COVER

BLUEGRASS FARMS Sub-
Drainage Calc. 6/24/86 -D. Leek

OVERVIEW ENTIRE BASIN

TOTAL AREA = 281.45 AC.

Distance = 4700 Lf

Height = 145'

"C" = 0.40

T.C = 20 MIN x 2 (overland) = 40 MINUTES.

100 YEAR (i) = 3.5"/hr.

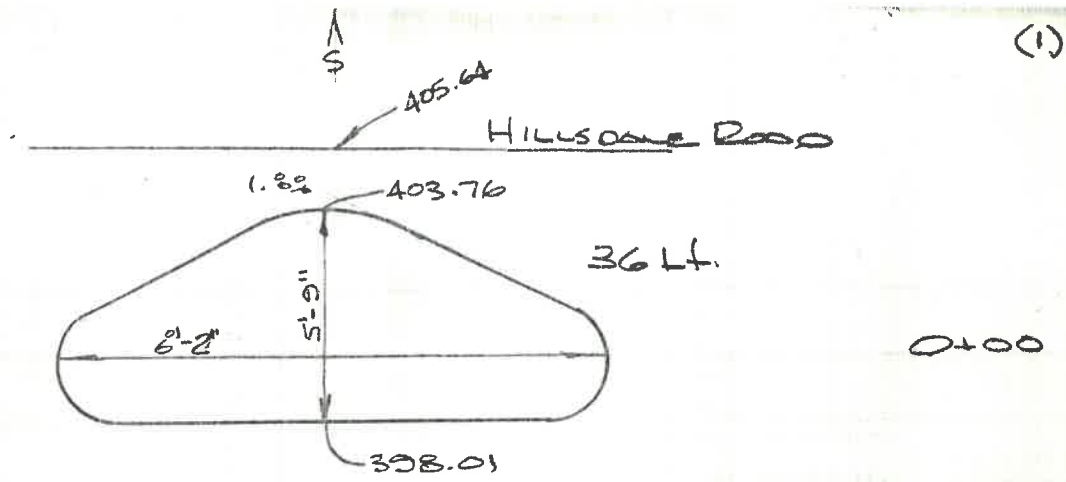
$Q = CiA$

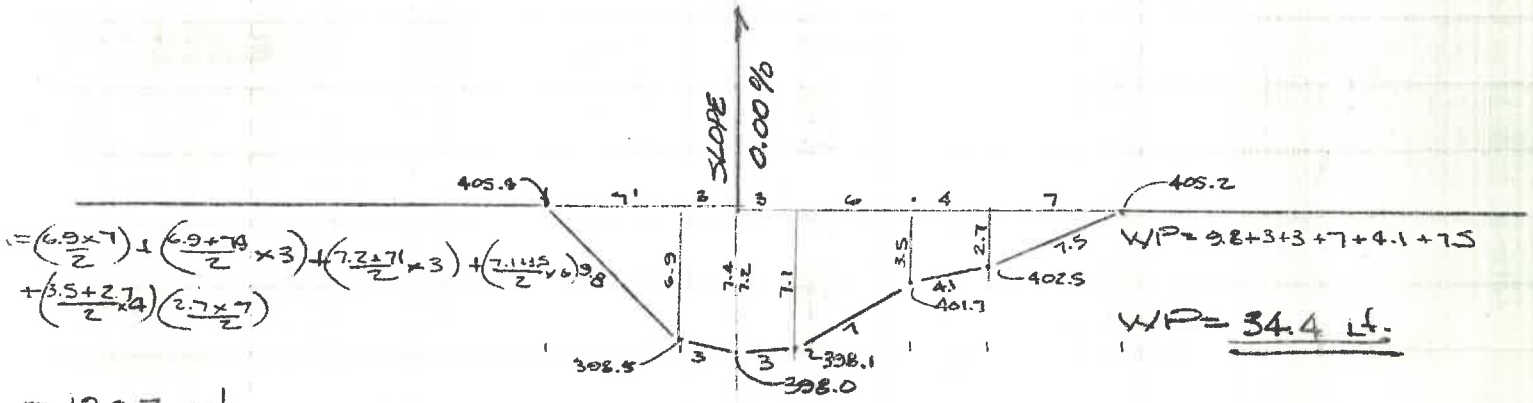
Q = 394 cfs.

Existing Eliptical will carry 450 cfs @ 1.8' HdW.

