

**HYDRAULIC CALCULATIONS
STORMWATER MANAGEMENT REPORT
O'FALLON CENTER**

**City of O'Fallon
St. Charles County, Missouri**

O'Fallon Center

ST. CHARLES ENGINEERING & SURVEYING
801 S. Fifth Street - Suite 202
St. Charles, Missouri 63301
(314) 947-0607

~~Rev 12/5/97 MJS~~

File

HYDRAULIC CALCULATIONS
STORMWATER MANAGEMENT REPORT
OFFICE ON CENTER

City of O'Fallon
Department of Public Works

O'Fallon Center

ST. CHARLES ENGINEERING & SURVEYING
111 S. Fifth Street - Suite 200
St. Charles, Missouri 63301
(314) 917-1000

Prepared by

STC



CONSULTING ENGINEERS AND LAND SURVEYORS

(314) 947-0607
 FAX 947-2448

801 SOUTH FIFTH ST.
 SUITE 202
 ST. CHARLES, MO 63301

Detention Pond

Required Volume:

$$V_R = Q_{D15} \times 1800$$

$$Q_{D15} = A (PI_D - PI_U)$$

$$Q_{D15} = 2.99 (3.85 - 1.87)$$

$$Q_D = \underline{5.92 \text{ cfs (15 yr)}}$$

$$V_R = (5.92) (1800)$$

$$V_R = \underline{10,656 \text{ cu ft}}$$

$$Q_{D100} = 2.99 (6.08 - 2.95)$$

$$Q_{D100} = \underline{9.36 \text{ cfs}}$$

Q to Basin

	<u>15 yr</u>	
Storm Drain:	4.08 cfs	
Sheet to Basin:	4.08 cfs	
	<u>8.16 cfs</u>	

	<u>100 yr</u>
6.44	
<u>6.44</u>	
<u>12.88</u>	

Min. Release Rate:

$$8.16 \text{ cfs} - 5.92 \text{ cfs} = \underline{2.24 \text{ cfs (15 yr)}}$$

$$12.88 - 9.36 = \underline{3.52 \text{ cfs (100 yr)}}$$

Soil Storage: $2.12 \text{ ft} \times 175 = \underline{371 \text{ cu ft}}$

$1.10' \times 10654 = \underline{1065 \text{ cu ft}}$

∴ Adequate Soil Storage Planes



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Detention Routing for Pond

$T_c = 5 \text{ min (min)}$

$Q_{15} = 9.16 \text{ cfs}$

$Q_{100} = 12.00 \text{ cfs}$

Release Rates:

$15 \text{ yr} = 2.24$

$100 \text{ yr} = 3.52 \text{ cfs}$

1.0' F.B., w/100' flow blocked @ 100' yr event

Pond Volume

<u>ELEV</u>	<u>AREA</u>	<u>Vol</u>
539.5	0	
540	212	
542	7736	
544	10654	



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ST. CHARLES, MO 63301

PROJECT NAME O'FALLOON CENTER
PROJECT #/JOB ORDER # 96-0977-07
DATE 12-5-97
DESIGNER M. Jones
PAGE _____

Additional Calculations - 2 yr & 25 yr Events.

$A = 1.06 \text{ Ac}$

$PI_2 = 2.63$

$PI_{25} = 4.75$

$Q_D(2yr) = 2.99 (2.63 - 1.26)$

$Q_D(2yr) = \underline{4.10 \text{ cfs}}$

$Q_D(25yr) = 2.99 (4.75 - 2.31)$

$Q_D(25yr) = \underline{7.30 \text{ cfs}}$

<u>Q TO BASIN</u>	<u>Area</u>	<u>2yr</u>	<u>25yr</u>
Storm Drain	1.06	2.79	5.04
Sheet Flow	1.06	2.79	5.04
		<u>5.58</u>	<u>10.08</u>

Max Release Rates:

2yr:

$5.60 \text{ cfs} - 4.10 = \underline{1.50 \text{ cfs}}$

25yr:

$10.10 \text{ cfs} - 7.30 = \underline{2.80 \text{ cfs}}$

O'FALLON CENTER
SITE DETENTION POND

CALCULATED 08-06-1997 11:08:55
DISK FILE: D:\PONDPACK\960185\DP1 .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
539.50	0.00	0	0	0	0
540.00	212.00	212	212	35	35
542.00	7,736.00	7,736	9,229	6,152	6,188
544.00	10,654.00	10,654	27,469	18,312	24,500

