ENGINEERING

PLANNING

SURVEYING

STORMWATER DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
DETENTION BASIN "A"
HOMEFIELD MANOR VILLAGE J - O'FALLON
BAX PROJECT NO. **98-10001J**
September 14, 1999
Revised March 6, 2000

INTRODUCTION:

This tract of land is presently an undeveloped site located in the City of O'Fallon, Missouri. The proposed Village J, consisting of 24.8 acres of the 103.4 acre Homefield tract will be developed into single-family residential lots. A dry-basin will be constructed in the southwest corner of the site. The storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the tract under post-developed conditions is less than or equal to the peak rate of runoff under pre-developed conditions for the 2, 15, and 25 year-20 minute design storm. The basin was also analyzed for the 100 year frequency - 20 minute duration design storm. Part of Villages J and K is served by this detention basin. Two other basins are proposed for the residential portion of this tract and will be analyzed, in conjunction with this basin, with submittals for future villages.

GENERAL SITE DATA AND RUNOFF CALCULATIONS:

The pre-developed P.I. factors to be used for the analysis are:

2 year - 0-5% impervious	1.15 cfs/ac.
15 year - 0-5% impervious	1.87 cfs/ac.
25 year - 0-5% impervious	2.31 cfs/ac.
100 year - 0-5% impervious	2.95 cfs/ac.

The post-developed P.I. factors to be used for the analysis are:

2 year - ±52% impervious	1.76 cfs/ac.
15 year - ±52% impervious	2.90 cfs/ac.
25 year - ±52% impervious	3.58 cfs/ac.
100 year - ±52% impervious	4.58 cfs/ac.

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TIME OF CONCENTRATION:

Of the inflows to the basin, the most remote point lies to the northeast near lot 69. Flows will travel approximately 320 feet overland to AI 629, then 850 feet via stormpipe to the detention basin. Time of concentration is estimated as follows:

T(overland): L = 320 feet
Elevation difference = 521 - 517 = 4 feet
T(overland) = 7.0 minutes: See figure 1

T(stormpipe): L = 850 feet
850 / 7 fps = 2.02 minutes

Total 9.0 min Use **9** min.

REQUIRED ATTENUATION

= [Developed area x PI(post)] – [Pre-developed area x PI(pre)]

(2 yr)	[27.94 x 1.76]	-	[28.00 x 1.15]	=	16.97 cfs
(15 yr)	[27.94 x 2.90]	-	[28.00 x 1.87]	=	28.67 cfs
(25 yr)	[27.94 x 3.58]	-	[28.00 x 2.31]	=	35.35 cfs

BASIN PEAK INFLOWS:

Inflows to the basin have been estimated from the drainage area map.

25 year-20 minute storm

20.53 Ac. x 3.58 cfs/Ac.	73.48 cfs
0.86 Ac. x 3.26 cfs/Ac.	2.80 cfs
Total=	76.29 cfs
2 year-20 minute storm:	37.51 cfs
15 year-20 minute storm:	61.80 cfs
100 year-20 minute storm:	97.60 cfs

ALLOWABLE OUTFLOWS:

Allowable outflows were determined by subtracting the required attenuation from the basin inflows.

STORM	INFLOW		REQUIRED. ATTENUATION		ALLOWABLE OUTFLOW
20-min	cfs		cfs		cfs
2 year	37.51	-	16.97	=	20.54
15 year	61.80	-	28.67	=	33.13
25 year	76.29	-	35.35	=	40.94

STORM ROUTING CALCULATIONS AND RESULTS:

A computer program was used in routing the 2, 15, and 25 year-20 minute storm through the basin. As found in the routing calculations, the results are as follows:

20 MIN STORM	ALLOWABLE RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2 YR	20.54	14.40 cfs	500.95
15 YR	33.13	17.88 cfs	502.15
25 YR	40.94	19.58 cfs	502.82

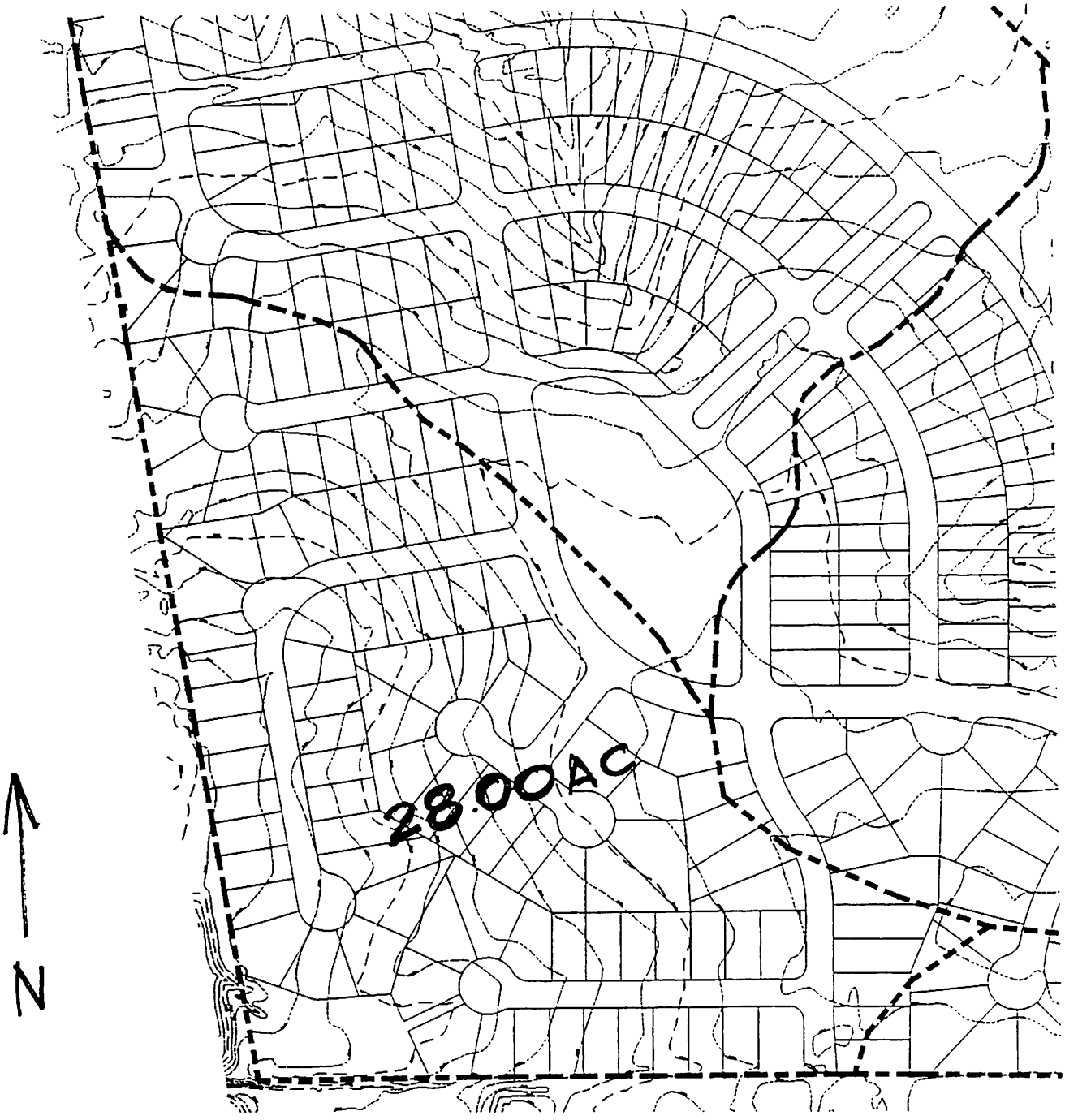
CHECK 100 YEAR OUTFLOW:(low-flow outlet pipe blocked)

WEIR FLOW $Q = C \times L \times H (3/2)$

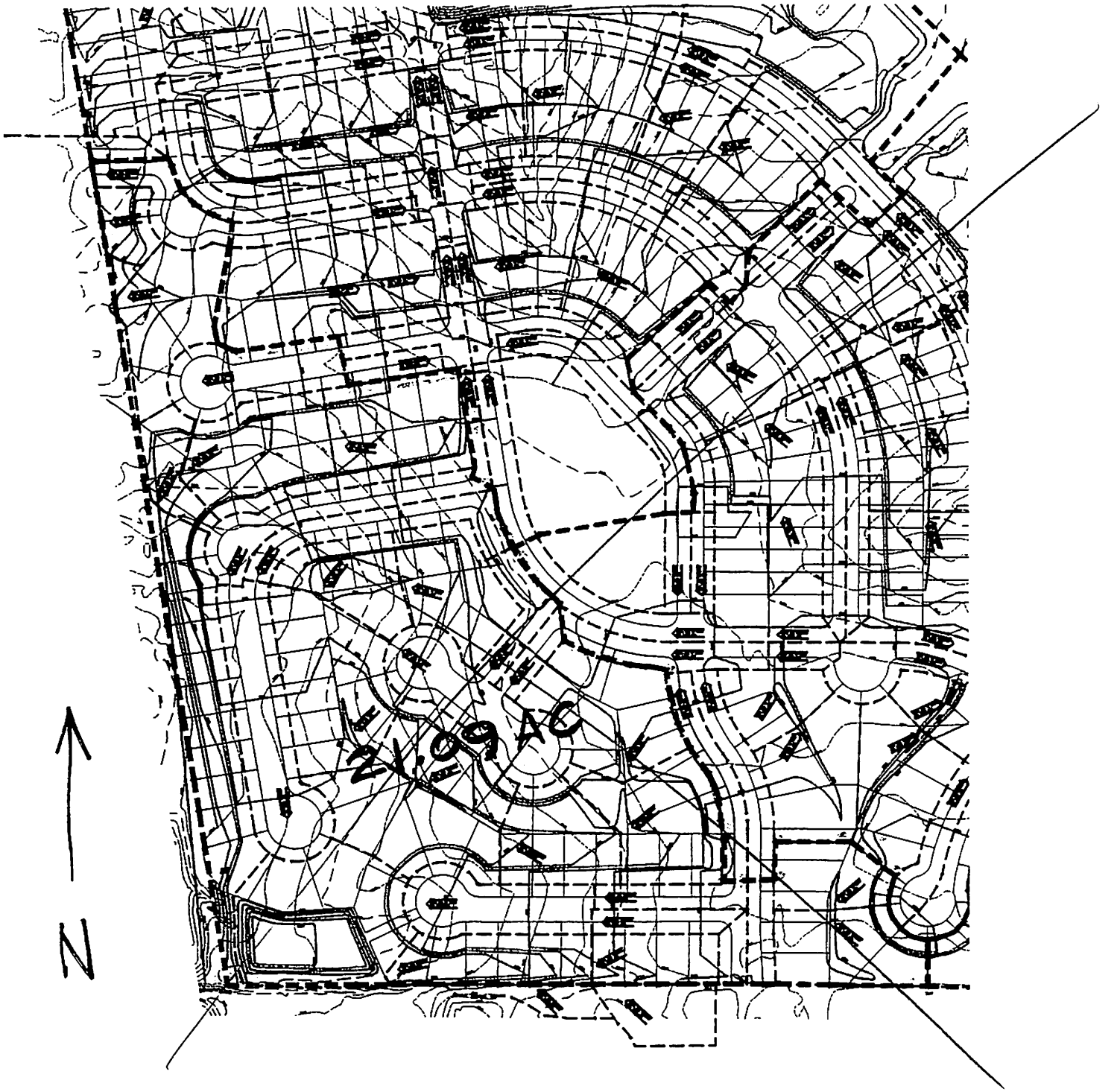
where 100-YEAR FLOW	Q	=	94.44 cfs
	c	=	3.0
Spillway width	L	=	14.137 ft
	H	=	1.71 ft
	sill	=	503.00 ft
	100 yr h/w	=	504.71 ft

SUMMARY

25 year-20min H.W.	502.82
100 year-20min H.W.	504.71
Low-flow slot	12"W x 24"H
Low-flow elevation	497.70
Top Of Berm	506.00



PRE-DEVELOPED



POST-DEVELOPED

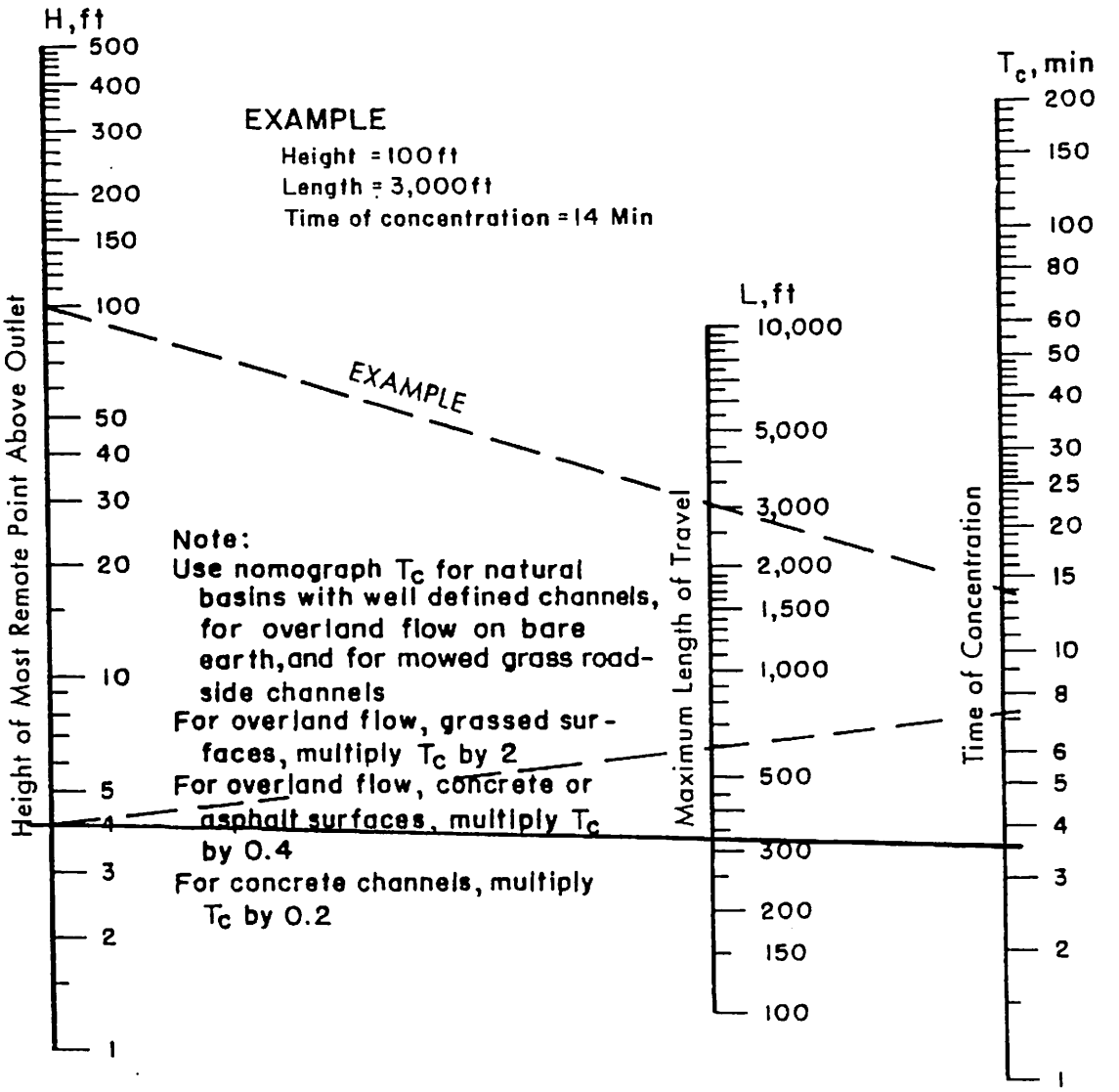
BAX ENGINEERING

SHEET ___ of ___

Project: HOMEFIELD VILLAGE J

Date: 10-5-99 Project No: 98-10001J

Designed: ADJ Checked: ___



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 362

1052 South Cloverleaf Drive
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POND-2 Version: 5.20
S/N:

HOMEFIELD
SOUTH BASIN
BAX ENGINEERING COMPANY INCORPORATED
SEPTEMBER 3, 1999

CALCULATED 09-15-1999 10:32:56
DISK FILE: c:\windows\profiles\andy\desktop\pondpa~1\10001A .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
497.70	0.00	0.00	0.00	0.00	0.00
500.00	16,231.00	0.37	0.37	0.29	0.29
502.00	21,916.00	0.50	1.31	0.87	1.16
504.00	26,056.00	0.60	1.65	1.10	2.26
506.00	30,493.00	0.70	1.95	1.30	3.55

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
HOMEFIELD
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
SEPTEMBER 3, 1999
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Outflow Rating Table A
Table A = 1 ? 2

Elevation (ft)	Q (cfs)	Contributing Structures
497.70	0.0	1
497.95	0.4	1
498.20	1.1	1
498.45	1.9	1
498.70	3.0	1
498.95	4.2	1
499.20	5.5	1
499.45	6.9	1
499.70	8.5	1
499.95	10.1	1
500.20	11.8	2
500.45	12.7	2
500.70	13.6	2
500.95	14.4	2
501.20	15.2	2
501.45	16.0	2
501.70	16.7	2
501.95	17.4	2
502.20	18.0	2
502.45	18.6	2
502.70	19.3	2
502.95	19.9	2
503.20	20.4	2
503.45	21.0	2
503.70	21.5	2
503.95	22.1	2
504.20	22.6	2
504.45	23.1	2
504.70	23.6	2
504.95	24.1	2
505.20	24.6	2
505.45	25.0	2
505.70	25.5	2
505.95	25.9	2
506.00	26.0	2