25 YEAR (i) = 2.9"/hr

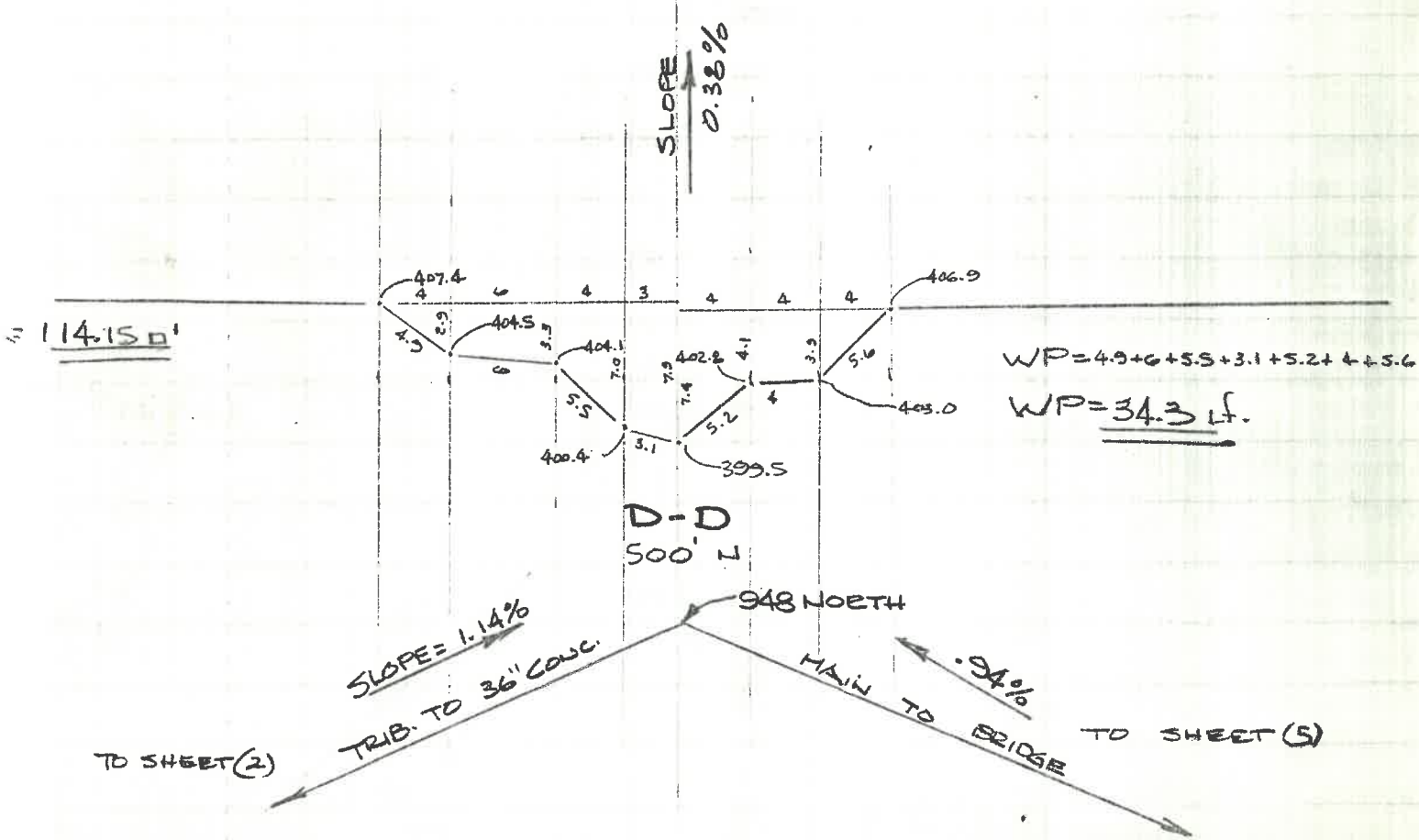
Q_{25} = 326.5



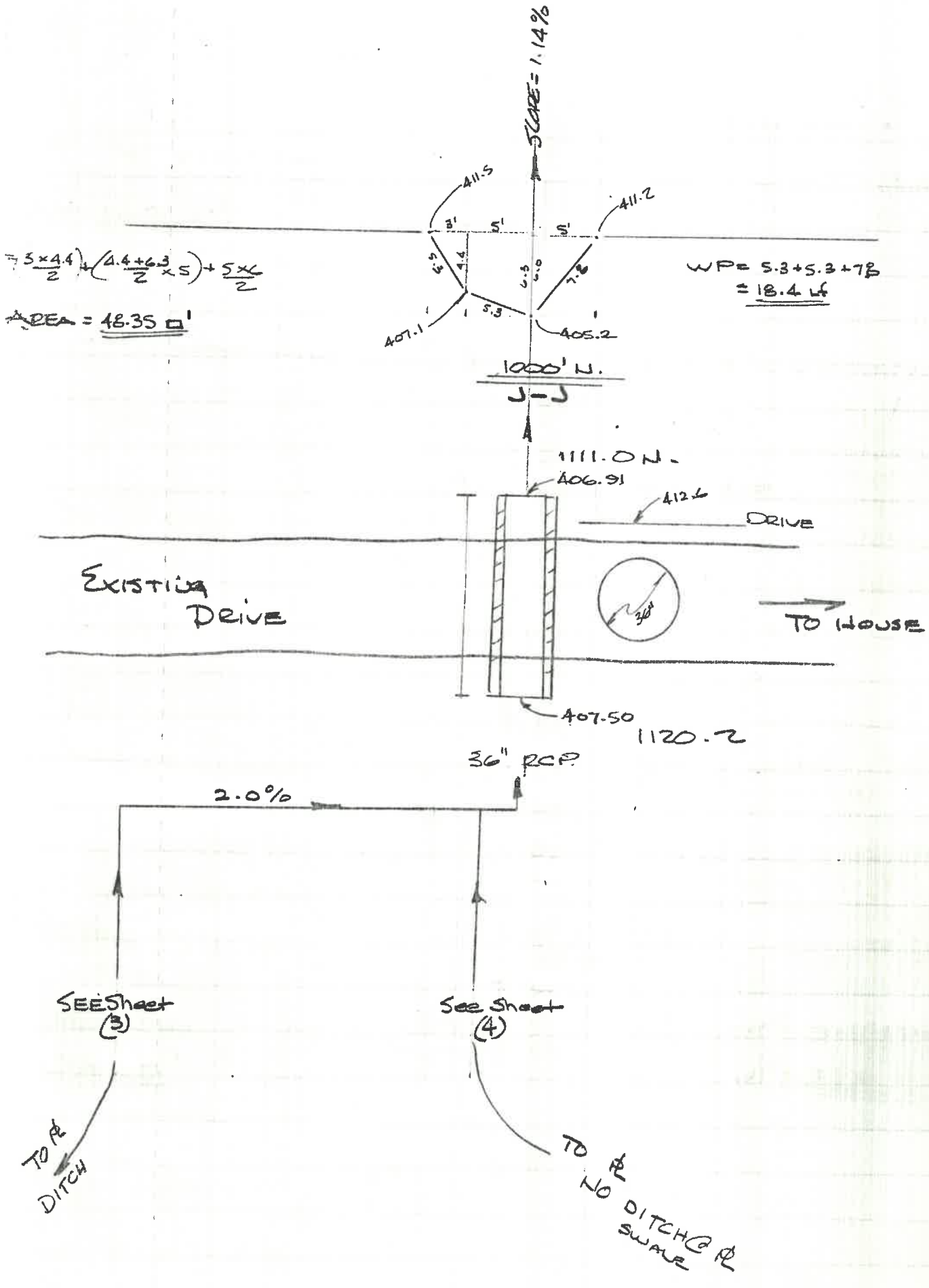


$= \left(\frac{6.9\times7}{2}\right) + \left(\frac{6.9+7.8}{2}\times3\right) + \left(\frac{7.2+7.1}{2}\times3\right) + \left(\frac{7.1+7.5}{2}\times6\right) + 9.8 + \left(\frac{3.5+2.7}{2}\times4\right) + \left(\frac{2.7\times7}{2}\right)$

$= 120.7\ \square'$



$= 114.15\ \square'$



$\frac{5 \times 4.4}{2} + \left(\frac{4.4+6.3}{2} \times 5\right) + \frac{5 \times 7}{2}$

AREA = 48.35 □'

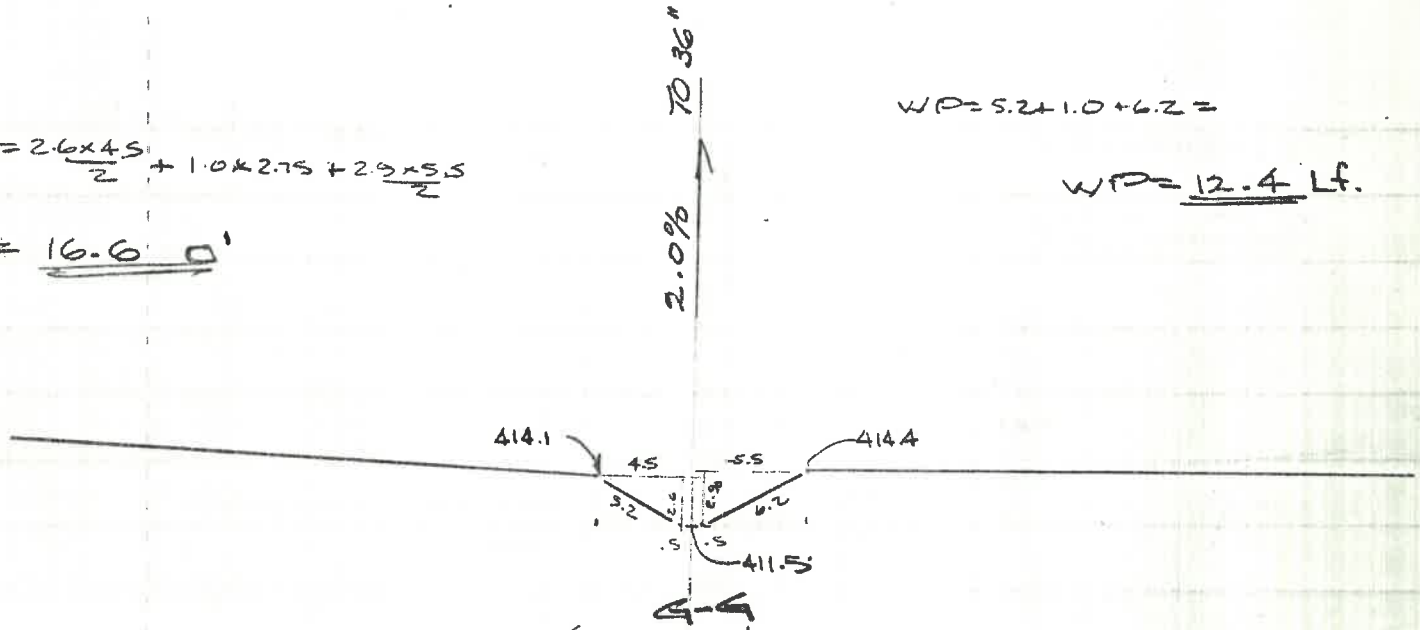
WP = 5.3+5.3+7.8
= 18.4 Lf

AREA = $\frac{2.6 \times 4.5}{2}$ + 1.0 × 2.75 + $\frac{2.9 \times 5.5}{2}$

A = 16.6 □'

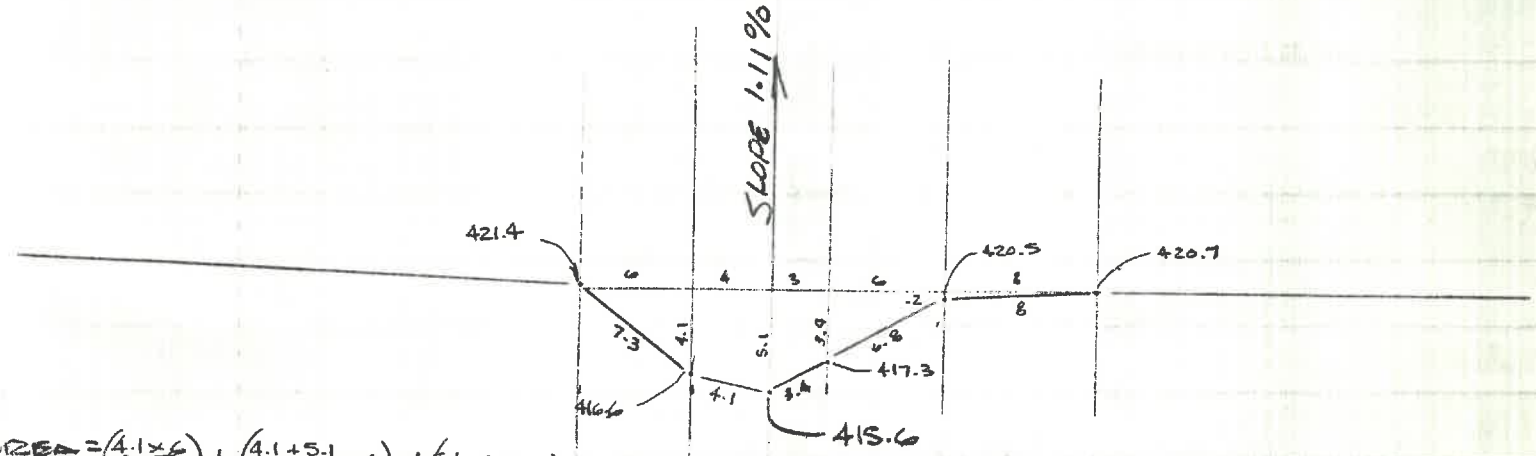
WP = 5.2 + 1.0 + 6.2 =

WP = 12.4 Lf.



