file. Pinehurst Detention Report

ENGINEERING

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STORMWATER DETENTION ANALYSIS
PINEHURST
PREPARED BY: BAX ENGINEERING CO., INC.
BAX PROJECT NO. 96-8115
OCTOBER 9, 1996

INTRODUCTION:

It is proposed that a tract of land consisting of 38.31 acres be developed into a single family residential subdivision to be known as Pinehurst. There are essentially two points of discharge on the property, one for runoff from the Northwest subwatershed and one for runoff from the Northeast subwatershed. It is proposed that a stormwater detention basin be constructed on the site to control runoff from the Northwest subwatershed. This report will also analyze the runoff from the Northeast subwatershed to show that a detention basin will not be required in this area. Stormwater detention requirements for the City of O'Fallon are such that the storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the site under post developed conditions is less than or equal to the peak rate of runoff leaving the site under pre-developed conditions for the required design storm. The basin shall be analyzed using both the 25 year - 20 minute design storm and the 100 year - 20 minute design storm as required by the City.

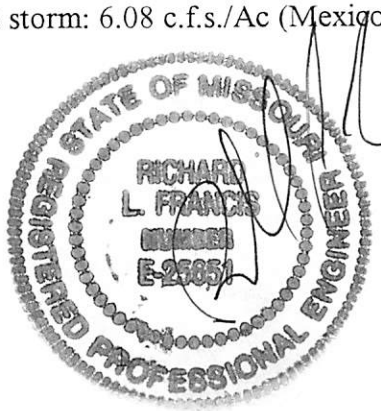
GENERAL SITE DATA AND RUNOFF CALCULATIONS:

1. Area of tract: 38.31 Acres

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

   ONSITE: 25 year - 20 minute storm: 2.31 c.f.s./Ac
   OFFSITE: 25 year - 20 minute storm: 2.31 c.f.s./Ac (for all areas except Mexico Road)
   OFFSITE: 25 year - 20 minute storm: 4.75 c.f.s./Ac (Mexico Road Area)

   ONSITE: 100 year - 20 minute storm: 2.95 c.f.s./Ac
   OFFSITE: 100 year - 20 minute storm: 2.95 c.f.s./Ac (for all areas except Mexico Road)
   OFFSITE: 100 year - 20 minute storm: 6.08 c.f.s./Ac (Mexico Road Area)



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

ONSITE: 25 year - 20 minute storm: 3.26 c.f.s./Ac
OFFSITE: 25 year - 20 minute storm: 3.26 c.f.s./Ac (Northeast & North Areas)
OFFSITE: 25 year - 20 minute storm: 4.75 c.f.s./Ac (Mexico Road Area & Northwest Areas)

ONSITE:100 year - 20 minute storm: 4.17 c.f.s./Ac
OFFSITE:100 year - 20 minute storm: 4.17 c.f.s./Ac (Northeast & North Areas)
OFFSITE:100 year - 20 minute storm: 6.08 c.f.s./Ac (Mexico Road Area & Northwest Areas)

4. The required attenuation due to proposed development of the project site is:

NORTHEAST SUBWATERSHED

Pre-developed runoff (25 year - 20 minute storm)
ONSITE: Q_{pre} = 16.49 Ac x 2.31 c.f.s./Ac = 38.09 c.f.s.
OFFSITE: Q_{pre} = 4.49 Ac x 2.31 c.f.s./Ac = 10.37 c.f.s.
48.46 c.f.s.

Post-developed runoff (25 year - 20 minute storm)
ONSITE: Q_{post} = 11.19 Ac x 3.26 c.f.s./Ac = 36.48 c.f.s.
OFFSITE: Q_{post} = 3.19 Ac x 3.26 c.f.s./Ac = 10.40 c.f.s.
46.88 c.f.s.

NOTE: Since the post developed discharge of 46.88 c.f.s. is less than the pre-developed discharge of 48.46 c.f.s. No detention is required for this subwatershed.

NORTHEAST SUBWATERSHED

Pre-developed runoff (100 year - 20 minute storm)
ONSITE: Q_{pre} = 16.49 Ac x 2.95 c.f.s./Ac = 48.65 c.f.s.
OFFSITE: Q_{pre} = 4.49 Ac x 2.95 c.f.s./Ac = 13.25 c.f.s.
61.90 c.f.s.

Post-developed runoff (100 year - 20 minute storm)

ONSITE: Q_{post} = 11.19 Ac x 4.17 c.f.s./Ac =	46.66 c.f.s.
OFFSITE: Q_{post} = 3.19 Ac x 4.17 c.f.s./Ac =	13.30 c.f.s.
	59.96 c.f.s.

NOTE: Since the post developed discharge of 59.96 c.f.s. is less than the pre-developed discharge of 61.90 c.f.s. No detention is required for this subwatershed.

NORTHWEST SUBWATERSHED

Pre-developed runoff (25 year - 20 minute storm)

ONSITE: Q_{pre} = 21.03 Ac x 2.31 c.f.s./Ac =	48.58 c.f.s.
NORTH OFFSITE: Q_{pre} = 1.52 Ac x 3.26 c.f.s./Ac =	4.96 c.f.s.
WEST OFFSITE: Q_{pre} = 3.51 Ac x 4.75 c.f.s./Ac =	16.67 c.f.s.
MEXICO OFFSITE: Q_{pre} = 3.55 Ac x 4.75 c.f.s./Ac =	16.86 c.f.s.
	87.07 c.f.s.