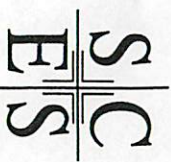
$$IA = (\text{sq.rt}(\text{Area1}) + ((E_i - E_1) / (E_2 - E_1)) * (\text{sq.rt}(\text{Area2}) - \text{sq.rt}(\text{Area1})))^2$$

where: E1, E2 = Closest two elevations with planimeter data
 E_i = Elevation at which to interpolate area
 Area1, Area2 = Areas computed for E1, E2, respectively
 IA = Interpolated area for E_i

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

$$\text{Volume} = (1/3) * (EL2 - EL1) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1} * \text{Area2}))$$

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



PROJECT NAME

O'Fallon Center

PROJECT #/JOB ORDER #

96-0927-02

DATE

8-6-97

DESIGNER

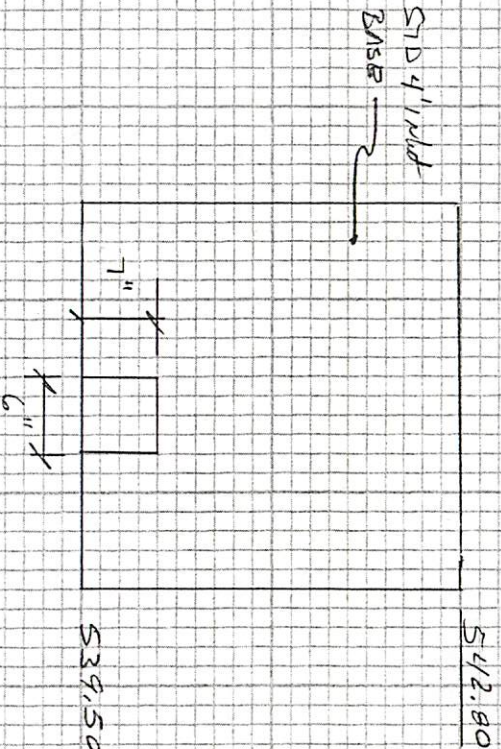
Mr. Towns

PAGE

DETENTION POND

OUTLET STANDARDS

700 gpm: 54/1.20



100 gpm flow = 54/3.10

(Clear flow threshold)

∴ 54/4.2 = 54/3.1 = 1.1 FT Free Board

O'FALLON CENTER
DETENTION POND

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

Elevation (ft)	Q (cfs)	Contributing Structures
539.50	0.0	1
539.70	0.1	1
539.90	0.4	1
540.10	0.8	2
540.30	1.0	2
540.50	1.2	2
540.70	1.4	2
540.90	1.5	2
541.10	1.6	2
541.30	1.8	2
541.50	1.9	2
541.70	2.0	2
541.90	2.1	2
542.10	2.2	2
542.30	2.3	2
542.50	2.4	2
542.70	2.5	2
542.90	3.7	2 +3
543.10	8.6	2 +3
543.30	15.5	2 +3
543.50	24.0	2 +3
543.70	33.7	2 +3
543.90	44.7	2 +3
544.00	50.5	2 +3

Outlet Structure File: 100YR .STR

POND-2 Version: 5.20

S/N:

Date Executed:

Time Executed:

O'FALLON CENTER
DETENTION POND

Outlet Structure File: D:\PONDPACK\960185\100YR .STR
Planimeter Input File: D:\PONDPACK\960185\DP1 .VOL
Rating Table Output File: D:\PONDPACK\960185\100YR .PND

Min. Elev.(ft) = 539.5 Max. Elev.(ft) = 544 Incr.(ft) = .2

Additional elevations (ft) to be included in table:

* * * * *

SYSTEM CONNECTIVITY

Structure	No.	Q Table	Q Table
-----	---	-----	-----
WEIR-VR	1	->	1
ORIFICE	2	->	2
WEIR-VR	3	->	3

Outflow rating table summary was stored in file:
D:\PONDPACK\960185\100YR .PND

Outlet Structure File: 100YR .STR

POND-2 Version: 5.20
Date Executed:

S/N:
Time Executed:

O'FALLON CENTER
DETENTION POND

>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	539.5
E2 elev.(ft)?	540.09
Weir coefficient?	3
Weir elev.(ft)?	539.5
Length (ft)?	.50
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 100YR .STR

POND-2 Version: 5.20

S/N:

Date Executed:

