HYDROLOGY

L14/D1B

NEW OFFICE BLDG.

L14-D1B

1 PLAN

8 INFORMATION SHEET 0

PROJECT TITLE New Office Building - MRGCD TYPE OF SUBMITTAL Drainage and Grading Plan

ZONE ATLAS PAGE NO. L - 14 D16 CITY ADDRESS ----------

LEGAL DESCRIPTION Tract C - South Barelas Industrial Park Unit One

ENGINEERING FIRM Resource Technology, Inc. CONTACT Elvidio V. Diniz

ADDRESS 7800 Marble Ave. NE, Suite 5 Albuquerque, NM 87110 PHONE 266 3320

OWNER Middle Rio Grande Conservancy District CONTACT Subhas Shah

ADDRESS P.O. Box 581 Albuquerque, NM 87103 PHONE 243 6796

ARCHITECT Boehning Protz Cook & Assoc. P.A. CONTACT David Dekker

ADDRESS 110 Second St. NW, Suite 5 PHONE 242 4044

SURVEYOR MRGCD CONTACT

ADDRESS PHONE

CONTRACTOR ---------- CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

✓ YES
___ NO
___ COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
✓ GRADING/PAVING PERMIT APPROVAL
___ OTHER _____ (SPECIFY)

RECEIVED JAN 25 1984 HYDROLOGY SECTION

DATE SUBMITTED: January 25, 1984

BY: Elvidio V. Diniz, P.E.

RESOURCE TECHNOLOGY, INCORPORATED

7800 MARBLE AVENUE NE, SUITE 5
ALBUQUERQUE, NEW MEXICO 87110
(505) 266-3320

C-14-D16

January 25, 1984

Mr. Fred Aguirre, P.E.
Asst. Civil Engineer/Hydrology
Municipal Development Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Attn.: Mr. John Armstrong, P.E.

Dear Mr. Aguirre:

Our drainage report for the new Middle Rio Grande Conservancy Office Building is attached. This report addresses all of your comments in our previous discussions and I hope that the proposed plan meets with your approval.

If you have any questions regarding this submittal, please give me a call.

Very truly yours,

Elvidio V. Diniz

Elvidio V. Diniz, P.E.
Principal Engineer

EVD:ob
attachment

RECEIVED
JAN 25 1984
HYDROLOGY SECTION

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

February 20, 1984

Mr. Elvidio V. Diniz, PE
Resource Technology, Inc.
7800 Marble Avenue NE, Suite 5
Albuquerque, NM 87110

REF: MRGCD OFFICE DRAINAGE PLAN (L14-D1B)

Dear Mr. Diniz:

The above mentioned plan, as received January 25, 1984, is hereby approved. Please be sure that the approved plan as well as approved copies of "Drainage Facilities Within City Right-of-Way" documents are attached to the permit sets prior to submittal to Hydrology for sign-off.

It should be noted that the grades in the parking area are extremely flat and that there will be bird baths which will cause damage to pavement due to freeze-thaw. This could be helped considerable by increasing the cross slope to the swale and, if the swale really needs to be as flat as it is shown, concreting the invert.

If you have any further questions, please feel free to contact me at 766-7644.

Thank you,

John Armstrong
Civil Engineer/Hydrology

JA:mrk

DRAINAGE STUDY
FOR A NEW OFFICE BUILDING
MIDDLE RIO GRANDE CONSERVANCY DISTRICT
ALBUQUERQUE, NEW MEXICO

prepared for
Boehning Protz Cook and Associates, P.A.
110 Second Street SW, Suite 500
Albuquerque, New Mexico 87102

by
E. V. Diniz, P.E.
S. K. Dell
Resource Technology, Inc.
7800 Marble Avenue NE, Suite 5
Albuquerque, New Mexico 87110

January 25, 1984

RECEIVED
JAN 25 1984
HYDROLOGY SECTION

ELVIDIO DINIZ
NEW MEXICO
Elvidio Diniz
Number 71
REGISTERED PROFESSIONAL ENGINEER

INTRODUCTION

The Middle Rio Grande Conservancy District (MRGCD) plans to construct a new office building on Tract C - South Barelas Industrial Park, Unit One. The building is being designed by the architectural firm of Boehning Protz Cook and Associates, P.A. This drainage report, prepared by Resource Technology, Incorporated (RTI), presents an analysis of existing and proposed drainage conditions on this tract. All topographic information for this analysis was provided by the MRGCD through Boehning Protz Cook and Associates.