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
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HOMEFIELD
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SEPTEMBER 3, 1999
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Outflow Rating Table for Structure #2
ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
497.70	0.0	E < E1=499.70
497.95	0.0	E < E1=499.70
498.20	0.0	E < E1=499.70
498.45	0.0	E < E1=499.70
498.70	0.0	E < E1=499.70
498.95	0.0	E < E1=499.70
499.20	0.0	E < E1=499.70
499.45	0.0	E < E1=499.70
499.70	9.6	H =1.0
499.95	10.8	H =1.25
500.20	11.8	H =1.5
500.45	12.7	H =1.75
500.70	13.6	H =2.0
500.95	14.4	H =2.25
501.20	15.2	H =2.5
501.45	16.0	H =2.75
501.70	16.7	H =3.0
501.95	17.4	H =3.25
502.20	18.0	H =3.5
502.45	18.6	H =3.75
502.70	19.3	H =4.0
502.95	19.9	H =4.25
503.20	20.4	H =4.5
503.45	21.0	H =4.75
503.70	21.5	H =5.0
503.95	22.1	H =5.25
504.20	22.6	H =5.5
504.45	23.1	H =5.75
504.70	23.6	H =6.0
504.95	24.1	H =6.25
505.20	24.6	H =6.5
505.45	25.0	H =6.75
505.70	25.5	H =7.0
505.95	25.9	H =7.25
506.00	26.0	H =7.3

C = .6 A = 2 sq.ft.
H (ft) = Table elev. - Datum elev. (498.7 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

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SEPTEMBER 3, 1999
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Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
497.70	0.0	H =0.0
497.95	0.4	H =.25
498.20	1.1	H =.5
498.45	1.9	H =.750
498.70	3.0	H =1.0
498.95	4.2	H =1.25
499.20	5.5	H =1.5
499.45	6.9	H =1.75
499.70	8.5	H =2.0
499.95	10.1	H =2.25
500.20	11.9	H =2.5
500.45	13.7	H =2.75
500.70	15.6	H =3.0
500.95	17.6	H =3.25
501.20	19.6	H =3.5
501.45	21.8	H =3.75
501.70	24.0	H =4.0
501.95	26.3	H =4.25
502.20	28.6	H =4.5
502.45	31.1	H =4.75
502.70	33.5	H =5.0
502.95	36.1	H =5.25
503.20	38.7	H =5.5
503.45	41.4	H =5.75
503.70	44.1	H =6.0
503.95	46.9	H =6.25
504.20	49.7	H =6.5
504.45	52.6	H =6.75
504.70	55.6	H =7.0
504.95	58.6	H =7.25
505.20	61.6	H =7.5
505.45	64.7	H =7.75
505.70	67.9	H =8.0
505.95	71.1	H =8.25
506.00	71.7	H =8.3

C = 3 L (ft) = 1
H (ft) = Table elev. - Invert elev. (497.7 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
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SEPTEMBER 3, 1999
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>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	499.70
E2 elev.(ft)?	506.001
Orifice coeff.?	0.6
Invert elev.(ft)?	497.700
Datum elev.(ft) ?	498.7000
Orifice area (sq ft)?	2.00000

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
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SEPTEMBER 3, 1999
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>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	497.7
E2 elev.(ft)?	506.001
Weir coefficient?	3.00
Weir elev.(ft)?	497.70
Length (ft)?	1.00000
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

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HOMEFIELD
DETENTION ANALYSIS
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SEPTEMBER 3, 1999
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Outlet Structure File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .STR

Planimeter Input File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .VOL

Rating Table Output File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Min. Elev.(ft) = 497.7 Max. Elev.(ft) = 506 Incr.(ft) = .25

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1
ORIFICE	2	? 1	->	A

Outflow rating table summary was stored in file:
c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Outlet Structure File: 10001A .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

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HOMEFIELD
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
SEPTEMBER 3, 1999
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
497.70	0.0	1
497.95	0.4	1
498.20	1.1	1
498.45	1.9	1
498.70	3.0	1
498.95	4.2	1
499.20	5.5	1
499.45	6.9	1
499.70	8.5	1
499.95	10.1	1
500.20	11.8	2
500.45	12.7	2
500.70	13.6	2
500.95	14.4	2
501.20	15.2	2
501.45	16.0	2
501.70	16.7	2
501.95	17.4	2
502.20	18.0	2
502.45	18.6	2
502.70	19.3	2
502.95	19.9	2
503.20	20.4	2
503.45	21.0	2
503.70	21.5	2
503.95	22.1	2
504.20	22.6	2
504.45	23.1	2
504.70	23.6	2
504.95	24.1	2
505.20	24.6	2
505.45	25.0	2
505.70	25.5	2
505.95	25.9	2
506.00	26.0	2

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*
* HOMEFIELD
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 26, 1999
*
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Inflow Hydrograph:
c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD
Rating Table file:
c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

----INITIAL CONDITIONS----
Elevation = 497.70 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
497.70	0.0	0	0.0	0.0
497.95	0.4	16	0.5	0.9
498.20	1.1	128	4.3	5.4
498.45	1.9	432	14.4	16.3
498.70	3.0	1,023	34.1	37.1
498.95	4.2	1,998	66.6	70.8
499.20	5.5	3,452	115.1	120.6
499.45	6.9	5,481	182.7	189.6
499.70	8.5	8,182	272.7	281.2
499.95	10.1	11,650	388.3	398.4
500.20	11.8	15,743	524.8	536.6
500.45	12.7	20,017	667.2	679.9
500.70	13.6	24,462	815.4	829.0
500.95	14.4	29,080	969.3	983.7
501.20	15.2	33,876	1129.2	1144.4
501.45	16.0	38,852	1295.1	1311.1
501.70	16.7	44,011	1467.0	1483.7
501.95	17.4	49,357	1645.2	1662.6
502.20	18.0	54,872	1829.1	1847.1
502.45	18.6	60,513	2017.1	2035.7
502.70	19.3	66,280	2209.3	2228.6
502.95	19.9	72,176	2405.9	2425.8
503.20	20.4	78,200	2606.7	2627.1
503.45	21.0	84,355	2811.8	2832.8
503.70	21.5	90,641	3021.4	3042.9
503.95	22.1	97,061	3235.4	3257.5
504.20	22.6	103,615	3453.8	3476.4
504.45	23.1	110,304	3676.8	3699.9
504.70	23.6	117,128	3904.2	3927.8
504.95	24.1	124,089	4136.3	4160.4
505.20	24.6	131,188	4372.9	4397.5

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
505.45	25.0	138,428
505.70	25.5	145,808
505.95	25.9	153,330
506.00	26.0	154,852

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
4614.2	4639.2
4860.3	4885.8
5111.0	5136.9
5161.7	5187.7

Time increment (t) = 1.0 min.

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A02 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	497.70
1.0	3.75	3.8	2.1	3.8	0.85	498.11
2.0	7.50	11.3	9.9	13.3	1.68	498.38
3.0	11.25	18.8	23.6	28.7	2.56	498.60
4.0	15.00	26.3	42.9	49.8	3.45	498.79
5.0	22.51	37.5	71.5	80.4	4.45	499.00
6.0	26.26	48.8	109.3	120.3	5.49	499.20
7.0	30.01	56.3	152.8	165.6	6.41	499.36
8.0	33.76	63.8	201.8	216.5	7.37	499.52
9.0	37.51	71.3	256.3	273.1	8.36	499.68
10.0	37.51	75.0	313.0	331.4	9.18	499.81
11.0	37.51	75.0	368.1	388.0	9.96	499.93
12.0	37.51	75.0	421.8	443.1	10.65	500.03
13.0	37.51	75.0	474.2	496.8	11.31	500.13
14.0	37.51	75.0	525.5	549.2	11.88	500.22
15.0	37.51	75.0	576.1	600.5	12.20	500.31
16.0	37.51	75.0	626.1	651.1	12.52	500.40
17.0	37.51	75.0	675.4	701.1	12.83	500.49
18.0	37.51	75.0	724.2	750.5	13.13	500.57
19.0	37.51	75.0	772.4	799.2	13.42	500.65
20.0	37.51	75.0	820.0	847.4	13.70	500.73
21.0	33.76	71.3	863.4	891.3	13.92	500.80
22.0	30.01	63.8	899.0	927.2	14.11	500.86
23.0	26.26	56.3	926.8	955.3	14.25	500.90
24.0	22.51	48.8	946.8	975.5	14.36	500.94
25.0	15.00	37.5	955.5	984.3	14.40	500.95
26.0	11.25	26.3	953.0	981.8	14.39	500.95
27.0	7.50	18.8	943.1	971.7	14.34	500.93
28.0	3.75	11.3	925.8	954.3	14.25	500.90
29.0	0.00	3.8	901.3	929.6	14.12	500.86
30.0	0.00	0.0	873.4	901.3	13.97	500.82
31.0	0.00	0.0	845.7	873.4	13.83	500.77
32.0	0.00	0.0	818.4	845.7	13.69	500.73
33.0	0.00	0.0	791.3	818.4	13.54	500.68
34.0	0.00	0.0	764.5	791.3	13.37	500.64
35.0	0.00	0.0	738.1	764.5	13.21	500.59
36.0	0.00	0.0	712.0	738.1	13.05	500.55
37.0	0.00	0.0	686.2	712.0	12.89	500.50
38.0	0.00	0.0	660.7	686.2	12.74	500.46
39.0	0.00	0.0	635.6	660.7	12.58	500.42
40.0	0.00	0.0	610.7	635.6	12.42	500.37
41.0	0.00	0.0	586.2	610.7	12.27	500.33
42.0	0.00	0.0	562.0	586.2	12.11	500.29
43.0	0.00	0.0	538.1	562.0	11.96	500.24
44.0	0.00	0.0	514.5	538.1	11.81	500.20

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A02 .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	0.00	0.0	491.4	514.5	11.53	500.16
46.0	0.00	0.0	468.9	491.4	11.24	500.12
47.0	0.00	0.0	447.0	468.9	10.97	500.08
48.0	0.00	0.0	425.6	447.0	10.70	500.04
49.0	0.00	0.0	404.7	425.6	10.43	500.00
50.0	0.00	0.0	384.4	404.7	10.18	499.96
51.0	0.00	0.0	364.5	384.4	9.91	499.92
52.0	0.00	0.0	345.3	364.5	9.64	499.88
53.0	0.00	0.0	326.5	345.3	9.37	499.84
54.0	0.00	0.0	308.3	326.5	9.12	499.80
55.0	0.00	0.0	290.5	308.3	8.87	499.76
56.0	0.00	0.0	273.3	290.5	8.63	499.72
57.0	0.00	0.0	256.6	273.3	8.36	499.68
58.0	0.00	0.0	240.4	256.6	8.07	499.63
59.0	0.00	0.0	224.9	240.4	7.79	499.59
60.0	0.00	0.0	209.8	224.9	7.52	499.55

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A02 .HYD

Starting Pond W.S. Elevation = 497.70 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	37.51 cfs
Peak Outflow	=	14.40 cfs
Peak Elevation	=	500.95 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	29,098 cu-ft
Total Storage in Pond	=	29,098 cu-ft

Return Freq: 2 years

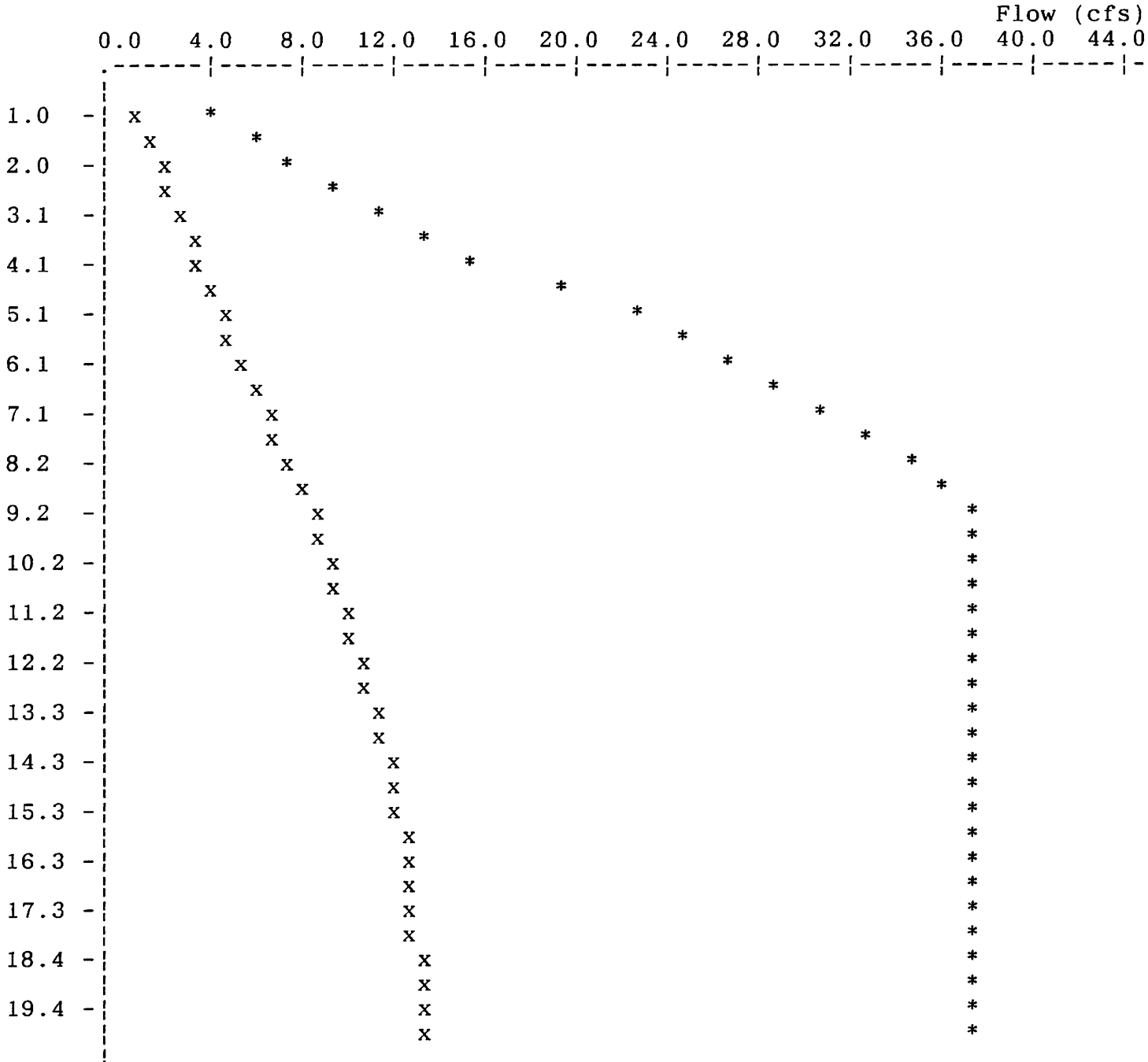
Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD

Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A02 .HYD

EXECUTED: 10-26-1999
14:26:46

Peak Inflow = 37.51 cfs
Peak Outflow = 14.40 cfs
Peak Elevation = 500.95 ft



x File: c:\windows\profiles\andy\desktop\pondpa~1\A02 .HYD Qmax = 1
4.4 cfs
* File: c:\windows\profiles\andy\desktop\pondpa~1\10001A02.HYD Qmax = 3

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* HOMEFIELD
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 26, 1999
*
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Inflow Hydrograph:
c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD
Rating Table file:
c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

----INITIAL CONDITIONS----
Elevation = 497.70 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
497.70	0.0	0	0.0	0.0
497.95	0.4	16	0.5	0.9
498.20	1.1	128	4.3	5.4
498.45	1.9	432	14.4	16.3
498.70	3.0	1,023	34.1	37.1
498.95	4.2	1,998	66.6	70.8
499.20	5.5	3,452	115.1	120.6
499.45	6.9	5,481	182.7	189.6
499.70	8.5	8,182	272.7	281.2
499.95	10.1	11,650	388.3	398.4
500.20	11.8	15,743	524.8	536.6
500.45	12.7	20,017	667.2	679.9
500.70	13.6	24,462	815.4	829.0
500.95	14.4	29,080	969.3	983.7
501.20	15.2	33,876	1129.2	1144.4
501.45	16.0	38,852	1295.1	1311.1
501.70	16.7	44,011	1467.0	1483.7
501.95	17.4	49,357	1645.2	1662.6
502.20	18.0	54,872	1829.1	1847.1
502.45	18.6	60,513	2017.1	2035.7
502.70	19.3	66,280	2209.3	2228.6
502.95	19.9	72,176	2405.9	2425.8
503.20	20.4	78,200	2606.7	2627.1
503.45	21.0	84,355	2811.8	2832.8
503.70	21.5	90,641	3021.4	3042.9
503.95	22.1	97,061	3235.4	3257.5
504.20	22.6	103,615	3453.8	3476.4
504.45	23.1	110,304	3676.8	3699.9
504.70	23.6	117,128	3904.2	3927.8
504.95	24.1	124,089	4136.3	4160.4
505.20	24.6	131,188	4372.9	4397.5

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
505.45	25.0	138,428
505.70	25.5	145,808
505.95	25.9	153,330
506.00	26.0	154,852

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
4614.2	4639.2
4860.3	4885.8
5111.0	5136.9
5161.7	5187.7

Time increment (t) = 1.0 min.