Time Executed:

O'FALLON CENTER
DETENTION POND

>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE

Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	540.10
E2 elev.(ft)?	544.1
Orifice coeff.?	.6
Invert elev.(ft)?	539.5
Datum elev.(ft) ?	539.80
Orifice area (sq ft)?	.300

Outlet Structure File: 100YR .STR

POND-2 Version: 5.20

S/N:

Date Executed:

Time Executed:

O'FALLON CENTER
DETENTION POND

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	542.80
E2 elev.(ft)?	544.1
Weir coefficient?	3.1
Weir elev.(ft)?	542.80
Length (ft)?	11.67
Contracted/Suppressed (C/S)?	S

 O'FALLON CENTER
 DETENTION POND

Outflow Rating Table for Structure #1
 WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
539.50	0.0	H =0.0
539.70	0.1	H =.2
539.90	0.4	H =.4
540.10	0.0	E = or > E2=540.09
540.30	0.0	E = or > E2=540.09
540.50	0.0	E = or > E2=540.09
540.70	0.0	E = or > E2=540.09
540.90	0.0	E = or > E2=540.09
541.10	0.0	E = or > E2=540.09
541.30	0.0	E = or > E2=540.09
541.50	0.0	E = or > E2=540.09
541.70	0.0	E = or > E2=540.09
541.90	0.0	E = or > E2=540.09
542.10	0.0	E = or > E2=540.09
542.30	0.0	E = or > E2=540.09
542.50	0.0	E = or > E2=540.09
542.70	0.0	E = or > E2=540.09
542.90	0.0	E = or > E2=540.09
543.10	0.0	E = or > E2=540.09
543.30	0.0	E = or > E2=540.09
543.50	0.0	E = or > E2=540.09
543.70	0.0	E = or > E2=540.09
543.90	0.0	E = or > E2=540.09
544.00	0.0	E = or > E2=540.09

C = 3 L (ft) = .5

H (ft) = Table elev. - Invert elev. (539.5 ft)

Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

 O'FALLON CENTER
 DETENTION POND

Outflow Rating Table for Structure #2
 ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
539.50	0.0	E < E1=540.10
539.70	0.0	E < E1=540.10
539.90	0.0	E < E1=540.10
540.10	0.8	H =.3
540.30	1.0	H =.5
540.50	1.2	H =.7
540.70	1.4	H =.9
540.90	1.5	H =1.1
541.10	1.6	H =1.3
541.30	1.8	H =1.5
541.50	1.9	H =1.7
541.70	2.0	H =1.9
541.90	2.1	H =2.1
542.10	2.2	H =2.3
542.30	2.3	H =2.5
542.50	2.4	H =2.7
542.70	2.5	H =2.9
542.90	2.5	H =3.1
543.10	2.6	H =3.3
543.30	2.7	H =3.5
543.50	2.8	H =3.7
543.70	2.9	H =3.9
543.90	2.9	H =4.1
544.00	3.0	H =4.2

C = .6 A = .3 sq.ft.

H (ft) = Table elev. - Datum elev. (539.8 ft)

Q (cfs) = C * A * sqr(2g * H)

 O'FALLON CENTER
 DETENTION POND

Outflow Rating Table for Structure #3
 WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
539.50	0.0	E < Inv.El. = 542.8
539.70	0.0	E < Inv.El. = 542.8
539.90	0.0	E < Inv.El. = 542.8
540.10	0.0	E < Inv.El. = 542.8
540.30	0.0	E < Inv.El. = 542.8
540.50	0.0	E < Inv.El. = 542.8
540.70	0.0	E < Inv.El. = 542.8
540.90	0.0	E < Inv.El. = 542.8
541.10	0.0	E < Inv.El. = 542.8
541.30	0.0	E < Inv.El. = 542.8
541.50	0.0	E < Inv.El. = 542.8
541.70	0.0	E < Inv.El. = 542.8
541.90	0.0	E < Inv.El. = 542.8
542.10	0.0	E < Inv.El. = 542.8
542.30	0.0	E < Inv.El. = 542.8
542.50	0.0	E < Inv.El. = 542.8
542.70	0.0	E < Inv.El. = 542.8
542.90	1.1	H = .1
543.10	5.9	H = .3
543.30	12.8	H = .5
543.50	21.2	H = .7
543.70	30.9	H = .9
543.90	41.7	H = 1.1
544.00	47.6	H = 1.2