This drainage analysis has been prepared in accordance with the criteria set forth in the City of Albuquerque Development Process Manual.

SITE LOCATION AND DESCRIPTION

The tract lies in southwest Albuquerque, north of Southern Avenue between Fourth Street and Second Street. The entire tract is about 460 feet wide and extends approximately 730 feet north of Southern Avenue as shown in Figure 1. However, only the southern third of the property is to be developed at the present time and this drainage report and grading plan will address only the affected area.

The property is generally sloping from the northeast corner to the southwest corner at approximately 1%. The southern section slopes more directly from east to west.

A soils report prepared by the U.S. Soil Conservation Service and entitled "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico", classifies this area in the Brazito soil series which falls within Hydrologic Soil Group A. Existing vegetation consists of grasses, weeds and several large trees. A copy of the soils map for this area is shown in Figure 2.

DRAINAGE ANALYSIS

Storm runoff was analyzed using the Rational Equation, Q = CIA. The study area was divided into the 3 subareas shown on Plate 1; and Table 1 shows the expected impervious area in each subarea. Values for the runoff coefficient, C, were obtained from the DPM Plate C-1. These values ranged from 0.16 for undeveloped conditions; to 0.25, 0.34 and 0.49 in the developed condition, corresponding to subareas A, B, and C, respectively.

The physical characteristics of the subareas and corresponding computations for the time of concentration, T_c, for each subarea are presented in Table 2. For the northeastern subarea (A), T_c was determined to be 19 minutes. In subarea B, the T_c was approximately 5 minutes; therefore, a default value of 10 minutes was used. T_c was determined to be 10 minutes for subarea C. Corresponding rainfall intensity values were obtained from DPM Plates D-1 and D-2. This information is shown in Table 3.

Off Site Flows

The property is bounded on three sides by paved roads with curbs and gutters which carry all existing on and off site flows to drain inlets at the intersection of Southern Avenue and Fourth Street, and on Second Street. Along the north boundary, runoff is directed southwest onto Fourth Street. Consequently, no off site flows will affect the building site.

On Site Flows

At present, runoff is in the form of surface sheet flow across the property with drainage onto Fourth Street where it is carried to the existing storm sewer inlets. The existing condition peak runoff rate, for the area being studied was determined to be 2 cfs for the 100-year rainfall, as shown in Table 4.

The northwestern half of the tract is not being developed at this time. Runoff from this subarea is presently draining onto Fourth Street where it is carried to the existing storm sewer inlets. As this area does not affect the

developed portion of the tract and the runoff is being adequately taken care of, flow from this area is not considered in this report.

The proposed drainage plan is to convey the runoff from the building and parking areas around the north side of the building and through the parking area in a V-shaped (triangular) asphalt channel, 3 inches deep and side slopes of 3 inches in 32 feet. The alignment for this channel will be the centerline of the circular parking area. Flow will then be carried to the nearest storm sewer inlet at the corner of Fourth Street and Southern Avenue through a grated inlet in the landscaped area at the southwest corner of the property. Runoff from the rest of the site (the landscaped area along Southern Avenue) will be carried along the south side of the building to the grated inlet in the southwest corner.

Because native vegetation landscaping is planned for the area, it would be desirable to hold as much water as possible on the site. This will be accomplished with a series of shallow ponds. These ponds will run along the south side of the property, which is all landscaped, and around the north side of the building, in the landscaped area between the building and the parking area. Each pond will be a depression of the landscaped area. The low point will be approximately 8 inches below the boundary sidewalk or at least 16 inches below the finished floor elevation, but the outlet will be only 4 inches above the low point. Therefore, only 4 inches of dead storage are possible (prior to any sedimentation); and 4 inches of temporary operating storage are available, if needed, before overflow at undesirable locations can occur. Also, the ponds will be graded such that, at a full depth of 8 inches of water, ponding will occur at least 10 feet away from any building wall. The proposed ponds and recommended low point elevations are also shown on Plate 1. This storage provides for supplemental water to landscaped areas only; when calculating the maximum flow rate to the grated inlet, storage in these ponds was not considered, and total runoff from all areas was assumed.

