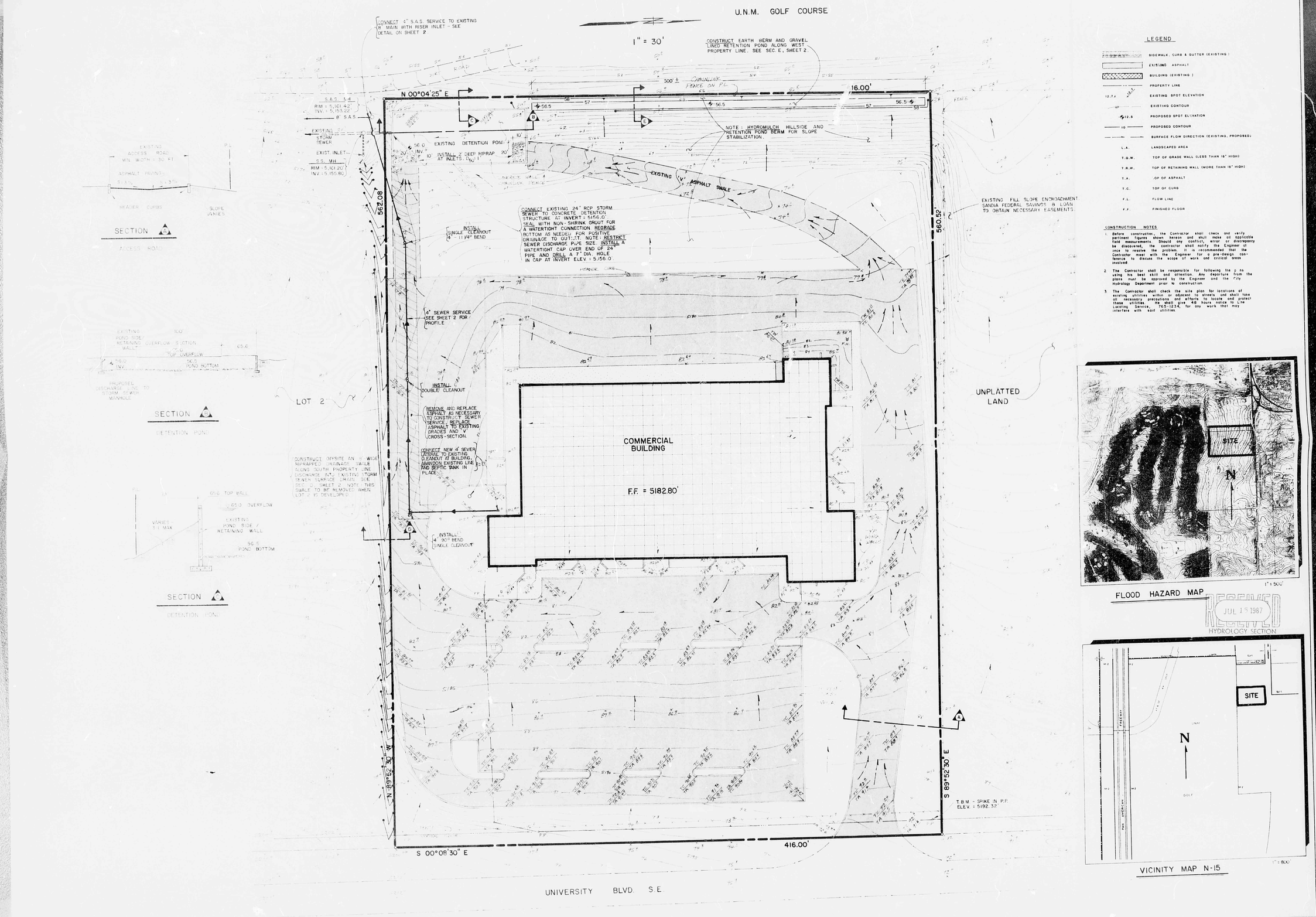
HYDROLOGY

N15/D1A1
2 PLANS

N 15/DIA1

2 PLANS




WEISS-HINES ENGINEERING INC.
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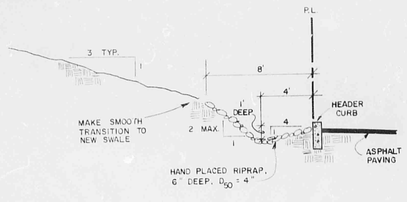
| REVISIONS | DATE |
|---|---|
| DESIGNED SF/DC | 7-87 |
| DRAWN SC/DC | 7-87 |
| CHECKED | |