E-E

(B) 200' FROM 36" RCP



AREA = $\left(\frac{4.1 \times 6}{2}\right)$ + $\left(\frac{4.1 + 5.1}{2} \times 4\right)$ + $\left(\frac{6.1 + 3.4}{2} \times 3\right)$

$\left(\frac{+3.4 + .2}{2} \times 6\right)$ + $\left(\frac{2 \times 8}{2}\right)$

(C) 570' FROM 36" RCP @ FF

F-F

A = 55.1 □'

WP = 7.3 + 4.1 + 3.4 + 6.8 + 8

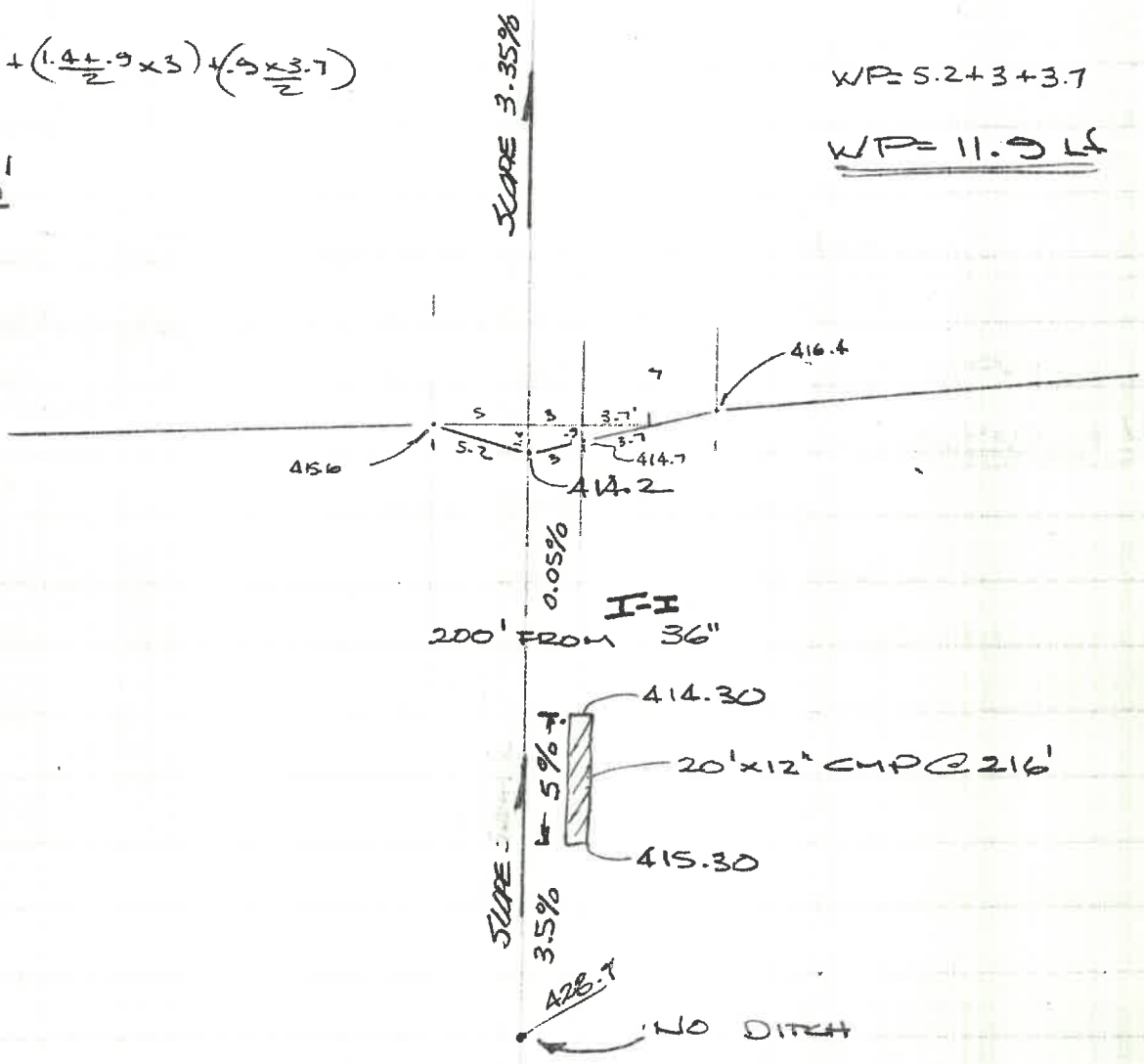
WP = 29.6 Lf.

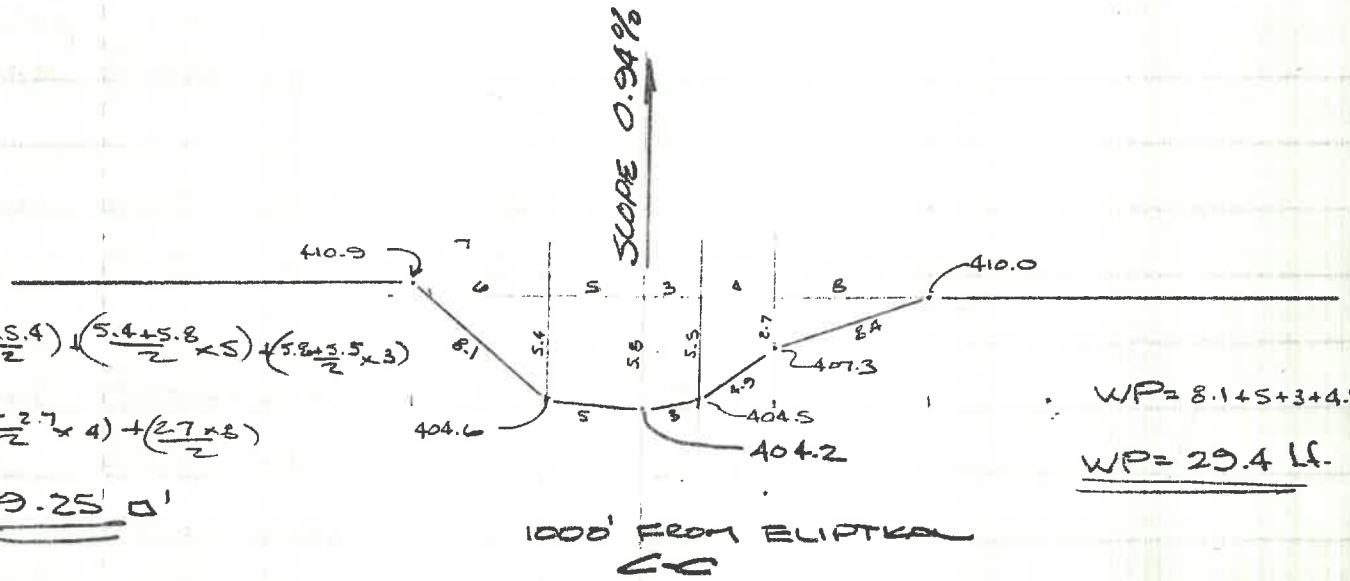
AREA = $\left(\frac{1.4 \times 5}{2}\right) + \left(\frac{1.4 + .9}{2} \times 3\right) + \left(\frac{.9 \times 3.7}{2}\right)$

A = 8.6 ft²

WP = 5.2 + 3 + 3.7

WP = 11.9 Lf





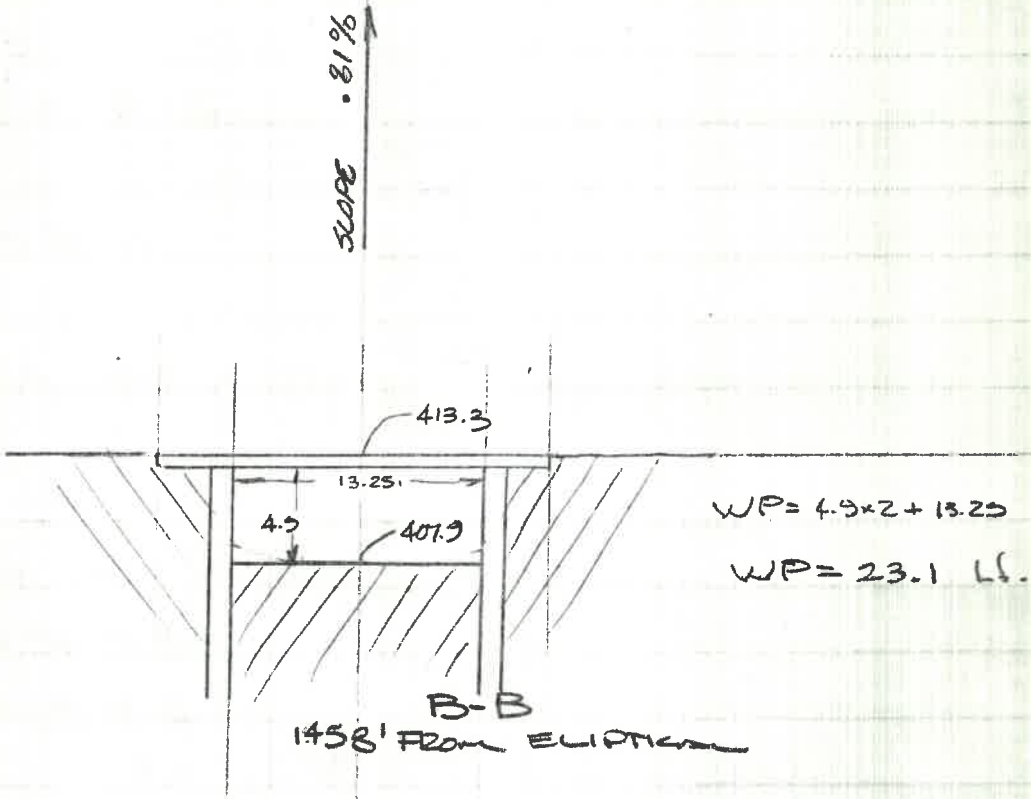
AREA = $\left(\frac{6\times5.4}{2}\right)+\left(\frac{5.4+5.8}{2}\times5\right)+\left(\frac{5.8+5.5}{2}\times3\right)+\left(\frac{5.5+2.7}{2}\times4\right)+\left(\frac{2.7\times8}{2}\right)$

A = 119.25 □'

WP = 8.1+5+3+4.9+8.4

WP = 29.4 Lf.