Calculation of runoff rates and volumes for existing conditions and the planned future condition are presented in Table 4. The expected 100-year flows for subareas A, B, and C are 2.4, 2.7 and 0.4 cfs, respectively. Although the peak flows from the 3 subareas will not be coincidental, the sum total of the three flows will be much lower than the capacities of the 3 ft. X 4 ft. grated

inlet (New Mexico State Highway Department Type II drop inlet), and the 12-inch diameter connector pipe to the storm sewer inlet. These computations are shown in Table 5.

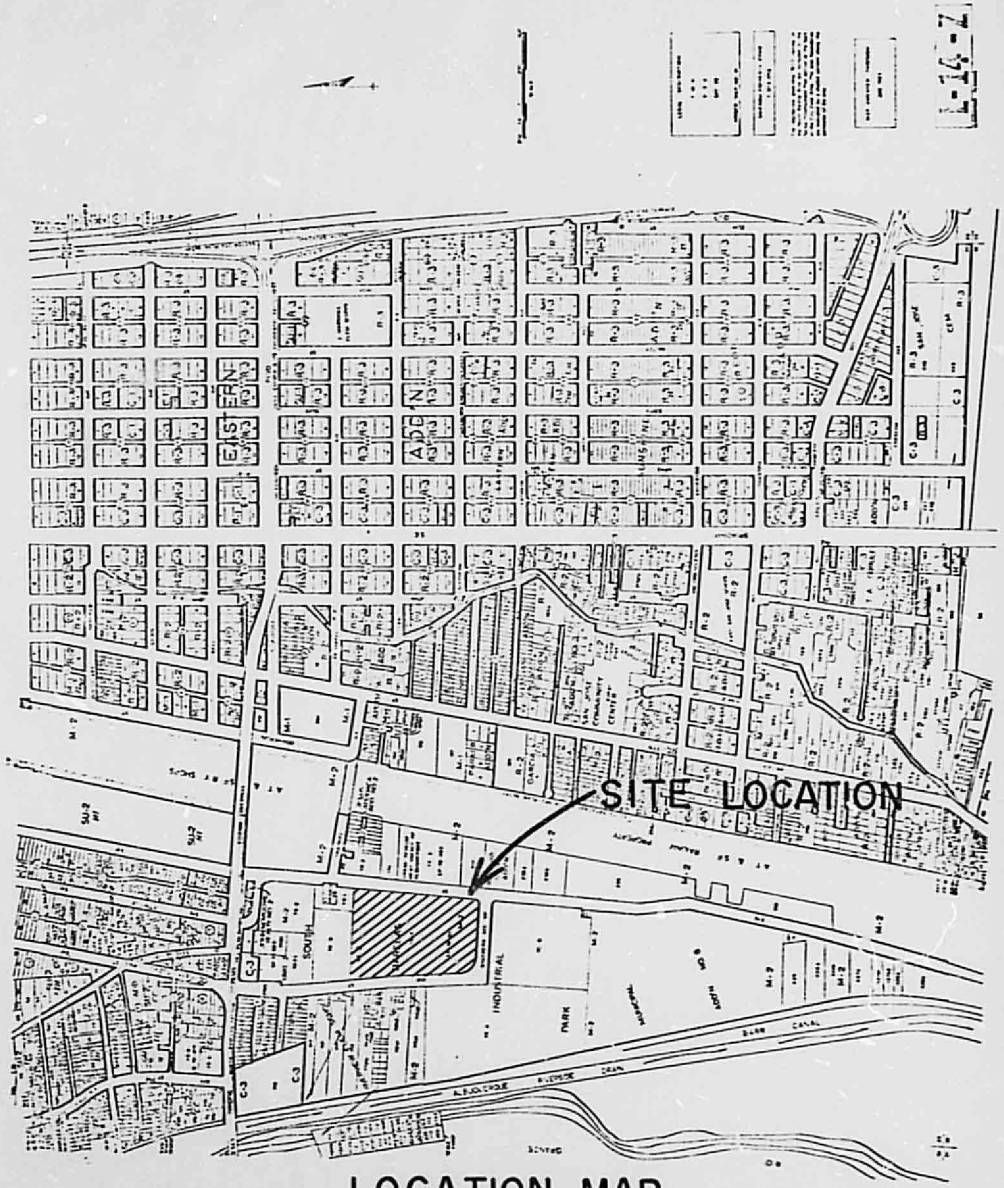
GRADING PLAN

The proposed grades based on this drainage analysis are shown on Plate 1. Although the proposed floor elevation of 44.0 feet for the building is lower than the elevation of Second Street to the east, water in Second Street would have to flow over the curb before it could approach the building. This depth of water in Second Street is unlikely because Southern Avenue would drain away the water before it could build up on Second Street. To prevent water from Second Street from entering the parking