$C = 3.1$ $L \text{ (ft)} = 11.67$

$H \text{ (ft)} = \text{Table elev.} - \text{Invert elev. (542.8 ft)}$

$Q \text{ (cfs)} = C * L * (H^{*1.5})$ -- Suppressed Weir

 *
 * O'FALLON CENTER *
 * DETENTION POND *
 * 2 YEAR EVENT *
 * REVISED DECEMBER 5, 1997 *
 *

Inflow Hydrograph: C:\PONDPACK\960185\2YR .HYD
 Rating Table file: C:\PONDPACK\960185\100YR .PND

----INITIAL CONDITIONS----
 Elevation = 539.50 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 + 0 (cfs)
539.50	0.0	0	0.0	0.0
539.70	0.1	2	0.1	0.2
539.90	0.4	18	0.6	1.0
540.10	0.8	62	2.1	2.9
540.30	1.0	159	5.3	6.3
540.50	1.2	331	11.0	12.2
540.70	1.4	599	20.0	21.4
540.90	1.5	986	32.9	34.4
541.10	1.6	1,512	50.4	52.0
541.30	1.8	2,200	73.3	75.1
541.50	1.9	3,071	102.3	104.2
541.70	2.0	4,146	138.2	140.2
541.90	2.1	5,446	181.5	183.6
542.10	2.2	6,968	232.2	234.4
542.30	2.3	8,570	285.6	287.9
542.50	2.4	10,226	340.8	343.2
542.70	2.5	11,938	397.9	400.4
542.90	3.7	13,708	456.9	460.6
543.10	8.6	15,535	517.7	526.3
543.30	15.5	17,421	580.6	596.1
543.50	24.0	19,368	645.5	669.5
543.70	33.7	21,374	712.3	746.0
543.90	44.7	23,443	781.3	826.0
544.00	50.5	24,500	816.5	867.0

Time increment (t) = 1.0 min.

Pond File: C:\PONDPACK\960185\100YR .PND
 Inflow Hydrograph: C:\PONDPACK\960185\2YR .HYD
 Outflow Hydrograph: C:\PONDPACK\960185\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - 0 (cfs)	2S/t + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	539.50
1.0	1.10	1.1	0.3	1.1	0.42	539.91
2.0	2.20	3.3	1.9	3.6	0.84	540.14
3.0	3.40	5.6	5.4	7.5	1.04	540.34
4.0	4.50	7.9	10.9	13.3	1.22	540.52
5.0	5.60	10.1	18.2	21.0	1.39	540.69
6.0	5.60	11.2	26.5	29.4	1.46	540.82
7.0	5.60	11.2	34.6	37.7	1.52	540.94
8.0	5.60	11.2	42.7	45.8	1.56	541.03
9.0	5.60	11.2	50.7	53.9	1.62	541.12
10.0	5.60	11.2	58.5	61.9	1.69	541.19
11.0	5.60	11.2	66.2	69.7	1.75	541.25
12.0	5.60	11.2	73.8	77.4	1.81	541.32
13.0	5.60	11.2	81.3	85.0	1.83	541.37
14.0	5.60	11.2	88.8	92.5	1.86	541.42
15.0	5.60	11.2	96.2	100.0	1.89	541.47
16.0	5.60	11.2	103.6	107.4	1.91	541.52
17.0	5.60	11.2	110.9	114.8	1.93	541.56
18.0	5.60	11.2	118.2	122.1	1.95	541.60
19.0	5.60	11.2	125.5	129.4	1.97	541.64
20.0	5.60	11.2	132.7	136.7	1.99	541.68
21.0	5.00	10.6	139.3	143.3	2.01	541.71
22.0	4.50	9.5	144.8	148.8	2.02	541.74
23.0	3.90	8.4	149.1	153.2	2.03	541.76
24.0	3.40	7.3	152.3	156.4	2.04	541.77
25.0	2.80	6.2	154.4	158.5	2.04	541.78
26.0	2.20	5.0	155.3	159.4	2.04	541.79
27.0	1.70	3.9	155.2	159.2	2.04	541.79
28.0	1.10	2.8	153.9	158.0	2.04	541.78
29.0	0.60	1.7	151.5	155.6	2.04	541.77
30.0	0.00	0.6	148.0	152.1	2.03	541.75

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

Pond File: C:\PONDPACK\960185\100YR .PND
Inflow Hydrograph: C:\PONDPACK\960185\2YR .HYD
Outflow Hydrograph: C:\PONDPACK\960185\OUT .HYD

