City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

November 21, 1985

Duane Logan
501 Kinley Avenue, NE
Albuquerque, New Mexico 87102

RE: DRAINAGE PLAN FOR EDMON INDUSTRIAL PARK
RECEIVED OCTOBER 25, 1985 (F-15/D9)

Dear Mr. Logan:

The referenced plan dated October ~~19~~ 10, 1985, is approved.

As each lot applies for building permit, a drainage plan will be required. This drainage plan will comply with the Master Drainage Plan.

If you have any questions or comments regarding this project, call me at 766-7644.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

DUANE LOGAN
CONSULTING CIVIL ENGINEER
501 KINLEY N. E. 243-6353
ALBUQUERQUE, NEW MEXICO 87102

HYDROLOGIC CALC'S	Filed H-11
For: EDMON LND. PARK	Date 10-25-85
At: EDITH & MONTANO, NE	Drawn DLL
BERNALILLO COUNTY, N.M.	Sheet 1 OF 1

CRITERIA:
AREA = 11.73 ACRES
SOIL TYPE = B
100 YR-6HR STORM = 2.2"
C = 0.34 UND. & 0.69 DEV.
CN = 79 UND. & 88 DEV.

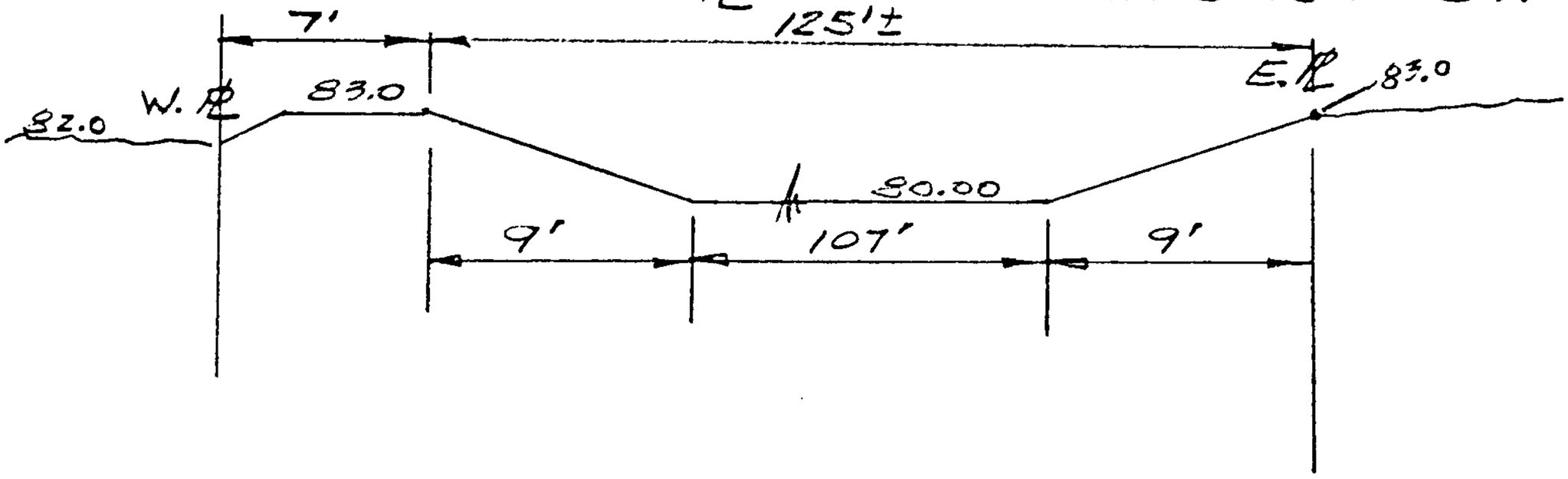
MAX. UNDEVELOPED FLOW = 0.34 × 2.2 × 2.15 × 11.73 = 18.9 CFS
MAX. UNDEVELOPED VOLUME = 0.60" × 510,960 S.F. = 25550 C.F
MAX. DEVELOPED FLOW = 0.68 × 4.73 × 11.73 = 38.8 CFS
MAX. DEVELOPED VOLUME = 1.20" × 510,960 S.F. = 51,096 C.F.

