

DRAINAGE CALCULATIONS

1. DRAINAGE AREA = 52,730 $\pm$ 1.21 ACRES

2. COMPOSITE C FACTOR

PERVIOUS = 0.4 ($\frac{15550}{52730}$) = 0.118
IMPERVIOUS = 0.9 ($\frac{37174}{52730}$) = 0.634
COMPOSITE VALUE = 0.75

3. TIME OF CONCENTRATION (FOR RATIONAL FORMULA)

$C = C_1A = 10$ MINUTES

4. HISTORIC CONDITIONS (UNDEVELOPED)

RUNOFF ($C = 0.75$)

100 YEAR $C = 0.4$ (SEE SOL GROUP B)

FROM INTENSITY/DURATION FREQUENCY CURVE AREA
IS 6.0 IN/HR FOR $T_c = 10$ MIN
 $Q = 0.4 (6.0) (1.21) = 2.9$ CFS

5 YEAR

FOR A DURATION = TIME OF CONCENTRATION
0.47 IN 24 HR FALL (FROM WEATHER BUREAU DATA)
IS $\frac{1.5}{24} (60) = 2.82$ IN/HR
 $Q = 0.4 (2.82) (1.21) = 1.36$ CFS REQ. FOR POSITIVE
POND DISCHARGE

RUNOFF VOLUME

100 YEAR (24 H. - 6 H.R.)

$V = 0.4 (\frac{360}{24}) (52730) = 4218.4$ FT³

5. DEVELOPED CONDITION

RUNOFF 100 YEAR

$Q = 0.75 (6.0) (1.21) = 5.45$ CFS

VOLUME 100 YEAR

$V = 0.75 (\frac{360}{24}) (52730) = 7099.5$ FT³

6. POND VOLUME REQUIREMENT

V 100 DEVELOPED - V 100 UNDEVELOPED

$7099.5 - 4218.4 = 2881$ FT³

7. POND VOLUMES (BY AVERAGE END AREA):

POND 1 TOP AREA = 1516 FT² ELEV 96.0

BOTTOM AREA = 496 FT² ELEV 94.0

AVERAGE END AREA = 1007 FT²

@ 2 FT DEEP $V = 0.7 (2) = 2014$ FT³

POND 2 TOP AREA = 1180 FT² ELEV 95.0

BOTTOM AREA = 520 FT² ELEV 93.0

AVERAGE END AREA = 850 FT²

@ 2 FT DEEP $V = 0.5 (2) = 1700$ FT³

TOTAL VOLUME $2014 + 1700 = 3714$ FT³

$3714 > 2881$ O.K.