Post-developed runoff (25 year - 20 minute storm)

ONSITE: Q_{post} = 12.82 Ac x 3.26 c.f.s./Ac =	41.79 c.f.s.
WEST OFFSITE: Q_{pre} = 3.51 Ac x 4.75 c.f.s./Ac =	16.67 c.f.s.
MEXICO OFFSITE: Q_{post} = 3.55 Ac x 4.75 c.f.s./Ac =	16.86 c.f.s.
BYPASS ONSITE:Q_{post} = 11.17 Ac x 3.26 c.f.s./Ac =	36.41 c.f.s.
BYPASS OFFSITE:Q_{post} = 1.52 Ac x 3.26 c.f.s./Ac =	4.96 c.f.s.
	116.69 c.f.s.

Required attenuation for the Northwest subwatershed is:

25 year - 20 minute storm:
116.69 c.f.s. - 87.07 c.f.s. = 29.62 c.f.s.

NOTE: Required attenuation when considering the site as a whole:

38.31 Ac x (3.26 - 2.31) = 36.39 c.f.s.
29.62 c.f.s. < 36.39 c.f.s.

So required attenuation = 36.39 c.f.s.

NORTHWEST SUBWATERSHED

Pre-developed runoff (100 year - 20 minute storm)

ONSITE: Q_{pre} = 21.03 Ac x 2.95 c.f.s./Ac =	62.04 c.f.s.
NORTH OFFSITE: Q_{pre} = 1.52 Ac x 4.17 c.f.s./Ac =	6.34 c.f.s.
WEST OFFSITE: Q_{pre} = 3.51 Ac x 6.08 c.f.s./Ac =	21.34 c.f.s.
MEXICO OFFSITE: Q_{pre} = 3.55 Ac x 6.08 c.f.s./Ac. =	21.58 c.f.s.
	111.30 c.f.s.

Post-developed runoff (100 year - 20 minute storm)

ONSITE: Q_{post} = 12.82 Ac x 4.17 c.f.s./Ac =	53.56 c.f.s.
OFFSITE: Q_{pre} = 3.51 Ac x 6.08 c.f.s./Ac =	21.34 c.f.s.
OFFSITE: Q_{post} = 3.55 Ac x 6.08 c.f.s./Ac =	21.58 c.f.s.
BYPASS ONSITE: Q_{post} = 11.17 Ac x 4.17 c.f.s./Ac =	46.58 c.f.s.
BYPASS OFFSITE: Q_{post} = 1.52 Ac x 4.17 c.f.s./Ac =	6.34 c.f.s.
	149.40 c.f.s.

Required attenuation for the Northwest subwatershed is:

100 year - 20 minute storm:
149.40 c.f.s. - 111.30 c.f.s. = 38.10 c.f.s.

NOTE: Required attenuation when considering the site as a whole:

38.31 Ac x (4.17 - 2.95) = 46.74 c.f.s.
38.10 c.f.s. < 46.74 c.f.s.

So required attenuation = 46.74 c.f.s.

5) Of the inflows to the proposed Northwest detention basin, the most remote point of origination lies Southwest on Mexico Road. It will flow approximately 175 feet in a concrete gutter to a curb inlet then an additional 1877 feet via the storm sewer system to the detention basin. The time of concentration is therefore estimated as follows:

A. T_{T175} : L = 175 feet
Elevation difference = 1.75 feet
See figure 1 sheet 6 : T_{T175} = 1.0 minutes

B. T_{T1877} = 1877 feet at an estimated velocity of 7 ft./sec.
T_{T1877} = 1877 ft. / 7 ft./sec. = 268.14 sec. = 4.47 min.

C. $T_C = T_{T175} + T_{T1877}$
$= 1.0$ min. + 4.47 min. = 5.47 min. => use 5 minutes

6) The permitted release rate of the detention basin will be equal to the pre-developed rate minus the post-developed flow that will bypass the basin: (See Drainage Area Map by Bax Engineering)

NORTHWEST DETENTION BASIN

25 year - 20 minute storm:
Permitted release rate: *87.07 cfs - 41.37 cfs = 45.7 c.f.s.
Required attenuation = 36.39 c.f.s.
Flow to Basin = 75.32 c.f.s.
Permitted release rate: 75.32 c.f.s. - 36.39 c.f.s. = 38.93 c.f.s.

100 year - 20 minute storm:
Permitted release rate: 111.30 cfs - 52.92 cfs = 58.38 c.f.s.
Required attenuation = 46.74 c.f.s.
Flow to basin = 96.48 c.f.s.
Permitted release rate: 96.48 c.f.s. - 46.74 c.f.s. = 49.74 c.f.s.

NORTHWEST DETENTION BASIN

25 year - 20 minute storm:
Peak Release Rate = 38.91 c.f.s. (< 38.93 c.f.s.)
Peak Elevation = 548.28 feet

100 year - 20 minute storm:
Peak Release Rate = 44.41 c.f.s. (< 49.74 c.f.s.)
Peak Elevation = 549.57 feet

As shown above, when the peak release rate is compared to the permitted release rate for that design storm, all peak release rates are less than the permitted release rate of the basin for that design storm.