STORE 50%± ON INDIVIDUAL LOTS (DIFFERENCE BETWEEN DEVELOPED & UNDEVELOPED FLOW)
UNDEVELOPED FLOW TO BE STORED IN ONE POND.
VOLUME REQUIRED = 25,550 CUBIC FEET.

LOT 16 = 145' × 135' @ ℄s. MAX. AREA = 19575 S.F. = 1.31' DEEP FOR 25550 C.F.
DEDUCT 15' ALL AROUND FOR BERMS AND 3:1 SLOPES
= 115 × 105 = 12075 S.F. = 2.12' DEEP

INLET INVERT = ELEV. 4982.10 — 2.12 = 4979.98

USE 4980.00 AS BOTTOM ELEVATION, BERM TOP AT 4983.00, WITH 5' WIDTH
ELEVATION AT ℄ VARIES FROM 83.0 TO 81.9



minimized. The earthwork indicated on the grading plans attempts to minimize the areas in which the top soil and existing vegetation is disturbed. This helps to reduce the wind erosion to the soil.

RECEIVED
OCT 29 1985
HYDROLOGY SECTION

EASEMENTS AND RIGHTS-OF-WAY

The easements and rights-of-way shown on Plate I were obtained from the subdivision plat and from information furnished by the developer.

MAINTENANCE

Maintenance of the swales in the private easements shall be the responsibility of the property owners. This maintenance agreement shall be made a part of the restrictive covenants for these lots prior to their sale. If it is in the public interest, the City has the right to enter any of the drainage easements to maintain or repair any of the drainage swales.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the hydrologic calculations outlined in Appendix A, the Retention Pond will be sized to contain existing undeveloped flow and developed flow from the Street. Individual lots will pond that volume of flow between undeveloped and developed rates. The calculations show this difference to be 50% of the developed rate. Off-site drainage does not exist. Thus, the drainage facilities outlined in this report will allow development of the site to comply with current AMAFCA and City of Albuquerque requirements.