8. POND DISCHARGE

REQUIRED RATE = $Q_{UNDEV.} = 1.36$ CFS

USE 24" PIPES

$Q = C_d A \sqrt{2gh}$

$C_d = 0.62$

$A = .17$ ft²

$h = 96.0 - 92.5 = 3.5$ ft

$Q = 1.34$ CFS

9. POND 1 - POND 2 INTERCONNECT

CAPACITY = $Q_{UNDEV.} = 1.36$ CFS

USE 3" PVC PIPES

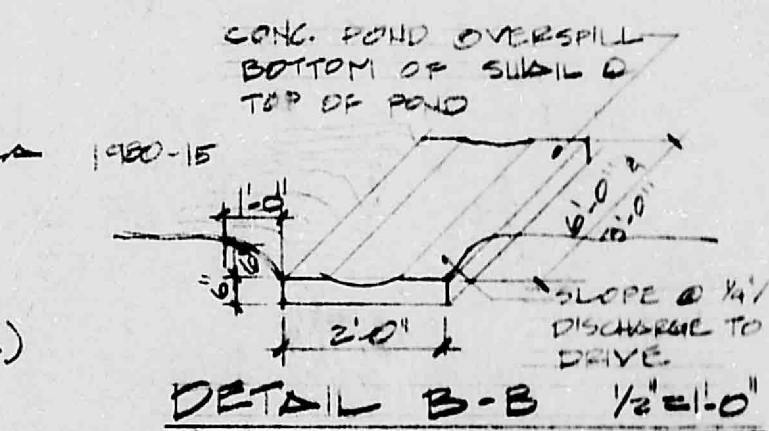
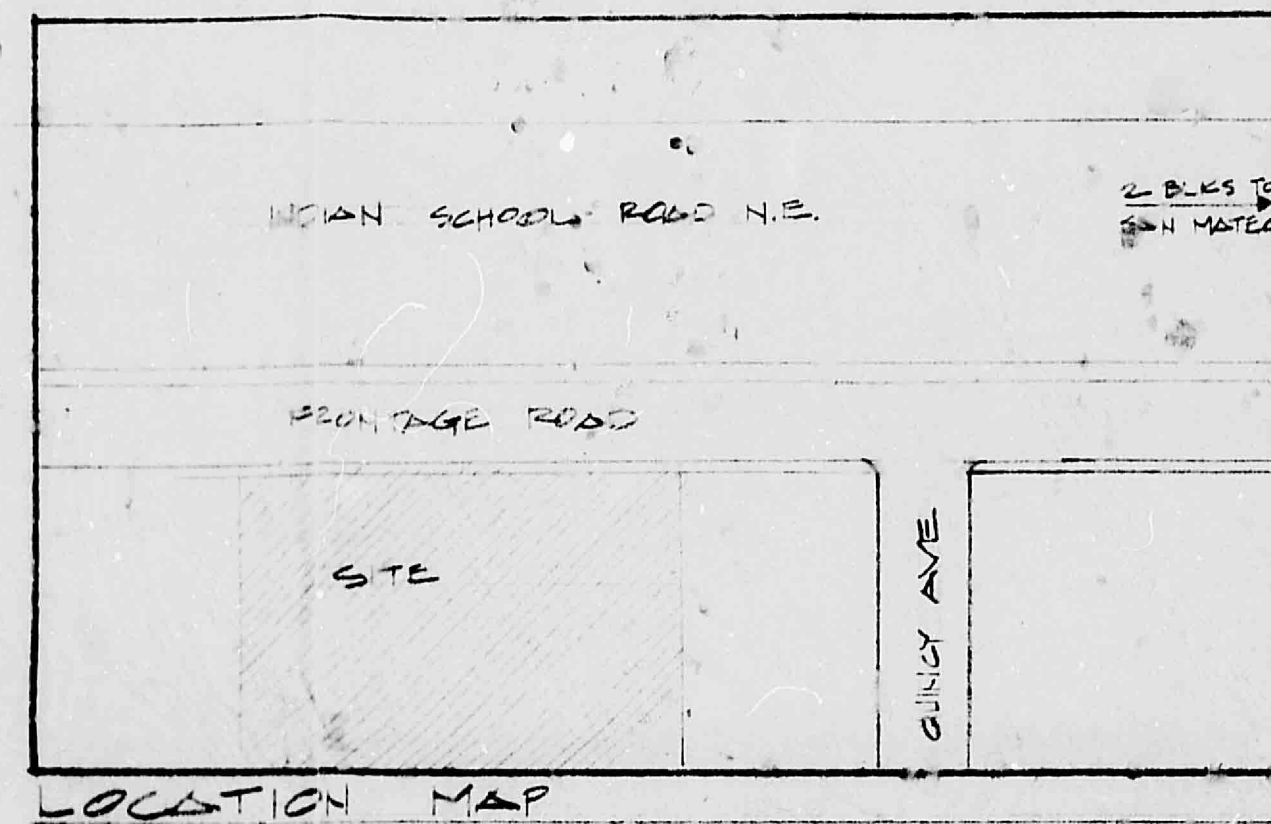
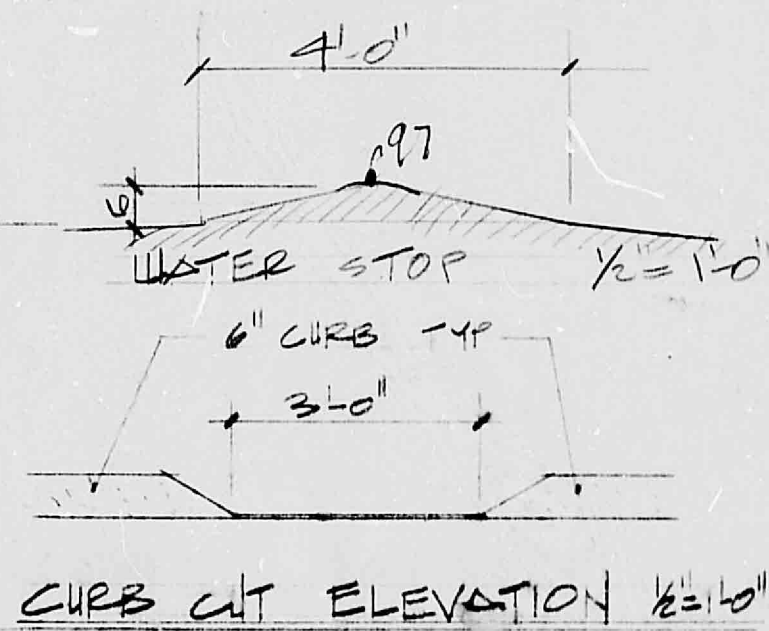
$Q = C_d A \sqrt{2gh}$