Starting Pond W.S. Elevation = 539.50 ft

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

Peak Inflow = 5.60 cfs
Peak Outflow = 2.04 cfs
Peak Elevation = 541.79 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 4,722 cu-ft

Total Storage in Pond = 4,722 cu-ft

 *
 * O'FALLON CENTER *
 * DETENTION POND *
 * 15 YEAR EVENT *
 * REVISED AUG 6, 1997 *
 *

Inflow Hydrograph: D:\PONDPACK\960185\15YR .HYD
 Rating Table file: D:\PONDPACK\960185\100YR .PND

----INITIAL CONDITIONS----
 Elevation = 539.50 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 + 0 (cfs)
539.50	0.0	0	0.0	0.0
539.70	0.1	2	0.1	0.2
539.90	0.4	18	0.6	1.0
540.10	0.8	62	2.1	2.9
540.30	1.0	159	5.3	6.3
540.50	1.2	331	11.0	12.2
540.70	1.4	599	20.0	21.4
540.90	1.5	986	32.9	34.4
541.10	1.6	1,512	50.4	52.0
541.30	1.8	2,200	73.3	75.1
541.50	1.9	3,071	102.3	104.2
541.70	2.0	4,146	138.2	140.2
541.90	2.1	5,446	181.5	183.6
542.10	2.2	6,968	232.2	234.4
542.30	2.3	8,570	285.6	287.9
542.50	2.4	10,226	340.8	343.2
542.70	2.5	11,938	397.9	400.4
542.90	3.7	13,708	456.9	460.6
543.10	8.6	15,535	517.7	526.3
543.30	15.5	17,421	580.6	596.1
543.50	24.0	19,368	645.5	669.5
543.70	33.7	21,374	712.3	746.0
543.90	44.7	23,443	781.3	826.0
544.00	50.5	24,500	816.5	867.0

Time increment (t) = 1.0 min.

Pond File: D:\PONDPACK\960185\100YR .PND
 Inflow Hydrograph: D:\PONDPACK\960185\15YR .HYD
 Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - 0 (cfs)	2S/t + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	---	0.0	0.0	0.00	539.50
1.0	1.60	1.6	0.5	1.6	0.53	539.96
2.0	3.30	4.9	3.5	5.4	0.95	540.25
3.0	4.90	8.2	9.4	11.7	1.18	540.48
4.0	6.50	11.4	18.0	20.8	1.39	540.69
5.0	8.20	14.7	29.7	32.7	1.49	540.87
6.0	8.20	16.4	43.0	46.1	1.57	541.03
7.0	8.20	16.4	56.1	59.4	1.66	541.16
8.0	8.20	16.4	68.9	72.5	1.78	541.28
9.0	8.20	16.4	81.6	85.3	1.84	541.37
10.0	8.20	16.4	94.3	98.0	1.88	541.46
11.0	8.20	16.4	106.9	110.7	1.92	541.54
12.0	8.20	16.4	119.3	123.3	1.95	541.61
13.0	8.20	16.4	131.8	135.7	1.99	541.68
14.0	8.20	16.4	144.1	148.2	2.02	541.74
15.0	8.20	16.4	156.4	160.5	2.05	541.79
16.0	8.20	16.4	168.7	172.8	2.08	541.85
17.0	8.20	16.4	180.9	185.1	2.10	541.91
18.0	8.20	16.4	193.0	197.3	2.13	541.95
19.0	8.20	16.4	205.1	209.4	2.15	542.00
20.0	8.20	16.4	217.2	221.5	2.17	542.05
21.0	7.30	15.5	228.3	232.7	2.20	542.09
22.0	6.50	13.8	237.7	242.1	2.21	542.13
23.0	5.70	12.2	245.4	249.9	2.23	542.16
24.0	4.90	10.6	251.5	256.0	2.24	542.18
25.0	4.10	9.0	256.0	260.5	2.25	542.20
26.0	3.30	7.4	258.9	263.4	2.25	542.21
27.0	2.40	5.7	260.1	264.6	2.26	542.21
28.0	1.60	4.0	259.6	264.1	2.26	542.21
29.0	0.80	2.4	257.5	262.0	2.25	542.20
30.0	0.00	0.8	253.8	258.3	2.24	542.19



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

Pond File: D:\PONDPACK\960185\100YR .PND
Inflow Hydrograph: D:\PONDPACK\960185\15YR .HYD
Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

