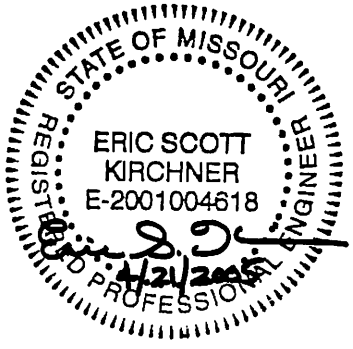
File
BU2005-194

DETENTION REPORT

FAMILY SERVICES
O'FALLON, MISSOURI

Prepared for:

Family Support Services
105 Crossings Industrial Court
O'Fallon, Missouri 63366



Prepared by:

Pickett, Ray and Silver, Inc.
333 Mid Rivers Mall Drive
St. Peters, MO 63376
636-397-1211

PICKETT RAY & SILVER

333 Mid Rivers Mall Dr
St. Peters, MO 63376

Civil Engineers
Planners
Land Surveyors

397-1211

PROJECT NAME FAN .Y SERVICES
PROJECT #/JOB ORDER # 01212.TRHU.01C
DATE 4/22/2005
DESIGNER ERIC KIRCHNER
PAGE 1

PREDEVELOPED

2YR - 20MIN
(5.57AC)(1.15) + (0.86AC)(2.39) = 8.46cfs
15YR - 20MIN
(5.57 c)(1.87) + (0.86AC)(3.85) = 13.73cfs
25YR - 20 MIN
(5.57AC)(2.31) + (0.86AC)(4.75) = 16.95cfs
100YR - 20 MIN
(5.57AC)(2.95) + (0.86AC)(6.08) = 21.66 cfs

POST DEVELOPED

* TO BASIN

2YR - 20 MIN
(5.57AC)(2.39) = 13.31 cfs
15YR - 20 MIN
(5.57AC)(3.85) = 21.44cfs
25YR - 20 MIN
(5.57AC)(4.75) = 26.46cfs
100YR - 20 MIN
(5.57AC)(6.08) = 33.87cfs

* BYPASS

2YR - 20 MIN
(0.86AC)(1.15) = 0.99 cfs
15YR - 20 MIN
(0.86)(1.87) = 1.61 cfs
25YR - 20 MIN
(0.86AC)(2.31) = 1.99cfs
100YR - 20 MIN
(0.86AC)(2.95) = 2.54 cfs

ALLOWABLE DISCHARGE

2YR - 20 MIN
8.46cfs - 0.99cfs = 7.47cfs
15YR - 20 MIN
13.73 cfs - 1.61 cfs = 12.12cfs
25YR - 20 MIN
16.95cfs - 1.99 cfs = 14.96cfs
100YR - 20 MIN
21.66 cfs - 2.54 cfs = 19.12cfs

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr
St. Peters, MO 63376

397-1211

PROJECT NAME FAW 4 SERVICES

PROJECT #/JOB ORDER # 01212.THRU.016

DATE 4/22/05

DESIGNER ERIC KIRCHNER

PAGE 2

TIME OF CONCENTRATION

* SHEET FLOW

$$T_t = \frac{(0.007)[(.011)(160)]^{.8}}{(3.85)^{.5}(0.024)^{.4}} = 0.025\ hr = 1.50\ min$$

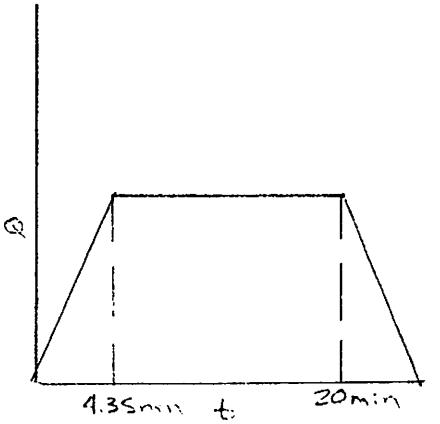
* CHANNEL FLOW

$$T_t = \frac{410}{3600(2.4)} = 0.04\ hr = 2.85\ min$$

$T_c = 4.35$ min

2YR Q_p = 13.31 cfs
15YR Q_p = 21.44 cfs
25YR Q_p = 26.46 cfs
100YR Q_p = 33.87 cfs

2YR θ = 71.9°
15YR θ = 78.5°
25YR θ = 80.7°
100YR θ = 82.7°



TIME	2YR-20min	15YR-20min	25YR-20min	100YR-20min
0	0	0	0	0
1	3.06	4.92	6.11	7.81
2	6.12	9.84	12.22	15.62
3	9.18	14.76	18.33	23.43
4	12.24	19.68	24.44	31.24
5	13.31	21.44	26.46	33.87
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20	13.31	21.44	26.46	33.87
21	12.24	19.68	24.44	31.24
22	9.16	14.76	18.33	23.43
23	6.12	9.84	12.22	15.62
24	3.06	4.92	6.11	7.81
25	0	0	0	0