$C_d = 0.62$

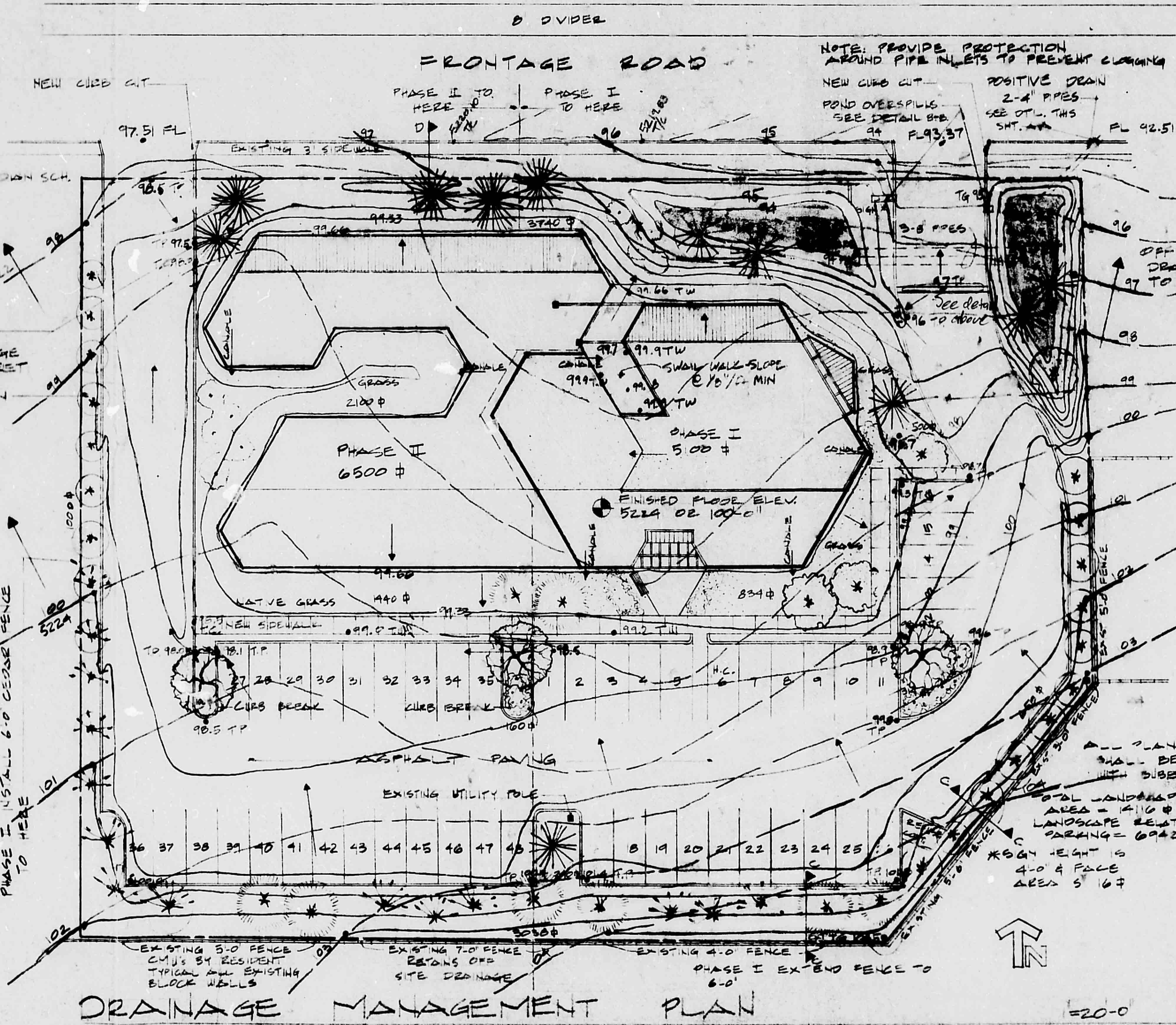
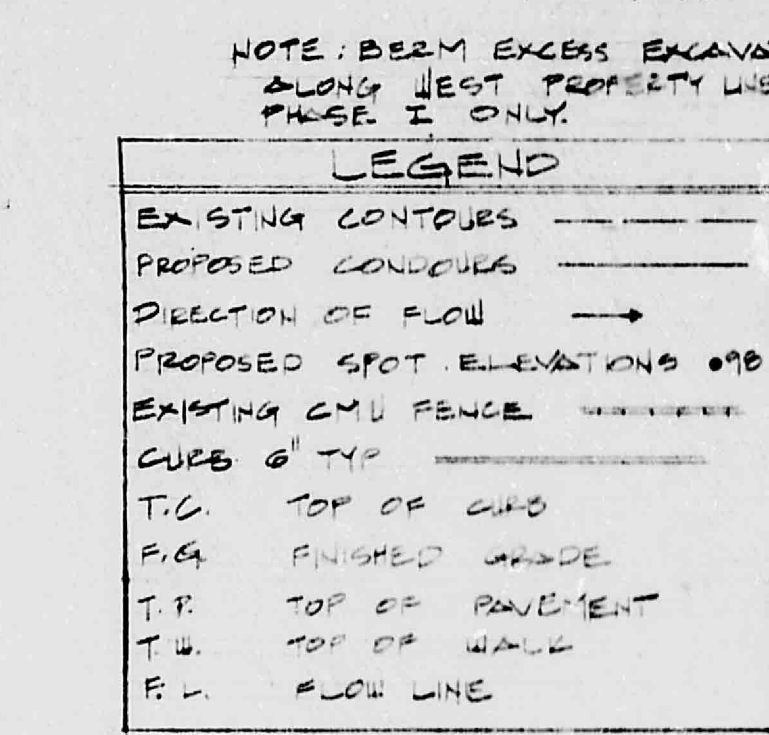
