Hydrology M16/D13c Saic Bldg.

M 16/D/3c

Saic Bldg.

1 Plan

PROJECT BENCHMARK

THE STATION IS A 3¼" ALUMINUM TABLET SET FLUSH IN THE CONCRETE PAVEMENT. STATION IS STAMPED "ACS C-8A, 1984." THE STATION IS LOCATED 3 MILES SOUTHEAST OF DOWNTOWN ALBUQUERQUE IN THE INTERSECTION OF GIBSON BLVD. & GIRARD BLVD.
ELEVATION = 5296.421 FEET (M.S.L.D.)

TBM

S.W. CORNER OF THE 4'-0" x 5'-5" CONCRETE PAD LOCATED APPROXIMATELY 82 FEET FROM THE PT. OF THE S.E PROPERTY CORNER, AS SHOWN ON THE DRAWING.
ELEVATION = 5288.84 FEET (M.S.L.D.)

LEGAL DESCRIPTION

LOTS G, 7 & 8, AIRPORT BUSINESS PARK REPLATTED INTO LOT 6A

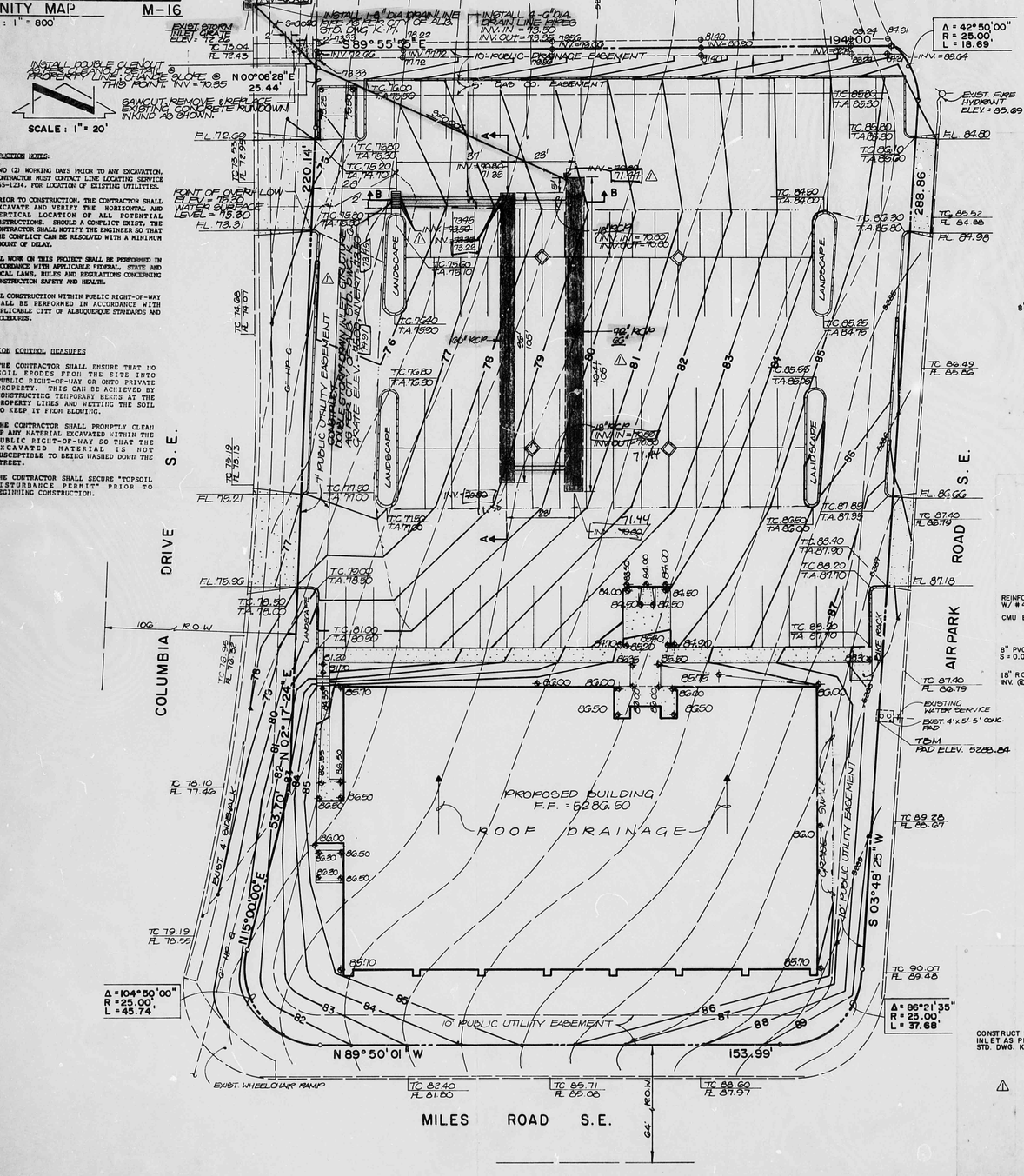
TOPOGRAPHIC SURVEY

PREPARED BY SOUTHWEST SURVEYING CO. AND PROVIDED BY OWNER.