1000' FROM ELIPTICAL CL



AREA = 64.9 □'

WP = 4.9×2 + 13.25

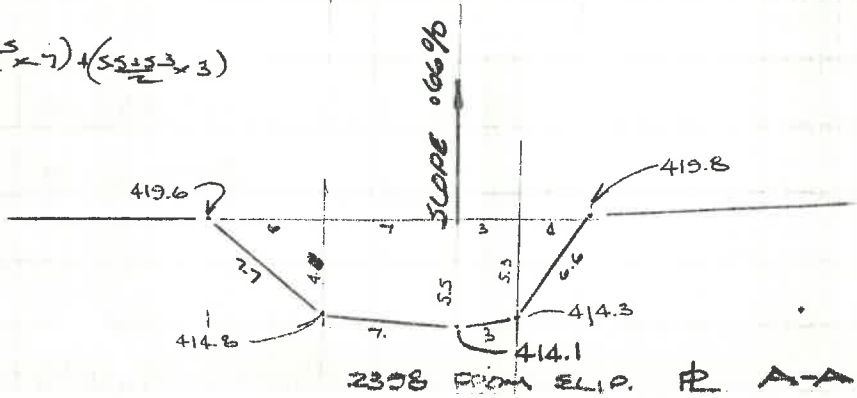
WP = 23.1 Lf.

B-B

1458' FROM ELIPTICAL

AREA = $\left(\frac{4.8\times6}{2}\right)+\left(\frac{4.8+5.5}{2}\times7\right)+\left(\frac{5.5+5.3}{2}\times3\right)+\frac{5.3\times4}{2}$

A = 77.3 □'



WP = 7.7+7+3+6.6

WP = 24.3 Lf

2398 FROM ELIP. & A-A

CALCULATE
DITCH CAPACITY:

Section A-A = 77.4 Sq. ft. I.E = 414.10

B-B = 64.9 Sq. ft I.E = $\frac{407.90}{6.20}$

Distance Between AA & B-B = 540'

SLOPE $\frac{6.20}{540} = 0.66\%$

$n = 0.035$

Section A-A

$A = 77.3$

$WP = 24.3$

$R = \frac{77.3}{24.3} = 3.18$

$Q = \frac{1.486}{n} \; R^{2/3} \; S^{1/2} \; A$

$Q = 42.457 \times 2.163 \times .0812 \times 77.4$

$Q = 577$ cfs

Distance B-B to ℄C = 458

SLOPE B-B = 407.9

℄-℄ = $\underline{404.2}$

3.7

SLOPE $\frac{3.7}{458} = .0081$

$n = 0.035$

SECTION B-B

A = 64.9

WP = 23.1

R = 2.8095

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

Q = 42.4571 x 1.9911 x .0900 x 64.9

Q = 493.8 cfs

Distance c-c to D-D = 500

SLOPE c-c = 404.2

D-D = 3995

4.7

SLOPE $\frac{4.7}{500}$ = .0094

n = 0.035

Section c-c

A = 119.25

WP = 29.4

R = 4.0561

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

Q = 42.4571 x 2.5435 x .0970 x 119.25

Q = 1,249.14

Distance D-D to E-E = 400

SLOPE D-D = 399.5

E-E = $\frac{398.0}{1.5}$

Slope $\frac{+S}{400}$ = 0.0038

n = 0.035

SECTION D-D

A = 114.15

WP = 34.3

R = 3.3280

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.4571 \times 2.2292 \times .0616 \times 114.15$

$Q = 665.5$

SECTION E-E

A = 120.7

WP = 34.4

R = 3.5190

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.4571 \times 2.3137 \times .0616 \times 120.7$

$Q = 730.4$

NEW RUN

Distance H-H to I-I 410

Slope H-H = 428.7

I-I = 414.2

14.5

Slope $\frac{14.5}{410}$ = .0354

n = 0.035

SECTION H-H (NO DITCH)

Distance I-I to J-J = 320.2

Slope I-I = 414.2

J-J = 405.2

9.0

Slope $\frac{9.0}{320.2}$ = .0281

n = 0.035

SECTION I-I

A = 8.6

WP = 11.9

R = .7227

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.4571 \times .8053 \times .1676 \times 8.6$

Q = 49.3 cfs

Distance J-J to D-D = 500

J-J = 405.2

D-D = 399.5

5.7

Slope $\frac{5.7}{500}$ = .0114

n = 0.035

Section J-J

A = 48.35

WP = 18.4

R = 2.6277

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.4571 \times 1.9043 \times .1068 \times 48.35$

$Q = 417.4$ CFS

NEW RUN

Distance F-F to G-G = 370

FF = 415.60

GG = 411.50

4.10

Slope $\frac{4.10}{370}$ = .0111

n = 0.035

Section FF

A = 55.1

wP = 29.6

R = 1.865

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.457 \times 1.5133 \times .1054 \times 55.1$

Q = 373.1 CFS

Distance G-G to J-J = 332.0

G-G = 411.50

J-J = 405.20

9.00

Slope $\frac{9.0}{332}$ = .0271

n = 0.035

Section G-G

A = 16.6

WP = 12.4

R = 1.3387

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

$Q = 42.4571 \times 1.2147 \times .1646 \times 16.6$

$Q = 140.9$ cfs

Section J-J (SEE SHEET 10)

DRAINAGE FLOW DETERMINATION

AREA (1)	164.83 AC.	to A-A Length 3750	H.P. 522 S
(2)	50.88 AC.	to BB (407.9) ditch 940' 2300 Length	H.P 501
(3)	9.48 AC.	to C-C (404.2) 458 ditch 1120 Length	H.P. 470
(4)	9.98 AC (1 and 2 to J)	(428.7) H-H to (405.2) J-J. DITCH 1200 Length	H.P 465
(5)	8.37 AC.	(404.2) C-C to (399.5) D-D 500' ditch 800 Length	H.P 450
(6)	22.68 AC	to E-F (415.6) ✓ No ditch 1580 LENGTH	HP 502 ✓
(7)	3.83 AC	(415.6) F-F to (411.5) G-G ✓ 500 ditch 620 LENGTH	455 H.P. ✓
(8)	6.66 AC.	(399.5) D-D to (398.0) E-E ✓ 500' ditch 850 LENGTH	425 H.P. ✓

278.71 AC.

281.45 AC.

-2.74 AC. Along road flows to Elliptical.

AREA (1)

164.83 Ac.

STEEP AREA = 1500 Lf trav

FLAT AREA = 2,250 Lf trav.

Runoff factor = 0.40

distance = 3,750

	STEEP	FLAT
Slope	522.5 440.0	440.0 414.1
	82.5	25.9

DITCH TIME CALC

STEEP AREA Slope $\frac{82.5}{1500} = .0550$

T.C. = 6.7 MIN

Overland Flow TCx2 = 13.4 MINUTES

FLAT AREA Slope $\frac{25.9}{2250} = .0115$

TC = 17 MIN

Overland TCx2 = 34 MIN

Time of Con = 13.4 + 34 = 47.4 MIN

(1) Rain Intensity 100 year Storm = 3.2"/hr

(1) " " 25 year Storm = 2.7"/hr

$Q = CiA$

$Q = .40 \times 3.2 \times 164.83$

$Q_{100} = 210.98$ cfs
211.0 cfs

$Q_{25} = .40 \times 2.7 \times 164.83$

$Q_{25} = 178$ cfs

AREA (2)

STEEP AREA = 1100

AREA = 50.88 AC.

FLAT AREA = 1200

RUNOFF(C) = 0.40

DISTANCE = 2,300 Lf.