REVISED 7-15-85

DRAINAGE REPORT

FOR

EDMON INDUSTRIAL PARK

PREPARED FOR

EDMON PARTNERSHIP

5321 MENAUL NE

ALBUQUERQUE, NEW MEXICO 87110

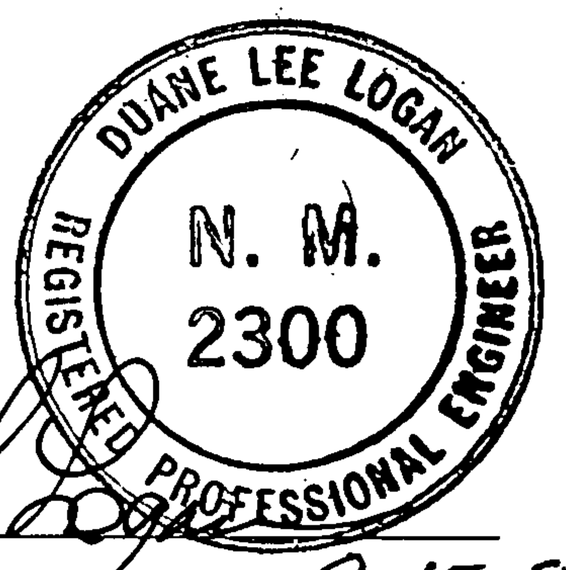
PREPARED BY

DUANE L. LOGAN - CONSULTING CIVIL ENGINEER

501 KINLEY NE

ALBUQUERQUE, NEW MEXICO 87102

PHONE 243-6353



RECEIVED
JUL 29 1985
HYDROLOGY SECTION

DUANE L. LOGAN
N.M.P.E. No. 2300

8-15-84
7-15-85

REVISED 7-15-85

DRAINAGE REPORT

FOR

EDMON INDUSTRIAL PARK

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REVISED 7-15-85

DRAINAGE REPORT

FOR

EDMON INDUSTRIAL PARK

PURPOSE AND SCOPE

This drainage report has been prepared to outline the treatment of storm water generated within the Edmon Industrial Park (see Plate 1). It has been written in compliance with the requirements of the City of Albuquerque's Development Process Manual (DPM) Chapter 22, entitled "Drainage and Flood Control." The hydraulic characteristics of the site were analyzed using procedures outlined in the DPM. Finally, the report contains recommendations for satisfactory treatment of the computed flow rates and runoff volumes. Detailed drainage reports shall be filed for the individual lots as they are developed to demonstrate compliance with the recommendations contained in this report.

SITE LOCATION AND DESCRIPTION

The site is located in the area shown on Plate 1. It is bounded on the north by private lands, on the west by Edith Boulevard, on the south by Montano Road, and on the east by the Alameda Lateral. The site slopes uniformly at less than 1% to the west. The Alameda Lateral berm to the east is 5' above the property. The land owner to the north constructed a low 1' berm to keep water from Edmon property confined.

There are two types of soil classifications found on the site. These are Gila loam (Gb) and the Vinton sandy loam (VbA). The data for these soil types was taken from the U.S.D.A. Soil Conservation Service Soil Survey. Both soil types are classified as Hydrologic Group "B."

METHODS OF ANALYSIS

The peak flow rates for the drainage basins were determined by application of the Modified Rational Method outlined in the DPM.

The Kirpich nomograph was used to determine time of concentration, which for the undeveloped condition equalled 15 minutes. A 10 minute concentration time was used for the developed condition.

Rainfall intensities were determined by applying Plates 22.2D-1 and 22.2D-2 of Chapter 22 of the DPM. The following calculation was used:

6-Hour Rainfall (100-Year) = 2.2 inches

6-Hour Rainfall (10-Year) = 2.2 x .657 = 1.45 inches

$$1_{100} = (2.2 \times 6.84 \times (T_c)^{-0.51}$$

$$1_{10} = (1.45) \times 6.84 \times (T_c)^{-0.51}$$

Values for the runoff coefficient were obtained from Plates 22.2C-1 and 22.2C-2 of Chapter 22 of the DPM. Plate 22.2C-2 indicates industrial districts to be 72% impervious. This was used with Plate 22.2C-1 to obtain a composite runoff coefficient of 0.70.

Flow depths and velocities were computed using Manning's equation for open channel flow. A roughness coefficient (n) of 0.017 was used for street flow; 0.025 was used for the earthen drainageways.

EXISTING DRAINAGE CONDITIONS

Presently, the site drains to the north and west into Edith Boulevard and 100' on to the north to a low point on the east side of Edith Boulevard. Montano Road is curbed and paved and contributes no drainage to the site. The Alameda Lateral intercepts all drainage from the east.

DRAINAGE CONDITIONS AFTER DEVELOPMENT

The drainage criteria for the developed site were based upon AMAFCA Resolution 1980-15 and the City of Albuquerque DPM. Based upon Plate 22.2C-1 of the DPM, with 72% of the site impervious, a runoff coefficient value of 0.70 was used for all developed basins. Plate I shows the detailed grading and drainage plan for the site.

FLOOD HAZARD AREAS

The Federal Emergency Management Agency (FEMA) map of the area (Panel 16), including the site, shows the flood waters from the 100-year storm to be well away from the site, some 700' west on Montano Road.

EROSION CONTROL

The grading plan for this project has attempted to minimize the soil disturbance on the site. Each lot will have a minimum of a 4" deep swale separating it from its downstream lot. This effectively reduces the runoff to be handled by the street and the north swale. By avoiding the concentration of runoff from several sites in one area, the amount of erosion should be

minimized. The earthwork indicated on the grading plans attempts to minimize the areas in which the top soil and existing vegetation is disturbed. This helps to reduce the wind erosion to the soil.

EASEMENTS AND RIGHTS-OF-WAY

The easements and rights-of-way shown on Plate I were obtained from the subdivision plat and from information furnished by the developer.