LEGEND

- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- 5G — PROPOSED CONTOUR
- 585G — EXISTING CONTOUR
- SWALE
- PROPERTY LINE
- CONCRETE
- PROPOSED ASPHALT
- PROPOSED FENCE
- x — x EXISTING FENCE
- T.C. 02.00 TOP OF CURB
- F.L. 01.65 FLOW LINE

VICINITY MAP M-16
SCALE : 1" = 800'



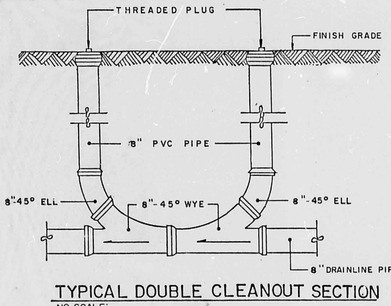
SCALE : 1" = 20'

CONSTRUCTION NOTES:

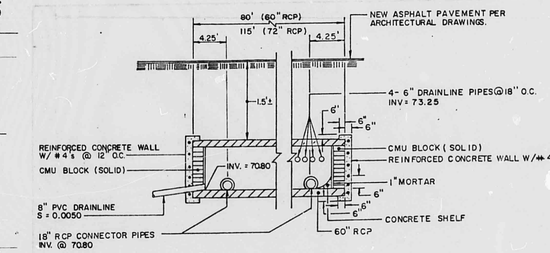
1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE 765-1234, FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, 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.

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.

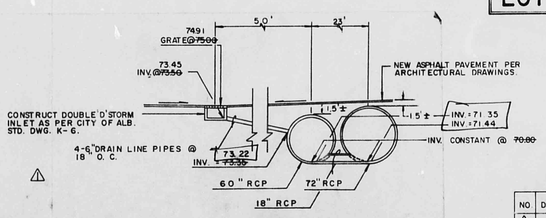


TYPICAL DOUBLE CLEANOUT SECTION
NO SCALE.



SECTION A-A (SIMILAR FOR 72" RCP RUN)
NOT TO SCALE.

NOTE:
1. ALL JOINTS SHALL BE GROUTED WITH NON-SHRINK GROUT INSIDE AND OUTSIDE.
2. COMPACT ALL BACKFILL AROUND PIPES TO 95% MAXIMUM DENSITY (A.S.T.M.-1557) TO FINISHED SUBGRADE.



SECTION B-B
NOT TO SCALE

DRAINAGE PLAN

The following items concerning the SAIC 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 northeast corner of the intersection of Columbia Drive S.E. and Miles Road S.E. Much of the surrounding area is currently developed, thereby making this an infill site.

As shown by Plate M-16 of the Albuquerque Master Drainage Study, this site does not lie within a designated Flood Hazard Zone, however, downstream flooding is a concern. Because of this, flows generated by this site will be routed through an onsite private storm drain facility which will discharge these flows at a controlled rate. Based under the previously approved Master Drainage Plan for the Airport Business Park, the proposed site consisted of three lots which were allowed a 0.5 cfs discharge each. This results in a total allowable discharge from this site of 1.5 cfs. Presently, runoff which is mainly in the form of sheetflow drains from east to west onto Columbia Drive S.E. From this point, the runoff flows north along the east edge of Columbia Drive S.E. to an existing public drain system located within Columbia Drive S.E.

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 porposed improvements, and 3) continuity between existing and proposed grades. As shown by this plan, the proposed improvements consist of the construction of a new office building along with adjacent paving and landscaping. Flows generated by this site will be routed to a private storm drain inlet located on site. From that point, flows will drain to an underground pipe storage system. This system will discharge flows directly to an existing storm drain inlet located in Columbia Drive S.E. at a controlled rate. No offsite flows will enter the project site since the site is surrounded by paved public streets which convey flows around the site. In addition, a public drainage channel has recently been constructed to drain flows from Air Park Road S.E. to Columbia Drive S.E. This channel was part of a City Work Order.

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 for this analysis in accordance with the City of Albuquerque Development Process Manual, Volume II. The analysis of the pipe storage release rate is based upon the Orifice Equations. The analysis of the pipe storage system volume is based upon "properties of the Circle". As shown by these calculations, the proposed improvements will result in a net increase in peak runoff of approximately 0.4 cfs.