STEEP	FLAT
501	425.0
425	407.9
76	17.1

STEEP AREA = $\frac{76}{1100}$ = .0691

TC = 4.8 MIN

Overland TC×2 = 9.6 MINUTES

FLAT AREA = $\frac{17.1}{1200}$ = 0.0143

TC = 9.5 MIN

Overland TC×2 = 19.0 MIN

TC = 9.6 + 19.0 = 28.6 MINUTES

i) 100 YEAR STORM = 4.2"

) 25 YEAR STORM = 3.5"

$Q = CiA$

$Q = .40 \times 4.2 \times 50.88$

$Q_{100} = 85.5$ cfs

$Q_{25} = .40 \times 3.5 \times 50.88$

$Q_{25} = 71.2$ cfs

AREA (3)

AREA = 9.48 ac

Run-off "C" = 040

distance = 1,120

SLOPE 470.0 − 404.2 = 65.8

$\frac{65.8}{1120} = .0588$

TIME of Conc. = 5.4 min

Overland x2 = 10.8 min

3) Rain Int. 100 Yr = 6.2"/hr

i) Rain Int 25 Yr = 5.5"/hr

$Q = CiA$

$Q = .4 \times 6.2 \times 9.48$

$Q_{100} = 23.5$ cfs.

$Q_{25} = .4 \times 5.5 \times 9.48$

$Q_{25} = 20.9$ cfs

AREA (4)

AREA = 9.98 AC

RUNOFF "C" = 0.40

DISTANCE = 1200

STEEP = 550
FLAT = 650

STEEP SLOPE = $\frac{465.0}{428.7}$ $\frac{36.3}{550}$ = .0660

36.3

FLAT SLOPE = $\frac{428.7}{405.2}$ $\frac{23.5}{650}$ = .0362

23.5

TIME of CONC. = 2.9 MIN (STEEP)
4.9 MIN (FLAT)

OVERLAND x 2 = 15.6 MIN TOTAL

1) 100 YR. RAINFALL = 5.4"/hr.
2) 25 YEAR = 4.6"/hr.

$Q = CIA$

$Q = .40 \times 5.4 \times 9.98$

$Q_{100} = 21.6$ cfs

$Q_{25} = .40 \times 4.6 \times 9.98$

$Q_{25} = 18.4$ cfs

AREA (5)

AREA = 8.37 AC.

RUNOFF "C" = 0.40

DISTANCE = 800'

$$\text{SLOPE} = \frac{450.0 - 395}{50.5} = \frac{50.5}{800} = .0631$$

TIME OF CONC. = 4.0 MIN.

OVERLAND x2 = 8.0 MIN. (USE 10 MINUTE MINIMUM)

(1) 100 YEAR RAINFALL = 6.5"/hr.

(1) 25 YEAR = 5.5"/hr.

$Q = CIA$

$Q = .40 \times 6.5 \times 8.37$

$Q_{100} = 21.8$ cfs.

$Q_{25} = .40 \times 5.5 \times 8.37$

$Q_{25} = 18.4$ cfs

AREA (6)

AREA = 22.68 AC.

RUNOFF 'C' = 0.40

DISTANCE = 1580

STEEP = 450 LF

FLAT = 1,130 LF.

$$\text{SLOPE (STEEP)} = \frac{502}{\frac{450}{52}} = \frac{52}{450} = .1156$$

$$\text{SLOPE (FLAT)} = \frac{460.0}{\frac{415.6}{34.4}} = \frac{34.4}{1130} = .0304$$

TIME CONC. (STEEP) = 1.9 MIN

OVERLAND x2 = 2.8 MIN

TIME of CONC (FLAT) = 6.9 MIN

OVERLAND x2 = 13.8 MIN

TOTAL = 2.8 + 13.8 = 16.6 MIN.

(i) 100 YEAR RAINFALL = 5.2"/hr

(j) 25 YEAR = 4.3"/hr.

$Q = CiA$

$Q = 0.40 \times 5.2 \times 22.68$

$Q_{100} = 47.2$ cfs.

$Q_{25} = .40 \times 4.3 \times 22.68$

$Q_{25} = 39.0$ cfs

AREA (1)

AREA = 3.83

RUNOFF "C" = 0.40

DISTANCE = 620

$$\text{SLOPE} = \frac{455.0 - 411.5}{43.5} = \frac{43.5}{620} = .0702$$

TIME of CONC = 3.2 MIN.

OVERLAND x2 = 6.2 MIN. (USE 10 MINUTE MINIMUM)

(i) 100 YEAR RAINFALL = 6.5 "/hr

(i) 25 YEAR = 5.5 "/hr

$Q = CiA$

$Q = 0.40 \times 6.5 \times 3.83$

$Q_{100} = 9.6$ cfs

$Q_{25} = .40 \times 5.5 \times 3.83$

$Q_{25} = 8.4$ cfs

AREA (E)

AREA = 8.66 AC.

RUNOFF "C" = 0.40

DISTANCE = 850 LF

$$\text{SLOPE} = \frac{425.0 - 398.0}{27.0} = \frac{27}{850} = .0318$$

TIME of CONC = 5.3 MIN

OVERLAND x2 = 10.6 MIN.

(i) 100 YEAR RAINFALL = 6.5"/hr.

(i) 25 YEAR = 5.5"/hr.

$Q = CiA$

$Q = 0.40 \times 6.5 \times 8.66$

$Q_{100} = 22.5$ cfs.

$Q_{25} = .40 \times 5.5 \times 8.66$

$Q_{25} = 19.0$ cfs

AT A-A – Q_{25} = 178.0 cfs
Q_{100} = 211.0 cfs

AT B-B – Q_{25} = 178.0 + 71.2 = 249.2 cfs
Q_{100} = 211.0 + 85.5 = 296 cfs

AT C-C – Q_{25} = 178.0 + 71.2 + 20.9 = 270.1 cfs
Q_{100} = 211.0 + 85.5 + 23.5 = 320 cfs

AT D-D – Q_{25} = 178.0 + 71.2 + 20.9 + 18.4 + 18.4 + 39.0 + 8.4 = 354.3
Q_{100} = 211.0 + 85.5 + 23.5 + 21.6 + 21.8 + 47.2 + 9.6 = 420.2 cfs

AT E-E – Q_{100} = 178 + 71.2 + 20.9 + 18.4 + 19.0 + 18.4 + 39.0 + 8.4 + 19.0 = 392.3
211 + 85.5 + 23.5 + 21.6 + 21.6 + 21.8 + 47.2 + 9.6 + 22.5 = 442.7 cfs

AT F-F – Q_{25} = 39.0 cfs
Q_{100} = 47.2 cfs

AT G-G – Q_{25} = 39.0 + 8.4 = 47.4 cfs
Q_{100} = 47.2 + 9.6 = 56.8 cfs

AT J-J – Q_{25} = 8.4 + 39.0 + 19.0 = 66.4 cfs
Q_{100} = 9.6 + 47.2 + 21.6 = 78.4 cfs

		USE * RUNOFF CFS		
		100 YR.	25 YEAR	REMARKS
Ditch Capacity @ A-A =	577 cfs	211.0	178.0	
B-B =	493.8 cfs	296.0	249.2	
C-C =	1249.1 cfs	320.0	270.1	
D-D =	665.5 cfs	420.2	354.3	100 YEAR STORM
E-E =	730.4 cfs	442.7	392.3	DOESN'T OVERFLOW DITCH BANK
F-F =	373.1 cfs	47.2	39.0	
G-G =	140.9 cfs	56.8	47.4	
@ 36" RCP J-J =	417.4 cfs	78.4	66.4	

Existing 8'x5'-9" ARCH @ Hinsdale
will carry 450 cfs w/ 1.8' Hdw.
4.5 crit. depth

@ E-E flow = 392.3 cfs 25 YEAR
@ E-E flow = 442.7 cfs 100 YR

100 YEAR WATER WILL BE AT TOP OF ROAD !

REQ. 1.5' of HDW

Existing 36" RCP (21 LF) I.E (IN) = 407.50 Slope $\frac{.59}{21}$ = .0281

(OUT) = 406.91

.59

36" @ 2.81% Sl. will carry 112/125 cfs / J-J = 66.4 cfs — 25 YEAR
J-J = 78.4 cfs — 36" OK 100 YEAR

Proposed Pipe "X" Blue Grass Rd. (23)

AREA(1) + AREA(2) = 178 cfs + 71.2 cfs = 249.2 cfs (25yr)
211 cfs + 85.5 cfs = 296.5 cfs (100yr)

(25) 249.2 cfs
(100) 296.5 cfs

→ RCP 60" @ 0.7% n=0.012 = 250 cfs
RCP 60" @ 1.2% n=0.012 = 300 cfs

.66% Slope exist ditch

Recommend OR 72" CMP (25 year / 100 yr)

Use 60" RCP (25 year)

(AREA) 1st set Inlets

Area = 13.67 + 3.21 + 16.26 + 6.37 = 41.5 AC

SLOPE 501 / 420 / 81 — 81/2100 = .0386

Length = 2100'

Tc = 9.8 − 9.8 × 2 = 19.6 min

(i) = 4.2"/hr 25yr
(i) = 5"/hr 100yr

Q = CiA

Q = .40 × 5 × 41.5

Q_{100} = 83 cfs

Req. 38"

Q_{25} = 69.7 cfs

Req 30" RCP

AA ✓
BB ✓
CC
DD
EE
FF
GG
JJ
E-E

100 YEAR FLOOD ELEV. DETERMINATION ALONG DITCH SECTIONS

NOTE: MINIMUM F. FLOOR SHOULD BE 2.0' ABOVE EXISTING ROAD. YARDS TO BE USED AS PONDING if regd for short duration.