# OFFICE / WAREHOUSE RENOVATION FOR SANDIA FEDERAL

## GRADING / DRAINAGE / UTILITY PLAN

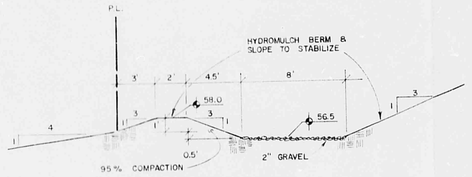
ENGINEERING

SHEET 1 OF 2




SECTION D

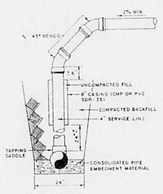
OFF-SITE EROSION CONTROL SWALE



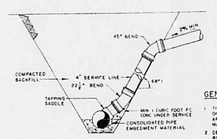

SECTION E

EARTH BERM & RETENTION POND

# SANITARY SEWER




DETAIL "A"



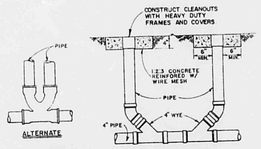

DETAIL "B"

SEWER RISER

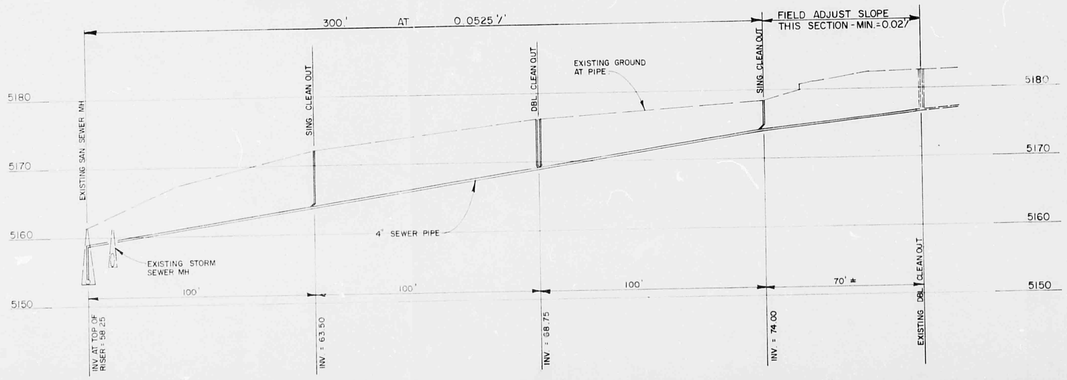
COA DWG No. 2136

GENERAL NOTES:

1. THESE DETAILS REFER ONLY TO INSTALLATIONS ON FLEXIBLE PIPE MAINS. REFER TO OTHER APPROPRIATE STANDARDS FOR RIGID PIPE MAINS.
2. DETAIL "A" SHALL BE USED WHEN A TRENCH BOX, SHORING OR OTHER MEANS OF EXCAVATION BRACING IS USED. OTHERWISE, DETAIL "B" SHALL BE USED. CONTRACTOR HAS OPTION TO USE EITHER DETAIL "A" OR DETAIL "B".
3. REFER TO SPECIFICATION SECTION 605 FOR MATERIAL REQUIREMENTS.




SEWER SERVICE CLEANOUT




## BACKGROUND

This drainage plan concerns a project comprised of an office - warehouse complex and associated paving and landscaping, which is being completed following partial construction and abandonment by a previous developer. The site is located on University Blvd. S.E. just east of the UNM South Golf Course and west of the International Airport. The 5.34 acre site comprises the northern lot of a 9-lot (28.4 acre) area to be developed as the Airport Technical Center. This report updates the original drainage/grading plans, shows the construction completed to date, and makes recommendations for completion of the project, including drainage improvements.