DETENTION BASIN CHARACTERISTICS SUMMARY:

Northwest Detention Basin

25 year - 20 minute storm highwater = 548.28 feet
100 year - 20 minute storm highwater = 549.57 feet

Outflow Structure

Flowline of Pipe Out (48" Diameter) = 542.00 feet
Flowline of Low Flow Slot (16.20"w x 32.40"h) = 542.00 feet
Flowline of Emergency Overflow = 549.60 feet
Top of Berm = 550.60 feet

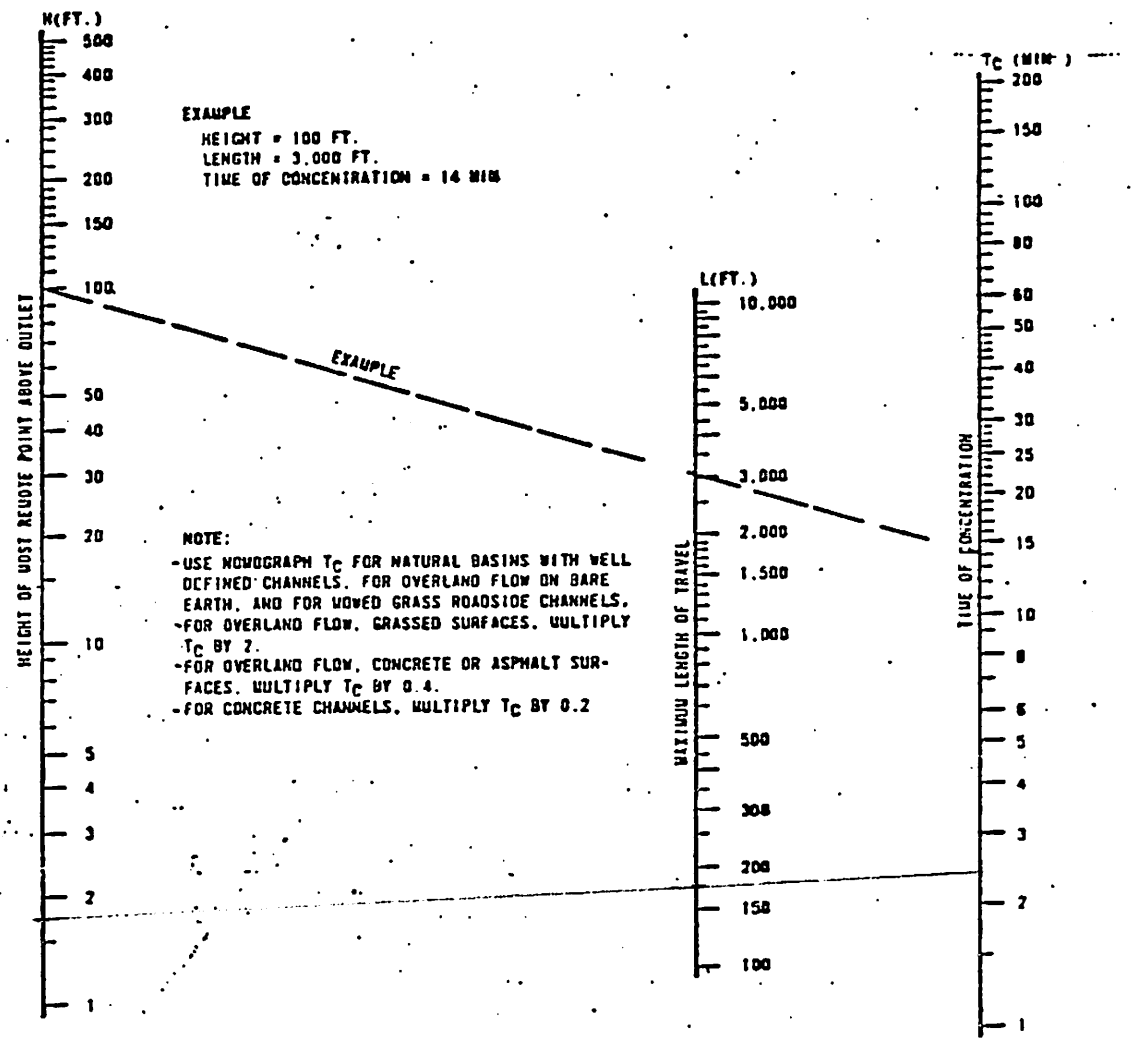

FIGURE 1

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

POND-2 Version: 5.[redacted]S/N:

>>>>> HYDROGRAPH PRINTOUT <<<<<

10-09-1996 07:50:18

Hydrograph file: 8115-25 .HYD

HYDROGRAPH ORDINATES (cfs)
Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	15.06	30.13	45.19	60.25	75.32	75.32
7.00	75.32	75.32	75.32	75.32	75.32	75.32	75.32
14.00	75.32	75.32	75.32	75.32	75.32	75.32	75.32
21.00	60.25	45.19	30.13	15.06	0.00		

POND-2 Version: 5.17 S/N:

>>>>> HYDROGRAPH PRINTOUT <<<<<

10-09-1996 07:50:36

Hydrograph file: 8115-100.HYD

HYDROGRAPH ORDINATES (cfs)
Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	19.30	38.59	57.89	77.18	96.48	96.48
7.00	96.48	96.48	96.48	96.48	96.48	96.48	96.48
14.00	96.48	96.48	96.48	96.48	96.48	96.48	96.48
21.00	77.18	57.89	38.59	19.30	0.00		