SECTION A-A

$Q_{100} = 211$ cfs

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

TRY 3' Water

$A = 33.4$

$WP = 17.2$

$R = 1.94$

$Q = \frac{1.486}{.035} \times 1.9410^{.66} \times .0066^{1/2} \times 33.4$

$42.4571 \times 1.5561 \times .0812 \times 33.4$

$Q = 179$ cfs <

$Q_{100} = 211$ cfs

USE 3.5'

414.1 EXIST.
3.05
100 YEAR ELEV = 417.6

Section B-B

$Q_{100} = 296$ cfs

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

TRY 3' of Water

$A = 39.75$

$WP = 19.25$

$R = 2.0648$

$Q = \frac{1.486}{.035} \times 2.0648^{.66} \times .0081^{1/2} \times 39.75$

$Q = 42.4571 \times 1.6215 \times .0900 \times 39.75$

$Q = 246.3$ cfs (No)

TRY 4' $A = 53.00$

$WP = 21.25$

$R = 2.4941$

$Q = 42.4571 \times 1.8392 \times .0900 \times 53.00$

$Q = 372.5$ >

USE 3.5' 407.9
3.5

FF > ELEVATION 100 YEAR = 411.4

SECTION E-E

$Q_{100} = 320$ cfs

$Q = \frac{1.486}{n} \times R^{2/3} S^{1/2} A$

TRY 3.5' WATER

$A = 39.2$

$WP = 19.0$

$R = 2.0632$

$Q = 42.4571 \times 1.6207 \times .0970 \times 39.2$

$Q = 261.6$

TRY 4.5 WATER

$A = 59.5$

$WP = 23.9$

$R = 2.489$

$Q = 42.4571 \times 1.8366 \times .0970 \times 59.5$

$\therefore Q = 450$ cfs >

USE 4.0

404.2
4.0
408.2

100 YEAR FLOOD ELEV = 408.2

Section D-D

Q_{100} = 420.2 cfs

$Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$

TRY 5.0' Water

A = 44.8

WP = 25.9

R = 1.7288

$Q = 42.4571 \times 1.4405 \times .0616^{.0616} \times .0038^{1/2} \times 44.8$

Q = 168.8 cfs

TRY 6.0'

A = 70.3

WP = 28.0

R = 2.5107

$Q = 42.4571 \times 1.8473 \times .0616 \times 70.3$

Q = 339.6

TRY 7.0

A = 98.8

WP = 32.0

R = 3.0875

$Q = 42.4571 \times 2.1204 \times .0616 \times 98.8$

Q = 547.9

USE 6.5 feet 399.5

6.5

100 YEAR FLOOD ELEVATION = 406.00

CRITICAL POINT / GROUND @ 407±

SECTION E-E

$Q_{100} = 442.7$ cfs

TRT 6.0' WATER

$A = 85.6$

$WP = 29.1$

$R = 2.9424$

$Q = 424571 \times 2.0535 \times .0616 \times 85.6$

$Q = 459.7$ cfs

USE 6.0' 398.0 + 6.0

100' YEAR FLOOD ELEV = 404.00

SECTION ALSO 1+' to GROUND CRITICAL

SECTION G-G

$Q_{100} = 56.8$ cfs

TRY 2'

$A = 9.6$

$WP = 9.6$

$R = 1.0$

$Q = 42.4571 \times 1.000 \times .1646 \times 9.6$

$Q = 67.1$ cfs >

USE 2.0'

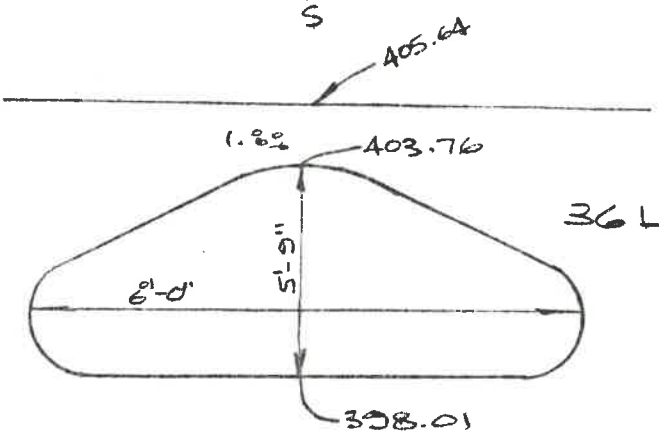
411.5
2.0

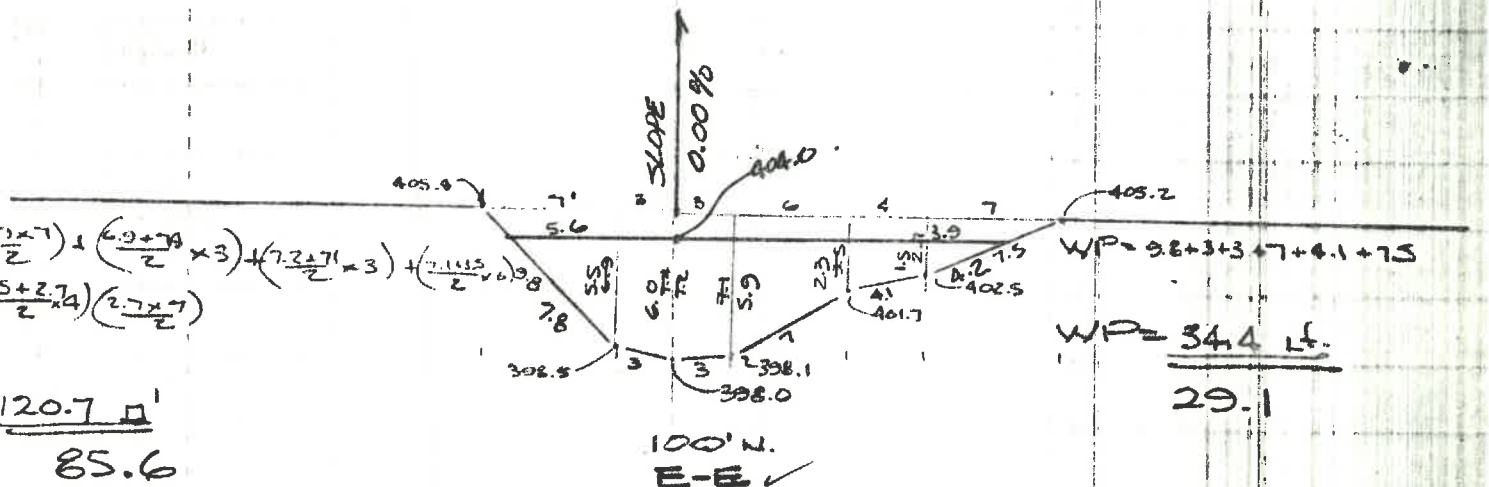
100 YEAR FLOOD ELEV = 413.50

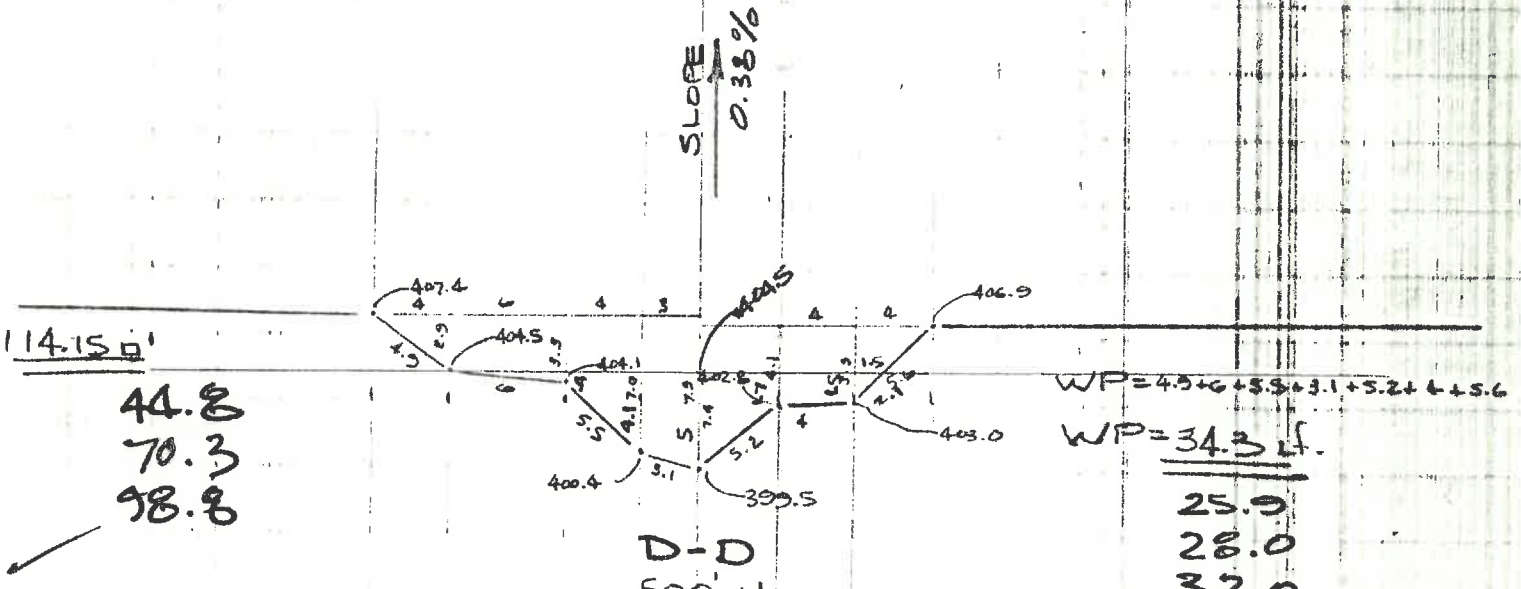
(1)