The Airport Technical Center Drainage Management Plan follows a discharge restriction imposed by City Hydrology several years ago. The first developed lot (this site) was to retain the entire 100-year developed runoff in a temporary retention pond (Phase I) that would become a detention pond (Phase II) when connected to a future storm drainage system. This new storm drainage system has just been completed, so connection of the existing retention pond (Phase I) and its conversion to a detention pond (Phase II) will be made as part of this project.

**LEGAL:** Lot 1, Division of Land of Airport Technical Center, Albq., N.M., NE Sect. 4, T9N, R3E, NMPM.

**SURVEYOR:** Hall Surveying Co., June 1987.

**B.M.:** City B.M. 7-N16, Std. ACS brass tablet located southwest corner of the Albuquerque International Airport in an open prairie. Elevevation = 5,304.881'.

**T.B.M.:** Spike in power pole at southeast corner of property. Elevation = 5,192.32'

**SOILS:** Cut/fill (CU) and Bluepoint-Kukan Assoc. (BKD) predominantly loamy sand, Hydrologic Group 'A'.

**FLOOD HAZARD:** No flood hazard area exists on the Airport Technical Center site. Downstream areas along the northern and southern arroyos are identified as 100-year hazard areas. Prescribed ponds and controlled releases from developed areas will insure that flood hazard areas are confined to pre-development conditions.

**OFF-SITE DRAINAGE:** Off-site area upslope from development is highly irregular in topography. It includes several ponded areas and low, sandy hills. Based on a site visit and inspection of topo maps, it appears that about 1 acre of off-site areas could contribute runoff to the development. The major portion of these flows will be diverted to the drain inlet to the storm sewer on Lot 2; a small portion will be diverted to the pond on Lot 1. Upon completion of future curb and gutter on University, all off-site flows will be diverted to the arroyo just north of the site.

**EROSION CONTROL:** All earthmoving has been completed under previously submitted erosion control plans. Prescribed hydromulching of the sloped area on the west side of the property will reduce the existing erosion hazard.

**CALCULATIONS:**
Based on criteria established by City of Albuquerque Hydrology, this lot will be required to detain developed flows in a pond which is connected to a storm sewer established through the University Golf Course. This storm sewer has just been completed as of July 1987.

Calculations are based on the City of Albuquerque D.P.M. Manual, Vol. II for the 100-year, 6-hour storm, using the Rational Formula to compare the existing and proposed runoff rates.

## PRESENT CONDITION

DISCHARGE RATES FOR LOT 1

RATIONAL METHOD: Q = CIA

Area of site: 232,400 sq.ft. = 5.34 Ac. (Lot 1)

Run-off Coefficient:

| Existing site: | Developed Site: (Lot 1) |
|---|---|
| A imp. = 0 Ac | A imp. = 4.11 Ac |
| % imp. = 0 % | % imp. = 0.77 % |
| "C" = 0.16 (DPM 22.2 C-1) | "C" = 0.61 (DPM 22.2 C-1) |

Rainfall Intensity:

$I = P_6(6.84)\ Tc^{-0.51} = 4.86"$ per hour
where $P_6 = 2.3"$ (DPM 22.2 D-1)
$Tc = 10$ minutes

| Existing Condition: | Developed Condition: (Lot 1) |
|---|---|
| $Q_{100} = (0.16)(4.86)(5.34) = 4$ cfs | $Q_{100} = (0.61)(4.86)(5.34) = 15$ cfs |
| $V_{100} = (0.16)(2.3/12)(232,400\ FT^2) = 7,130\ FT^3$ | $V_{100} = (0.61)(2.3/12)(232,400\ FT^2) = 27,200\ FT^3$ - total retention vol. required for Lot 1. (Phase I original design conditions) |

SUMMARY: (Lot 1)

Lot 1 was the only lot allowed development prior to the completion of the storm sewer, and as such, is the only phase of the overall development that was originally required to have total retention (Phase I) of its surface flows. The required retention volume of this pond was 27,200 $FT^3$.

However, the storm sewer is complete, so the retention system will be converted to a detention pond (Phase II).