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A15 .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	497.70
1.0	6.18	6.2	3.9	6.2	1.16	498.22
2.0	12.36	18.5	18.0	22.4	2.22	498.52
3.0	18.54	30.9	42.0	48.9	3.42	498.79
4.0	24.72	43.3	76.1	85.3	4.58	499.02
5.0	37.08	61.8	126.2	137.9	5.85	499.26
6.0	43.26	80.3	192.2	206.6	7.20	499.50
7.0	49.44	92.7	267.8	284.9	8.55	499.71
8.0	55.62	105.1	353.3	372.8	9.75	499.90
9.0	61.80	117.4	448.8	470.7	10.99	500.08
10.0	61.80	123.6	548.3	572.4	12.02	500.26
11.0	61.80	123.6	646.6	671.9	12.65	500.44
12.0	61.80	123.6	743.7	770.2	13.25	500.60
13.0	61.80	123.6	839.7	867.3	13.80	500.76
14.0	61.80	123.6	934.7	963.3	14.29	500.92
15.0	61.80	123.6	1028.8	1058.3	14.77	501.07
16.0	61.80	123.6	1121.9	1152.4	15.24	501.21
17.0	61.80	123.6	1214.1	1245.5	15.69	501.35
18.0	61.80	123.6	1305.5	1337.7	16.11	501.49
19.0	61.80	123.6	1396.2	1429.1	16.48	501.62
20.0	61.80	123.6	1486.1	1519.8	16.84	501.75
21.0	55.62	117.4	1569.2	1603.5	17.17	501.87
22.0	49.44	105.1	1639.4	1674.2	17.44	501.97
23.0	43.26	92.7	1696.8	1732.1	17.63	502.04
24.0	37.08	80.3	1741.6	1777.1	17.77	502.11
25.0	24.72	61.8	1767.7	1803.4	17.86	502.14
26.0	18.54	43.3	1775.2	1810.9	17.88	502.15
27.0	12.36	30.9	1770.3	1806.1	17.87	502.14
28.0	6.18	18.5	1753.3	1788.9	17.81	502.12
29.0	0.00	6.2	1724.0	1759.4	17.71	502.08
30.0	0.00	0.0	1688.8	1724.0	17.60	502.03
31.0	0.00	0.0	1653.8	1688.8	17.49	501.99
32.0	0.00	0.0	1619.1	1653.8	17.37	501.94
33.0	0.00	0.0	1584.7	1619.1	17.23	501.89
34.0	0.00	0.0	1550.5	1584.7	17.09	501.84
35.0	0.00	0.0	1516.5	1550.5	16.96	501.79
36.0	0.00	0.0	1482.9	1516.5	16.83	501.75
37.0	0.00	0.0	1449.5	1482.9	16.70	501.70
38.0	0.00	0.0	1416.4	1449.5	16.56	501.65
39.0	0.00	0.0	1383.5	1416.4	16.43	501.60
40.0	0.00	0.0	1350.9	1383.5	16.29	501.55
41.0	0.00	0.0	1318.6	1350.9	16.16	501.51
42.0	0.00	0.0	1286.5	1318.6	16.03	501.46
43.0	0.00	0.0	1254.8	1286.5	15.88	501.41
44.0	0.00	0.0	1223.3	1254.8	15.73	501.37

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A15 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	0.00	0.0	1192.2	1223.3	15.58	501.32
46.0	0.00	0.0	1161.3	1192.2	15.43	501.27
47.0	0.00	0.0	1130.7	1161.3	15.28	501.23
48.0	0.00	0.0	1100.5	1130.7	15.13	501.18
49.0	0.00	0.0	1070.5	1100.5	14.98	501.13
50.0	0.00	0.0	1040.9	1070.5	14.83	501.09
51.0	0.00	0.0	1011.5	1040.9	14.68	501.04
52.0	0.00	0.0	982.4	1011.5	14.54	500.99
53.0	0.00	0.0	953.6	982.4	14.39	500.95
54.0	0.00	0.0	925.1	953.6	14.24	500.90
55.0	0.00	0.0	896.9	925.1	14.10	500.86
56.0	0.00	0.0	869.0	896.9	13.95	500.81
57.0	0.00	0.0	841.4	869.0	13.81	500.76
58.0	0.00	0.0	814.1	841.4	13.66	500.72
59.0	0.00	0.0	787.1	814.1	13.51	500.68
60.0	0.00	0.0	760.4	787.1	13.35	500.63

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A15 .HYD

Starting Pond W.S. Elevation = 497.70 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	61.80 cfs
Peak Outflow	=	17.88 cfs
Peak Elevation	=	502.15 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	53,792 cu-ft
Total Storage in Pond	=	53,792 cu-ft

Return Freq: 15 years

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD

Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A15 .HYD

EXECUTED: 10-26-1999
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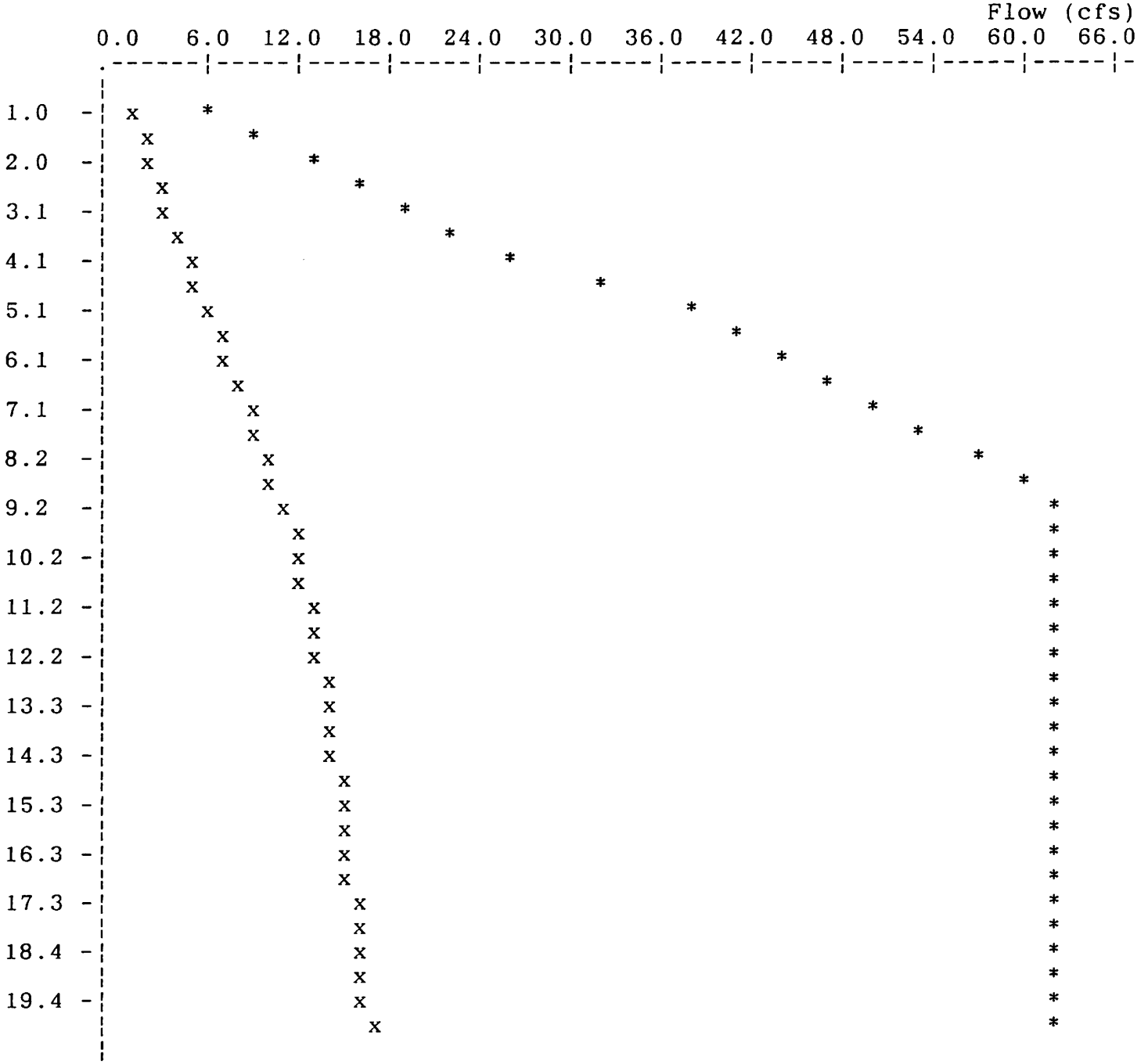
Peak Inflow = 61.80 cfs
Peak Outflow = 17.88 cfs
Peak Elevation = 502.15 ft



x File: c:\windows\profiles\andy\desktop\pondpa~1\A15 .HYD Qmax = 1
7.9 cfs
* File: c:\windows\profiles\andy\desktop\pondpa~1\10001A15.HYD Qmax = 6

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* HOMEFIELD
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 26, 1999
*
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Inflow Hydrograph:
c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD
Rating Table file:
c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

----INITIAL CONDITIONS----
Elevation = 497.70 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
497.70	0.0	0	0.0	0.0
497.95	0.4	16	0.5	0.9
498.20	1.1	128	4.3	5.4
498.45	1.9	432	14.4	16.3
498.70	3.0	1,023	34.1	37.1
498.95	4.2	1,998	66.6	70.8
499.20	5.5	3,452	115.1	120.6
499.45	6.9	5,481	182.7	189.6
499.70	8.5	8,182	272.7	281.2
499.95	10.1	11,650	388.3	398.4
500.20	11.8	15,743	524.8	536.6
500.45	12.7	20,017	667.2	679.9
500.70	13.6	24,462	815.4	829.0
500.95	14.4	29,080	969.3	983.7
501.20	15.2	33,876	1129.2	1144.4
501.45	16.0	38,852	1295.1	1311.1
501.70	16.7	44,011	1467.0	1483.7
501.95	17.4	49,357	1645.2	1662.6
502.20	18.0	54,872	1829.1	1847.1
502.45	18.6	60,513	2017.1	2035.7
502.70	19.3	66,280	2209.3	2228.6
502.95	19.9	72,176	2405.9	2425.8
503.20	20.4	78,200	2606.7	2627.1
503.45	21.0	84,355	2811.8	2832.8
503.70	21.5	90,641	3021.4	3042.9
503.95	22.1	97,061	3235.4	3257.5
504.20	22.6	103,615	3453.8	3476.4
504.45	23.1	110,304	3676.8	3699.9
504.70	23.6	117,128	3904.2	3927.8
504.95	24.1	124,089	4136.3	4160.4
505.20	24.6	131,188	4372.9	4397.5

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
505.45	25.0	138,428
505.70	25.5	145,808
505.95	25.9	153,330
506.00	26.0	154,852

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
4614.2	4639.2
4860.3	4885.8
5111.0	5136.9
5161.7	5187.7

Time increment (t) = 1.0 min.

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A25 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	497.70
1.0	7.63	7.6	5.1	7.6	1.27	498.25
2.0	15.26	22.9	22.9	28.0	2.52	498.59
3.0	22.89	38.2	53.4	61.1	3.85	498.88
4.0	30.52	53.4	96.5	106.8	5.14	499.13
5.0	45.77	76.3	159.7	172.8	6.56	499.39
6.0	53.40	99.2	242.6	258.9	8.11	499.64
7.0	61.03	114.4	338.0	357.1	9.54	499.86
8.0	68.66	129.7	445.8	467.7	10.95	500.08
9.0	76.29	145.0	566.5	590.7	12.14	500.29
10.0	76.29	152.6	693.2	719.0	12.94	500.52
11.0	76.29	152.6	818.4	845.7	13.69	500.73
12.0	76.29	152.6	942.3	970.9	14.33	500.93
13.0	76.29	152.6	1065.0	1094.9	14.95	501.12
14.0	76.29	152.6	1186.4	1217.5	15.55	501.31
15.0	76.29	152.6	1306.8	1339.0	16.11	501.49
16.0	76.29	152.6	1426.2	1459.4	16.60	501.66
17.0	76.29	152.6	1544.6	1578.7	17.07	501.83
18.0	76.29	152.6	1662.2	1697.2	17.51	502.00
19.0	76.29	152.6	1778.9	1814.7	17.89	502.16
20.0	76.29	152.6	1895.0	1931.5	18.27	502.31
21.0	68.66	145.0	2002.7	2039.9	18.62	502.46
22.0	61.03	129.7	2094.5	2132.4	18.95	502.58
23.0	53.40	114.4	2170.5	2208.9	19.23	502.67
24.0	45.77	99.2	2230.8	2269.6	19.42	502.75
25.0	30.52	76.3	2268.0	2307.1	19.54	502.80
26.0	22.89	53.4	2282.2	2321.4	19.58	502.82
27.0	15.26	38.2	2281.2	2320.4	19.58	502.82
28.0	7.63	22.9	2265.1	2304.1	19.53	502.80
29.0	0.00	7.6	2233.8	2272.7	19.43	502.76
30.0	0.00	0.0	2195.2	2233.8	19.32	502.71
31.0	0.00	0.0	2156.8	2195.2	19.18	502.66
32.0	0.00	0.0	2118.8	2156.8	19.04	502.61
33.0	0.00	0.0	2081.0	2118.8	18.90	502.56
34.0	0.00	0.0	2043.4	2081.0	18.76	502.51
35.0	0.00	0.0	2006.2	2043.4	18.63	502.46
36.0	0.00	0.0	1969.2	2006.2	18.51	502.41
37.0	0.00	0.0	1932.4	1969.2	18.39	502.36
38.0	0.00	0.0	1895.8	1932.4	18.27	502.31
39.0	0.00	0.0	1859.5	1895.8	18.16	502.26
40.0	0.00	0.0	1823.5	1859.5	18.04	502.22
41.0	0.00	0.0	1787.6	1823.5	17.92	502.17
42.0	0.00	0.0	1752.0	1787.6	17.81	502.12
43.0	0.00	0.0	1716.6	1752.0	17.69	502.07
44.0	0.00	0.0	1681.5	1716.6	17.58	502.02

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A25 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	0.00	0.0	1646.5	1681.5	17.46	501.98
46.0	0.00	0.0	1611.9	1646.5	17.34	501.93
47.0	0.00	0.0	1577.5	1611.9	17.20	501.88
48.0	0.00	0.0	1543.3	1577.5	17.07	501.83
49.0	0.00	0.0	1509.5	1543.3	16.93	501.78
50.0	0.00	0.0	1475.9	1509.5	16.80	501.74
51.0	0.00	0.0	1442.5	1475.9	16.67	501.69
52.0	0.00	0.0	1409.5	1442.5	16.53	501.64
53.0	0.00	0.0	1376.7	1409.5	16.40	501.59
54.0	0.00	0.0	1344.1	1376.7	16.27	501.54
55.0	0.00	0.0	1311.9	1344.1	16.13	501.50
56.0	0.00	0.0	1279.9	1311.9	16.00	501.45
57.0	0.00	0.0	1248.2	1279.9	15.85	501.40
58.0	0.00	0.0	1216.8	1248.2	15.70	501.36
59.0	0.00	0.0	1185.7	1216.8	15.55	501.31
60.0	0.00	0.0	1154.9	1185.7	15.40	501.26

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A25 .HYD

Starting Pond W.S. Elevation = 497.70 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	76.29 cfs
Peak Outflow	=	19.58 cfs
Peak Elevation	=	502.82 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	69,055 cu-ft
Total Storage in Pond	=	69,055 cu-ft

Return Freq: 25 years

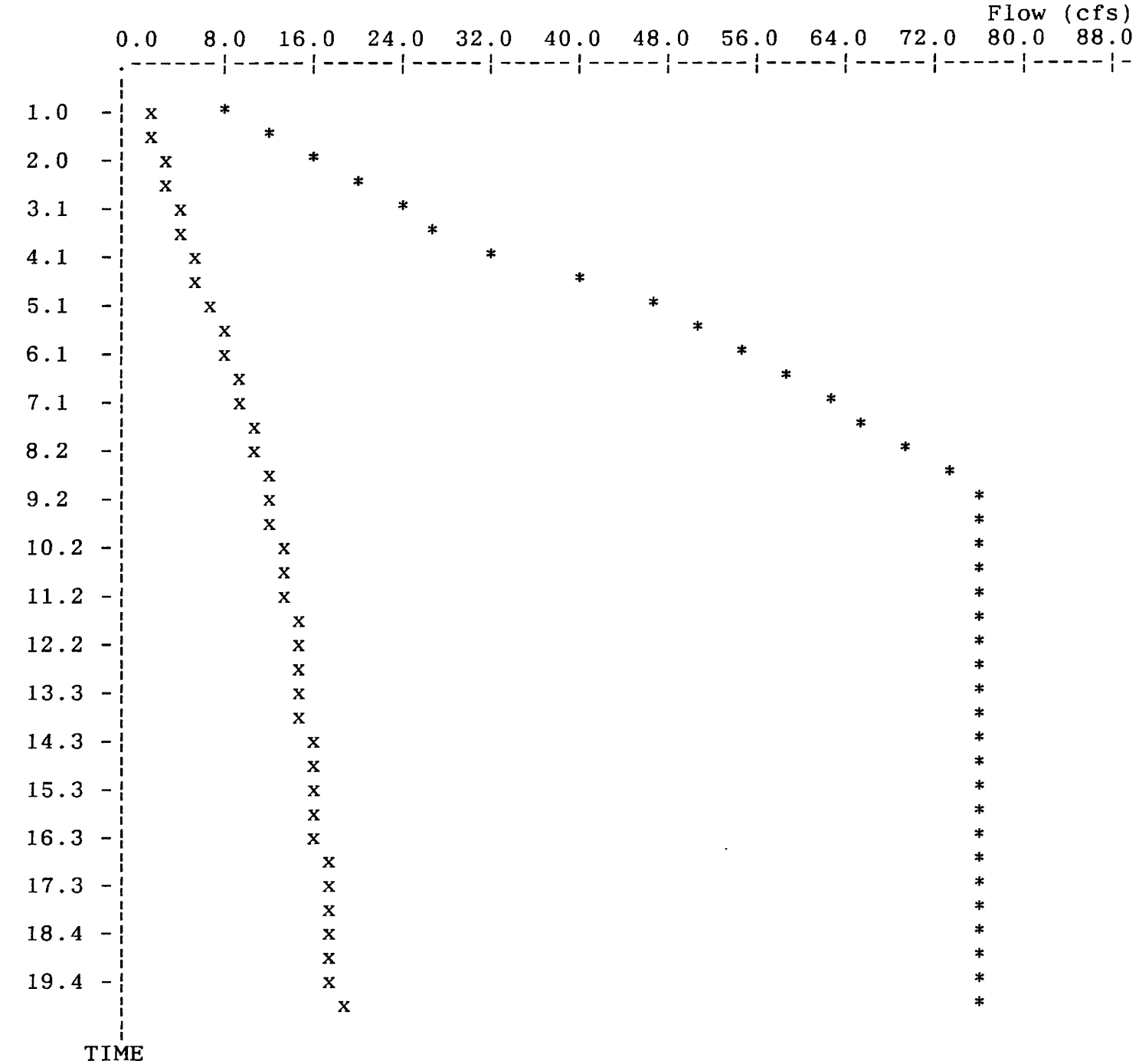
Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD

Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A25 .HYD

EXECUTED: 10-26-1999
14:26:46

Peak Inflow = 76.29 cfs
Peak Outflow = 19.58 cfs
Peak Elevation = 502.82 ft



x File: c:\windows\profiles\andy\desktop\pondpa~1\A25 .HYD Qmax = 1
9.6 cfs
* File: c:\windows\profiles\andy\desktop\pondpa~1\10001A25.HYD Qmax = 7

****
*
* HOMEFIELD
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 26, 1999
*
****

Inflow Hydrograph:
c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD
Rating Table file:
c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

----INITIAL CONDITIONS----
Elevation = 497.70 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
497.70	0.0	0	0.0	0.0
497.95	0.4	16	0.5	0.9
498.20	1.1	128	4.3	5.4
498.45	1.9	432	14.4	16.3
498.70	3.0	1,023	34.1	37.1
498.95	4.2	1,998	66.6	70.8
499.20	5.5	3,452	115.1	120.6
499.45	6.9	5,481	182.7	189.6
499.70	8.5	8,182	272.7	281.2
499.95	10.1	11,650	388.3	398.4
500.20	11.8	15,743	524.8	536.6
500.45	12.7	20,017	667.2	679.9
500.70	13.6	24,462	815.4	829.0
500.95	14.4	29,080	969.3	983.7
501.20	15.2	33,876	1129.2	1144.4
501.45	16.0	38,852	1295.1	1311.1
501.70	16.7	44,011	1467.0	1483.7
501.95	17.4	49,357	1645.2	1662.6
502.20	18.0	54,872	1829.1	1847.1
502.45	18.6	60,513	2017.1	2035.7
502.70	19.3	66,280	2209.3	2228.6
502.95	19.9	72,176	2405.9	2425.8
503.20	20.4	78,200	2606.7	2627.1
503.45	21.0	84,355	2811.8	2832.8
503.70	21.5	90,641	3021.4	3042.9
503.95	22.1	97,061	3235.4	3257.5
504.20	22.6	103,615	3453.8	3476.4
504.45	23.1	110,304	3676.8	3699.9
504.70	23.6	117,128	3904.2	3927.8
504.95	24.1	124,089	4136.3	4160.4
505.20	24.6	131,188	4372.9	4397.5

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
505.45	25.0	138,428
505.70	25.5	145,808
505.95	25.9	153,330
506.00	26.0	154,852

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
4614.2	4639.2
4860.3	4885.8
5111.0	5136.9
5161.7	5187.7

Time increment (t) = 1.0 min.