Starting Pond W.S. Elevation = 539.50 ft

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

Peak Inflow = 8.20 cfs
Peak Outflow = 2.26 cfs
Peak Elevation = 542.21 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 7,872 cu-ft

Total Storage in Pond = 7,872 cu-ft

 *
 * O'FALLON CENTER *
 * DETENTION POND *
 * 25 YEAR EVENT *
 * REVISED DECEMBER 5, 1997 *

Inflow Hydrograph: C:\PONDPACK\960185\25YR .HYD
 Rating Table file: C:\PONDPACK\960185\100YR .PND

----INITIAL CONDITIONS----
 Elevation = 539.50 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 + 0 (cfs)
539.50	0.0	0	0.0	0.0
539.70	0.1	2	0.1	0.2
539.90	0.4	18	0.6	1.0
540.10	0.8	62	2.1	2.9
540.30	1.0	159	5.3	6.3
540.50	1.2	331	11.0	12.2
540.70	1.4	599	20.0	21.4
540.90	1.5	986	32.9	34.4
541.10	1.6	1,512	50.4	52.0
541.30	1.8	2,200	73.3	75.1
541.50	1.9	3,071	102.3	104.2
541.70	2.0	4,146	138.2	140.2
541.90	2.1	5,446	181.5	183.6
542.10	2.2	6,968	232.2	234.4
542.30	2.3	8,570	285.6	287.9
542.50	2.4	10,226	340.8	343.2
542.70	2.5	11,938	397.9	400.4
542.90	3.7	13,708	456.9	460.6
543.10	8.6	15,535	517.7	526.3
543.30	15.5	17,421	580.6	596.1
543.50	24.0	19,368	645.5	669.5
543.70	33.7	21,374	712.3	746.0
543.90	44.7	23,443	781.3	826.0
544.00	50.5	24,500	816.5	867.0

Time increment (t) = 1.0 min.

Pond File: C:\PONDPACK\960185\100YR .PND
 Inflow Hydrograph: C:\PONDPACK\960185\25YR .HYD
 Outflow Hydrograph: C:\PONDPACK\960185\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	539.50
1.0	2.00	2.0	0.8	2.0	0.61	540.01
2.0	4.00	6.0	4.7	6.8	1.02	540.32
3.0	6.10	10.1	12.3	14.8	1.26	540.56
4.0	8.10	14.2	23.6	26.5	1.44	540.78
5.0	10.10	18.2	38.8	41.8	1.54	540.98
6.0	10.10	20.2	55.6	59.0	1.66	541.16
7.0	10.10	20.2	72.2	75.8	1.80	541.30
8.0	10.10	20.2	88.7	92.4	1.86	541.42
9.0	10.10	20.2	105.1	108.9	1.91	541.53
10.0	10.10	20.2	121.4	125.3	1.96	541.62
11.0	10.10	20.2	137.6	141.6	2.00	541.71
12.0	10.10	20.2	153.7	157.8	2.04	541.78
13.0	10.10	20.2	169.7	173.9	2.08	541.86
14.0	10.10	20.2	185.7	189.9	2.11	541.92
15.0	10.10	20.2	201.6	205.9	2.14	541.99
16.0	10.10	20.2	217.5	221.8	2.18	542.05
17.0	10.10	20.2	233.3	237.7	2.21	542.11
18.0	10.10	20.2	249.0	253.5	2.24	542.17
19.0	10.10	20.2	264.7	269.2	2.27	542.23
20.0	10.10	20.2	280.3	284.9	2.29	542.29
21.0	9.10	19.2	294.8	299.5	2.32	542.34
22.0	8.10	17.2	307.3	312.0	2.34	542.39
23.0	7.10	15.2	317.8	322.5	2.36	542.43
24.0	6.10	13.2	326.3	331.0	2.38	542.46
25.0	5.00	11.1	332.6	337.4	2.39	542.48
26.0	4.00	9.0	336.8	341.6	2.40	542.49
27.0	3.00	7.0	339.0	343.8	2.40	542.50
28.0	2.00	5.0	339.2	344.0	2.40	542.50
29.0	1.00	3.0	337.4	342.2	2.40	542.50
30.0	0.00	1.0	333.6	338.4	2.39	542.48

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

Pond File: C:\PONDPACK\960185\100YR .PND
Inflow Hydrograph: C:\PONDPACK\960185\25YR .HYD
Outflow Hydrograph: C:\PONDPACK\960185\OUT .HYD