area through the eastside driveway, the existing back of sidewalk elevation will be retained as a water block. Similarly, the back of sidewalk elevation along the Fourth Street driveway will be retained as a water block to confine all flows on site, and directed towards the grated inlet.

Also, the planned finished floor elevation is 8 inches above the adjacent landscaped areas, so that the site will have to be severely flooded (over 20 inches in the parking area) before water could enter the building. Again, this is very unlikely.

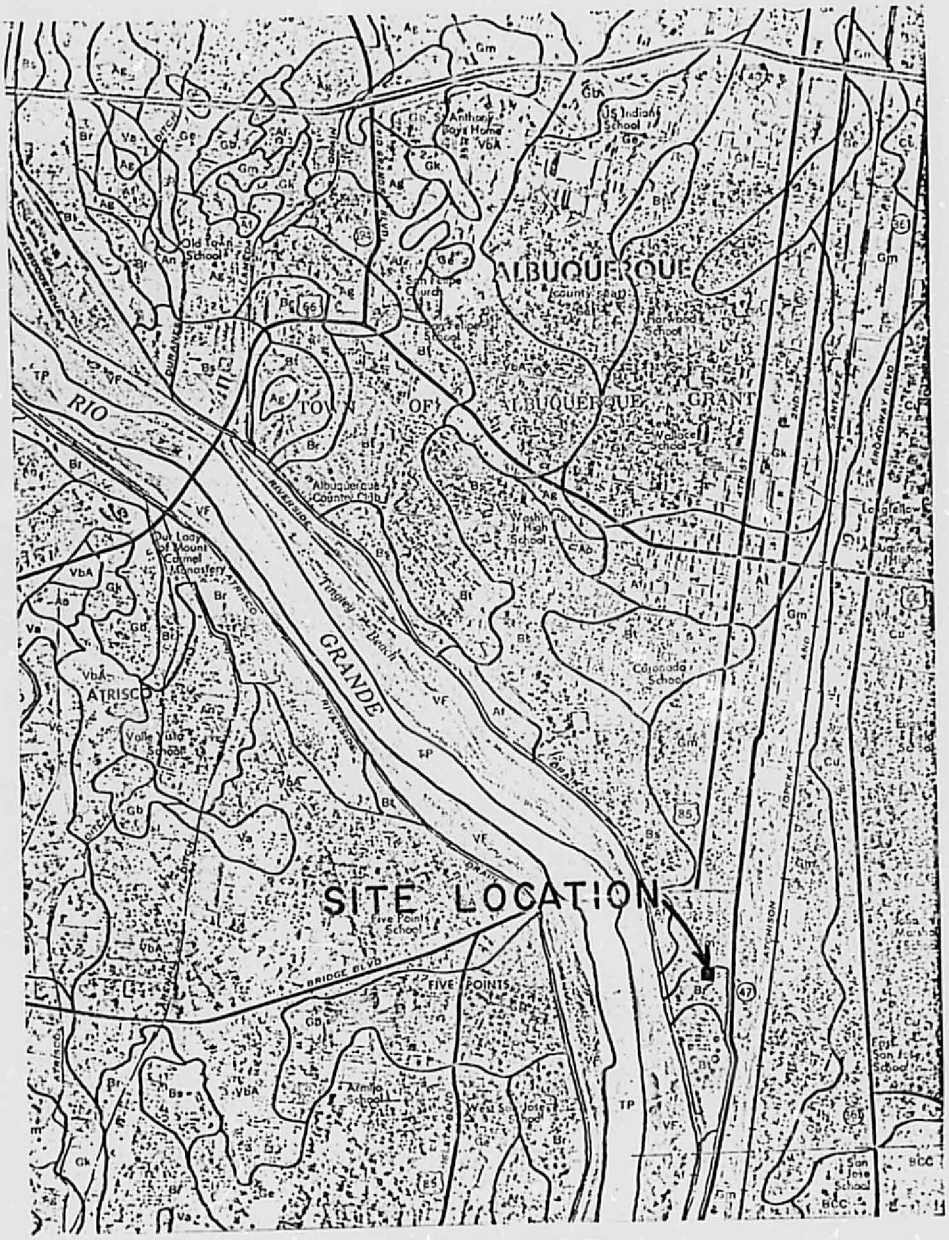
Flows from upstream (northeast) of the parking area will be diverted by the northern parking area curb into the islands that jut out into the parking area, and then released into the parking area through 4 in. X 4 in. cuts in the curbs forming the islands. This routing of flows will assist in increasing the amount of water available to the native vegetation which will be planted inside the islands. Similar to the ponding areas, this detention of flows was not accounted for in the sizing of the downstream discharge facilities.