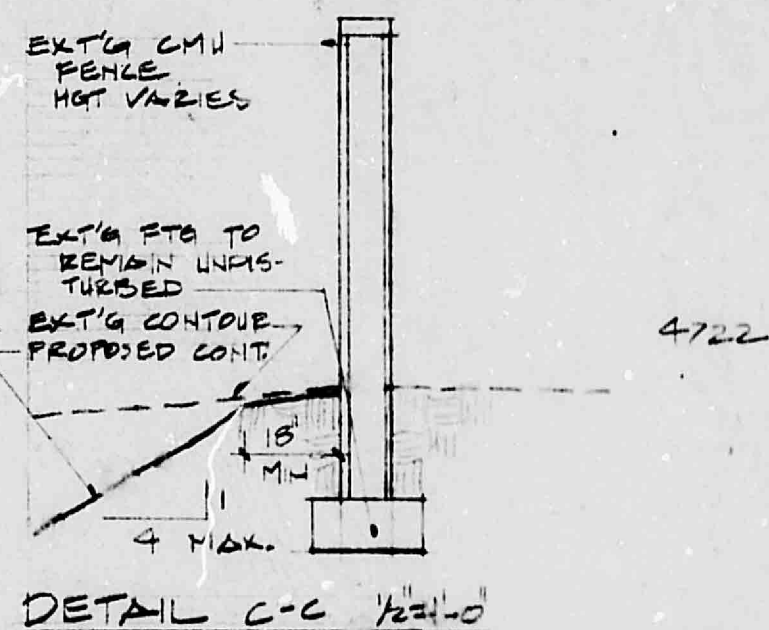
