

NEW STEEL INTERNATIONAL, INC.

6730 Roosevelt Avenue
Franklin, Ohio 45005

MMK HAVERHILL

HYDROLOGIC STUDY AND REPORT

November 2007

MCCARTY ASSOCIATES, LLC

ARCHITECTS—ENGINEERS—SURVEYORS

HILLSBORO — WASHINGTON C.H. — LOVELAND

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Jerrold B. Bradley, AIA — Dain S. Schwickart, AIA — Ryan C. Jeter, P.E.

E07-178

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MMK-Haverhill Hydrologic Study and Report

The proposed MMK development site has been divided into nine drainage basins for the current phase of development. A portion of the site will remain undeveloped and has not been included in this analysis. The area identified as wetland K is to remain undeveloped and the approximate hydrology of K is to be maintained. Other wetlands on site will be filled. A large section of the site is designated for use as slag and scrap metal storage. These areas will be equipped with an impervious liner system and perimeter embankment. The embankment will prevent surface storm water from running onto this portion of the site and will contain precipitous storm water within this area. Storm water collected in this area will be used in plant processes and not discharged to the storm sewer system.

Wetland K is to remain undisturbed through this development. Other wetlands on site will be filled. The tributary area to wetland K has been identified and hydrographs were developed for using the TR-55 method for this area. These hydrographs are attached as Figures 1 through 5. Through minor diversion of tributary area, the hydrograph volume was reduced by approximately 4% in the post developed model. TR-55 calculation data and output are attached in appendix 1a and 1b.

Drainage areas affected by developments planned at this time are outlined in figure 6. There are no storm water regulations in place for this jurisdiction. Detention volumes in most basins were estimated using a modified rational method wherein detention volume was determined using a predeveloped C factor of 0.40 and post developed C factors as shown in the following table. Basins 1 and 7 were constrained by a maximum allowable discharge rate lower than calculated using a C of 0.40 due to existing or maximum downstream pipe sizes. The detention volume provided for these basins exceeds that required to match predeveloped runoff rates.

Table 1: Drainage Basin Summary

Basin	Watershed Area (Ac.)	Cav (post Dev.)	Detention Volume (ac-ft)	WQ Basin Volume (ac-ft)	Sediment Basin (ac-ft)
1	191.9	0.83	39.7	10.8	8.0
2	8.8	0.51	0.4	0.5	0.4
3	23.6	0.65	1.8	1.3	0.9
4	23.2	0.61	2.0	1.3	1.0
5	8.0	0.62	0.7	0.5	0.3
6	13.4	0.88	2.0	0.8	0.6
7	42.8	0.75	7.2	2.4	1.8
8	19.5	0.68	1.9	1.1	0.8
9	14.3	0.66	1.3	0.8	0.6

- (1) WQ volume calculated based on NPDES requirements and provide in addition to detention volume.
- (2) Construction phase sediment basin sized at 67 cubic yards per disturbed acre.

Computer output for detention volume determination is provided in appendices 2 through 10.