MAINTENANCE

Maintenance of the swales in the private easements shall be the responsibility of the property owners. This maintenance agreement shall be made a part of the restrictive covenants for these lots prior to their sale. If it is in the public interest, the City has the right to enter any of the drainage easements to maintain or repair any of the drainage swales.

CONCLUSIONS

Based upon the hydrologic calculations outlined in Appendix A, the developed site will safely handle all on-site runoff generated during the 100-year storm and discharge these flows to a deep gravel stratum at an uncontrolled rate. Off-site drainage does not exist. Thus, the drainage facilities outlined in this report will allow development of the site to comply with current AMAFCA and City of Albuquerque requirements.

DUANE LOGAN
CONSULTING CIVIL ENGINEER
501 KINLEY N. E. 243-6353
ALBUQUERQUE, NEW MEXICO 87102

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At: EDITH & MONTANO, NE	Drawn DLL
BERNALILLO COUNTY, NM	Sheet 1 OF 3

REVISED 7-15-85

AREA = 11.73 Acres -100YR STORM = 2.2" ℄L = 2.3×2.2 = 5.06

C = 70% IMPERVIOUS FOR INDUSTRIAL AREAS - MAX. DEVELOPED FLOW
= 0.70×5.06×11.73 = 41.6 CFS - PER DPM 22.2 C-2 & 4, CN88

TOTAL DEVELOPED RUNOFF = 1.2"×11.73Ac×43560 = 51100 cu.ft
PER CN 79 - UNDEVELOPED RUNOFF = 0.60"×519060 = 25550 C.F.

STORE 25,550 C.F. Cannot substract

PERCOLATION TEST: AT A 5' DEPTH, IN STANDARD 8"ϕ × 8" DEEP HOLE (7/23/83) SATURATED FIRST DAY WITH AVERAGE DROP OF 6" PER HOUR - TEST ON 7/24 GAVE SAME RESULT: 6"/HR
TEST ON 7/25 GAVE SLIGHTLY LOWER RESULT: 5¼"/HR

INJECTION WELL TEST: (2/27/84) A 12" AUGER HOLE DONE 7/25/83 HAD BEEN CASED WITH 4" PVC TO DEPTH OF 35', THE BOTTOM 7' IN THE GRAVEL. WITH METERED TANKER, WATER WAS DUMPED INTO THE CASING TO THE TOP AND THE DROP IN WATER SURFACE WAS TIMED. CONSISTENTLY THE THE FIRST 10' DROPPED IN 30 SECONDS. IN A 4" PIPE, THIS EQUATES TO 15 GALLONS/MINUTE, THROUGH A 0.05 SQUARE FOOT OPENING, UNDER AN AVG. 30' HEAD.

AN 1½"ϕ WELL POINT WAS PLACED IN THE CASING AND DRIVEN INTO THE UNDERLYING CLAY AT ELEVATION -36. WATER WAS PUMPED FROM THE TANKER THROUGH THE 1½"ϕ PIPE AT A 15 gpm RATE. NO WATER SURFACED IN THE CASING. EQUATING THE 1'×1½"ϕ WELL POINT WITH 25% OPENING, AREA = 1'×0.12'×π×.25 = 0.09 SQ.FT., A VERY CLOSE CORRELATION WITH THE 4"ϕ OPEN PIPE.

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CONSULTING CIVIL ENGINEER
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REVISED 7-15-85

EQUATING THAT FLOW TO A 24"ϕ PIPE, SCREENED FOR 2' WITH 50% OPENINGS AND 6' ABOVE THE BOTTOM OF THE GRAVEL

OPENING AREA = 2' × π × 2' × 50% = 6.28 SQ.FT.