Additional lots were also planned to be developed immediately after the completion of Lot 1. These lots, 2-4, were planned to drain to the pond on Lot 1 in order to maximize the efficiency of the drainage system. Because the original developer is no longer associated with this project, only Lot 1 would use this pond in the foreseeable future. Therefore, the pond discharge will at this time be limited to the predeveloped rate for only Lot 1, or 4 cfs.

If Lots 2-4 are developed by others, then these lots could drain to the pond, with the release rate correspondly increased up to 9 cfs (refer to drainage/grading plan for Lot 1-4, Sunder Corp 6-19-85).

## FUTURE CONDITIONS

ULTIMATE DISCHARGE RATE FOR LOTS 1-4

RATIONAL METHOD: Q = CIA

Area of site: 522,720 sq.ft. = 12 Ac.

Run-off Coefficient:

| Existing site: | Developed Site: |
|---|---|
| A imp. = 0 Ac | A imp. = 9.2 Ac |
| % imp. = 0 % | % imp. = 0.77 % |
| "C" = 0.16 (DPM 22.2 C-1) | "C" = 0.61 (DPM 22.2 C-1) |

Rainfall Intensity:

$I = P_6(6.84)\ Tc^{-0.51} = 4.86"$ per hour
where $P_6 = 2.3"$ (DPM 22.2 D-1)
$Tc = 10$ minutes

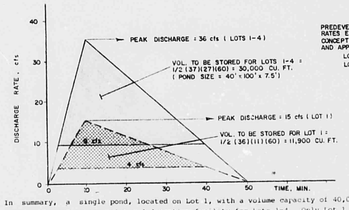
| Existing Condition: | Developed Condition: |
|---|---|
| $Q_{100} = (0.16)(4.86)(12) = 9$ cfs | $Q_{100} = (0.61)(4.86)(12) = 36$ cfs |
| $V_{100} = (0.16)(2.3/12)(522,720) = 16,000\ FT^3$ | $V_{100} = (0.61)(2.3/12)(522,720) = 61,100\ FT^3$ |

SUMMARY:

The original runoff rate for Lots 1-4 is 9 cfs. The increased rates and volume associated with development will be detained and released through the pond located on Lot 1.

Inflow/Outflow Hydrograph

LOT 1 - PRESENT CONDITIONS/LOTS 1-4 - FUTURE CONDITIONS




PREDEVELOPMENT DISCHARGE RATES ESTABLISHED BY U-M CONCEPTUAL DRAINAGE PLAN AND APPROVED BY THE CITY:
LOT 1 - 4 cfs
LOTS 1-4 - 9 cfs

In summary, a single pond, located on Lot 1, with a volume capacity of 40,000 $FT^3$, will act as the collection point and detention facility for Lots 1-4. Only Lot 1 will use the facility at this time. Correspondly, the discharge rates will be set for the predeveloped rate of Lot 1 (4 cfs), with increases to this rate made if Lots 2-4 are developed and drained to this detention facility.

RECEIVED
JUL 15 1987
HYDROLOGY SECTION

DETENTION SWALE ALONG EAST PROPERTY LINE AT BOTTOM OF FILL SLOPE:

DRAINAGE AREA = 20,230 $FT^2$

SURFOFF VOLUME = $\frac{(0.16)(2.3)(20,230)}{12}$
= 620 $FT^3$ NEEDED

POND SIZE = $(300')(8')(0.5')$
= 1,200 $FT^3$ CAPACITY

ORIFICE SIZE AT RETENTION POND OUTLET TO STORM SEWER (LOT 1 ONLY):

$Q = CA\sqrt{2gh}$
$4\ cfs = (0.6)(A)\sqrt{2(32.2)(8.0)}$
SOLVE FOR A = 0.29 $FT^2$
DIAMETER = 7" - Locate hole in a watertight cap installed over the end of the 24" storm sewer drain at Invert 56.0.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| | |

DESIGNED S.C. 7-87
DRAWN S.C. 7-87
CHECKED

OFFICE / WAREHOUSE RENOVATION FOR SANDIA FEDERAL

GRADING / DRAINAGE / UTILITY PLAN

ENGINEERING

STEVEN CHRISTOPHER L. HINES
NEW MEXICO
8453
REGISTERED PROFESSIONAL ENGINEER

SHEET 2 OF 2