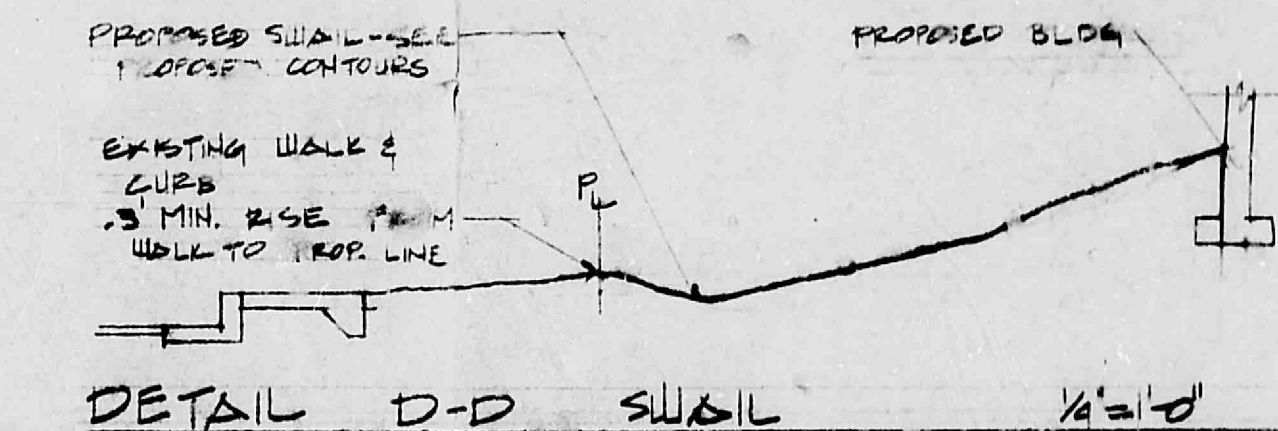
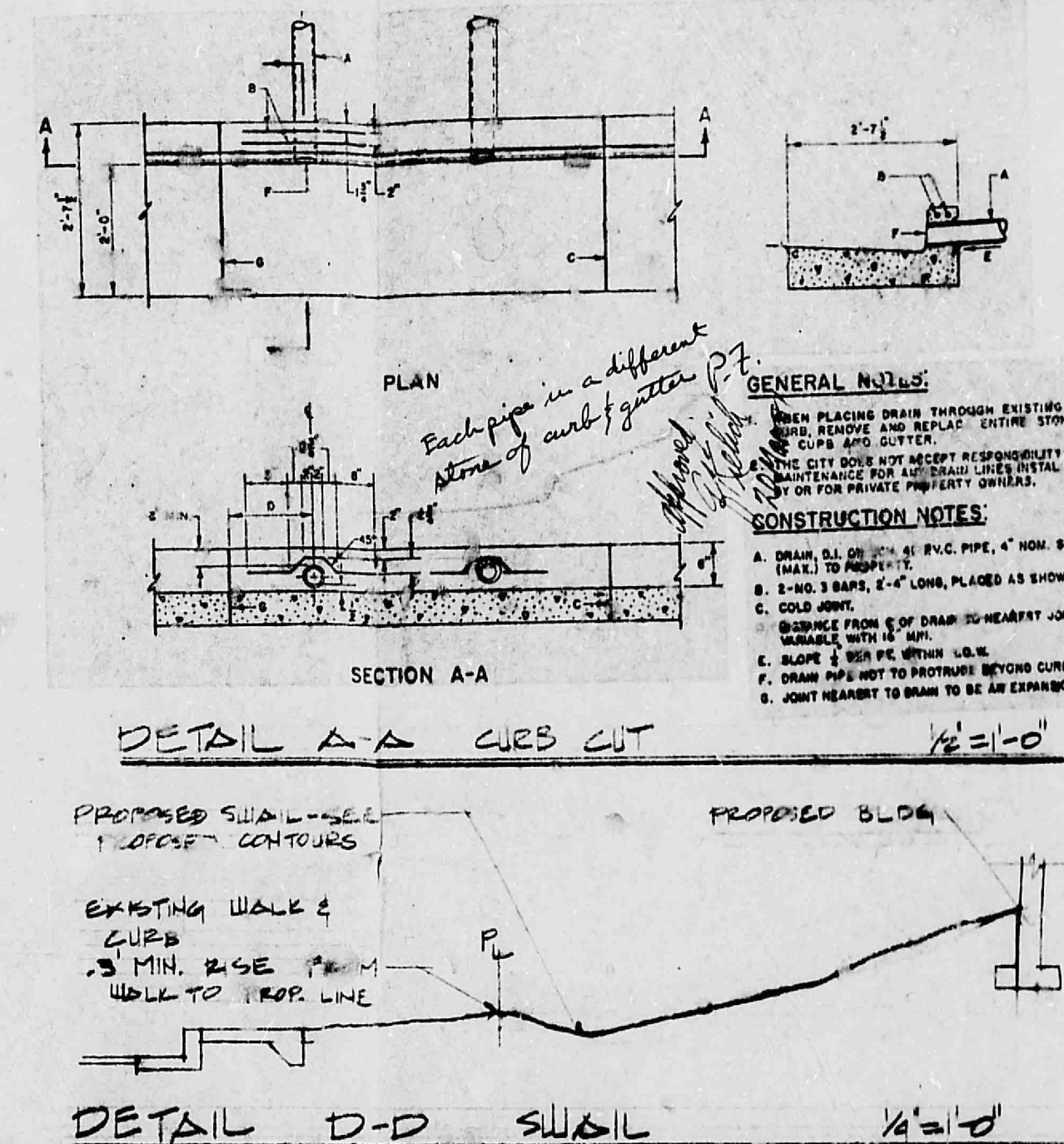
$A = 1.00$ ft²