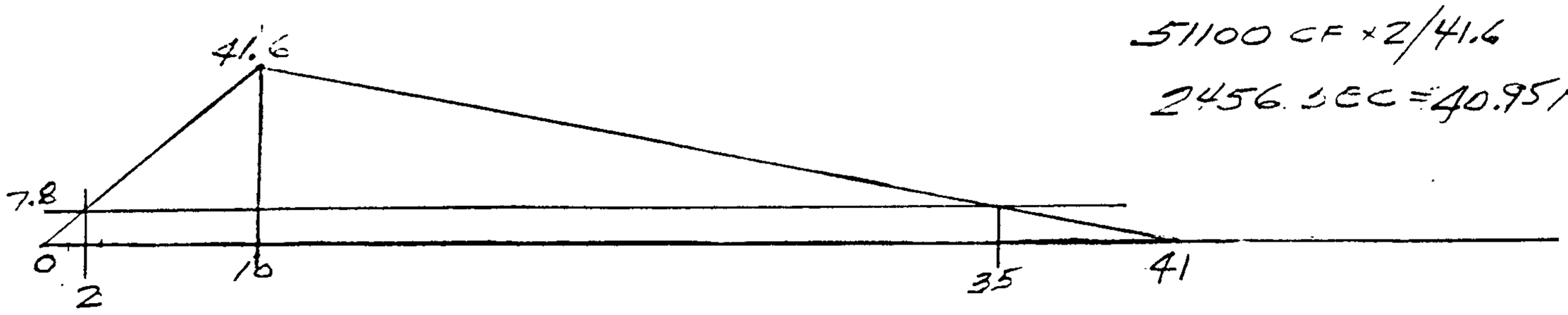
+ π × 1'² = 3.14 SQ.FT

9.42 SQ.FT

0.08 = 117.75 × 15 gpm = 1766

gpm = 29.4 gps = 3.93 CFS

WE PROPOSE TO AUGER 2 -24"ϕ WELLS, CASED WITH CMP AND SCREENED FOR 2', TO A DEPTH OF -30'. A MAXIMUM DISCHARGE OF 7.8 CFS IS ANTICIPATED.



51100 CF × 2/41.6

2456 SEC = 40.95 MIN.

DISCHARGE VOLUME = 33 MIN. × 60 SEC. × 7.8 CFS = 15444

+ 1.0 MIN × 60 SEC. × 7.8 CFS = 468

+ 6.0 MIN × 60 SEC. × 7.8 CFS = 2808

18720 C.F. DISCHARGE

STORAGE REQ'D = 25506 - 18720 = 6780 CU.FT. = 6" DEPTH ON 0.25 ACRES

= 250 CU.YD

THE ALTERNATIVE OF A PONDING AREA DRAINED ONLY BY PERCOLATION IS UNACCEPTABLE, BOTH AESTHETICALLY AND PROFESSIONALLY. THE SEEPAGE DURING A 52 MINUTE INFLO WOULD BE ONLY 5000 CU.FT. THIS REQUIRES STORAGE OF ABOU 28,000 CU.FT. WITH A POND OF 3' DEPTH, REQUIRING ANOTHE 6 HOURS ± TO DRAIN TO POND BOTTOM, LEAVING A MUD HOLE.

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501 KINLEY N. E. 243-6353
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REVISED 7-15-85

THE 10' DROP IN 30 SECONDS = 20' PER MINUTE
IF A = 0.08, H & L = 30, & Q = 2 CFM, K (COEFFICIENT OF PERMEABILITY
= Q/A = 2/0.08 = 25

FOR SAND & GRAVEL WITH AN EFFECTIVE SIZE OF 4 MM (± 4 ±)
THE POROSITY = 47% & VOIDS RATIO "e" = 0.90 (See Lyo 9-33/34)

AREA OF GRAVEL BED, PROVED BY DRILLING = 265' (HOLE #4 TO HOLE #6)
× 225' (#6 TO #7
× 8' AVG. DEPTH
477,000 C.F. = 17667 C.Y.