POND-2 Version: 5.17
S/N:

PINEHURST
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
SEPTEMBER 11, 1996

CALCULATED 10-09-1996 07:50:52
DISK FILE: 8115 .VOL

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
542.00	0.00	0.00	0.00	0.00	0.00
544.00	3.22	0.18	0.18	0.12	0.12
546.00	4.25	0.24	0.64	0.43	0.55
548.00	5.42	0.31	0.83	0.55	1.10
550.00	7.05	0.40	1.07	0.71	1.82
550.60	7.58	0.44	1.26	0.25	2.07

* 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 Structu File: 8115 .STR

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SEPTEMBER 11, 1996
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***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
542.00	0.0	1
542.50	1.4	1
543.00	4.1	1
543.50	6.8	2
544.00	11.5	1
544.50	16.0	1
545.00	21.0	1
545.50	25.7	2
546.00	28.6	2
546.50	31.1	2
547.00	33.5	2
547.50	35.8	2
548.00	37.8	2
548.50	39.8	2
549.00	41.7	2
549.50	43.5	2
550.00	54.1	2 +3
550.50	76.8	2 +3
550.60	0.0	

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SEPTEMBER 11, 1996
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Outlet Structure File: 8115 .STR
Planimeter Input File: 8115 .VOL
Rating Table Output File: 8115 .POND

Min. Elev.(ft) = 542 Max. Elev.(ft) = 550.6 Incr.(ft) = .5

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

****
SYSTEM CONNECTIVITY
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Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1
ORIFICE	2	? 1	->	A
WEIR-VR	3		->	3

Outflow rating table summary was stored in file:
8115 .POND

Outlet Structure File: S115 .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

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DETENTION ANALYSIS
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SEPTEMBER 11, 1996
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>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	542.00
E2 elev.(ft)?	550.60
Weir coefficient?	3
Weir elev.(ft)?	542.00
Length (ft)?	1.35
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8115 .STR

POND-2 Version: 5.17 S/N:
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SEPTEMBER 11, 1996
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>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	543.35
E2 elev.(ft)?	550.60
Orifice coeff.?	.6
Invert elev.(ft)?	542.0
Datum elev.(ft) ?	543.35
Orifice area (sq ft)?	3.645

Outlet Structure File: 8115 .STR

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>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	549.60
E2 elev.(ft)?	550.60
Weir coefficient?	3
Weir elev.(ft)?	549.60
Length (ft)?	11.67
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8115 .STR

POND-2 Version: 5.17 S/N:
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PINEHURST
DETENTION ANALYSIS
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SEPTEMBER 11, 1996
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Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
542.00	0.0	H =0.0
542.50	1.4	H =.5
543.00	4.1	H =1.0
543.50	7.4	H =1.5
544.00	11.5	H =2.0
544.50	16.0	H =2.5
545.00	21.0	H =3.0
545.50	26.5	H =3.5
546.00	32.4	H =4.0
546.50	38.7	H =4.5
547.00	45.3	H =5.0
547.50	52.2	H =5.5
548.00	59.5	H =6.0
548.50	67.1	H =6.5
549.00	75.0	H =7.0
549.50	83.2	H =7.5
550.00	91.6	H =8.0
550.50	100.4	H =8.5
550.60	0.0	E = or > E2=550.60

C = 3 L (ft) = 1.35
H (ft) = Table elev. - Invert elev. (542 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8115 .STR

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DETENTION ANALYSIS
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SEPTEMBER 11, 1996
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Outflow Rating Table for Structure #2
ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
542.00	0.0	E < E1=543.35
542.50	0.0	E < E1=543.35
543.00	0.0	E < E1=543.35
543.50	6.8	H =.15
544.00	14.1	H =.65
544.50	18.8	H =1.15
545.00	22.5	H =1.65
545.50	25.7	H =2.15
546.00	28.6	H =2.65
546.50	31.1	H =3.15
547.00	33.5	H =3.65
547.50	35.8	H =4.15
548.00	37.8	H =4.65
548.50	39.8	H =5.15
549.00	41.7	H =5.65
549.50	43.5	H =6.15
550.00	45.3	H =6.65
550.50	46.9	H =7.150
550.60	0.0	E = or > E2=550.60

C = .6 A = 3.645 sq.ft.
H (ft) = Table elev. - Datum elev. (543.35 ft)
Q (cfs) = C * A * sqr(2g * H)

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DETENTION ANALYSIS
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SEPTEMBER 11, 1996
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Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
542.00	0.0	E < Inv.El.= 549.6
542.50	0.0	E < Inv.El.= 549.6
543.00	0.0	E < Inv.El.= 549.6
543.50	0.0	E < Inv.El.= 549.6
544.00	0.0	E < Inv.El.= 549.6
544.50	0.0	E < Inv.El.= 549.6
545.00	0.0	E < Inv.El.= 549.6
545.50	0.0	E < Inv.El.= 549.6
546.00	0.0	E < Inv.El.= 549.6
546.50	0.0	E < Inv.El.= 549.6
547.00	0.0	E < Inv.El.= 549.6
547.50	0.0	E < Inv.El.= 549.6
548.00	0.0	E < Inv.El.= 549.6
548.50	0.0	E < Inv.El.= 549.6
549.00	0.0	E < Inv.El.= 549.6
549.50	0.0	E < Inv.El.= 549.6
550.00	8.9	H =.4
550.50	29.9	H =.9
550.60	0.0	E = or > E2=550.60