Starting Pond W.S. Elevation = 539.50 ft

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

Peak Inflow = 10.10 cfs
Peak Outflow = 2.40 cfs
Peak Elevation = 542.50 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 10,250 cu-ft

Total Storage in Pond = 10,250 cu-ft

 *
 * O'FALLON CENTER *
 * DETENTION POND *
 * 100 YEAR EVENT *
 * REVISED AUG 6, 1997 *
 *

Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
 Rating Table file: D:\PONDPACK\960185\100YR .PND

----INITIAL CONDITIONS----
 Elevation = 539.50 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 + 0 (cfs)
539.50	0.0	0	0.0	0.0
539.70	0.1	2	0.1	0.2
539.90	0.4	18	0.6	1.0
540.10	0.8	62	2.1	2.9
540.30	1.0	159	5.3	6.3
540.50	1.2	331	11.0	12.2
540.70	1.4	599	20.0	21.4
540.90	1.5	986	32.9	34.4
541.10	1.6	1,512	50.4	52.0
541.30	1.8	2,200	73.3	75.1
541.50	1.9	3,071	102.3	104.2
541.70	2.0	4,146	138.2	140.2
541.90	2.1	5,446	181.5	183.6
542.10	2.2	6,968	232.2	234.4
542.30	2.3	8,570	285.6	287.9
542.50	2.4	10,226	340.8	343.2
542.70	2.5	11,938	397.9	400.4
542.90	3.7	13,708	456.9	460.6
543.10	8.6	15,535	517.7	526.3
543.30	15.5	17,421	580.6	596.1
543.50	24.0	19,368	645.5	669.5
543.70	33.7	21,374	712.3	746.0
543.90	44.7	23,443	781.3	826.0
544.00	50.5	24,500	816.5	867.0

Time increment (t) = 1.0 min.

Pond File: D:\PONDPACK\960185\100YR .PND
 Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
 Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - 0 (cfs)	2S/t + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	539.50
1.0	2.60	2.6	1.1	2.6	0.74	540.07
2.0	5.20	7.8	6.7	8.9	1.09	540.39
3.0	7.70	12.9	16.9	19.6	1.36	540.66
4.0	10.30	18.0	31.9	34.9	1.50	540.91
5.0	12.90	23.2	51.9	55.1	1.63	541.13
6.0	12.90	25.8	74.0	77.7	1.81	541.32
7.0	12.90	25.8	96.1	99.8	1.88	541.47
8.0	12.90	25.8	118.0	121.9	1.95	541.60
9.0	12.90	25.8	139.8	143.8	2.01	541.72
10.0	12.90	25.8	161.4	165.6	2.06	541.82
11.0	12.90	25.8	183.0	187.2	2.11	541.91
12.0	12.90	25.8	204.5	208.8	2.15	542.00
13.0	12.90	25.8	225.9	230.3	2.19	542.08
14.0	12.90	25.8	247.3	251.7	2.23	542.16
15.0	12.90	25.8	268.5	273.1	2.27	542.24
16.0	12.90	25.8	289.7	294.3	2.31	542.32
17.0	12.90	25.8	310.8	315.5	2.35	542.40
18.0	12.90	25.8	331.8	336.6	2.39	542.48
19.0	12.90	25.8	352.8	357.6	2.43	542.55
20.0	12.90	25.8	373.7	378.6	2.46	542.62
21.0	11.60	24.5	393.2	398.2	2.50	542.69
22.0	10.30	21.9	409.5	415.1	2.79	542.75
23.0	9.00	19.3	422.6	428.8	3.07	542.79
24.0	7.70	16.7	432.8	439.3	3.28	542.83
25.0	6.40	14.1	440.0	446.9	3.43	542.85
26.0	5.20	11.6	444.6	451.6	3.52	542.87
27.0	3.90	9.1	446.6	453.7	3.56	542.88
28.0	2.60	6.5	446.0	453.1	3.55	542.88
29.0	1.30	3.9	442.9	449.9	3.49	542.86
30.0	0.00	1.3	437.4	444.2	3.37	542.85

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

Pond File: D:\PONDPACK\960185\100YR .PND
Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

Starting Pond W.S. Elevation = 539.50 ft

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

Peak Inflow = 12.90 cfs
Peak Outflow = 3.56 cfs
Peak Elevation = 542.88 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 13,507 cu-ft