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A00 .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	497.70
1.0	9.76	9.8	6.9	9.8	1.42	498.30
2.0	19.52	29.3	30.3	36.2	2.95	498.69
3.0	29.28	48.8	70.3	79.1	4.42	498.99
4.0	39.04	68.3	126.8	138.6	5.87	499.27
5.0	58.56	97.6	209.4	224.4	7.51	499.55
6.0	68.32	126.9	317.8	336.3	9.25	499.82
7.0	78.08	146.4	442.4	464.2	10.91	500.07
8.0	87.84	165.9	583.8	608.3	12.25	500.33
9.0	97.60	185.4	742.8	769.2	13.24	500.60
10.0	97.60	195.2	909.6	938.0	14.16	500.88
11.0	97.60	195.2	1074.8	1104.8	15.00	501.14
12.0	97.60	195.2	1238.4	1270.0	15.80	501.39
13.0	97.60	195.2	1400.6	1433.6	16.50	501.63
14.0	97.60	195.2	1561.6	1595.8	17.14	501.86
15.0	97.60	195.2	1721.3	1756.8	17.71	502.08
16.0	97.60	195.2	1880.1	1916.5	18.22	502.29
17.0	97.60	195.2	2037.8	2075.3	18.74	502.50
18.0	97.60	195.2	2194.4	2233.0	19.31	502.71
19.0	97.60	195.2	2350.0	2389.6	19.79	502.90
20.0	97.60	195.2	2504.8	2545.2	20.20	503.10
21.0	87.84	185.4	2649.1	2690.3	20.58	503.28
22.0	78.08	165.9	2773.1	2815.0	20.95	503.43
23.0	68.32	146.4	2877.1	2919.5	21.21	503.55
24.0	58.56	126.9	2961.2	3004.0	21.41	503.65
25.0	39.04	97.6	3015.7	3058.8	21.54	503.72
26.0	29.28	68.3	3040.8	3084.0	21.61	503.75
27.0	19.52	48.8	3046.3	3089.6	21.63	503.75
28.0	9.76	29.3	3032.4	3075.6	21.59	503.74
29.0	0.00	9.8	2999.2	3042.2	21.50	503.70
30.0	0.00	0.0	2956.4	2999.2	21.40	503.65
31.0	0.00	0.0	2913.8	2956.4	21.29	503.60
32.0	0.00	0.0	2871.4	2913.8	21.19	503.55
33.0	0.00	0.0	2829.2	2871.4	21.09	503.50
34.0	0.00	0.0	2787.2	2829.2	20.99	503.45
35.0	0.00	0.0	2745.5	2787.2	20.87	503.39
36.0	0.00	0.0	2704.0	2745.5	20.75	503.34
37.0	0.00	0.0	2662.8	2704.0	20.62	503.29
38.0	0.00	0.0	2621.8	2662.8	20.50	503.24
39.0	0.00	0.0	2581.0	2621.8	20.39	503.19
40.0	0.00	0.0	2540.4	2581.0	20.29	503.14
41.0	0.00	0.0	2500.0	2540.4	20.18	503.09
42.0	0.00	0.0	2459.9	2500.0	20.08	503.04
43.0	0.00	0.0	2419.9	2459.9	19.98	502.99
44.0	0.00	0.0	2380.1	2419.9	19.88	502.94

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A00 .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
45.0	0.00
46.0	0.00
47.0	0.00
48.0	0.00
49.0	0.00
50.0	0.00
51.0	0.00
52.0	0.00
53.0	0.00
54.0	0.00
55.0	0.00
56.0	0.00
57.0	0.00
58.0	0.00
59.0	0.00
60.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	2340.6	2380.1	19.76	502.89
0.0	2301.3	2340.6	19.64	502.84
0.0	2262.3	2301.3	19.52	502.79
0.0	2223.5	2262.3	19.40	502.74
0.0	2184.9	2223.5	19.28	502.69
0.0	2146.6	2184.9	19.14	502.64
0.0	2108.6	2146.6	19.00	502.59
0.0	2070.9	2108.6	18.86	502.54
0.0	2033.5	2070.9	18.73	502.50
0.0	1996.3	2033.5	18.59	502.45
0.0	1959.3	1996.3	18.47	502.40
0.0	1922.6	1959.3	18.36	502.35
0.0	1886.1	1922.6	18.24	502.30
0.0	1849.9	1886.1	18.12	502.25
0.0	1813.9	1849.9	18.01	502.20
0.0	1778.1	1813.9	17.89	502.15

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND
Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD
Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A00 .HYD

Starting Pond W.S. Elevation = 497.70 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	97.60 cfs
Peak Outflow	=	21.63 cfs
Peak Elevation	=	503.75 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	92,038 cu-ft
Total Storage in Pond	=	92,038 cu-ft

Return Freq: 100 years

Pond File: c:\windows\profiles\andy\desktop\pondpa~1\10001A .PND

Inflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD

Outflow Hydrograph: c:\windows\profiles\andy\desktop\pondpa~1\A00 .HYD

EXECUTED: 10-26-1999
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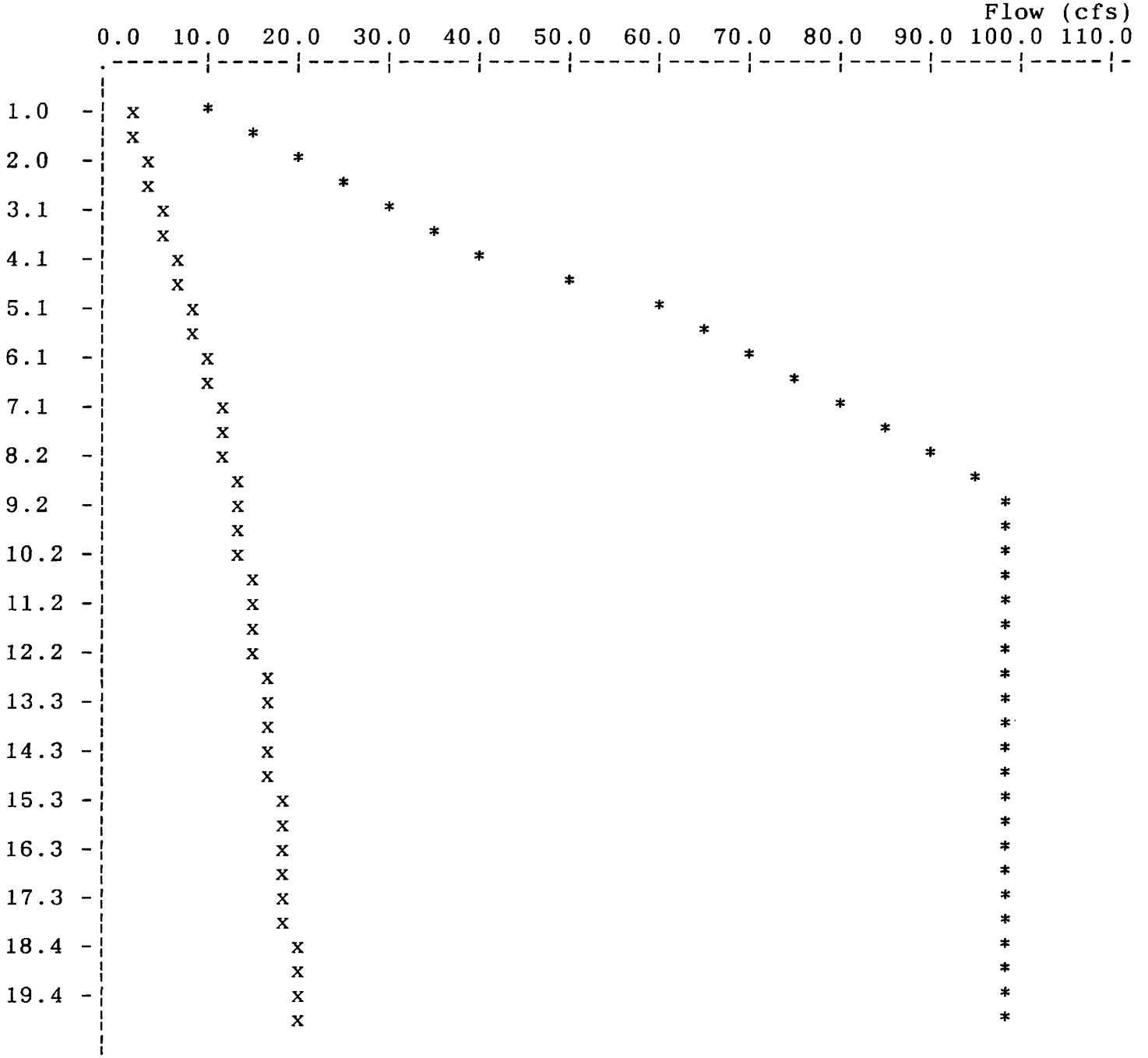
Peak Inflow = 97.60 cfs
Peak Outflow = 21.63 cfs
Peak Elevation = 503.75 ft



x File: c:\windows\profiles\andy\desktop\pondpa~1\A00 .HYD Qmax = 2
1.6 cfs
* File: c:\windows\profiles\andy\desktop\pondpa~1\10001A00.HYD Qmax = 9

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER U. KENDRICK
PAGE 5 OF 7.

STORMWATER DETENTION BASIN "A"
DESIGN STORM 100YEAR/20MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 34.70AC.
OFFSITE: 1.43AC.
TOTAL : 36.13AC.

PRE-DEVELOPED CONDITIONS:

ONSITE: 34.70AC. x 2.95CFS/AC. Q = 102.37CFS
OFFSITE: 1.43AC. x 2.95 CFS/AC. Q = 4.22CFS
TQ = 106.59CFS

POST-DEVELOPED Q TO BASIN:

ONSITE: 37.75 AC. x 4.17 CFS/AC. Q = 157.42CFS
OFFSITE: 3.18 AC. x ~~2.95~~ 4.17 CFS/AC. Q = 9.38CFS 13.26
TQ = 166.80CFS 170.68

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 1.58AC. x 4.17CFS/AC. Q = 6.59CFS
OFFSITE: 0.70AC. x ~~2.95~~ 4.17 CFS/AC. Q = 2.07CFS 2.92
TQ = 8.66CFS 9.51

DETENTION REQUIRED:

166.80CFS + 8.66CFS = 175.46CFS - 106.59CFS = 68.87CFS
73.6CFS x 20MIN. x 60SEC/MIN = 88,320CU.FT. (VOLUME)
73.6

ALLOWABLE RELEASE FROM BASIN:

166.80CFS - 68.87 CFS Q = 97.93CFS

Q = 97.08

```
**********************************************
*                                            *
*  RECTANGULAR ORIFICE                       *
*   18 in W X 36 in H    ELEV= 470.5         *
*                                            *
*  Outlet Pipe -  60 ft - 54 in pipe         *
*  UFL= 470.5  LFL= 470    n= .013           *
*                                            *
*  Overflow Structure -  Standpipe           *
*  DIAM= 72 in    STANDPIPE ELEV= 477        *
*                                            *
**********************************************
```

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 4 OF 7

HIGHGROVE PLACE "A" 6-17-96 SUBMITTAL DATE: 6-18-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	391.26	391.26	0.00	391.26	470.35
2	782.52	1173.78	2.93	1170.85	470.66
3	1173.78	2344.63	15.14	2329.49	470.82
4	1565.04	3894.53	42.49	3852.04	471.03
5	1956.30	5808.34	90.34	5718.00	471.29
6	2347.56	8065.56	163.39	7902.17	471.54
7	2738.82	10640.99	249.42	10391.57	471.71
8	3130.08	13521.65	312.69	13208.96	471.91
9	3521.34	16730.30	389.83	16340.48	472.11
10	3912.60	20253.08	480.14	19772.94	472.34
11	4303.86	24076.80	584.39	23492.42	472.59
12	4695.12	28187.54	704.80	27482.75	472.85
13	5086.38	32569.13	842.08	31727.05	473.13
14	5477.64	37204.69	996.76	36207.93	473.42
15	5868.90	42076.83	1169.25	40907.58	473.73
16	6260.16	47167.74	1739.53	45428.21	474.03
17	6651.42	52079.63	1882.24	50197.39	474.32
18	7042.68	57240.07	2014.71	55225.36	474.64
19	7433.94	62659.30	2145.53	60513.77	474.96
20	7825.20	68338.97	2275.02	66063.96	475.27
21	7433.94	73497.90	2391.04	71106.86	475.55
22	7042.68	78149.54	2490.44	75659.10	475.80
23	6651.42	82310.53	2576.89	79733.63	476.02
24	6260.16	85993.80	2650.82	83342.97	476.20
25	5868.90	89211.88	2707.58	86504.28	476.35
26	5477.64	91981.92	2756.34	89225.58	476.48
27	5086.38	94311.96	2797.62	91514.34	476.59
28	4695.12	96209.46	2831.89	93377.58	476.68
29	4303.86	97681.44	2859.47	94821.96	476.75
30	3912.60	98734.56	2880.68	95853.88	476.80
31	3521.34	99375.22	2895.73	96479.50	476.83
32	3130.08	99609.58	2904.82	96704.76	476.84
33	2738.82	99443.58	2908.08	96535.50	476.83
34	2347.56	98883.06	2905.63	95977.44	476.81
35	1956.30	97933.74	2897.52	95036.22	476.76
36	1565.04	96601.26	2883.80	93717.46	476.70
37	1173.78	94891.24	2864.48	92026.76	476.62
38	782.52	92809.28	2839.50	89969.78	476.52
39	391.26	90361.04	2808.81	87552.24	476.40
40	0.00	87552.24	2772.31	84779.94	476.27

PEAK OUTFLOW= 48.47 CFS AT 33 MINUTES

File, South Portion

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

441-1211
278-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER V. KENDRICK
PAGE 10F 4.

SEDIMENT DESIGN:

BASIN "A" (DRY):

36.90AC. TO BASIN (ONSITE & OFFSITE)

USING FIGURE 1:

A = 36.90
C = 0.6

FIND: 107 (FACTOR)

36.90 x 107 = 3,948 CU.FT./YR. x 5 = 19,740 CU.FT.