$h = 96.0 - 95.0 = 1.0$ ft

$Q = 9.11$ CFS > 1.36 CFS O.K.



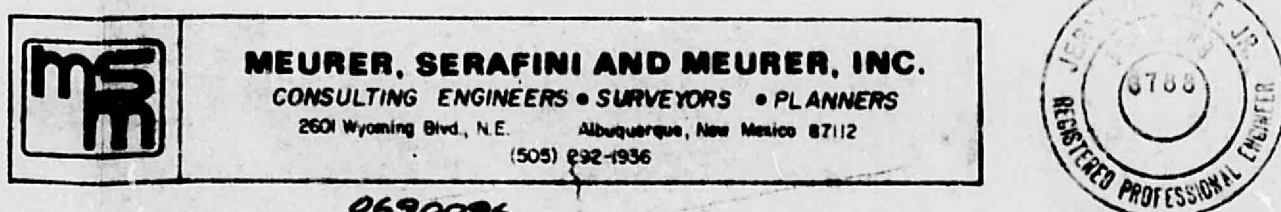
BEACH MARK #117 LOCATED ON NORTH SIDE OF INDIAN SCHOOL ROAD OPPOSITE HOUSE # 4722. ELEVATION 92.134' 95.00' LOCAL DATUM. 52.24' CITY DATUM = 100' LOCAL DATUM.



DATE: 11/10/00
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DESIGNED BY: [Signature]
17 May 01

CHRISTIAN REFORMED CHURCH

Ponding has a positive discharge and should have no adverse effect to the structure.



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D 24

C 20

B 16

A 12

C

D

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THIS MICROIMAGE IS THE BEST
POSSIBLE REPRODUCTION DUE
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