PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr
St. Peters, MO 63376

441-1211
278-1211

PROJECT NAME CARRIAGE HILLS OUTPARCEL
PROJECT #/JOB ORDER # 89-047C
DATE 8-31-95
DESIGNER
PAGE

"25yr./20min. Storm"

Total Area of Site :		3.86Ac.			
Disturbed Areas :					
Buildings / Pavement :		1.28Ac.			
Grassed Areas :		1.22Ac.			
	Total :	2.50Ac.			
Pre-developed P.I. =		2.31cfs/ac.			
Developed P.I. =		4.75 cfs/ac.			
Pre-developed Conditions —					
2.50 Ac. x 2.31 cfs/ac. =		5.78cfs			
Developed Conditions —					
1.28 Ac. x 4.75 cfs/ac. =		6.08cfs			
1.22 Ac. x 2.31 cfs/ac. =		2.82cfs			
	T.Q. =	8.90cfs			
Detention Required —					
8.90 cfs - 5.78 cfs =		3.12cfs			
3.12 cfs x 1800 =		5,616 cu. ft. (Estimated Storage)			

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Estimated Storage: 5,616 Cu. Ft.

Storage Provided in Existing Detention Facility for the entire "Carriage Hills" Development:

Storage Required: 147,186 cu.ft.

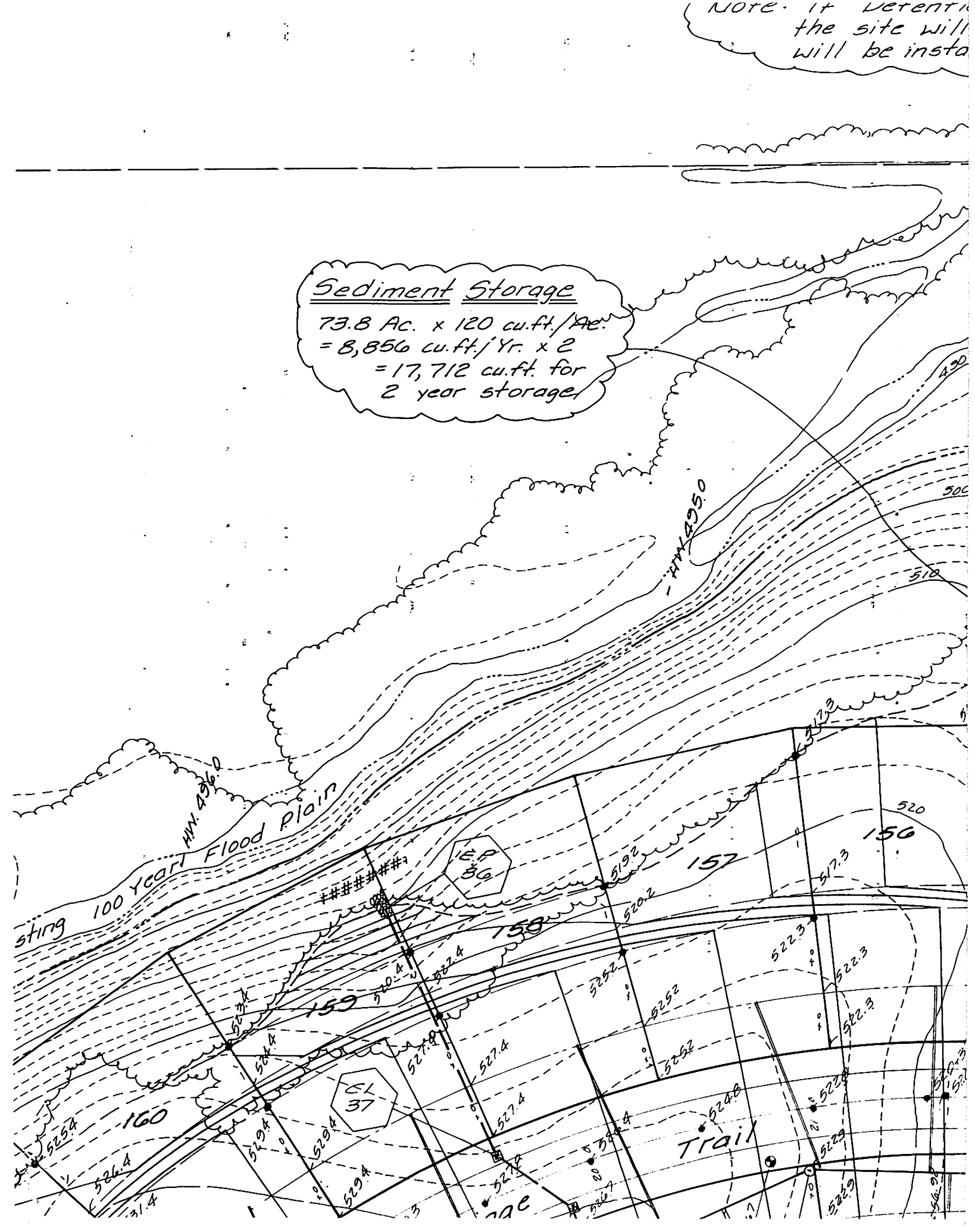
Storage Provided: 160,403 cu.ft.