ELEV.	AREA	STORAGE (ACCUM.)		
468.50	10,510	24,227	USE:	24,227 CU.FT. @ 468.5
470.50	13,717			

STATE OF MISSOURI
HAROLD J. BARTCH
NUMBER E-17751
REGISTERED PROFESSIONAL ENGINEER

6/14/96

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

441-1211
278-1211

PROJECT NAME _____

PROJECT #/JOB ORDER # 95-067

DATE _____

DESIGNER _____

SEDIMENT BASIN:

BASIN "B" (DRY): 1.93 AC. TO BASIN (ONSITE)

USING FIGURE 1:

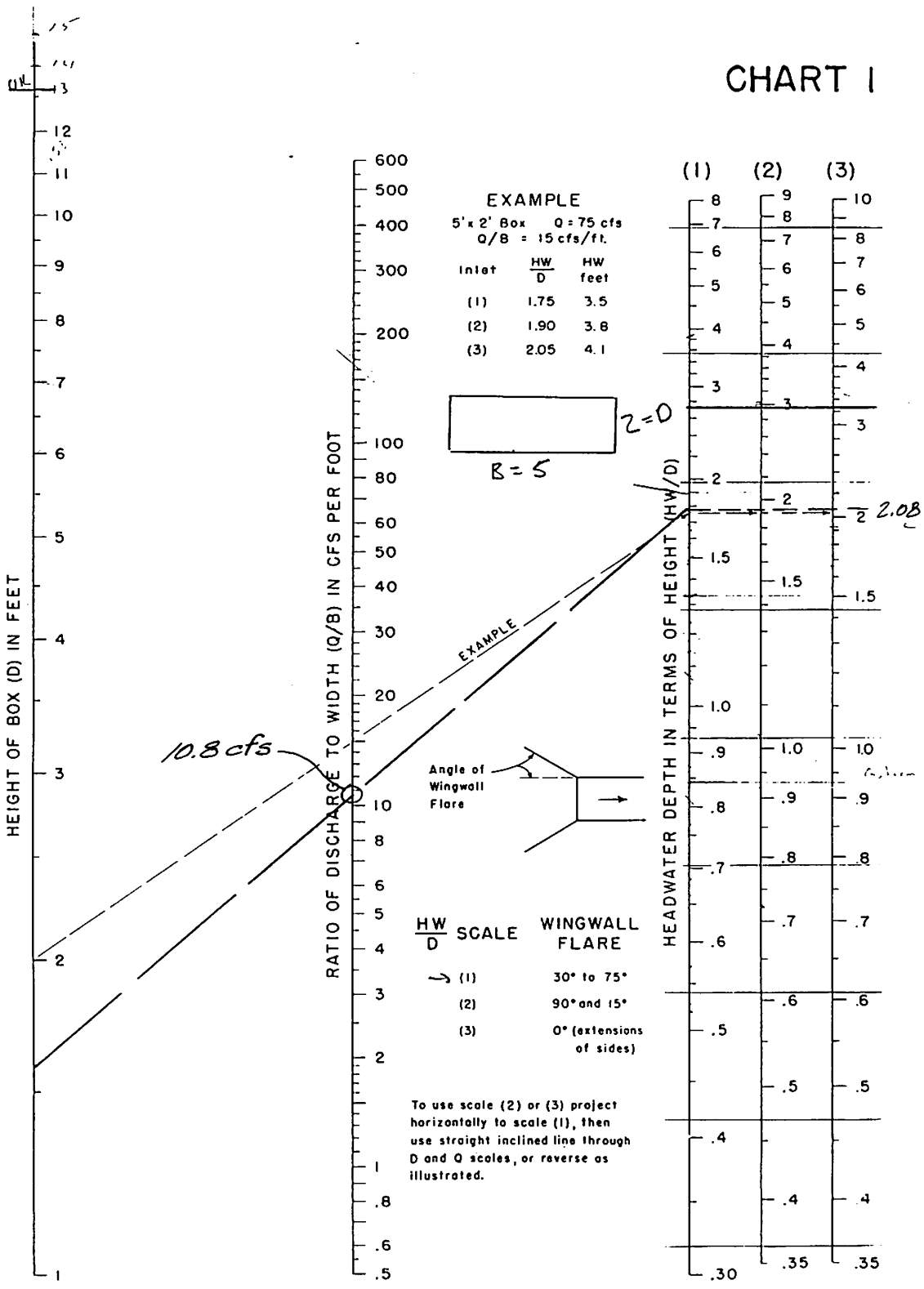
A = 1.93
C = 0.6

FIND: 170 (FACTOR)

1.93 x 170 = 328 CU. FT./YR. x 5 = 1,640 CU. FT.

ELEV.	AREA	STORAGE (ACCUM.)		
494.00	3990		USE:	4,475 CU. FT. @ 494.0
495.00	4960	4475		

CHART 1



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

Existing Culvert @ Old Hwy. 79

File, South Portion.

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER V. KENDRICK
PAGE 10F7.

STORMWATER DETENTION BASIN "A"

DESIGN STORM 15 YEAR/20 MINUTE

A { 40.93 / 2.28 bypass

D - 2.8
NW - 17.71
NE - 7.62
71.34
Total 90.2 Ac

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 34.70 ACRES
OFFSITE: 1.43 ACRES
TOTAL : 36.13 ACRES

PRE-DEVELOPED CONDITIONS:

ONSITE: 34.70 AC. x 1.87 CFS/AC. Q = 64.89 CFS
OFFSITE: 1.43 AC. x 1.87 CFS/AC. Q = 2.67 CFS
TQ = 67.56 CFS

POST-DEVELOPED Q TO BASIN:

ONSITE: 37.75 AC. x 2.64 CFS/AC. Q = 99.67 CFS
OFFSITE: 3.18 AC. x (1.87) 2.64 CFS/AC. Q = 5.95 CFS 8.40
TQ = 105.62 CFS 108.07

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 1.58 AC. x 2.64 CFS/AC. Q = 4.17 CFS
OFFSITE: 0.70 AC. x (1.87) 2.64 CFS/AC. Q = 1.31 CFS 1.85
TQ = 5.48 CFS 6.02

DETENTION REQUIRED:

105.62 CFS + 5.48 CFS = 111.10 CFS - 67.56 CFS = 43.54 CFS

43.54 CFS x 20 MIN. x 60 SEC./MIN. = 52,248. CU. FT. (VOLUME)

46.53 cfs

ALLOWABLE RELEASE FROM BASIN:

105.62 CFS - 43.54 CFS Q = 62.08 CFS

Q = 59.09 cfs

STATE OF MISSOURI
HAROLD J. BARTCH
NUMBER E-17751
REGISTERED PROFESSIONAL ENGINEER

6/14/96

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*****************************************
*                                       *
*  RECTANGULAR ORIFICE                  *
*    18 in W X 36 in H   ELEV= 470.5    *
*                                       *
*  Outlet Pipe -  60 ft - 54 in pipe    *
*  UFL= 470.5  LFL= 470    n= .013      *
*                                       *
*  Overflow Structure -  Standpipe      *
*  DIAM= 72 in   STANDPIPE ELEV= 477    *
*                                       *
*****************************************
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PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 20F7

HIGHGROVE PLACE "A" 6-17-96 SUBMITTAL DATE: 6-18-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	316.86	316.86	0.00	316.86	470.54
2	633.72	950.58	2.13	948.45	470.63
3	950.58	1899.03	11.04	1887.99	470.76
4	1267.44	3155.43	31.00	3124.43	470.93
5	1584.30	4708.73	65.99	4642.74	471.14
6	1901.16	6543.90	119.55	6424.35	471.38
7	2218.02	8642.37	194.58	8447.79	471.58
8	2534.88	10982.67	262.87	10719.80	471.74
9	2851.74	13571.54	321.39	13250.15	471.91
10	3168.60	16418.75	391.00	16027.75	472.09
11	3485.46	19513.21	471.00	19042.21	472.29
12	3802.32	22844.53	561.63	22282.90	472.51
13	4119.18	26402.08	664.82	25737.26	472.73
14	4436.04	30173.30	781.03	29392.28	472.97
15	4752.90	34145.18	910.61	33234.57	473.23
16	5069.76	38304.33	1053.78	37250.56	473.49
17	5386.62	42637.18	1210.69	41426.49	473.77
18	5703.48	47129.97	1756.61	45373.36	474.02
19	6020.34	51393.70	1880.67	49513.03	474.28
20	6337.20	55850.23	1996.25	53853.99	474.55
21	6020.34	59874.33	2110.66	57763.67	474.79
22	5703.48	63467.15	2208.64	61258.52	475.01
23	5386.62	66645.15	2292.30	64352.85	475.18
24	5069.76	69422.61	2356.35	67066.28	475.33
25	4752.90	71819.18	2411.12	69408.06	475.46
26	4436.04	73844.10	2457.40	71386.71	475.57
27	4119.18	75505.88	2495.84	73010.05	475.66
28	3802.32	76812.37	2526.94	74285.43	475.73
29	3485.46	77770.90	2551.12	75219.78	475.78
30	3168.60	78388.38	2568.67	75819.71	475.81
31	2851.74	78671.46	2579.89	76091.56	475.83
32	2534.88	78626.46	2584.95	76041.50	475.82
33	2218.02	78259.53	2584.02	75675.50	475.80
34	1901.16	77576.66	2577.20	74999.46	475.76
35	1584.30	76583.76	2564.54	74019.22	475.71
36	1267.44	75286.66	2546.09	72740.57	475.64
37	950.58	73691.15	2521.81	71169.35	475.55
38	633.72	71803.07	2491.65	69311.43	475.45
39	316.86	69628.28	2455.51	67172.78	475.33
40	0.00	67172.78	2413.24	64759.54	475.20

PEAK OUTFLOW= 43.08 CFS AT 32 MINUTES

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER V. KENDRICK
PAGE 30F7.

STORMWATER DETENTION BASIN "A"
DESIGN STORM 25 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 34.70 ACRES
OFFSITE: 1.43 ACRES
TOTAL: 36.13 ACRES

PRE-DEVELOPED CONDITIONS:

ONSITE: 34.70 AC. x 2.31 CFS/AC. Q = 80.16 CFS
OFFSITE: 1.43 AC. x 2.31 CFS/AC. Q = 3.30 CFS
TQ = 83.46 CFS

POST-DEVELOPED Q TO BASIN:

ONSITE: 37.75 AC. x 3.26 CFS/AC. Q = 123.07 CFS
OFFSITE: 3.18 AC. x ~~2.31~~ 3.26 CFS/AC. Q = 7.35 CFS 10.37
TQ = 130.42 CFS 133.44

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 1.58 AC. x 3.26 CFS/AC. Q = 5.15 CFS
OFFSITE: 0.70 AC. x ~~2.31~~ 3.26 CFS/AC. Q = 1.62 CFS 2.28
TQ = 6.77 CFS 7.43

DETENTION REQUIRED:

130.42 CFS + 6.77 CFS = 137.19 CFS - 83.46 CFS = 53.73 CFS

53.73 CFS x 20 MIN. x 60 SEC./MIN. = 64,476 CU. FT. (VOLUME)

57.41 cfs

ALLOWABLE RELEASE FROM BASIN:

130.42 CFS - 53.73 CFS Q = 76.69 CFS

Q = 76.01

```
**************************************
*                                    *
*  RECTANGULAR ORIFICE               *
*   18 in W X 36 in H   ELEV= 470.5  *
*                                    *
*  Outlet Pipe -  60 ft - 54 in pipe *
*  UFL= 470.5  LFL= 470   n= .013    *
*                                    *
*  Overflow Structure -  Standpipe   *
*  DIAM= 72 in   STANDPIPE ELEV= 477 *
*                                    *
**************************************
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PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 6 OF 7.

HIGHGROVE PLACE "A" 6-17-96 SUBMITTAL DATE: 6-18-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	500.40	500.40	0.00	500.40	470.57
2	1000.80	1501.20	4.23	1496.97	470.71
3	1501.20	2998.17	21.89	2976.28	470.91
4	2001.60	4977.88	61.36	4916.52	471.18
5	2502.00	7418.52	130.27	7288.25	471.50
6	3002.40	10290.63	234.56	10056.09	471.69
7	3502.80	13558.89	303.89	13255.00	471.91
8	4003.20	17258.20	391.14	16867.07	472.15
9	4503.60	21370.67	495.69	20874.98	472.41
10	5004.00	25878.98	619.28	25259.70	472.70
11	5504.40	30764.10	764.60	29999.51	473.01
12	6004.80	36004.31	932.77	35071.54	473.35
13	6505.20	41576.74	1124.65	40452.09	473.70
14	7005.60	47457.69	1724.40	45733.29	474.05
15	7506.00	53239.29	1891.00	51348.29	474.39
16	8006.40	59354.69	2045.40	57309.29	474.76
17	8506.80	65816.10	2197.47	63618.62	475.14
18	9007.20	72625.82	2341.31	70284.51	475.51
19	9507.60	79792.11	2474.51	77317.60	475.89
20	10008.00	87325.60	2607.68	84717.92	476.26
21	9507.60	94225.52	2728.89	91496.62	476.59
22	9007.20	100503.80	2831.62	97672.21	476.89
23	8506.80	106179.00	2922.07	103256.90	477.16
24	8006.40	111263.40	3196.31	108067.00	477.39
25	7506.00	115573.00	3847.41	111725.60	477.57
26	7005.60	118731.20	4537.71	114193.50	477.68
27	6505.20	120698.70	5097.02	115601.70	477.75
28	6004.80	121606.50	5475.96	116130.60	477.78
29	5504.40	121635.00	5601.22	116033.70	477.77
30	5004.00	121037.70	5578.15	115459.60	477.75
31	4503.60	119963.20	5379.95	114583.20	477.70
32	4003.20	118586.40	5182.91	113403.50	477.65
33	3502.80	116906.40	4875.67	112030.70	477.58
34	3002.40	115033.10	4597.70	110435.40	477.50
35	2502.00	112937.40	4269.91	108667.50	477.42
36	2001.60	110669.10	3944.22	106724.90	477.32
37	1501.20	108226.10	3635.24	104590.80	477.22
38	1000.80	105591.60	3346.14	102245.50	477.11
39	500.40	102745.90	3096.92	99648.96	476.98
40	0.00	99648.96	2950.43	96698.54	476.84

PEAK OUTFLOW= 93.35 CFS AT 29 MINUTES

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr
St. Peters, MO 63376

441-1211
278-1211

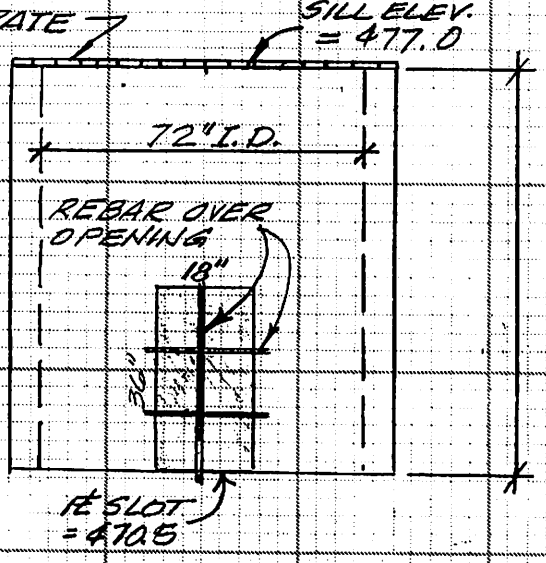
PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 7 OF 7.

BASIN STORAGE:

HIGHGROVE PLACE "A" — SUBMITTAL DATE: 6-18-96

ELEVATION	AREA	VOLUME	CUM. VOLUME
[illegible]			
471.50	14530	[illegible]	[illegible]
472.00	14800	7332	14597
474.00	15578	30379	44975
475.00	16700	16139	61114
476.00	19608	18154	79268
[illegible]	[illegible]	41467	120731
480.00	23632	45907	166232
480.50	27745	12349	181587

72" INSIDE DIAMETER STANDPIPE W/ GRATE ON SILL



CHECK LOWFLOW BLOCKED WEIR EQUATION: (25 YEAR/20 MINUTE)

$Q = CLH^{3/2}$

$130.42 = (3.0)(18.85)H^{3/2}$

$130.42 = (56.55)H^{3/2}$

$\frac{130.42}{56.55} = H^{3/2}$

$2.31^{2/3} = H$

$1.75' = H$

(476.84 H.W. + 1.75 = 478.59)
DAM ELEVATION = 480.50

100 YEAR H.W. = 477.78
2.72' FREEBOARD 100 YR.

Spillway = 479.50

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 1 OF 7

STORMWATER DETENTION BASIN "B"
DESIGN STORM 15 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 2.30 AC.
OFFSITE: 0.20 AC.
TOTAL : 2.50 AC.

PRE-DEVELOPED CONDITIONS:

ONSITE: 2.30 AC. x 1.87 CFS/AC. Q = 4.30 CFS
OFFSITE: 0.20 AC. x 1.87 CFS/AC. Q = 0.37 CFS
TQ = 4.67 CFS

POST DEVELOPED Q TO BASIN:

ONSITE: 1.93 AC. x 2.64 CFS/AC. TQ = 5.10 CFS

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 0.50 AC. x 2.64 CFS/AC. Q = 1.32 CFS
OFFSITE: 0.37 AC. x ~~1.87~~ 2.64 CFS/AC. Q = 0.69 CFS .98
TQ = 2.01 CFS 2.30

DETENTION REQUIRED:

5.10 CFS + 2.01 CFS = 7.11 CFS - 4.67 CFS = 2.44 CFS
2.44 CFS x 20 MIN. x 60 SEC./MIN. = 2,928 CU.FT. (VOLUME)

2.73

ALLOWABLE RELEASE FROM BASIN:

5.10 CFS - 2.44 CFS. Q = 2.66 CFS

Q 2.37

STATE OF MISSOURI
HAROLD J. BARTCH
NUMBER E-17751
REGISTERED PROFESSIONAL ENGINEER

1/16/01

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**********************************************
*                                            *
*  RECTANGULAR ORIFICE                       *
*    8 in W X 16 in H    ELEV= 495           *
*                                            *
*  Outlet Pipe -  41 ft - 18 in pipe         *
*  UFL= 495  LFL= 494    n= .013             *
*                                            *
*  Overflow Structure -  Standpipe           *
*  DIAM= 42 in    STANDPIPE ELEV= 497.5       *
*                                            *
**********************************************
```

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 2 OF 7

HIGHGROVE PLACE SOUTH "B" 6-1-96 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	15.30	15.30	0.00	15.30	495.01
2	30.60	45.90	0.04	45.86	495.02
3	45.90	91.76	0.22	91.54	495.03
4	61.20	152.74	0.62	152.12	495.05
5	76.50	228.62	1.32	227.30	495.08
6	91.80	319.10	2.42	316.68	495.11
7	107.10	423.78	3.98	419.80	495.15
8	122.40	542.20	6.07	536.13	495.19
9	137.70	673.83	8.76	665.07	495.24
10	153.00	818.07	12.10	805.97	495.29
11	168.30	974.27	16.15	958.12	495.34
12	183.60	1141.72	20.93	1120.79	495.40
13	198.90	1319.69	26.48	1293.21	495.46
14	214.20	1507.41	32.82	1474.59	495.53
15	229.50	1704.09	39.96	1664.13	495.60
16	244.80	1908.93	47.91	1861.02	495.67
17	260.10	2121.12	56.66	2064.46	495.74
18	275.40	2339.86	66.20	2273.66	495.81
19	290.70	2564.36	76.51	2487.85	495.89
20	306.00	2793.85	87.57	2706.28	495.97
21	290.70	2996.98	99.36	2897.62	496.02
22	275.40	3173.02	106.47	3066.55	496.04
23	260.10	3326.65	110.37	3216.28	496.06
24	244.80	3461.08	113.87	3347.21	496.08
25	229.50	3576.71	116.97	3459.74	496.10
26	214.20	3673.94	119.65	3554.29	496.11
27	198.90	3753.19	121.91	3631.28	496.12
28	183.60	3814.88	123.77	3691.11	496.13
29	168.30	3859.41	125.21	3734.20	496.14
30	153.00	3887.20	126.26	3760.94	496.14
31	137.70	3898.64	126.92	3771.72	496.14
32	122.40	3894.12	127.17	3766.94	496.14
33	107.10	3874.04	127.06	3746.98	496.14
34	91.80	3838.78	126.57	3712.21	496.13
35	76.50	3788.71	125.73	3662.98	496.13
36	61.20	3724.18	124.53	3599.65	496.12
37	45.90	3645.55	123.00	3522.55	496.11
38	30.60	3553.15	121.15	3432.00	496.09
39	15.30	3447.30	118.98	3328.32	496.08
40	0.00	3328.32	116.52	3211.80	496.06

PEAK OUTFLOW= 2.12 CFS AT 32 MINUTES

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 3 OF 7

STORMWATER DETENTION BASIN "B"
DESIGN STORM 25 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 2.30 AC.
OFFSITE: 0.20 AC.
TOTAL : 2.50 AC.