Consequently, the proposed plan will be more than adequate to handle all flows generated by the project, with a large safety margin throughout. Future expansion of development at the site will reduce this safety margin. but the discharge structures will still remain capable of handling all flows resulting from full development of the entire site.



LOCATION MAP

FIGURE I



SOILS MAP

FIGURE 2

TABLE 1

TRACT BREAKDOWN

EXISTING CONDITIONS

Total area is undeveloped at present — 196,936 ft^2

PROPOSED CONDITION

Area A

Impervious		
parking lot		19,205
sidewalk		2820
		22,025
Pervious		
landscaped area		10,364
natural ground		84,958
		95,322
Total Area	117,347 ft^2	

Area B

Impervious		
building		10,150
parking lot		16,606
sidewalks		3414
		30,170
Pervious		
landscaped area		6751
natural ground		6591
		13,342
Total Area	43,512 ft^2	

Area C

Impervious		
0		—
Pervious		
landscaped area		18,964
Total Area	18,964 ft^2	

Note: 17,113 ft^2 will drain to Fourth Street after development of tract.

TABLE 2

NAME	AREA (acres)	LEN. of flow path	MAXIMUM ELEV.	MINIMUM ELEV.	ΔH	SLOPE	Computed Tc (minutes)	Computed Velocity (ft/sec) (>3 ft/sec to be valid)	Overland/Street flow Velocity (ft/sec) (plate 22.2 B-1 or 2)	Actual Tc (minutes)
UNDEVELOPED	4.52	868	46.06	40.1*	6.0	0.0069	9.7	1.49	0.47	31
A - impervious	0.51	35'	41.06	40.96	0.1	0.0029	—	—	1.50	0.39
A - pervious	2.19	590'	46.06	41.06	5.0	0.0085	—	—	0.53	18.73
A - Total	2.70	625'	46.06	40.96	5.1	0.0082	7.1	1.48	—	19.12
B - impervious	0.68	195	40.80	39.95	0.8	0.0041	—	—	1.70	1.91
B - pervious	0.31	150	43.6*	40.80	3.0	0.0200	—	—	0.85	2.94
B - Total	0.99	335	43.6*	39.95	3.8	0.0113	3.85	1.45	—	4.85
C - impervious	0.0									
C - pervious	0.44									
C - Total	0.44	415	45.16	39.62	5.54	0.0133	4.26	1.62	0.65	10.64

