON ST. N.E. AT THE N.W. CORNER OF PROPERTY AS SHOWN HEREON. ELEVATION: 5110.99 FEET (M.S.L.D.)

PROJECT BENCHMARK

A SQUARE, ▢, CHISELED ON TOP OF CONCRETE CURB. LOCATED ON THE SOUTH SIDE OF OSUNA ROAD N.E. 040 MILES EAST OF THE CROSSING OF THE NORTH DIVERSION CHANNEL. ELEVATION: 5111.550 FEET (M.S.L.D.)

LEGEND

—5110—	EXISTING CONTOUR
—16—	PROPOSED CONTOUR
⊕	EXISTING SPOT ELEVATION
✦	PROPOSED SPOT ELEVATION
—×—×—	EXISTING CHAINLINK FENCE
☀	EXISTING TREE
	EXISTING SWALE
	PROPOSED SWALE

CONSTRUCTION NOTES:

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE 765-1234, FOR LOCATION OF EXISTING UTILITIES.

2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.

4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.

5. IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NONE ARE SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS UNDERTAKEN NO FIELD VERIFICATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE LINES AND FACILITIES.

EROSION CONTROL MEASURES

1. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC RIGHT-OF-WAY OR ONTO PRIVATE PROPERTY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AT THE PROPERTY LINES AND WETTING THE SOIL TO KEEP IT FROM BLOWING.

2. THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY SO THAT THE EXCAVATED MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.

3. THE CONTRACTOR SHALL SECURE "TOPSOIL DISTURBANCE PERMIT" PRIOR TO BEGINNING CONSTRUCTION.

VICINITY MAP
SCALE: 1" = 800'

E-17

DRAINAGE PLAN

The following items concerning the Continental Manufacturing Grading and Drainage Plan are contained hereon:
1. Vicinity Map
2. Grading Plan
3. Calculations

As shown by the Vicinity Map, this site is located on the east side of Washington Street N.E. between Osuna Road N.E. and Parkway North N.E. At present, the majority of the site is developed. Part of the surrounding area is also developed commercially. As shown by Plate E-17 of the Albuquerque Master Drainage Study, this site does not lie within a designated Flood Hazard Zone. Downstream flooding is not apparent and therefore does not appear to be a problem. At present, the site flows from east to west onto Washington Street N.E. From that point, runoff flows north along the east edge of Washington Street N.E. to an existing asphalt rundown located on the north side of the existing cul-de-sac in Washington Street N.E. No offsite flows enter this site along the east property line since the existing street routes runoff away from the project site. No offsite flows enter the site along the north property line since the existing lot is graded in a manner which will route runoff away from the project site. Some offsite flows enter the site along the east and south property lines. These flows which have been quantified in the calculations below will be accepted and conveyed through the project site.

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 grades, and 3) the limit and character of the proposed improvements. The proposed improvements consist of the construction of a new building. Flows generated by the proposed improvements will be routed from east to west onto Washington Street N.E. which is consistent with existing site drainage pattern. From that point, runoff will flow north along the east edge of Washington Street N.E. to the aforementioned asphalt rundown. From that point, runoff enters the Arroyo del Pino which is the outfall for this site. Based upon the fact that this site is adjacent to the Arroyo del Pino Channel and a minor increase in runoff, the free discharge for this site is appropriate.

The Calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The Rational Method has been used to quantify the peak rate of discharge and the SCS Method has been used to quantify the volume of runoff. Both Methods have been used in accordance with the City of Albuquerque Development Process Manual, Volume II and the Mayor's Emergency Rule adopted January 14, 1986. As shown by these calculations, the proposed improvements will result in an increase in runoff. The increase in runoff will be approximately 0.3 cfs.

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey,
Plate: 21, EmB - Embudo 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)

Time of Concentration/Time to Peak

$T_C = 0.0078 \, L^{0.77}/S^{0.385}$ (Kirpich Equation)

$T_p = T_C = 10$ min.

Point Rainfall

$P_6 = 2.2$ in. (DPM Plate 22.2 D-1)

Rational Method

Discharge: $Q = CiA$

where C varies
$i = P_6 \,(6.84)\, T_C^{-0.51} = 4.65$ in/hr
$P_6 = 2.2$ in (DPM Plate 22.2D-1)
$T_C = 10$ min (minimum)
A = area, acres

SCS Method

Volume: $V = 3630(DRO) \, A$

Where DRO = Direct runoff in inches
    A = area, acres

Existing Condition

A_{total} = 81,044 sf = 1.86 Ac
Roof area = 16,025 sf (0.20)
Paved area = 14,660 sf (0.18)
Landscaped area = 50,359 sf (0.62)
C = 0.51 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = (0.51)(4.65)(1.86) = 4.4 cfs
A_{imp} = 30,685 sf; % impervious = 38 %
Composite CN = 75 (DPM Plate 22.2 C-3)
DRO = 0.55 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 3,710 cf

Developed Condition

A_{total} = 81,044 sf = 1.86 Ac
Roof area = 20,435 sf (0.25)
Paved area = 14,660 sf (0.18)
Landscaped area = 45,949 sf (0.57)
C = 0.54 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = (0.54)(4.65)(1.86) = 4.7 cfs
A_{imp} = 35,095 sf; % impervious = 43 %
Composite CN = 78 (DPM Plate 22.2 C-3)
DRO = 0.60 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO) A = 4050 cf

Offsite Flows

A_{total} = 10,080 sf = 0.23 Ac
C = 0.40 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = (0.40)(4.65)(0.23) = 0.4 cfs
A_{imp} = -0- sf; % impervious = 0 %
Composite CN = 70 (DPM Plate 22.2 C-3)
DRO = 0.35 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO) A = 290 cf

Comparison

ΔQ_{100} = 4.7 - 4.4 = 0.3 cfs (increase)
ΔV_{100} = 4050 - 3710 = 340 cf (increase)

EXIST. BLDG.
F.F. = 5115.91

PROPOSED BUILDING
F.F. = 5115.91

TRACT D

TRACT B

TRACT AB-1

SCALE: 1" = 20'

JEFFREY G. MORTENSEN — NEW MEXICO — 8547 — REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	BY	REVISIONS		

DESIGNED BY: L.P.U.
DRAWN BY: R.A.R.
APPROVED: J.G.M.

JOB NO. 61841
DATE 01/87

BOHANNAN HUSTON ASSOCIATES INC
811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110
ENGINEERS

GRADING & DRAINAGE PLAN

CONTINENTAL MANUFACTURING

FILE NO.

SHEET 1 OF 1