PRE-DEVELOPED CONDITIONS:

ONSITE: 2.30 AC. x 2.31 CFS/AC. Q = 5.31 CFS
OFFSITE: 0.20 AC. x 2.31 CFS/AC. Q = 0.46 CFS
TQ = 5.77 CFS

POST DEVELOPED Q TO BASIN:

ONSITE: 1.93 AC. x 3.26 CFS/AC. TQ = 6.29 CFS

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 0.50 AC. x 3.26 CFS/AC. Q = 1.63 CFS
OFFSITE: 0.37 AC. x ~~2.31~~ 3.26 CFS/AC. Q = 0.85 CFS ~~1.21~~
TQ = 2.48 CFS ~~2.84~~

DETENTION REQUIRED:

6.29 CFS + 2.48 CFS = 8.77 CFS - 5.77 CFS = 3.00 CFS
3.00 CFS x 20 MIN. x 60 SEC./MIN. = 3,600 CU.FT. (VOLUME)

3.36 cfs

ALLOWABLE RELEASE FROM BASIN:

6.29 CFS - 3.00 CFS Q = 3.29 CFS

Q = 2.93 cfs

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**********************************************
*                                            *
*  RECTANGULAR ORIFICE                       *
*    8 in W X 16 in H    ELEV= 495           *
*                                            *
*  Outlet Pipe -  41 ft - 18 in pipe         *
*  UFL= 495  LFL= 494    n= .013             *
*                                            *
*  Overflow Structure -  Standpipe           *
*  DIAM= 42 in    STANDPIPE ELEV= 497.5       *
*                                            *
**********************************************
```

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34616
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 4 OF 7

HIGHGROVE PLACE SOUTH "B" 6-1-96 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	18.87	18.87	0.00	18.87	495.01
2	37.74	56.61	0.06	56.55	495.02
3	56.61	113.16	0.30	112.86	495.04
4	75.48	188.34	0.85	187.49	495.07
5	94.35	281.84	1.81	280.03	495.10
6	113.22	393.25	3.31	389.94	495.14
7	132.09	522.03	5.43	516.60	495.19
8	150.96	667.56	8.29	659.27	495.24
9	169.83	829.10	11.95	817.15	495.29
10	188.70	1005.85	16.48	989.37	495.35
11	207.57	1196.94	21.96	1174.98	495.42
12	226.44	1401.42	28.42	1373.00	495.49
13	245.31	1618.31	35.90	1582.41	495.57
14	264.18	1846.59	44.42	1802.17	495.65
15	283.05	2085.22	53.99	2031.23	495.73
16	301.92	2333.15	64.60	2268.55	495.81
17	320.79	2589.34	76.25	2513.09	495.90
18	339.66	2852.75	88.91	2763.84	495.99
19	358.53	3122.37	102.54	3019.83	496.03
20	377.40	3397.23	109.29	3287.94	496.07
21	358.53	3646.47	115.56	3530.91	496.11
22	339.66	3870.57	121.35	3749.22	496.14
23	320.79	4070.01	126.63	3943.38	496.17
24	301.92	4245.30	131.39	4113.91	496.19
25	283.05	4396.96	135.61	4261.35	496.22
26	264.18	4525.53	139.30	4386.23	496.23
27	245.31	4631.54	142.46	4489.08	496.25
28	226.44	4715.52	145.07	4570.45	496.26
29	207.57	4778.02	147.15	4630.87	496.27
30	188.70	4819.57	148.70	4670.87	496.28
31	169.83	4840.70	149.73	4690.97	496.28
32	150.96	4841.93	150.25	4691.68	496.28
33	132.09	4823.77	150.26	4673.51	496.28
34	113.22	4786.73	149.80	4636.93	496.27
35	94.35	4731.28	148.86	4582.42	496.26
36	75.48	4657.90	147.45	4510.45	496.25
37	56.61	4567.06	145.62	4421.44	496.24
38	37.74	4459.18	143.35	4315.83	496.22
39	18.87	4334.70	140.68	4194.03	496.21
40	0.00	4194.03	137.62	4056.41	496.19

PEAK OUTFLOW= 2.5 CFS AT 33 MINUTES

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 5 OF 7

STORMWATER DETENTION BASIN "B"
DESIGN STORM 100 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 2.30 AC.
OFFSITE: 0.20 AC.
TOTAL : 2.50 AC.

PRE-DEVELOPED CONDITIONS:

ONSITE: 2.30 AC. x 2.95 CFS/AC. Q = 6.79 CFS
OFFSITE: 0.20 AC. x 2.95 CFS/AC. Q = 0.59 CFS
TQ = 7.38 CFS

POST DEVELOPED Q TO BASIN:

ONSITE: 1.93 AC. x 4.17 CFS/AC. TQ = 8.05 CFS

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 0.50 AC. x 4.17 CFS/AC. Q = 2.09 CFS
OFFSITE: 0.37 AC. x (2.95) 4.17 CFS/AC. Q = 1.09 CFS 1.54
TQ = 3.18 CFS 3.63

DETENTION REQUIRED:

8.05 CFS + 3.18 CFS = 11.23 CFS - 7.38 CFS = 3.85 CFS
3.85 CFS x 20 MIN. x 60 SEC./MIN. = 4,620 CU. FT. (VOLUME) 4.3

ALLOWABLE RELEASE FROM BASIN:

8.05 CFS - 3.85 CFS Q = 4.20 CFS

Q = 3.75

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr
St. Peters, MO 63376

441-1211
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PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 7 OF 7.

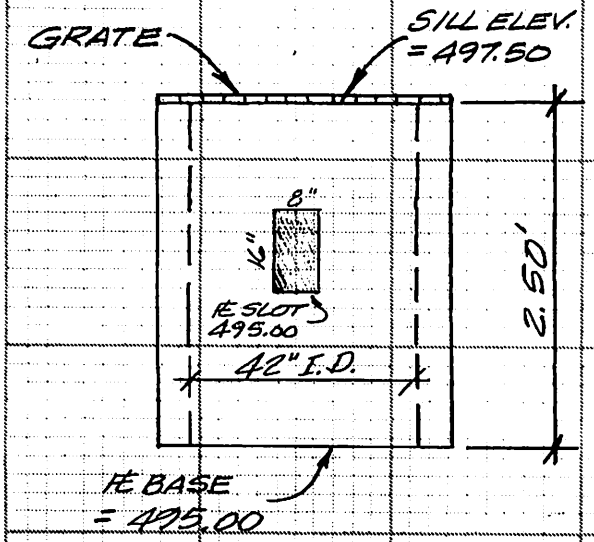
BASIN STORAGE:

HIGHGROVE PLACE SOUTH "B" 6-1-96 SUBMITTAL DATE:

ELEVATION	AREA	VOLUME	CUM. VOLUME
495.00	0		
		2790	2790
496.00	5580		
		13679	16469
498.00	8099		
		19181	35650
500.00	11082		

OVERFLOW STRUCTURE

42" INSIDE DIAMETER STANDPIPE W/GRATE ON SILL.



CHECK LOWFLOW BLOCKED:
WEIR EQUATION:
(25 YEAR/20 MINUTE)

$Q = CLH^{3/2}$

$6.29 = (3.0)(11.00)H^{3/2}$

$6.29 = 33.00H^{3/2}$

$\frac{6.29}{33.00} = H^{3/2}$

$0.1906^{2/3} = H$

$0.33' = H$

(496.28 H.W. + 0.33' = 496.61)
DAM ELEVATION = 500.00

100 YEAR H.W. = 496.43
3.57' FREEBOARD 100YR.

```
**********************************************
*                                            *
*  RECTANGULAR ORIFICE                       *
*    8 in W X 16 in H    ELEV= 495           *
*                                            *
*  Outlet Pipe -  41 ft - 18 in pipe         *
*  UFL= 495  LFL= 494    n= .013             *
*                                            *
*  Overflow Structure -  Standpipe           *
*  DIAM= 42 in    STANDPIPE ELEV= 497.5       *
*                                            *
**********************************************
```

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE JUNE 1996
DESIGNER J. KENDRICK
PAGE 6 OF 7.

HIGHGROVE PLACE SOUTH "B" 6-1-96 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	24.15	24.15	0.00	24.15	495.01
2	48.30	72.45	0.08	72.37	495.03
3	72.45	144.82	0.43	144.39	495.05
4	96.60	240.99	1.22	239.77	495.09
5	120.75	360.52	2.62	357.90	495.13
6	144.90	502.80	4.78	498.02	495.18
7	169.05	667.07	7.84	659.23	495.24
8	193.20	852.43	11.94	840.49	495.30
9	217.35	1057.84	17.19	1040.65	495.37
10	241.50	1282.15	23.69	1258.46	495.45
11	265.65	1524.11	31.50	1492.61	495.53
12	289.80	1782.41	40.69	1741.72	495.62
13	313.95	2055.67	51.30	2004.37	495.72
14	338.10	2342.47	63.33	2279.14	495.82
15	362.25	2641.39	76.79	2564.60	495.92
16	386.40	2951.00	91.66	2859.34	496.01
17	410.55	3269.89	105.58	3164.31	496.05
18	434.70	3599.01	112.65	3486.36	496.10
19	458.85	3945.21	120.28	3824.93	496.15
20	483.00	4307.93	128.48	4179.45	496.20
21	458.85	4638.30	137.25	4501.05	496.25
22	434.70	4935.75	145.38	4790.37	496.29
23	410.55	5200.92	152.82	5048.10	496.33
24	386.40	5434.50	159.55	5274.95	496.36
25	362.25	5637.20	217.91	5419.29	496.38
26	338.10	5757.39	221.19	5536.20	496.40
27	313.95	5850.15	223.81	5626.34	496.41
28	289.80	5916.14	225.81	5690.33	496.42
29	265.65	5955.98	227.21	5728.77	496.43
30	241.50	5970.27	228.06	5742.21	496.43
31	217.35	5959.56	228.35	5731.21	496.43
32	193.20	5924.41	228.11	5696.30	496.42
33	169.05	5865.35	227.34	5638.01	496.42
34	144.90	5782.91	226.06	5556.85	496.40
35	120.75	5677.60	224.27	5453.33	496.39
36	96.60	5549.93	221.96	5327.98	496.37
37	72.45	5400.43	219.12	5181.31	496.35
38	48.30	5229.61	215.76	5013.85	496.33
39	24.15	5038.00	158.64	4879.36	496.31
40	0.00	4879.36	155.13	4724.23	496.28

PEAK OUTFLOW= 3.81 CFS AT 31 MINUTES

File

Highgrove-South

MINIMUM SPECIFICATION FOR PLACEMENT AND CONSTRUCTION OF MIRAFI

1. SOIL REINFORCEMENT SHALL BE MIRAFI GEOGRIDS MANUFACTURED BY THE MIRAFI CORPORATION. LOCATION AND TYPE AS SHOWN ON THE PLAN.

2. MIRAFI 5T SHALL BE ORIENTED WITH THE ROLL DIRECTION PERPENDICULAR TO WALL FACE.

3. SURFACE DRAINAGE DURING AND AFTER CONSTRUCTION OF WALL SHALL BE PROVED TO MINIMIZE WATER INFILTRATION INTO THE REINFORCED ZONE.

4. GEOGRID AND GEOGRID/VERSA-LOK CONNECTIONS SHALL BE PULLED AND HELD TAUT UNTIL SUFFICIENT FILL IS PLACED OVER THE GEOGRID TO MAINTAIN TENSION IN GEOGRID.

5. ONE INCH CLEAN CRUSHED LIMESTONE BACKFILL WITHIN THE REINFORCED ZONE SHALL BE COMPACTED BY SEVERAL PASSES OF A VIBRATORY ROLLER. THE NUMBER OF PASSES AND MINIMUM ROLLER WEIGHT SHOULD BE DETERMINED IN THE FEILD BY THE ENGINEER.

6. HEAVY COMPACTION EQUIPMENT SHALL NOT BE OPERATED WITHIN THREE FEET OF THE WALL FACE. HAND OPERATED EQUIPMENT SHALL BE USED WITHIN THREE FEET OF THE FACING UNITS.

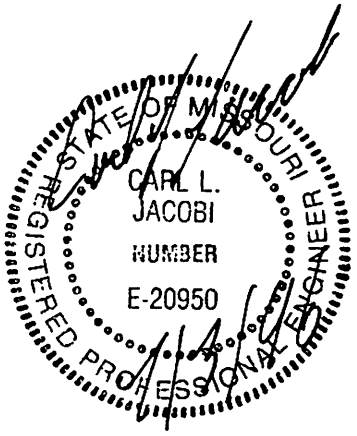
NOTES:

SEE ATTACHED NOTES AND CONSULT MANUFACTURE FOR MINIMUM SPECIFICATION FOR PLACEMENT AND CONSTRUCTION, MATERIAL SPECIFICATION AND DETAILS.

LOCATION OF PROPOSED WALL INDICATED ON SHEET 4 OF 23 "GRADING PLAN" PREPARED BY PICKETT, RAY AND SILVER, DATED MAY, 1996

OBSERVATION OF CONSTRUCTION BY THE GEOTECHNICAL ENGINEER IS NECESSARY TO PROPERLY IMPLEMENT THE WALL DESIGN. FIELD OBSERVATION AND TESTING SERVICES ARE VIEWED AS ESSENTIAL AND A CONTINUATION OF THE DESIGN PROCESS.

THE RETAINING WALL DESIGN IS BASED ON USING VERSA-LOK STANDARD UNITS AND MIRAFI GEOGRID. THE DESIGN IS NOT APPLICABLE TO OTHER BLOCKS AND/OR GEOGRIDS.

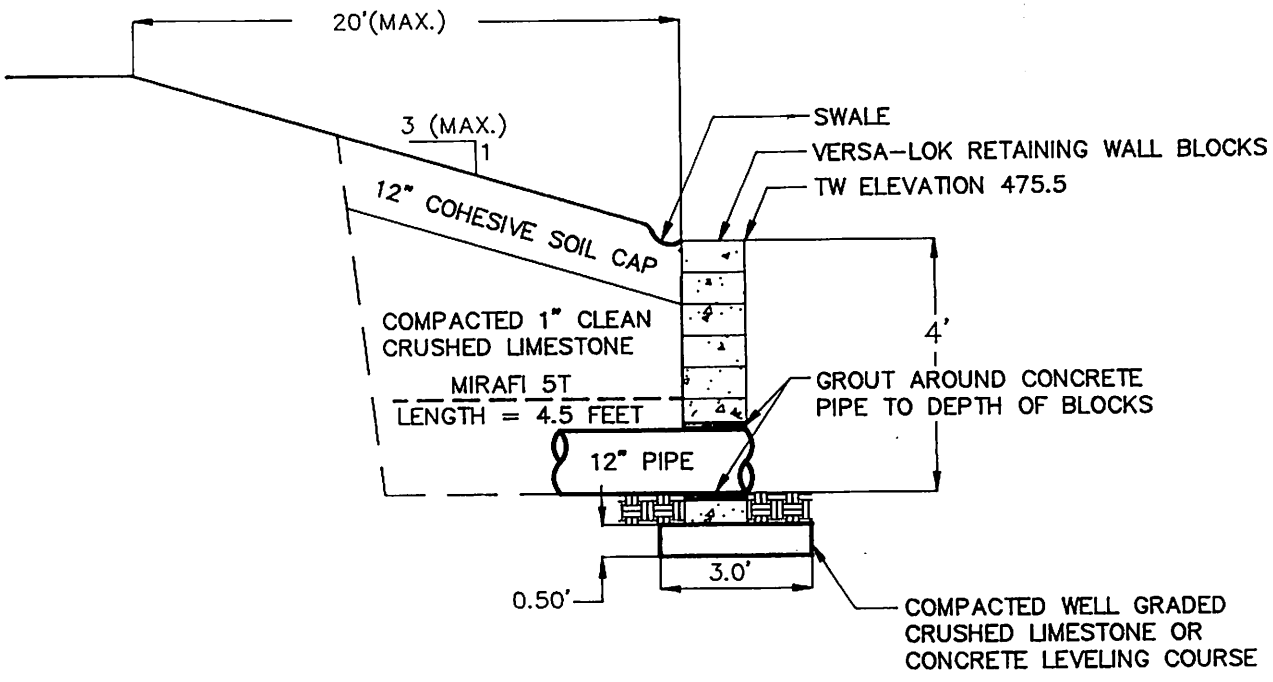


SCI SOIL CONSULTANTS, INC.
333 MID RIVERS MALL DRIVE ST. PETERS, MISSOURI 63376

HIGHGROVE PLACE
O'FALLON, MISSOURI

DETENTION BASIN RETAINING WALL

JULY 1996 SCI NO. 96-011-111


20'(MAX.)
3 (MAX.)
1
12" COHESIVE SOIL CAP
SWALE
VERSA-LOK RETAINING WALL BLOCKS
TW ELEVATION 475.5
COMPACTED 1" CLEAN
CRUSHED LIMESTONE
MIRAFI 5T
LENGTH = 4.5 FEET
4'
GROUT AROUND CONCRETE
PIPE TO DEPTH OF BLOCKS
12" PIPE
3.0'
0.50'
COMPACTED WELL GRADED
CRUSHED LIMESTONE OR
CONCRETE LEVELING COURSE

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE 9-4-96
DESIGNER J. Kendrick
PAGE 1 of 4.

STORMWATER DETENTION BASIN "A"

DESIGN STORM 5 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 34.70 ACRES
OFFSITE: 1.43 ACRES
TOTAL: 36.13 ACRES

PRE-DEVELOPED CONDITIONS:

ONSITE: 34.70 ACRES x 1.33 (1.48) CFS/AC. Q= 46.15 CFS = 51.36
OFFSITE: 1.43 ACRES x 1.33 CFS/AC. Q= 1.90 CFS 2.12
TQ= 48.05 CFS 53.48

POST-DEVELOPED Q TO BASIN:

ONSITE: 37.75 ACRES x 1.98 (2.08) CFS/AC. Q= 74.75 CFS 78.52
OFFSITE: 3.18 ACRES x 1.33 (1.48) CFS/AC. Q= 4.23 CFS 4.71
TQ= 78.98 CFS 83.23

POST-DEVELOPED-
BYPASS BASIN:

ONSITE: 1.58 ACRES x 1.98 CFS/AC. Q= 3.13 CFS 3.29
OFFSITE: 0.70 ACRES x 1.33 CFS/AC. Q= 0.93 CFS 1.04
TQ= 4.06 CFS 4.33

DETENTION REQUIRED:

78.98 CFS + 4.06 CFS = 83.04 CFS - 48.05 CFS = 34.99 CFS
83.23 + 4.33 = 87.56 - 53.48 = 34.08
34.99 CFS x 20 MIN. x 60 SEC./MIN. = 41,988 CU.FT. (VOLUME)

ALLOWABLE RELEASE FROM BASIN:

78.98 CFS - 34.99 CFS Q= 43.99 CFS
83.23 - 34.08 = 49.15 cfs

STATE OF MISSOURI
HAROLD J. BARTCH
NUMBER E-17751
REGISTERED PROFESSIONAL ENGINEER

9/5/96

95-067
2 of 4