* INTERPOLATED FROM CONTOUR MAP

TABLE 3

NAME	AREA (acres)	FLOW DEPTH (in) 100yr	10yr	2yr	Intensity Factor (plate D-2)	Intensity (in/hr) (plate D-2) 100yr	10yr	2yr	% Impervious	"C" factor (plate C-1)
UNDEVELOPED	4.52	2.25	1.48	1.00	1.20	2.70	1.78	1.20	0	0.16
AREA A	2.70	"	"	"	1.55	3.49	2.29	1.55	19	0.25
AREA B	0.99	"	"	"	2.20	4.49	3.26	2.20	69	0.55
AREA C	0.44	"	"	"	2.20	4.49	3.26	2.20	1	0.17

TABLE 4

FLOW RATES & VOLUMES

	AREA (acres)	"C" factor (plate C-1)	i (Intensity) 100yr	10yr	2yr	Q (cfs) 100yr	10yr	2yr	Volume (ft³) 100yr	10yr	2yr
UNDEVELOPED	4.52	0.16	2.70	1.78	1.20	1.95	1.29	0.87			
AREA A	2.70	0.25	3.49	2.29	1.55	2.36	1.55	1.05	5878	3527	2449
AREA B	0.99	0.55	4.49	3.26	2.20	2.70	1.78	1.20	2985	1990	1761
AREA C	0.44	0.17	4.49	3.26	2.20	0.38	0.25	0.16	1747	1165	544

TABLE 5

INLET

$Q = CLH^{3/2}$

$Q = 5.4$ cfs

$C = 2.2$

$L = 2(3' + 4') = 14'$

$L_{eff} = 0.75 \times 14 = 10.5'$ for effect of bars

$$H^{3/2} = \frac{5.4}{2.2} \times 10.5 = 0.234$$

$H = 0.38$ ft

∴ Inlet will not be submerged.

PIPE

$$h_L = f \frac{LV^2}{D\,2g}$$

$f = 0.04$

$L = 15.5'$

$V = \text{area} \times Q = .79\ ft^2 \times 5\ cfs = 3.93$ fps

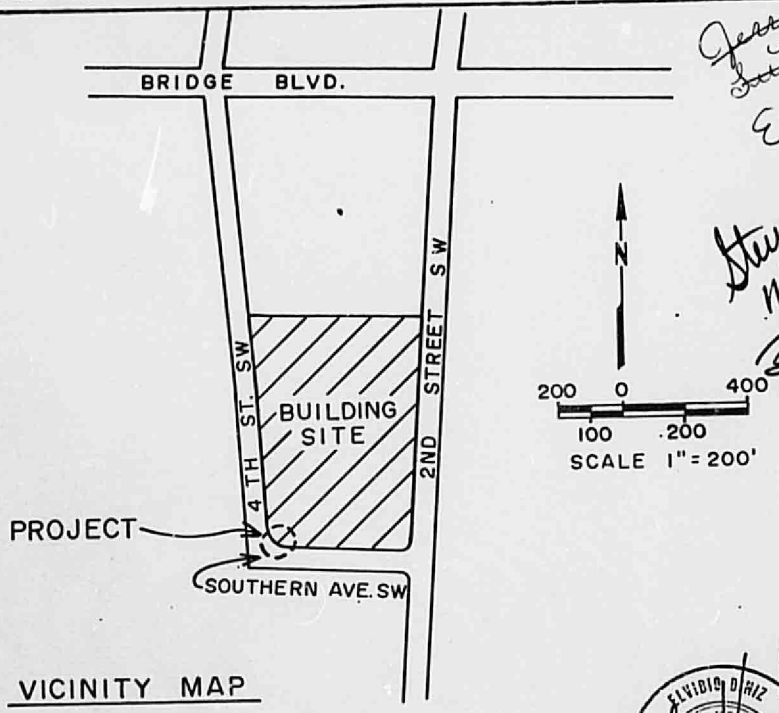
$D = 1'$

$g = 32.2$ ft/sec^2

$h_L = 0.15'$

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



VICINITY MAP

OWNER:
Middle Rio Grande Conservancy District
P.O. Box 581
Albuquerque, New Mexico 87103