C = 3 L (ft) = 11.67
H (ft) = Table elev. - Invert elev. (549.6 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8115 .STR

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DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
SEPTEMBER 11, 1996
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Outflow Rating Table A
Table A = 1 ? 2

Elevation (ft)	Q (cfs)	Contributing Structures
542.00	0.0	1
542.50	1.4	1
543.00	4.1	1
543.50	6.8	2
544.00	11.5	1
544.50	16.0	1
545.00	21.0	1
545.50	25.7	2
546.00	28.6	2
546.50	31.1	2
547.00	33.5	2
547.50	35.8	2
548.00	37.8	2
548.50	39.8	2
549.00	41.7	2
549.50	43.5	2
550.00	45.3	2
550.50	46.9	2
550.60	0.0	-

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* PINEHURST
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 24, 1996
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Inflow Hydrograph: 8115-25 .HYD
Rating Table file: 8115 .PND

----INITIAL CONDITIONS----
Elevation = 542.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
542.00	0.0	0.000
542.50	1.4	0.002
543.00	4.1	0.015
543.50	6.8	0.052
544.00	11.5	0.123
544.50	16.0	0.219
545.00	21.0	0.322
545.50	25.7	0.433
546.00	28.6	0.551
546.50	31.1	0.677
547.00	33.5	0.811
547.50	35.8	0.953
548.00	37.8	1.104
548.50	39.8	1.265
549.00	41.7	1.438
549.50	43.5	1.622
550.00	54.1	1.818
550.50	76.8	2.026

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
2.8	4.2
22.4	26.5
75.5	82.3
178.9	190.4
318.1	334.1
467.7	488.7
628.0	653.7
799.4	828.0
982.3	1013.4
1177.0	1210.5
1383.8	1419.6
1603.3	1641.1
1837.1	1876.9
2087.4	2129.1
2354.7	2398.2
2639.5	2693.6
2942.3	3019.1

Time increment (t) = 1.0 min.

POND-2 Version: 5.17 S/N:
EXECUTED: 10-24-1996 16:37:24

Pond File: 8115 .PND
Inflow Hydrograph: 8115-25 .HYD
Outflow Hydrograph: OUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
1.0	15.06
2.0	30.13
3.0	45.19
4.0	60.25
5.0	75.32
6.0	75.32
7.0	75.32
8.0	75.32
9.0	75.32
10.0	75.32
11.0	75.32
12.0	75.32
13.0	75.32
14.0	75.32
15.0	75.32
16.0	75.32
17.0	75.32
18.0	75.32
19.0	75.32
20.0	75.32
21.0	60.25
22.0	45.19
23.0	30.13
24.0	15.06
25.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	542.00
15.1	9.6	15.1	2.72	542.74
45.2	43.9	54.8	5.47	543.25
75.3	102.4	119.2	8.40	543.67
105.4	183.7	207.8	12.05	544.06
135.6	288.2	319.3	15.54	544.45
150.6	400.1	438.9	19.39	544.84
150.6	505.2	550.7	22.77	545.19
150.6	604.4	655.8	25.74	545.51
150.6	700.2	755.0	27.39	545.79
150.6	793.1	850.9	28.91	546.06
150.6	883.4	943.7	30.16	546.31
150.6	971.3	1034.0	31.35	546.55
150.6	1057.1	1122.0	32.42	546.78
150.6	1140.8	1207.8	33.47	546.99
150.6	1222.7	1291.5	34.39	547.19
150.6	1302.7	1373.3	35.29	547.39
150.6	1381.2	1453.4	36.10	547.58
150.6	1458.2	1531.8	36.81	547.75
150.6	1533.8	1608.8	37.51	547.93
150.6	1608.1	1684.4	38.17	548.09
135.6	1666.3	1743.7	38.67	548.22
105.4	1694.0	1771.8	38.91	548.28
75.3	1691.5	1769.3	38.89	548.27
45.2	1659.5	1736.7	38.61	548.20
15.1	1598.4	1674.5	38.08	548.07

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

Pond File: 8115 .PND
Inflow Hydrograph: 8115-25 .HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 542.00 ft