```
*****************************************
*                                       *
*  RECTANGULAR ORIFICE                  *
*    18 in W X 36 in H    ELEV= 470.5    *
*                                       *
*  Outlet Pipe -  60 ft - 54 in pipe    *
*  UFL= 470.5  LFL= 470    n= .013      *
*                                       *
*  Overflow Structure -  Standpipe      *
*  DIAM= 72 in    STANDPIPE ELEV= 477   *
*                                       *
*****************************************
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HIGHGROVE PLACE SOUTH 9-5-96 SUBMITTAL DATE: 9-5-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	236.94	236.94	0.00	236.94	470.53
2	473.88	710.82	1.38	709.44	470.60
3	710.82	1420.26	7.14	1413.12	470.69
4	947.76	2360.88	20.08	2340.80	470.82
5	1184.70	3525.50	42.80	3482.70	470.98
6	1421.64	4904.34	77.66	4826.68	471.16
7	1658.58	6485.26	126.72	6358.55	471.38
8	1895.52	8254.07	191.61	8062.46	471.55
9	2132.46	10194.92	253.35	9941.57	471.68
10	2369.40	12310.97	300.91	12010.07	471.82
11	2606.34	14616.41	356.32	14260.09	471.98
12	2843.28	17103.37	420.03	16683.34	472.14
13	3080.22	19763.56	490.25	19273.31	472.31
14	3317.16	22590.47	568.79	22021.68	472.49
15	3554.10	25575.78	656.30	24919.48	472.68
16	3791.04	28710.52	752.96	27957.56	472.88
17	4027.98	31985.54	858.95	31126.60	473.09
18	4264.92	35391.52	974.36	34417.16	473.30
19	4501.86	38919.02	1099.22	37819.80	473.53
20	4738.80	42558.60	1634.28	40924.32	473.73
21	4501.86	45426.18	1740.09	43686.10	473.92
22	4264.92	47951.03	1829.08	46121.95	474.07
23	4027.98	50149.93	1902.09	48247.84	474.20
24	3791.04	52038.88	1961.64	50077.24	474.32
25	3554.10	53631.34	2011.48	51619.86	474.41
26	3317.16	54937.02	2052.56	52884.46	474.49
27	3080.22	55964.68	2085.65	53879.03	474.55
28	2843.28	56722.31	2111.29	54611.02	474.60
29	2606.34	57217.36	2129.98	55087.38	474.63
30	2369.40	57456.78	2142.05	55314.73	474.64
31	2132.46	57447.19	2147.78	55299.41	474.64
32	1895.52	57194.93	2147.40	55047.54	474.62
33	1658.58	56706.12	2141.04	54565.08	474.59
34	1421.64	55986.72	2128.81	53857.91	474.55
35	1184.70	55042.61	2110.76	52931.85	474.49
36	947.76	53879.62	2086.87	51792.74	474.42
37	710.82	52503.56	2057.12	50446.44	474.34
38	473.88	50920.32	2021.39	48898.93	474.24
39	236.94	49135.87	1979.53	47156.35	474.14
40	0.00	47156.35	1931.30	45225.06	474.02

PEAK OUTFLOW= 35.8 CFS AT 31 MINUTES

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

397-1211

PROJECT NAME HIGHGROVE PLACE
PROJECT #/JOB ORDER # 95-067/34618
DATE 9-4-96
DESIGNER J. Kendrick
PAGE 3 of 4

STORMWATER DETENTION BASIN "A"

DESIGN STORM 10 YEAR/20 MINUTE

TOTAL AREA TO DISCHARGE POINT:

ONSITE: 34.70 ACRES
OFFSITE: 1.43 ACRES
TOTAL: 36.13 ACRES

PRE-DEVELOPED CONDITIONS:

ONSITE: 34.70 ACRES X 1.67 CFS/AC. Q = 57.95 CFS
OFFSITE: 1.43 ACRES X 1.67 CFS/AC. Q = 2.39 CFS
TQ = 60.34 CFS

POST DEVELOPED Q TO BASIN:

ONSITE: 37.75 ACRES X 2.35 CFS/AC. Q = 88.71 CFS
OFFSITE: 3.18 ACRES X 1.67 CFS/AC. Q = 5.31 CFS
TQ = 94.02 CFS

POST-DEVELOPED-BYPASS BASIN:

ONSITE: 1.58 ACRES X 2.35 CFS/AC. Q = 3.71 CFS
OFFSITE: 0.70 ACRES X 1.67 CFS/AC. Q = 1.17 CFS
TQ = 4.88 CFS

DETENTION REQUIRED:

94.02 CFS + 4.88 CFS = 98.90 CFS - 60.34 CFS = 38.56 CFS

38.56 CFS X 20 MIN. X 60 SEC./MIN. = 46,272 CU. FT. (VOLUME)

ALLOWABLE RELEASE FROM BASIN:

94.02 CFS - 38.56 CFS Q = 55.46 CFS

95-067
4 of 4

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*******************************************
*                                         *
*  RECTANGULAR ORIFICE                    *
*   18 in W X 36 in H   ELEV= 470.5       *
*                                         *
*  Outlet Pipe -  60 ft - 54 in pipe      *
*  UFL= 470.5  LFL= 470   n= .013         *
*                                         *
*  Overflow Structure -  Standpipe        *
*  DIAM= 72 in   STANDPIPE ELEV= 477      *
*                                         *
*******************************************
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HIGHGROVE PLACE SOUTH 9-5-96 SUBMITTAL DATE: 9-5-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	282.06	282.06	0.00	282.06	470.54
2	564.12	846.18	1.79	844.39	470.62
3	846.18	1690.57	9.27	1681.30	470.73
4	1128.24	2809.54	26.05	2783.49	470.88
5	1410.30	4193.79	55.50	4138.29	471.07
6	1692.36	5830.65	100.60	5730.05	471.29
7	1974.42	7704.47	163.91	7540.56	471.52
8	2256.48	9797.04	240.63	9556.41	471.66
9	2538.54	12094.95	290.93	11804.02	471.81
10	2820.60	14624.62	350.65	14273.97	471.98
11	3102.66	17376.63	420.44	16956.19	472.16
12	3384.72	20340.91	498.35	19842.56	472.35
13	3666.78	23509.34	586.57	22922.77	472.55
14	3948.84	26871.61	685.88	26185.73	472.76
15	4230.90	30416.63	796.57	29620.06	472.99
16	4512.96	34133.02	918.89	33214.13	473.23
17	4795.02	38009.15	1053.00	36956.15	473.47
18	5077.08	42033.23	1198.93	40834.30	473.73
19	5359.14	46193.44	1737.11	44456.33	473.97
20	5641.20	50097.53	1853.14	48244.39	474.20
21	5359.14	53603.53	1961.55	51641.99	474.41
22	5077.08	56719.07	2053.15	54665.92	474.60
23	4795.02	59460.94	2131.37	57329.57	474.77
24	4512.96	61842.53	2197.97	59644.56	474.91
25	4230.90	63875.46	2254.25	61621.22	475.03
26	3948.84	65570.06	2299.90	63270.17	475.12
27	3666.78	66936.96	2334.14	64602.81	475.19
28	3384.72	67987.53	2361.44	65626.10	475.25
29	3102.66	68728.75	2382.20	66346.55	475.29
30	2820.60	69167.15	2396.71	66770.44	475.31
31	2538.54	69308.98	2405.21	66903.78	475.32
32	2256.48	69160.25	2407.88	66752.38	475.31
33	1974.42	68726.81	2404.84	66321.96	475.29
34	1692.36	68014.32	2396.21	65618.11	475.25
35	1410.30	67028.41	2382.04	64646.36	475.19
36	1128.24	65774.60	2362.33	63412.27	475.13
37	846.18	64258.45	2337.06	61921.39	475.04
38	564.12	62485.51	2306.16	60179.35	474.94
39	282.06	60461.41	2267.05	58194.36	474.82
40	0.00	58194.36	2219.16	55975.20	474.68

PEAK OUTFLOW= 40.13 CFS AT 32 MINUTES

(15) 2.4 cfs 10,000 ft²

2.64

2.4 × 1.05 = 2.52 10
2.4 5

(2) 1.61 × 1.02 = 1.64 devel.

(5) 1.98 × 1.05 = 2.08

under. 1.15 × .02 = 1.17

1.41 × 1.05 = 1.48

100 NORTH MAIN STREET
O'FALLON, MISSOURI 63366
636.240.2000
FACSIMILE 636.978.4144

December 11, 2000

Craig Tajkowski
County Engineer
St. Charles County Highway Department
201 North Second Street, Suite 429
St. Charles, MO 63301

Re: HWY 79, Drainage

Dear Mr. Tajkowski:

Please be advised that the City of O'Fallon has received a concern from the residents of the Highgrove Subdivision regarding the drainage along Hwy 79. The concern is that the drainage ditches along the southwest side of Hwy 79 north of the Highgrove subdivision cannot carry the storm water therefore, the water crosses over the roadway pavement.

The City is therefore requesting that the County investigate this situation and take the appropriate action to alleviate the situation.

Should you have any questions give me a call at 636-379-5561.

Sincerely,

Karl Ebert

Karl Ebert
Sr. Construction Inspector

Cc: Todd Criswell P.E., Director of Community Development

45

City of O'Fallon, Missouri

138 South Main Street
O'Fallon, MO 63366
Phone 314-240-2000
Fax 314-978-4144

July 30, 1996

Mr. James Kendrick
Pickett Ray & Silver
333 Mid Rivers Mall Drive
St. Peters, MO 63376

RE: Highgrove Place - South Portion

Dear Mr. Kendrick:

Per our telephone conversation on July 29, 1996, this letter is to clarify the approval letter for the improvement plans for the South Portion of Highgrove Place. Regarding the proposed 12" water main along Pieper Road, Whittaker is responsible for the installation of the water main from the point at which it currently ends through the Highgrove Place Subdivision. The City shall make up the difference in cost for the upgrade from an 8" to a 12" main for this portion.

If you have any questions, please contact me at 240-5555, ext. 318.

Sincerely,

Colleen Kramme

Colleen Kramme
Engineer III

cc P. Nasi, M. Holden, file thru S. Schertel
Brad Goss @ Whittaker Construction

18

81

18

City of O'Fallon, Missouri

138 South Main Street
O'Fallon, MO 63366
Phone 314-240-2000
Fax 314-978-4144

July 25, 1996

Mr. James Kendrick
Pickett Ray & Silver
333 Mid Rivers Mall Drive
St. Peters, MO 63376

RE: Highgrove Place - South Portion
Improvement Plans

Dear Mr. Kendrick:

The improvement plans for the proposed Highgrove Place Subdivision have been reviewed and are approved. Regarding the proposed 12" water main along Pieper Road, the City shall make up the difference in cost for the upgrade from an 8" main. Three sets of stamped "APPROVED" plans are enclosed for your use.

Please notify the City of O'Fallon at least 48 hours in advance of the start of construction to facilitate inspection scheduling. Upon completion of the improvements and necessary tests, an engineer shall certify that construction took place according to plan with all changes noted. Please insure that the as-builts show accurately storm sewer locations and elevations. One (1) set of reproducible as-builts should then be submitted along with three (3) copies. With this information, the City of O'Fallon can proceed to accept these improvements.

Prior to construction, please contact this office to schedule a pre-construction meeting. Thank you for your cooperation in this matter. If you have any questions, please contact me at 240-5555, ext. 318.

Sincerely,

Colleen Kramme

Colleen Kramme
Engineer III

cc P. Nasi, M. Holden, file thru S. Schertel
Brad Goss @ Whittaker Construction

17

City of O'Fallon, Missouri

100 North Main St.
O'Fallon, MO [illegible]
[illegible]
[illegible]

July 2[illegible], 199[illegible]

[illegible]
[illegible]
[illegible] Mill Drive
[illegible] MO [illegible]

Re: Highgrove Place [illegible]
[illegible] Plans

Dear [illegible]:

[illegible] proposed Highgrove Place [illegible] reviewed [illegible] are enclosed for your use.

[illegible] notify the City [illegible] 48 hours in advance [illegible] completion of the improvements [illegible]

[illegible]

Thank you for your cooperation [illegible]

Sincerely,

[illegible]

[illegible]

SUBMITTED: REVISED 7-10-96 FILENAME: 95067S

VEL	VEL HEAD	JUNC LOSS	TURN LOSS	CURVE LOSS	STR GRADE	INL CAP	DR AREA	FI	Q	TQ	PIPE CAP		REMARKS
0.43	0.00	0.00	0.00	0.00	2%	1.93	0.20	2.64	0.53	0.53	6.46	1	
1.35	0.03	0.04	0.00	0.00	2%	1.93	0.20	2.64	0.53	1.06	3.56	2	
1.35	0.03	0.00	0.02	0.00		0.00	0.00	0.00	0.00	1.06	4.35	3	
2.62	0.11	0.13	0.02	0.00	3S	8.25	0.38	2.64	1.00	2.06	4.77	4	
2.62	0.11	0.00	0.04	0.00		0.00	0.00	0.00	0.00	2.06	3.56	5	PFV=1.43FPS
1.10	0.02	0.03	0.00	0.00	2.02%	1.93	0.51	2.64	1.35	1.35	6.46	6	
3.57	0.20	0.27	0.00	0.00	LOW	4.00	1.06	2.64	2.80	2.80	6.64	7	PFV=1.62FPS
0.39	0.00	0.00	0.00	0.00	1.81%	2.00	0.18	2.64	0.48	0.48	6.46	8	
1.35	0.03	0.04	0.00	0.00	1.81%	2.00	0.22	2.64	0.58	1.06	3.56	9	
4.06	0.26	0.35	0.00	0.00	4S	11.00	1.21	2.64	3.19	3.19	3.56	10	
4.12	0.26	0.13	0.10	0.00	3S	8.25	0.71	2.64	1.87	5.06	6.46	11	
3.75	0.22	0.03	0.15	0.00	3S	8.25	0.59	2.64	1.56	6.62	10.50	12	
4.84	0.36	0.25	0.14	0.00	LOW	4.00	0.33	2.64	0.87	8.55	26.04	13	
5.33	0.44	0.15	0.00	0.00	LOW	4.00	0.33	2.64	0.87	9.42	15.92	14	
0.81	0.01	0.01	0.00	0.00	LOW	4.00	0.38	2.64	1.00	1.00	6.46	15	
2.75	0.12	0.15	0.01	0.00	LOW	4.00	0.44	2.64	1.16	2.16	3.56	16	
2.75	0.12	0.00	0.08	0.00		0.00	0.00	0.00	0.00	2.16	3.56	17	
3.91	0.24	0.25	0.08	0.00	4S	11.00	1.00	2.64	2.64	4.80	6.46	18	
3.96	0.24	0.10	0.00	0.00	3S	8.25	0.83	2.64	2.19	6.99	10.50	19	
4.60	0.33	0.16	0.16	0.00	3S	8.25	0.43	2.64	1.14	8.13	10.50	20	
4.60	0.33	0.00	0.22	0.00		0.00	0.00	0.00	0.00	8.13	10.50	21	
4.97	0.38	0.10	0.19	0.00	2%	1.93	0.25	2.64	0.66	8.79	10.50	22	
5.27	0.43	0.10	0.20	0.00	2%	1.93	0.20	2.64	0.53	9.32	10.50	23	
5.27	0.43	0.00	0.23	0.00		0.00	0.00	0.00	0.00	9.32	10.50	24	
5.46	0.46	0.11	0.41	0.00	4S	11.00	1.12	2.64	2.96	21.70	30.97	25	
5.46	0.46	0.00	0.23	0.00		0.00	0.00	0.00	0.00	21.70	40.62	26	PFV=2.84FPS
2.32	0.08	0.11	0.00	0.00	LOW	4.00	0.69	2.64	1.82	1.82	3.56	27	
0.64	0.01	0.01	0.00	0.00	2%	1.93	0.30	2.64	0.79	0.79	6.46	28	
2.01	0.06	0.07	0.00	0.00	2%	1.93	0.30	2.64	0.79	1.58	4.05	29	
2.92	0.13	0.12	0.04	0.00	1.72%	2.03	0.27	2.64	0.71	2.29	3.56	30	
5.03	0.39	0.42	0.09	0.00	3S	8.25	0.63	2.64	1.66	3.95	5.63	31	
1.15	0.02	0.03	0.00	0.00	4S	11.00	0.34	2.64	0.90	0.90	5.04	32	
0.86	0.01	0.01	0.00	0.00	2.31%	1.82	0.40	2.64	1.06	1.06	6.46	33	
3.03	0.14	0.18	0.00	0.00	2.31%	1.82	0.50	2.64	1.32	2.38	3.56	34	
4.88	0.37	0.38	0.10	0.00	3S	8.25	0.55	2.64	1.45	3.83	5.35	35	
3.94	0.24	0.05	0.20	0.00	3S	8.25	1.19	2.64	3.14	6.97	14.11	36	
4.73	0.35	0.20	0.17	0.00	1%	2.29	0.18	2.64	0.48	8.35	10.50	37	
5.05	0.40	0.10	0.24	0.00	1%	2.29	0.22	2.64	0.58	8.93	13.33	38	
1.27	0.03	0.04	0.00	0.00	2.31%	1.82	0.38	2.64	1.00	1.00	9.24	39	
1.08	0.02	0.00	0.02	0.00	2.74%	1.66	0.12	2.64	0.32	1.32	12.32	40	
1.85	0.05	0.07	0.00	0.00	3S	8.25	0.55	2.64	1.45	1.45	4.79	41	
5.90	0.37	0.47	0.03	0.00	3S	8.25	0.91	2.64	2.40	3.85	5.04	42	
4.45	0.31	0.07	0.13	0.00	4S	11.00	0.61	2.64	1.61	5.46	6.46	43	