WITH A TOTAL OF 25,550 CU.FT. TO GO TO GRAVEL BED WITH
47% POROSITY = 51100 CU.FT. REQUIRED & 477,000 CF AVAILABLE

POND FOR 6780 CF ≈ 250 C.Y., WITH 8" DEPTH = POND 120' SQ.
WITH PERIMETER DIMENSIONS OF 135 × 145 & NEEDING 15' TO
ALL PROPERTY LINES = 105 × 115 = 12075 S.F. AT ELEV. 4982.00
WITH 1:3 SLOPE TO BOTTOM AT 4981.33 = 100 × 110 = 11000 SF
$\frac{11000 + 12075}{2}$ = 11,537 S.F. AT MIDPOINT & = 7,730 CU.FT. STORAGE
(6,780 REQ'D)

EXCAVATED MATERIAL WILL BE USED TO BERM POND TO
4983.00 FOR 12" FREEBOARD. AVERAGE BERM X-SECTION
= 15' BASE (℄ TO WATER LINE) BY 0.5' HEIGHT (82.5 EXISTING TO
83.0 TOP) = 7.5 S.F. = 0.833 SQ. YDS. × 500' ± LENGTH OF
BERM = 415 CU. YDS.

DUANE LOGAN
CONSULTING CIVIL ENGINEER
501 KINLEY N. E. 243-6353
ALBUQUERQUE, NEW MEXICO 87102

HYDRAULIC CALC'S	Filed H-11
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At: EDITH & MONTANO	Drawn DLL
BERNALILLO COUNTY, NM	Sheet 1 OF 1

REVISED 7-15-85

TOTAL MAXIMUM Q = 41.6 CFS / 11.73 = 3.55 CFS/ACRE ≈ 1.8 CFS/LOT

MAXIMUM LOT (9) = 3.53 ACRES = 12.52 CFS

LOTS 10 THRU 16 = 2.65 ACRES = 9.41 CFS

21.93 CFS IN NORTH SWALE AT POND.

LOT 9 SWALE WILL BE PAVED, "n" = 0.017, SLOPE = 0.25%, WIDTH = 10'

DEPTH = 1.0' — AVAILABLE Q = $5.0 \times \frac{1.486}{0.017} \times 0.630 \times 0.050$ = 13.76 CFS

NEED BE ONLY 6" DEEP AT SOUTH END TO PICK UP 40% OF LOT 9 DRAINING INTO STREET FROM SOUTH END

NORTH SWALE WILL BE PAVED, "n" = 0.017, SLOPE = 0.65%, WIDTH = 10'

DEPTH = 1.0' — AVAILABLE Q = $5.0 \times \frac{1.486}{0.017} \times 0.630 \times 0.081$ = 22.30 CFS

21.93 REQ'D

INDIVIDUAL LOT SWALES FOR 1.8 CFS, NEED NOT BE PAVED, "n" = .02

S = 0.25%, WIDTH = 10', DEPTH = 4"

AVAILABLE Q = $1.65 \times \frac{1.486}{0.025} \times 0.300 \times 0.050$ = 1.47 CFS - SAY OK

(ACTUAL LOTS ARE 0.43 A

STREET CAPACITY: WITH 5" ROLL-OVER CURB & 42' WIDTH (½=20')

A = 0.42 × 20/2 = 4.2 S.F., "n" = 0.017, S = 0.65%,

AVAILABLE Q = $4.2 \times \frac{1.486}{0.017} \times 0.353 \times 0.081$ = 10.50 CFS / HALF-SECTION

14.06 CFS REQ'D AT WEST END - FOR 9 LOTS AT 0.44 ACRES

STREET IS OVER-CAPACITY AT LOT 2 - DIP CROWN SECTION TO NORTH GUTTER WHICH CARRIES ONLY NORTH ½ OF STREET.

4982

4984

4986

4988

4990

EDITH BLVD., N.E.

65'

120'

40'

20'

35'

DRILL HOLE #5

TEST PIT #1

10'

DRILL HOLE #6

235'

75'

TO PROP. LINE

DRILL HOLE #7

60'

1" = 100'

800'

TO PROP. LINE

DRILL HOLE #3

45'

DRILL HOLE #4

500'

TEST PIT #2

45'

70'

200'

MONTANO ROAD, N.E.

EDMONT INDUSTRIAL PARK

LOCATIONS OF TEST PITS & DRILL HOLES