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

Peak Inflow	=	75.32 cfs
Peak Outflow	=	38.91 cfs
Peak Elevation	=	548.28 ft

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

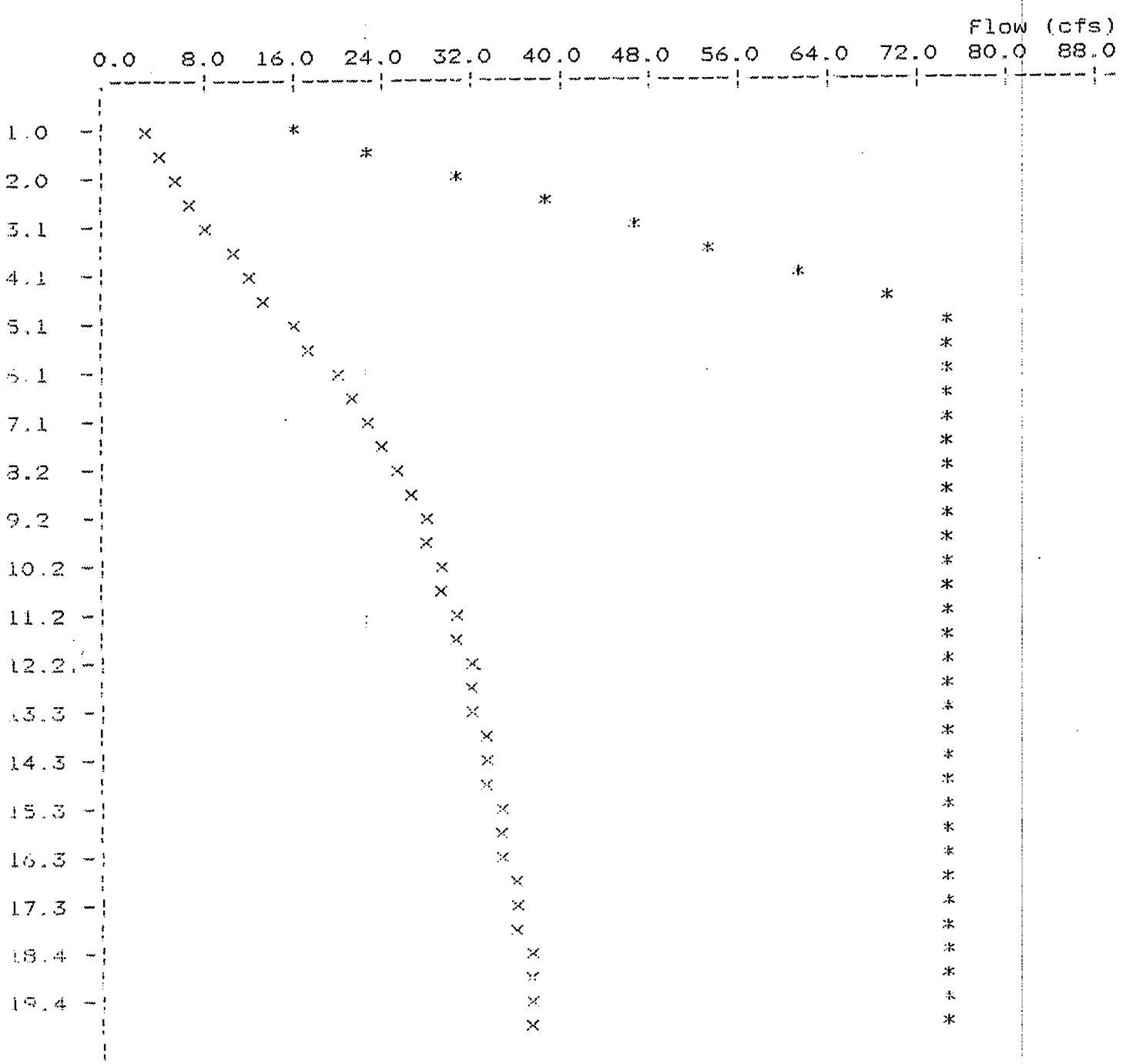
Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	1.19 ac-ft
Total Storage in Pond	=	1.19 ac-ft

POND-2 Version: 5.17 S/N:

Pond File: 8115 .PND
Inflow Hydrograph: 8115-25 .HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 10-24-1996
16:37:24

Peak Inflow = 75.32 cfs
Peak Outflow = 38.91 cfs
Peak Elevation = 548.28 ft



× File: 8115-25 .HYD Qmax = 38.9 cfs
* File: OUT .HYD Qmax = 75.3 cfs

****
*
* PINEHURST
* DETENTION ANALYSIS
* PREPARED BY: BAX ENGINEERING CO., INC.
* OCTOBER 24, 1996
*
****

Inflow Hydrograph: 8115-100.HYD
Rating Table file: 8115 .PND

----INITIAL CONDITIONS----
Elevation = 542.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
542.00	0.0	0.000
542.50	1.4	0.002
543.00	4.1	0.015
543.50	6.8	0.052
544.00	11.5	0.123
544.50	16.0	0.219
545.00	21.0	0.322
545.50	25.7	0.433
546.00	28.6	0.551
546.50	31.1	0.677
547.00	33.5	0.811
547.50	35.8	0.953
548.00	37.8	1.104
548.50	39.8	1.265
549.00	41.7	1.438
549.50	43.5	1.622
550.00	54.1	1.818
550.50	76.8	2.026

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
2.8	4.2
22.4	26.5
75.5	82.3
178.9	190.4
318.1	334.1
467.7	488.7
628.0	653.7
799.4	828.0
982.3	1013.4
1177.0	1210.5
1383.8	1419.6
1603.3	1641.1
1837.1	1876.9
2087.4	2129.1
2354.7	2398.2
2639.5	2693.6
2942.3	3019.1

Time increment (t) = 1.0 min.