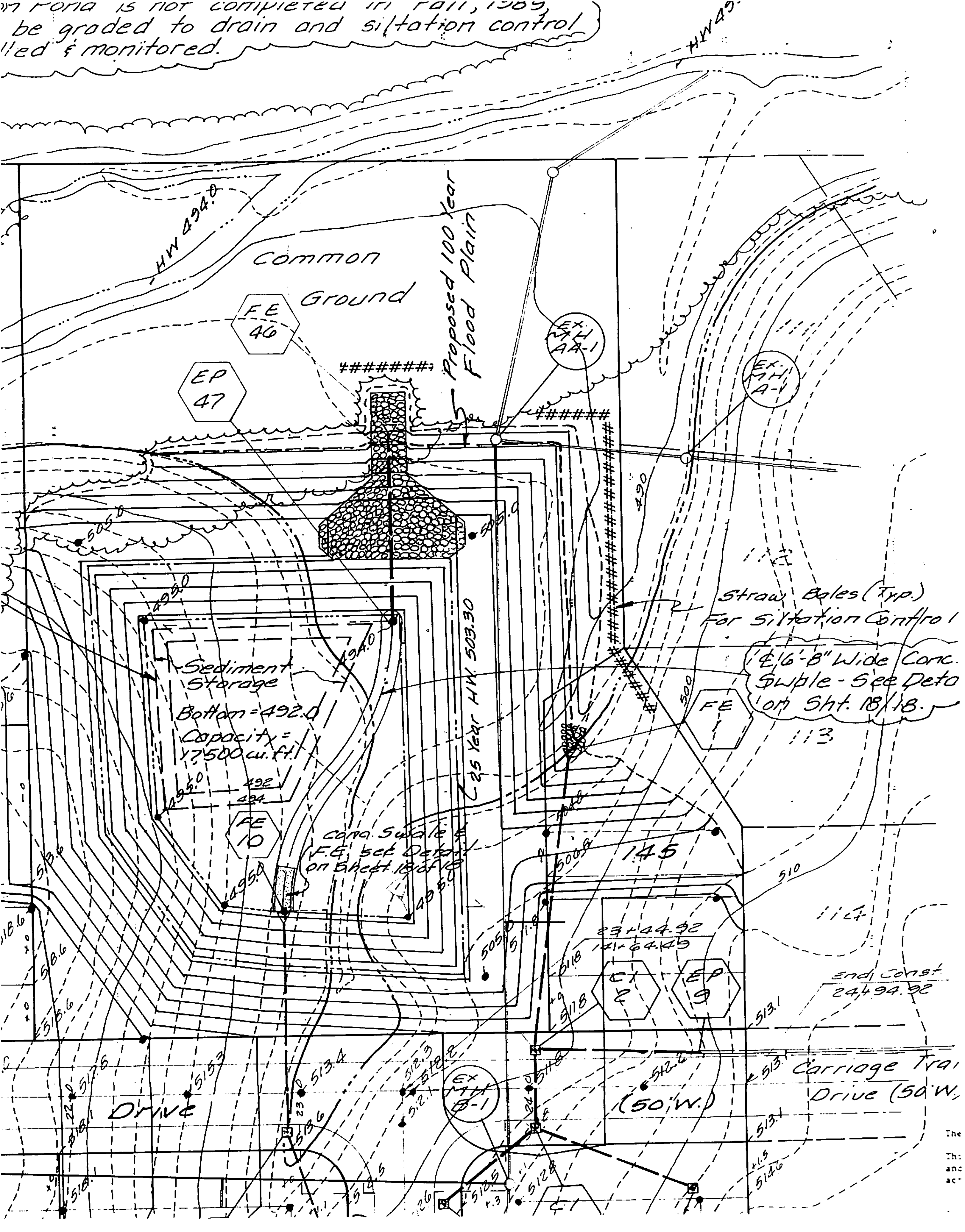
Excess Storage: 13,217 cu.ft.