Total Storage in Pond = 13,507 cu-ft

 *
 * O'FALLON CENTER *
 * DETENTION POND *
 * 100 YEAR EVENT - LOW FLOW BLOCKED *
 * REVISED AUG 6, 1997 *
 *

Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
 Rating Table file: D:\PONDPACK\960185\100YR-B .PND

----INITIAL CONDITIONS----
 Elevation = 539.50 ft
 Outflow = 0.00 cfs
 Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
539.50	0.0	0
539.70	0.0	2
539.90	0.0	18
540.10	0.0	62
540.30	0.0	159
540.50	0.0	331
540.70	0.0	599
540.90	0.0	986
541.10	0.0	1,512
541.30	0.0	2,200
541.50	0.0	3,071
541.70	0.0	4,146
541.90	0.0	5,446
542.10	0.0	6,968
542.30	0.0	8,570
542.50	0.0	10,226
542.70	0.0	11,938
542.90	1.1	13,708
543.10	5.9	15,535
543.30	12.8	17,421
543.50	21.2	19,368
543.70	30.9	21,374
543.90	41.7	23,443
544.00	47.6	24,500

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.1	0.1
0.6	0.6
2.1	2.1
5.3	5.3
11.0	11.0
20.0	20.0
32.9	32.9
50.4	50.4
73.3	73.3
102.3	102.3
138.2	138.2
181.5	181.5
232.2	232.2
285.6	285.6
340.8	340.8
397.9	397.9
456.9	458.0
517.7	523.6
580.6	593.4
645.5	666.7
712.3	743.2
781.3	823.0
816.5	864.1

Time increment (t) = 1.0 min.

Pond File: D:\PONDPACK\960185\100YR-B .PND
 Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
 Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - 0 (cfs)	2S/t + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	539.50
1.0	2.60	2.6	2.6	2.6	0.00	540.13
2.0	5.20	7.8	10.4	10.4	0.00	540.48
3.0	7.70	12.9	23.3	23.3	0.00	540.75
4.0	10.30	18.0	41.3	41.3	0.00	541.00
5.0	12.90	23.2	64.5	64.5	0.00	541.22
6.0	12.90	25.8	90.3	90.3	0.00	541.42
7.0	12.90	25.8	116.1	116.1	0.00	541.58
8.0	12.90	25.8	141.9	141.9	0.00	541.72
9.0	12.90	25.8	167.7	167.7	0.00	541.84
10.0	12.90	25.8	193.5	193.5	0.00	541.95
11.0	12.90	25.8	219.3	219.3	0.00	542.05
12.0	12.90	25.8	245.1	245.1	0.00	542.15
13.0	12.90	25.8	270.9	270.9	0.00	542.24
14.0	12.90	25.8	296.7	296.7	0.00	542.34
15.0	12.90	25.8	322.5	322.5	0.00	542.43
16.0	12.90	25.8	348.3	348.3	0.00	542.53
17.0	12.90	25.8	374.1	374.1	0.00	542.62
18.0	12.90	25.8	399.8	399.9	0.04	542.71
19.0	12.90	25.8	424.6	425.6	0.51	542.79
20.0	12.90	25.8	448.5	450.4	0.96	542.87
21.0	11.60	24.5	468.6	473.0	2.20	542.95
22.0	10.30	21.9	483.5	490.5	3.48	543.00
23.0	9.00	19.3	494.1	502.8	4.38	543.04
24.0	7.70	16.7	500.9	510.8	4.96	543.06
25.0	6.40	14.1	504.4	515.0	5.27	543.07
26.0	5.20	11.6	505.3	516.0	5.34	543.08
27.0	3.90	9.1	504.0	514.4	5.23	543.07
28.0	2.60	6.5	500.6	510.5	4.94	543.06
29.0	1.30	3.9	495.5	504.5	4.50	543.04
30.0	0.00	1.3	488.9	496.8	3.94	543.02

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

Pond File: D:\PONDPACK\960185\100YR-B .PND
Inflow Hydrograph: D:\PONDPACK\960185\100YR .HYD
Outflow Hydrograph: D:\PONDPACK\960185\OUT .HYD

Starting Pond W.S. Elevation = 539.50 ft

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

Peak Inflow = 12.90 cfs
Peak Outflow = 5.34 cfs
Peak Elevation = 543.08 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 15,324 cu-ft

Total Storage in Pond = 15,324 cu-ft