POND-2 Version: 5.17 S/N:
EXECUTED: 10-24-1996 16:39:28

Pond File: 8115 .PND
Inflow Hydrograph: 8115-100.HYD
Outflow Hydrograph: OUT .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	542.00
1.0	19.30	19.3	12.8	19.3	3.23	542.84
2.0	38.59	57.9	58.2	70.7	6.24	543.40
3.0	57.89	96.5	134.8	154.7	9.95	543.84
4.0	77.18	135.1	241.9	269.9	13.99	544.28
5.0	96.48	173.7	378.3	415.6	18.64	544.76
6.0	96.48	193.0	524.6	571.3	23.35	545.25
7.0	96.48	193.0	664.0	717.5	26.76	545.68
8.0	96.48	193.0	799.0	857.0	28.99	546.08
9.0	96.48	193.0	930.3	991.9	30.81	546.44
10.0	96.48	193.0	1058.4	1123.3	32.44	546.78
11.0	96.48	193.0	1183.5	1251.4	33.95	547.10
12.0	96.48	193.0	1305.8	1376.4	35.32	547.40
13.0	96.48	193.0	1425.7	1498.7	36.51	547.68
14.0	96.48	193.0	1543.5	1618.7	37.60	547.95
15.0	96.48	193.0	1659.2	1736.4	38.61	548.20
16.0	96.48	193.0	1773.0	1852.2	39.59	548.45
17.0	96.48	193.0	1885.0	1965.9	40.47	548.68
18.0	96.48	193.0	1995.3	2078.0	41.31	548.90
19.0	96.48	193.0	2104.1	2188.3	42.10	549.11
20.0	96.48	193.0	2211.4	2297.1	42.82	549.31
21.0	77.18	173.7	2298.3	2385.1	43.41	549.48
22.0	57.89	135.1	2343.8	2433.3	44.76	549.56
23.0	38.59	96.5	2350.3	2440.3	45.01	549.57
24.0	19.30	57.9	2320.4	2408.1	43.86	549 52
25.0	0.00	19.3	2253.5	2339.7	43.11	549.39

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

Pond File: 8115 .PND
Inflow Hydrograph: 8115-100.HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 542.00 ft

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

Peak Inflow	=	96.48 cfs
Peak Outflow	=	45.01 cfs
Peak Elevation	=	549.57 ft

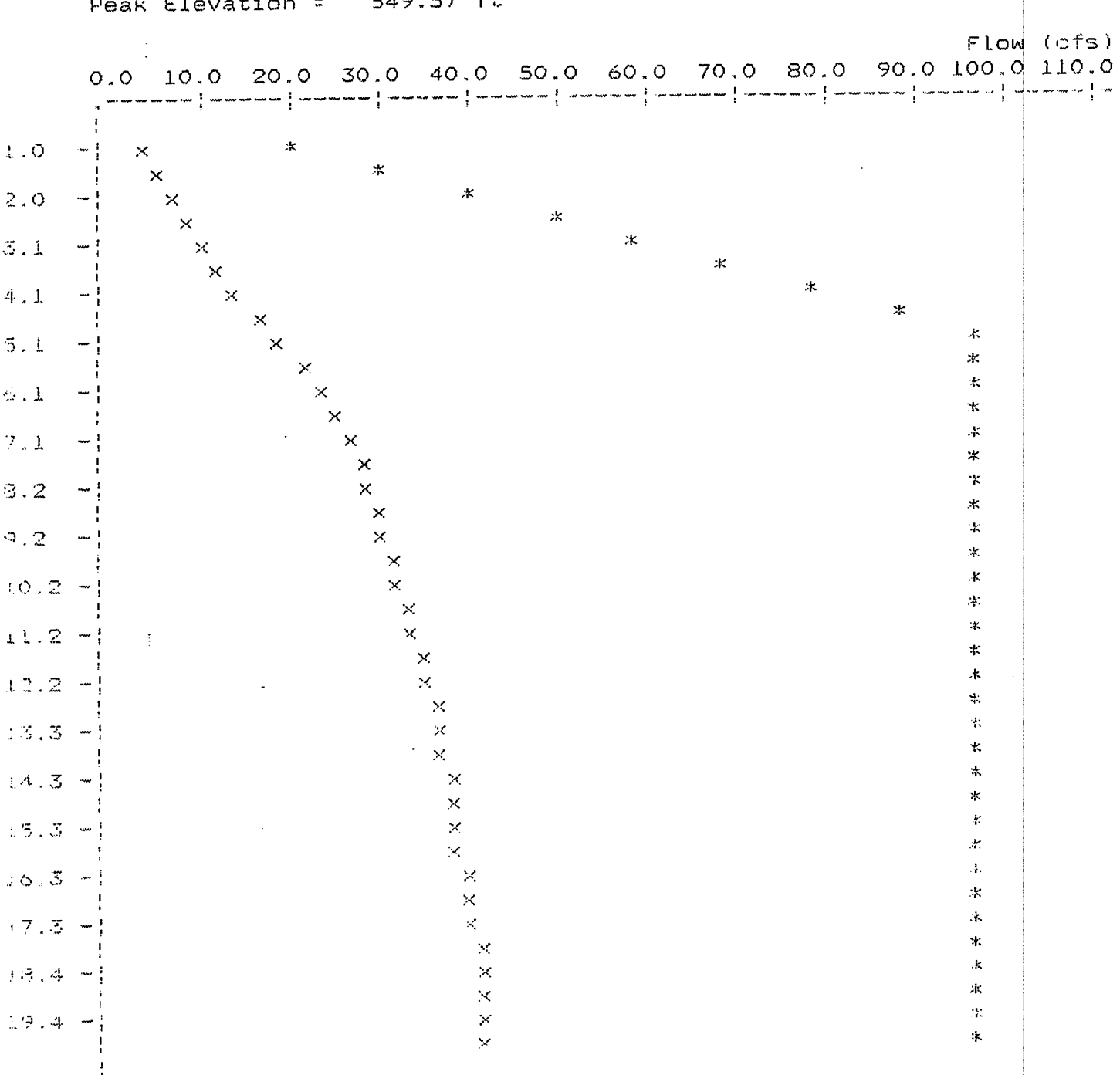
***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	1.65 ac-ft
Total Storage in Pond	=	1.65 ac-ft