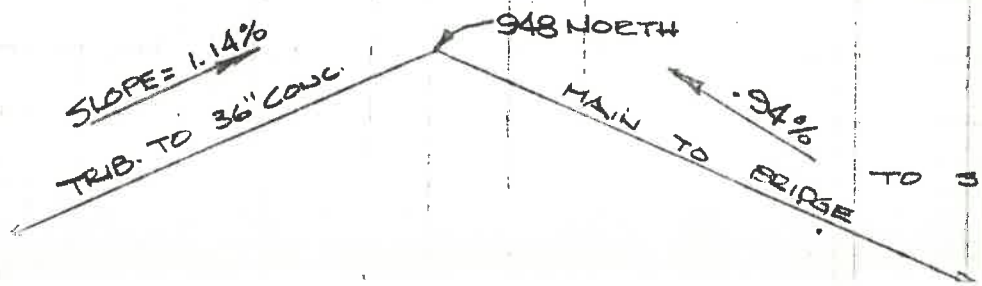
(29)

USE to CALC 100 YR FLOOD ELEV







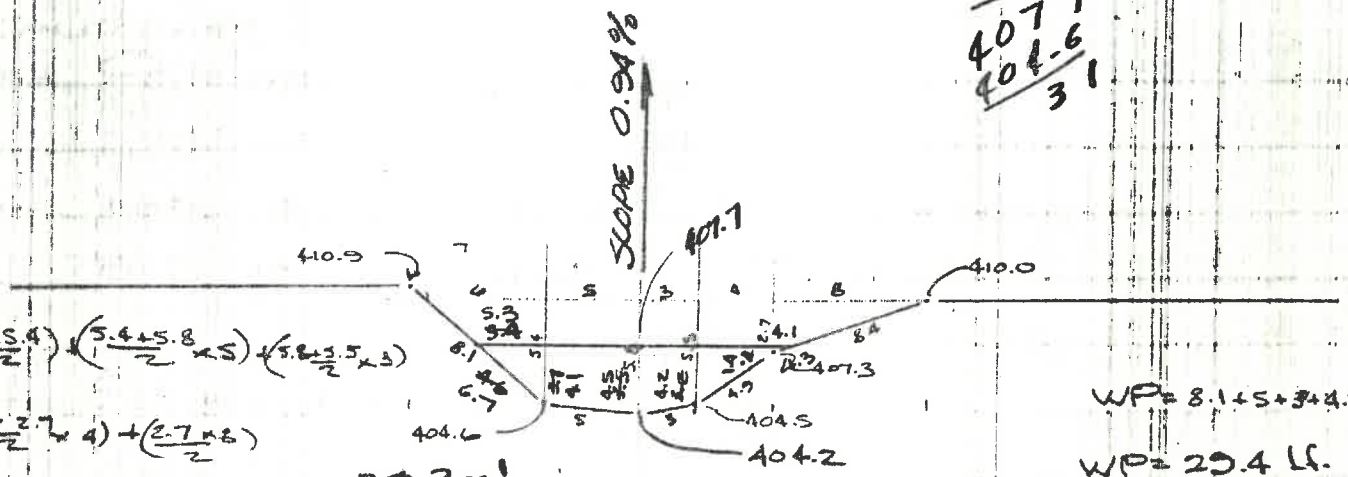


TO SHEET (2)
TO SHEET (5)

(5)

(30)

404.2
3 S
407.7
404.6
3 1



AREA = $\left(\frac{6\times5.4}{2}\right)+\left(\frac{5.4+5.8}{2}\times5\right)+\left(\frac{5.8+3.5}{2}\times3\right)+\left(\frac{5.3+2.7}{2}\times4\right)+\left(\frac{2.7\times6}{2}\right)$

A = 119.25 □'

39.20'

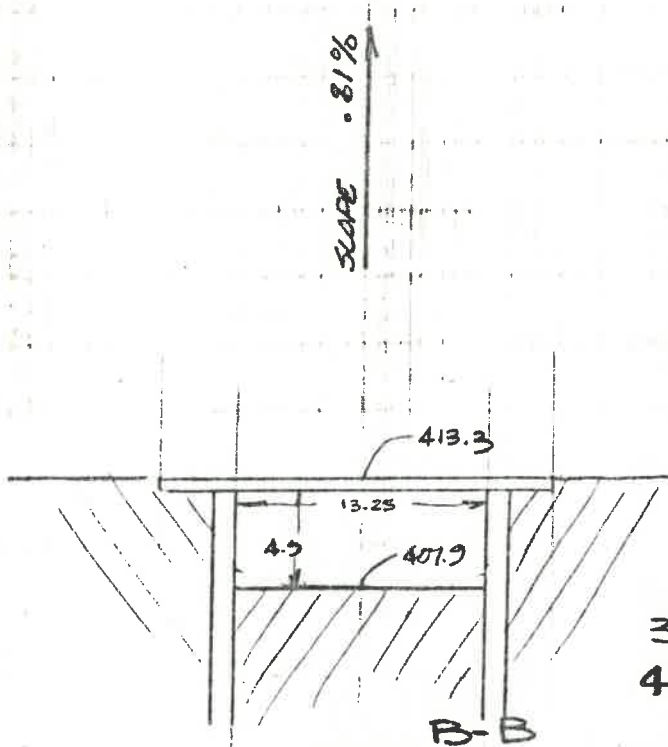
595 1000' FROM ELIPTICAL CC

WP = 8.1+5+3+4.9+

WP = 20.4 Ll.

19.0

23.9



AREA = 64.9 □'

CAP/H. % of 51.9/□'

3' - 39.75

4' 53.00

B-B

1458' FROM ELIPTICAL

WP = 4.9×2 + 13.25

WP = 23.1 Ll.

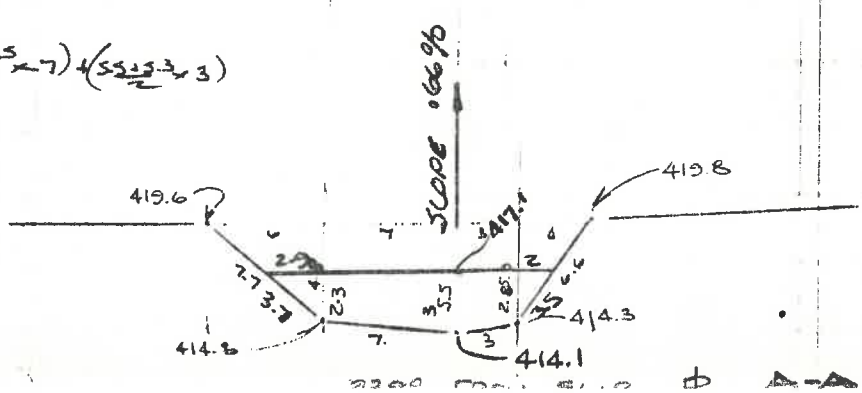
3' - 19.25

4' - 21.25

AREA = $\left(\frac{4.8\times6}{2}\right)+\left(\frac{4.8+5.5}{2}\times7\right)+\left(\frac{5.5+3.3}{2}\times3\right)+\frac{5.3\times4}{2}$

A = 77.3 □'

33.40



WP = 7.7+7+3+6.6

WP = 24.3 Ll

17.2

(3)

(31)

$A = \frac{2.6 \times 4.5}{2} + 1.0 \times 2.75 + \frac{2.9 \times 5.5}{2}$

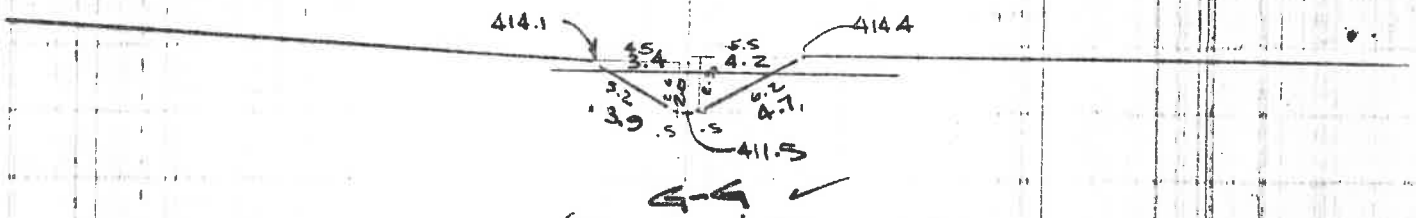
$A = \frac{16.6}{9.6}$ □'