ELVIDIO DIAZ
NEW MEXICO
7111
REGISTERED PROFESSIONAL ENGINEER

NOTICE TO CONTRACTOR

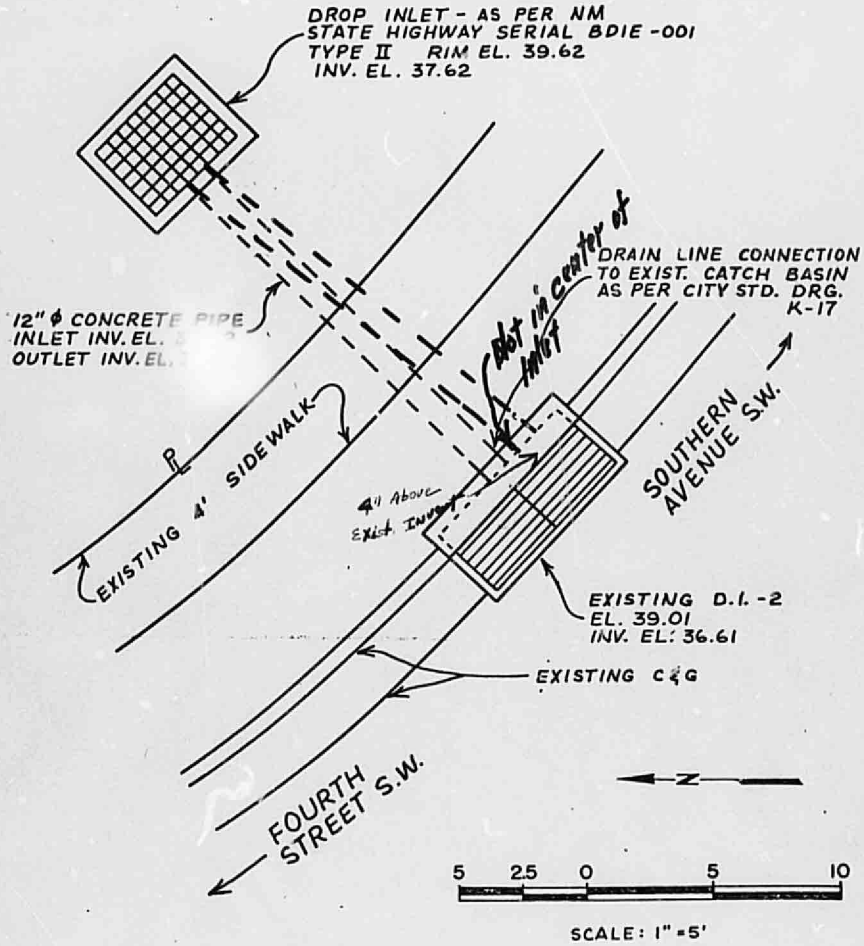
1. An excavation/construction permit will be required before beginning any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.
2. All work detailed on these plans to be performed, except as otherwise stated or provided hereon, shall be constructed in accordance with "Contract Documents for Public Works Contract No. 84 - 1 "
3. Two working days prior to any excavation, contractor must contact Line Locating Service, 765-1234, for location of existing utilities.
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to COMMERCIAL street use.

Wylie Corp. Okay Tom D-49

APPROVALS	NAME	DATE	TITLE: JUNCTION STRUCTURE TO CATCH BASIN NEW M.R.G.C.D. OFFICE BUILDING 200 SOUTHERN SW	
A.C.E./DESIGN	[illegible]	23 Mar 84		
INSPECTOR	Ernest Vallejos	11/2/84	PERMIT NO. 16230	MAP
A.C.E./FIELD	[illegible] McNamara	11/2/84	SHEET 1 OF 2	NO. L-14

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



Wylie Corp.

D-49

APPROVALS	NAME	DATE	TITLE: JUNCTION STRUCTURE TO CATCH BASIN NEW M.R.G.C.D. OFFICE BUILDING 200 Southern SW	
A.C.E./DESIGN	G Kelsch	23 Nov 84		
INSPECTOR	Ernest Jolly	11/2/84	PERMIT NO. 16230	MAP
A.C.E./FIELD	W.T. McNamara	11/2/84	SHEET 2 OF 2	NO. L-14