Pond File: 8115 .PND
Inflow Hydrograph: 8115-100.HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 10-24-1996
16:39:28

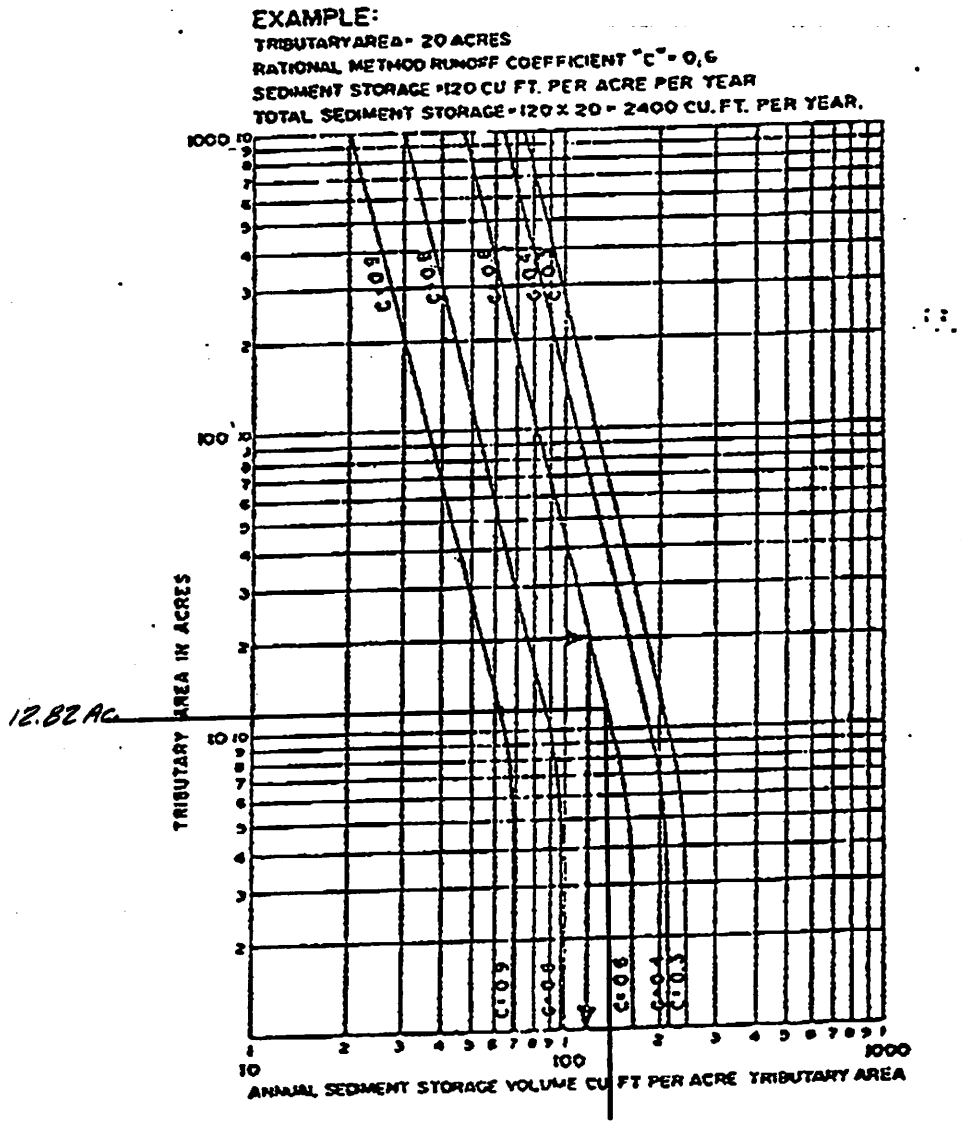
Peak Inflow = 96.48 cfs
Peak Outflow = 45.01 cfs
Peak Elevation = 549.57 ft



× File: 8115-100.HYD Qmax = 45.0 cfs
* File: OUT .HYD Qmax = 96.5 cfs

PINEHURST
96-B115
11-1-96
SHEET 1 OF 1

SEDIMENT ACCUMULATION CALCULATIONS



ANNUAL SEDIMENT STORAGE

FIG. 1

ONSITE AREA TO BASIN: (POST DEVELOPED)

TRIBUTARY AREA = 12.82 ACRES

COEFFICIENT = 0.60

SEDIMENT STORAGE = 135 CU. FT. PER ACRE PER YEAR

TOTAL SEDIMENT STORAGE = 135 X 12.82 = 1,731 CU. FT X 5 YEARS = 8,654 CU. FT.
VOLUME AREA NEEDED