HIGHGROVE PLACE (SOUTH) 7-10-96

File

UPP STR	LOW STR	L	DIA	UPPER FL LN	LOWER FL LN	PS	UPPER ST EL	DEPTH HY GR	UPPER HY EL	LOWER HY EL	HYDR GRADE	FR HEAD
CIS83	CIS82	34	15	504.00	503.66	1.00	508.06	3.83	504.23	503.84	.00010	0.00
CIS82	MHS81	72	12	503.46	502.74	1.00	508.06	4.23	503.84	502.88	.00090	0.06
MHS81	AIS80	129	12	502.54	500.62	1.50	510.40	7.52	502.88	500.88	.00090	0.11
AIS80	MHS79	201	12	500.42	496.81	1.80	505.60	4.73	500.88	497.15	.00330	0.67
MHS79	FES78	67	12	496.61	495.94	1.00	501.40	4.25	497.15	496.14	.00330	0.22
CIS74	EXCI15	151	15	488.71	487.20	1.00	493.24	4.15	489.09	488.45	.00040	0.07
CIS73	EPS72	132	12	476.08	471.50	3.47	480.75	2.82	477.93	476.84	.00620	0.82
CIS71	CIS70	34	15	482.30	481.96	1.00	487.36	4.83	482.53	482.14	.00010	0.00
CIS70	CIS66	57	12	481.76	481.19	1.00	487.36	5.22	482.14	481.58	.00090	0.05
AIS69	AIS68	168	12	485.69	484.01	1.00	490.10	4.15	485.95	484.25	.00800	1.35
AIS68	AIS67	159	15	483.81	482.22	1.00	489.00	4.75	484.25	483.04	.00610	0.98
AIS67	CIS66	83	18	482.02	481.19	1.00	487.70	5.62	482.08	481.58	.00400	0.33
CIS66	CIS65	34	18	480.99	478.90	6.15	486.08	4.51	481.58	480.13	.00660	0.23
CIS65	AIS54	118	18	478.70	475.99	2.30	486.08	5.95	480.13	479.03	.00800	0.95
CIS64	CIS63	34	15	487.35	487.01	1.00	490.87	3.19	487.68	487.06	.00020	0.01
CIS63	MHS62	43	12	486.81	486.38	1.00	490.87	3.82	487.06	486.74	.00370	0.16
MHS62	AIS61	99	12	486.18	485.19	1.00	491.20	4.47	486.74	485.59	.00370	0.36
AIS61	AIS60	221	15	484.99	482.78	1.00	490.50	4.91	485.59	484.04	.00550	1.22
AIS60	AIS59	147	18	482.58	481.11	1.00	489.50	5.46	484.04	483.29	.00440	0.65
AIS59	MHS58	83	18	480.91	480.08	1.00	487.00	3.71	483.29	482.47	.00600	0.50
MHS58	CIS57	92	18	479.88	479.06	1.00	486.80	4.33	482.47	481.76	.00600	0.49
CIS57	CIS56	34	18	478.86	478.52	1.00	487.58	5.82	481.76	481.23	.00700	0.24
CIS56	MHS55	31	18	478.32	478.01	1.00	487.58	6.35	481.23	480.69	.00790	0.24
MHS55	AIS54	182	18	477.81	475.99	1.00	488.50	7.81	480.69	479.03	.00790	1.43
AIS54	MHS53	132	27	475.79	474.47	1.00	482.00	2.97	479.03	477.86	.00490	0.65
MHS53	EPS52A	161	27	474.27	471.50	1.72	482.60	4.74	477.86	476.84	.00490	0.79
CIS21	AIS4	105	12	477.00	475.95	1.00	482.25	4.81	477.44	477.06	.00260	0.27
CIS25	CIS24	34	15	484.00	483.66	1.00	489.74	5.44	484.30	483.90	.00010	0.01
CIS24	CIS23	116	12	483.46	481.96	1.29	489.74	5.84	483.90	482.34	.00200	0.23
CIS23	AIS22	167	12	481.76	480.09	1.00	486.69	4.35	482.34	480.73	.00410	0.69
AIS22	AIS5	195	12	479.89	475.01	2.50	485.90	5.17	480.73	477.82	.01230	2.40
EXAI29	EXCI23	37	12	488.47	487.73	2.00	491.00	2.25	488.75	488.01	.00060	0.02
CIS29	CIS28	34	15	498.00	497.66	1.00	503.10	5.07	498.03	498.01	.00030	0.01
CIS28	AIS27	105	12	497.46	496.41	1.00	503.10	5.62	497.49	496.84	.00450	0.47
AIS27	AIS26	322	12	496.21	488.96	2.25	501.10	4.27	496.84	489.51	.01160	3.72
AIS26	EXCI23	154	18	488.76	485.98	1.81	494.80	5.29	489.51	487.52	.00440	0.68
EXCI23	EXCI25A	44	18	485.78	485.34	1.00	490.96	3.44	487.52	486.87	.00630	0.28
EXCI25A	EXCI25	231	18	485.14	481.42	1.61	490.96	4.09	486.87	484.86	.00720	1.67
CIS39	CIS38	93	12	492.03	485.78	6.72	495.15	2.90	492.25	486.07	.00080	0.07
CIS38	CIS30	58	15	485.58	483.47	3.64	490.66	4.59	486.07	486.03	.00040	0.02
AIS37	AIS36	210	12	493.93	490.14	1.80	499.00	4.70	494.31	491.30	.00170	0.35
AIS36	AIS35	103	12	489.94	487.88	2.00	494.80	3.50	491.30	489.60	.01170	1.20
AIS35	MHS34	112	15	487.68	486.56	1.00	492.80	3.20	489.60	488.60	.00710	0.80

07	0.15	0.00	4S	11.00	0.81	2.64	1.81	9.46	8.46	43	
00	0.21	0.00		0.00	0.00	0.00	0.00	5.46	6.46	44	
07	0.18	0.00	LOW	4.00	0.75	2.64	1.98	7.44	6.74	45	
14	0.20	0.00	LOW	4.00	0.38	2.64	1.00	8.44	10.50	46	
00	0.18	0.00		0.00	0.00	0.00	0.00	8.44	10.50	47	
02	0.24	0.00	2.74%	1.66	0.10	2.64	0.26	10.02	15.85	48	
09	0.17	0.00	LOW	4.00	0.32	2.64	0.84	10.86	15.84	49	
03	0.00	0.00	3S	8.25	0.34	2.64	0.90	0.90	4.85	50	
09	0.01	0.00	3S	8.25	0.32	2.64	0.84	1.74	4.64	51	
01	0.00	0.00	2%	1.93	0.31	2.64	0.82	0.82	6.46	52	
18	0.01	0.00	2%	1.93	0.58	2.64	1.53	2.35	3.56	53	
00	0.10	0.00		0.00	0.00	0.00	0.00	2.35	4.64	54	
19	0.15	0.00	3S	8.25	0.26	2.64	0.69	4.78	9.48	55	
31	0.14	0.00	3S	8.25	0.59	2.64	1.56	6.34	6.46	56	
04	0.04	0.00	3%	1.57	0.45	2.64	1.19	7.53	10.50	57	
15	0.04	0.00	3%	1.57	0.38	2.64	1.00	8.53	13.37	58	
01	0.00	0.00	2%	1.93	0.32	2.64	0.84	0.84	6.46	59	
17	0.01	0.00	2%	1.93	0.54	2.64	1.43	2.27	3.90	60	
12	0.00	0.00	3S	8.25	0.71	2.64	1.87	1.87	3.58	61	
07	0.00	0.00	4S	11.00	0.51	2.64	1.36	1.36	4.36	62	
03	0.00	0.00	3S	8.25	0.31	2.64	0.82	0.82	4.64	63	
48	0.05	0.00	4S	11.00	2.44	2.64	6.44	8.62	10.50	64	
43	0.01	0.00	LOW	4.00	0.92	2.64	2.43	11.05	12.86	65	
36	0.00	0.00	LOW	4.00	0.63	2.64	1.66	12.71	18.76	66	
28	0.56	0.00		0.00	0.00	0.00	0.00	14.58	22.62	67	
37	0.23	0.00	4S	11.00	1.52	2.64	4.01	18.59	22.62	68	
00	0.25	0.00		0.00	0.00	0.00	0.00	18.59	22.62	69	
21	0.25	0.00	LOW	4.00	0.63	2.64	1.66	20.25	22.62	70	
02	0.09	0.00	LOW	4.00	0.41	2.64	1.08	23.60	30.97	71	
18	0.19	0.00	3S	8.25	0.76	2.64	2.01	25.61	30.97	72	
08	0.46	0.00	3S	8.25	1.00	2.64	2.64	36.78	46.78	73	
10	0.29	0.00	1%	2.29	0.76	2.64	2.01	38.79	81.36	74	
87	0.79	0.00	LOW	4.00	0.18	2.64	0.48	59.06	66.70	75	
11	0.15	0.00	3S	8.25	0.55	2.64	1.45	60.51	75.43	76	
32	0.63	0.00	4S	11.00	0.99	2.64	2.61	63.12	71.42	77	
06	0.00	0.00	LOW	4.00	0.51	2.64	1.35	64.47	71.14	78	
10	0.00	0.00	LOW	4.00	0.84	2.64	2.22	66.69	71.14	79	
12	0.50	0.00	4S	11.00	1.13	2.64	2.98	69.67	77.29	80	
13	0.27	0.00	4S	11.00	1.15	2.64	3.04	76.66	111.44	81	
14	0.19	0.00	3S	8.25	0.16	2.64	0.42	78.90	257.06	82	PFV=1.91FPS

Q TQ PIPE CAP

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MHS34	CIS33	55	[illegible]	486.36	485.81	1.00	493.30	4.70	[illegible]60	488.00	.00710	0.39	4.45	0.31
CIS33	CIS32	34	[illegible]	485.61	485.47	0.41	491.93	3.93	[illegible].00	487.58	.00500	0.17	4.21	0.28
CIS32	MHS31	85	18	485.27	484.42	1.00	491.93	4.35	487.58	486.69	.00650	0.55	4.78	0.35
MHS31	CIS30	75	18	484.22	483.47	1.00	493.00	6.31	486.69	486.03	.00650	0.48	4.78	0.35
CIS30	EXCI24	121	21	483.27	482.06	1.00	490.66	4.63	486.03	485.33	.00400	0.48	4.17	0.27
EXCI24	EXCI25	44	21	481.86	481.42	1.00	488.77	3.44	485.33	484.86	.00470	0.21	4.52	0.32
AIS48	AIS47	200	12	500.50	496.80	1.85	505.70	4.92	500.78	497.03	.00060	0.13	1.15	0.02
AIS47	AIS43	163	12	496.60	493.83	1.70	502.40	5.38	497.03	494.26	.00240	0.39	2.22	0.08
CIS46	CIS45	34	15	497.00	496.66	1.00	502.10	4.80	497.30	496.96	.00020	0.01	0.67	0.01
CIS45	MHS44	80	12	496.46	495.66	1.00	502.10	5.60	496.50	495.96	.00440	0.35	2.99	0.14
MHS44	AIS43	96	12	495.46	493.83	1.70	500.20	4.24	495.96	494.26	.00440	0.42	2.99	0.14
AIS43	AIS42	264	15	493.63	487.95	2.15	499.10	4.85	494.26	489.09	.00550	1.45	3.90	0.24
AIS42	CIS41	124	15	487.75	486.51	1.00	494.00	4.91	489.09	487.45	.00960	1.19	5.17	0.41
CIS41	CIS40	39	18	486.31	485.92	1.00	491.60	4.15	487.45	487.25	.00510	0.20	4.26	0.28
CIS40	EXAI28	145	18	485.72	483.37	1.62	491.62	4.37	487.25	486.10	.00660	0.96	4.83	0.36
CIS50	CIS49	34	15	493.50	493.16	1.00	498.72	5.20	493.52	493.50	.00020	0.01	0.68	0.01
CIS49	CIS12	192	12	492.96	490.66	1.20	498.72	5.22	493.50	491.20	.00410	0.78	2.89	0.13
AIS51	MHS16	117	12	492.88	491.70	1.01	498.40	5.00	493.40	492.22	.00280	0.32	2.38	0.09
AIS52	AIS19	225	12	501.05	497.68	1.50	506.50	5.08	501.43	498.48	.00150	0.33	1.73	0.05
AIS20	AIS19	225	12	501.50	497.68	1.70	506.50	4.72	501.78	498.48	.00050	0.12	1.04	0.02
AIS19	CIS18	101	18	497.48	496.47	1.00	502.00	3.52	498.48	497.27	.00670	0.68	4.88	0.37
CIS18	CIS17	34	18	496.27	495.76	1.50	502.74	5.47	497.27	496.45	.01110	0.38	6.25	0.61
CIS17	MHS16	121	18	495.56	491.70	3.19	502.74	6.29	496.45	492.59	.01460	1.77	7.19	0.80
MHS16	AIS15	30	24	489.80	489.50	1.00	495.00	3.37	491.63	491.23	.00420	0.12	4.64	0.33
AIS15	MHS14	98	24	489.30	488.32	1.00	495.20	3.97	491.23	489.97	.00680	0.66	5.92	0.54
MHS14	CIS13	28	24	488.12	487.84	1.00	496.20	6.23	489.97	489.53	.00680	0.19	5.92	0.54
CIS13	CIS12	34	24	487.64	487.30	1.00	495.45	5.92	489.53	488.80	.00800	0.27	6.45	0.65
CIS12	AIS11	143	27	487.10	485.67	1.00	493.45	4.65	488.80	487.90	.00580	0.83	5.94	0.55
AIS11	EXAI28	210	27	485.47	483.37	1.00	493.10	5.20	487.90	486.10	.00680	1.44	6.44	0.64
EXAI28	EXCI27	61	36	483.17	482.87	0.49	488.80	2.70	486.10	485.53	.00300	0.19	5.20	0.42
EXCI27	EXCI25	84	36	482.67	481.42	1.49	489.28	3.75	485.53	484.86	.00340	0.28	5.49	0.47
EXCI25	AIS10	34	36	481.22	480.88	1.00	488.77	3.91	484.86	482.93	.00780	0.27	8.36	1.08
AIS10	AIS9	190	36	480.68	478.25	1.28	488.10	5.17	482.93	481.11	.00820	1.56	8.56	1.14
AIS9	CIS8	127	42	478.05	477.41	0.50	484.30	3.19	481.11	480.30	.00390	0.50	6.56	0.67
CIS8	CIS7	34	42	477.21	477.04	0.50	484.07	3.77	480.30	480.10	.00410	0.14	6.70	0.70
CIS7	AIS6	114	42	476.84	476.27	0.50	484.07	3.97	480.10	479.50	.00440	0.50	6.93	0.75
AIS6	AIS5	222	42	476.07	474.76	0.59	485.90	6.40	479.50	477.82	.00480	1.06	7.24	0.81
AIS5	AIS4	216	48	474.76	473.46	0.60	482.00	4.18	477.82	477.06	.00280	0.62	6.10	0.58
AIS4	EPS3	103	54	473.26	471.50	1.71	482.00	4.94	477.06	476.84	.00160	0.17	4.96	0.38

SUBMITTED: 6-18-96 FILENAME: 950670S

FR HEAD	VEL	VEL HEAD	JUNC LOSS	TURN LOSS	CURVE LOSS	STR GRADE	INL CAP	DR AREA	PI	Q	TQ	PIPE CAP		REMARKS
0.26	8.20	1.04	1.39	0.00	0.00		0.00	0.00	0.00	0.00	130.42	179.52	1	P.F.V. = 5.21fps
0.15	3.56	0.20	0.27	0.00	0.00		0.00	0.00	0.00	0.00	6.29	16.41	2	P.F.V. = 1.53fps
10.16	21.55	7.21	9.61	0.00	0.00		0.00	0.00	0.00	0.00	51.83	70.86	3	P.F.V. = 13.68fps
6.94	13.60	2.87	3.83	0.00	0.00		0.00	0.00	0.00	0.00	16.69	23.70	4	P.F.V. = 8.36fps

Top Pipe (Typical)

STATE OF MISSOURI
HAROLD J. BARTCH
NUMBER E-17751
REGISTERED PROFESSIONAL ENGINEER

1/5/96

HIGHGROVE PLACE (SOUTH) 6-18-96

UPP STR	LOW STR	L	DIA	UPPER FL LN	LOWER FL LN	PS	UPPER ST EL	DEPTH HY GR	UPPER HY EL	LOWER HY EL	HYDR GRADE
OSS2	FES1	60	54	470.50	470.00	0.83	477.00	0.85	476.15	474.50	.00440
OSS76	FES75	41	18	495.00	494.00	2.44	497.50	1.58	495.92	495.50	.00360
OSN2	FEN1	95	21	475.00	456.00	20.00	478.80	1.28	477.52	457.75	.10700
OSN50	FEN49	104	15	482.00	468.00	13.46	486.10	3.34	482.76	469.25	.06680

℄ Inside