Note: If detenti
the site will
will be insta

Sediment Storage

73.8 Ac. x 120 cu.ft./Ac.
= 8,856 cu.ft./Yr. x 2
= 17,712 cu.ft. for
2 year storage





be graded to drain and siltation control
lled & monitored.
HW 494.0
Common
Ground
F.E.
46
EP
47
Proposed 100 Year
Flood Plain
EX.
MH
AA-1
EX.
MH
A-1
490
505.0
505.0
498.0
494.0
Straw Bales (Typ.)
For Siltation Control
Sediment
Storage
Bottom = 492.0
Capacity =
17,500 cu. ft.
25 Year HW. 503.30
¢ 6'-8" Wide Conc.
Swale - See Deta
on Sht. 18/18.
FE
1
113
500
492
494
495.0
FE
10
Conc. Swale &
F.E. see Detail
on Sheet 18 of 18
145
510
114
23+44.92
141+64.45
CI
2
EP
9
End Const.
24+94.92
513.1
Carriage Tra
Drive (50' W.
Drive
(50' W.)
EX.
MH
B-1
513.4
513.6
512.3
512.2
512.1
511.8
515.3
517.5
518.6
516.6
518.1
514.6
CI

SCALE:

HORZ. - 1" = 50'
VERT. - 1" = 10'

SANITARY & STORM SEWER PROFILES
CARRIAGE HILLS - PHASE 2
Aug., 1989 89-047A

PVC

DETENTION CALCULATIONS (25 Year)

Total Area of Tract 65.97 Acres
Area of Future Commercial 7.83 Acres

Developed Q of Tract	65.97 Ac. @ 3.26 =	215.06 c.f.s.
Undeveloped Q of Tract	65.97 Ac. @ 2.31 =	152.39 c.f.s.
Differential Runoff	=	62.67 c.f.s.
Developed Q of Comm.	7.83 Ac. x 4.75 =	37.19 c.f.s.
Undeveloped Q of Comm.	7.83 Ac x 2.31 =	18.09 c.f.s.
Differential Runoff	=	19.10 c.f.s.

Storage Required 81.77 c.f.s. x 1800 (30 min.) = 147,186 cu.ft.
Storage of Dry Pond @ elev. 503.30 = 160,403 cu.ft.

OVERFLOW PIPE CALCULATIONS

Capacity of 33" C.S.P. as an orifice

$Q = Ca\sqrt{2gh}$

$Q = 0.6 \times 5.94 \sqrt{2(32.2)7.925}$

$Q = 3.56\sqrt{510.37}$

Constant	C = 0.6
Area	a = 5.94
Gravity	g = 32.2
Ave. Head	h = 7.925

Note! Reduce 36" C.S.P. opening to 33" using steel reinforcing band

$Q = 3.56 \times 22.59$

$Q = 80.42$ c.f.s.

Q to Dry Pond (25 Years) = 169.07 c.f.s.

Out Overflow Pipe = 80.42 c.f.s.

Storage Required = 88.65 c.f.s.

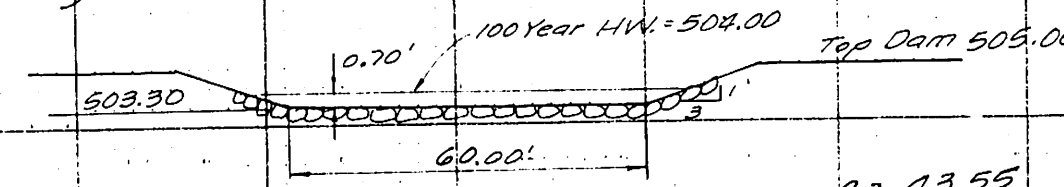
88.65×1800 (30 min.) = 159,570 cu. ft.

EMERGENCY SPILLWAY (Grouted Rip Rap)

Q to Dry Pond for 100 Year = 216.29 c.f.s.

505.00

25 Year H.W. 503.30



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

$Q = 43.55 \times \frac{1.486}{0.0225} \times 0.773 \times 0.10$

$Q = 222.33$ c.f.s.

$a = 43.55$

$wp = 64.42$

$S = 0.1$ $S^{1/2} = 0.10$

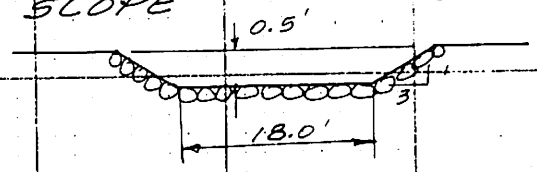
$R = \frac{43.55}{64.42} = 0.68$ $R^{2/3} = 0.773$

$n = 0.0225$

Conc Swale see Detail on Sheet 15 of 16

2' Conc. Cut-off Wall

SIDE SLOPE



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

$Q = 9.75 \times \frac{1.486}{0.0225} \times 0.596 \times 0.577$

$Q = 221.44$ c.f.s.

$a = 9.75$

$wp = 21.16$

$S = 0.333$ $S^{1/2} = 0.577$

$R = \frac{9.75}{21.16} = 0.46$ $R^{2/3} = 0.596$

$n = 0.0225$

A1 39

Ground