TO 36"

2.0%

WP = 5.2 + 1.0 + 6.2 =

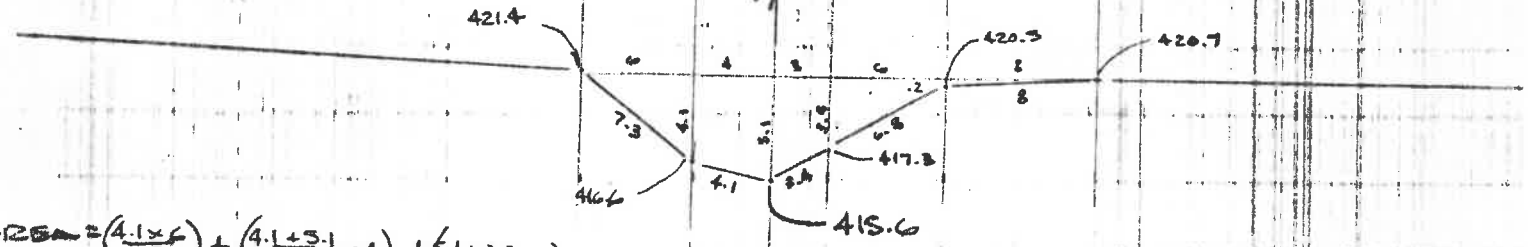
WP = $\frac{12.4}{9.6}$ Lf.



G-G

(B) 200' From 36" RCP

SLOPE 1.11%



$A = \left(\frac{4.1 \times 6}{2}\right) + \left(\frac{4.1 + 3.1}{2} \times 4\right) + \left(\frac{3.1 + 3.6}{2} \times 3\right) + \left(\frac{5.4 + .2}{2} \times 6\right) + \left(\frac{2 \times 8}{2}\right)$

A = $\frac{55.1}{}$ □'

(C) 570'. From 36" RCP @ ℄

F-F

WP = 7.3 + 4.1 + 3.4 + 6.8 + 8

WP = $\frac{29.6}{}$ Lf.

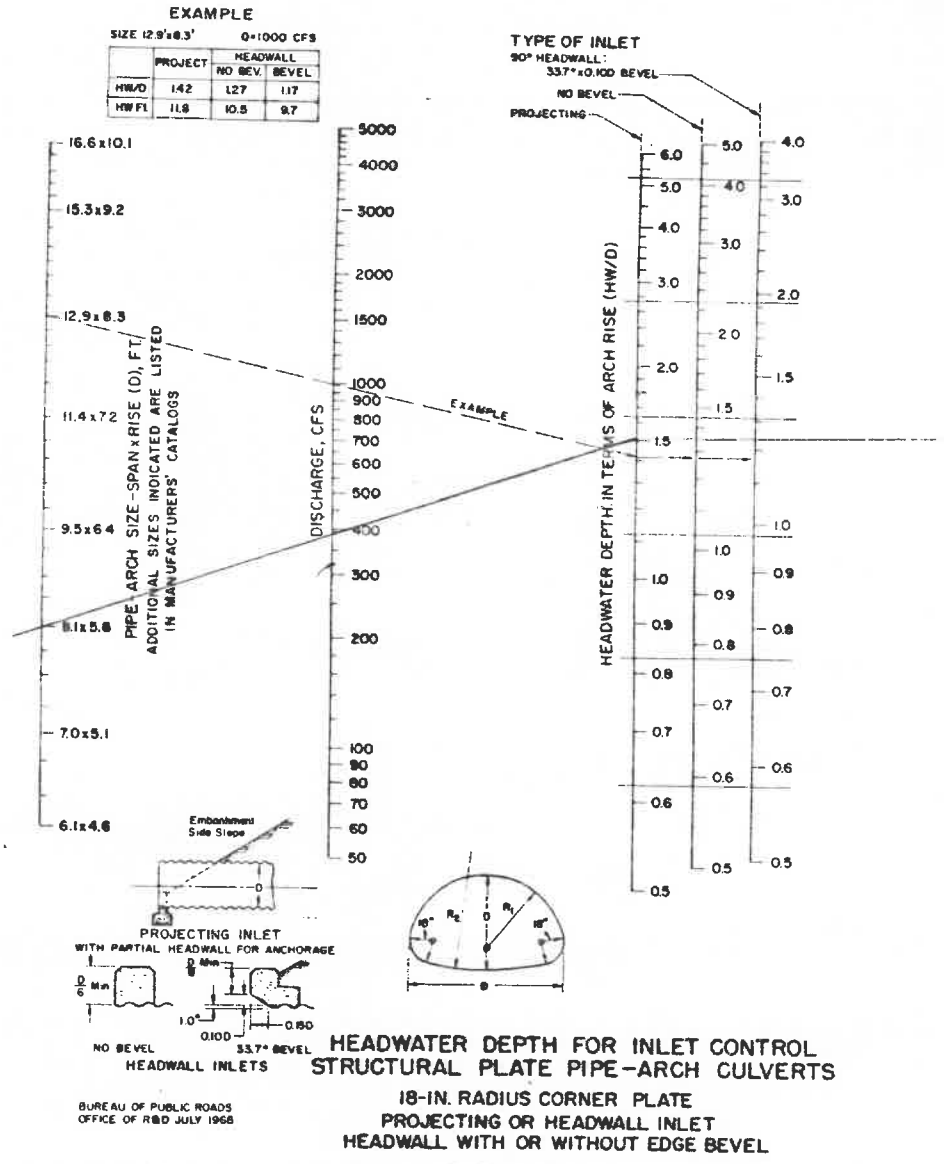


Fig. 4-21A. *Inlet Control.* Headwater depths for structural plate *pipe-arch* culverts with *18-in. radius* corner plate for three types of inlet.

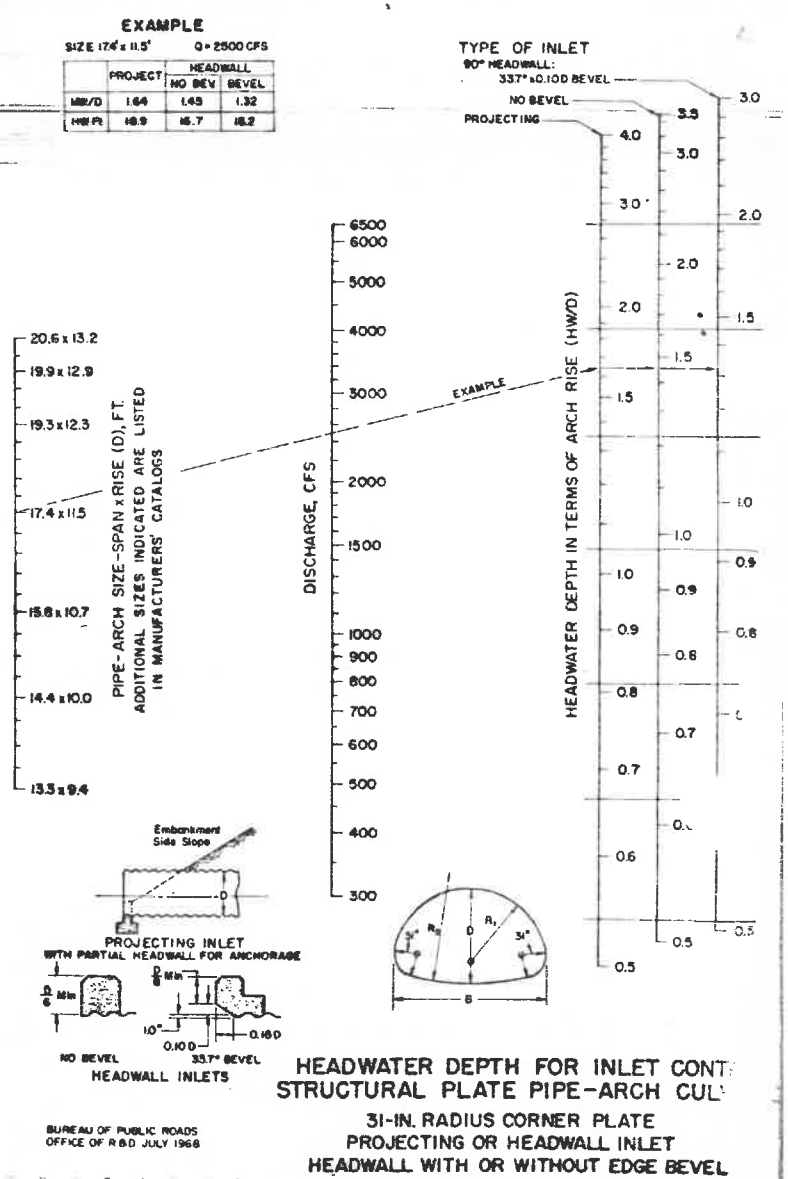


Fig. 4-21B. *Inlet Control.* Headwater depths for structural plate pipe-arch culverts, wi *31-in. radius* corner plate, for three types of inlet.