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey, Plate 31:
CU - Cut and Fill Land
Hydrologic Soil Group A

Rational Method

Discharge: $Q = CIA$
where C varies
$= P_6/6.84$ $T_c^{-0.51} = 4.84$ in./hr
$P_6 = 2.29$ in (DPM Plate 22.2 D-1)
$T_c = 10$ min (minium)
A = area, acres

Volume: $V = CP_6A(1/12)$
where C varies
$P_6 = 2.29$ in (DPM Plate 22.2 D-1)
A = area, sf

Existing Condition

$A_{total} = 64,660$ sf = 1.48 Ac
$A_{imp} = 0$ sf; % impervious = 0%
$C_{100} = 0.16$ (DPM Plate 22.2 C-1)
$Q_{100} = CIA = (0.16)(4.84)(1.48) = 1.1$ cfs
$V_{100} = CP_6A = (0.16)(2.29/12)(64,660) = 1,975$ cf

Developed Condition

$A_{total} = 64,660$ sf = 1.48 Ac
$A_{imp} = 51,965$ sf; % impervious = 80%
$C_{100} = 0.64$ (DPM Plate 22.2 C-1)
$Q_{100} = CIA = (0.64)(4.84)(1.48) = 4.6$cfs
$V_{100} = CP_6A = (0.64)(2.29/12)(64,660) = 7,900$ cf

$Q_{release} = CA\sqrt{2gh} = 1.0$ cfs
where C = 0.70
A = 0.0873 sf (4" dia. pipe)
g = 32.2 ft/sec²
h = 4.17'

However, pipe flow governs.
By "Feild's Hydraulics Calculator for Gravity Flow in Pipes"
for n = 0.009, s = 0.005 and d = 4", $Q_{release}$ = 1.5 cfs

By Hydrograph Analysis, $\boxed{V_{required} = 3,535 \text{ cf}}$

$V_{pond} = 1/2\ [(A_{75.30} + A_{75.00})\ (75.30 - 75.00)]$
$= 1/2[810 + 0)(0.30)]$
$= 125$ cf

$Volume_{60"RCP} = Area_{total} - Area_{void} \times 8' = 125$ cf

Where $Area_{total} = \pi r^2 = \pi(2.5)^2 = 19.63$ sf
r = 2.5 ft

$Area_{void} = 4.0$ sf (By Properties of the Circle-Manual of Steel Construction Eighth Edition - pp. 6-18 at a average depth of 2.75 ft full)

Therefore, use 96 LF of pipe = 1,500 cf

$Volume_{72"RCP} = Area_{total} - Area_{void} \times 8' = 151$ cf

Where $Area_{total} = \pi (3)^2 = 28.27$ sf

$Area_{void} = 9.4$ sf (By Properties of the Circle-Manual of Steel Construction Eighth Edition - pp. 6-18 at average depth of 4.25 ft full)

Therefore, use 104 LF of pipe = 1,963 cf

Total volume = 125 + 1,500 + 1,963 = 3,588 cf > $V_{req'd}$

Comparison

$\Delta Q_{100} = 1.5 - 1.1 = 0.4$ cfs (increase)
$\Delta V_{100} = 7900 - 1,975 = 5925$ (increase)

AS-BUILT CERTIFICATION

I, Jeffrey G. Hortenmen, Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of the underground pipe storage portion of this project to the best of my knowledge and belief. The calculations which appear hereon analyze the available storage volume.

Jeffrey G. Hortenmen, P.E. — Date 04-14-86

AS-BUILT CALCULATIONS

$Volume_{60"RCP} = Area_{total} - Area_{void} \times L$
$= (19.64 - 3.0)105' = 1747$ cf.
Where $Area_{total} = \pi r^2 = \pi(2.5)^2 = 19.64$ sf
$Area_{void} = 3.0$ sf

$Volume_{66"RCP} = Area_{total} - Area_{void} \times L$
$= (23.76 - 5.94)105' = 1870$ cf
Where $Area_{total} = \pi r^2 = \pi(2.75) = 23.76$ sf
Area void = 5.94 sf

Therefore: Total Volume = 1747 + 1870 = 3742 cf > $V_{req'd}$

GRADING AND DRAINAGE PREPARED UNDER THE SUPERVISION OF

TOPOGRAPHIC SURVEY PREPARED BY OTHERS. ITS ADEQUACY IS HEREBY DISCLAIMED AS IT RELATES TO THIS DRAWING.

THIS PLAN FOR GRADING & DRAINAGE ONLY; SEE ARCHITECTURAL SITE PLAN FOR BUILDING & PARKING LOT LAYOUT.

Fanning / Bard Architects AIA
110 Amherst Drive SE
Albuquerque, New Mexico
87106 (505) 266-5874

RECEIVED APR 14 1986 HYDROLOGY SECTION

NO.	DATE	BY	REVISIONS
1	4/86	JGM	REVISE UNDERGROUND PIPE STORAGE INVERTS AS PER AS-BUILTS.

M16/D13c