U.S. ROUTE 52

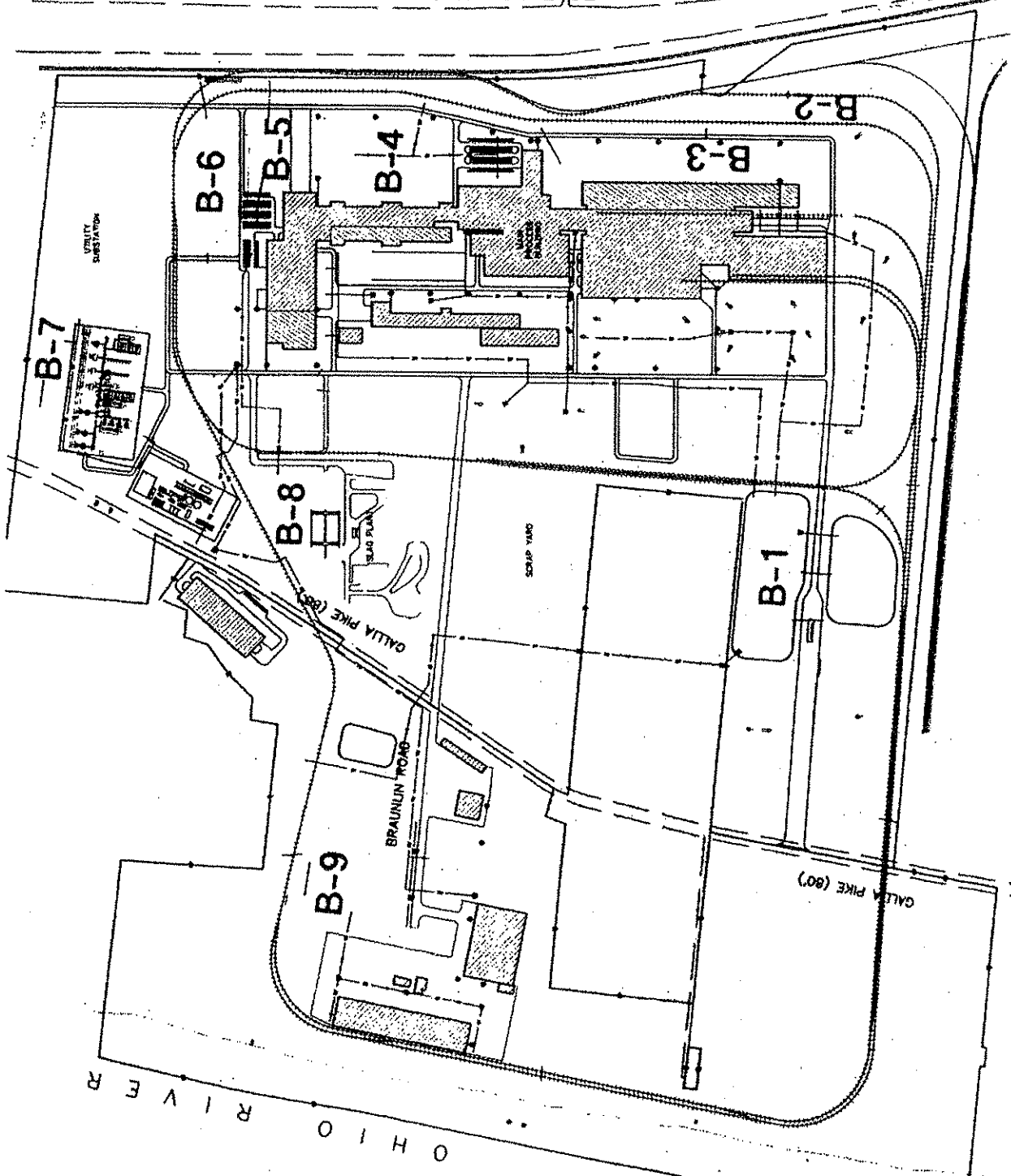
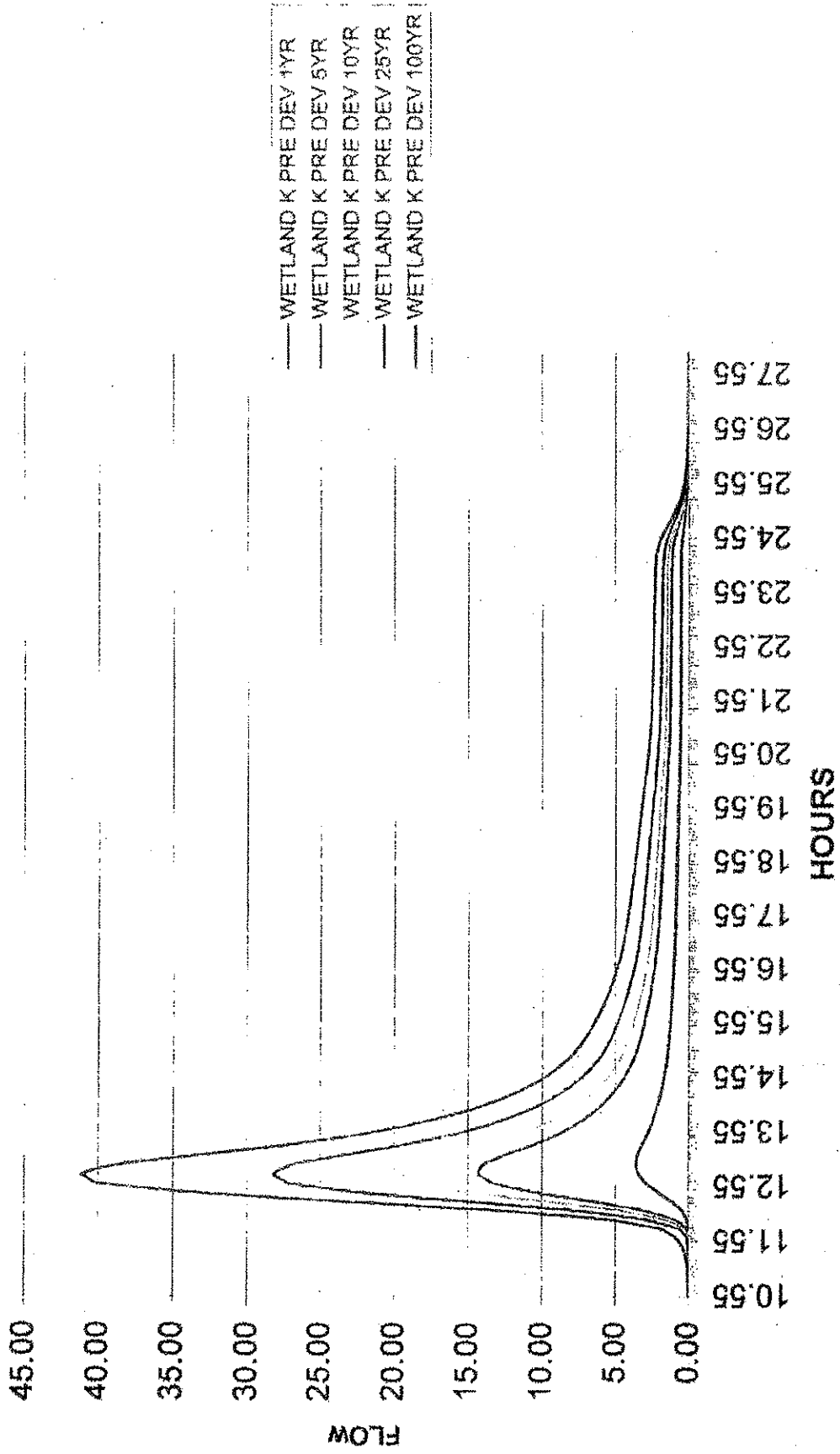
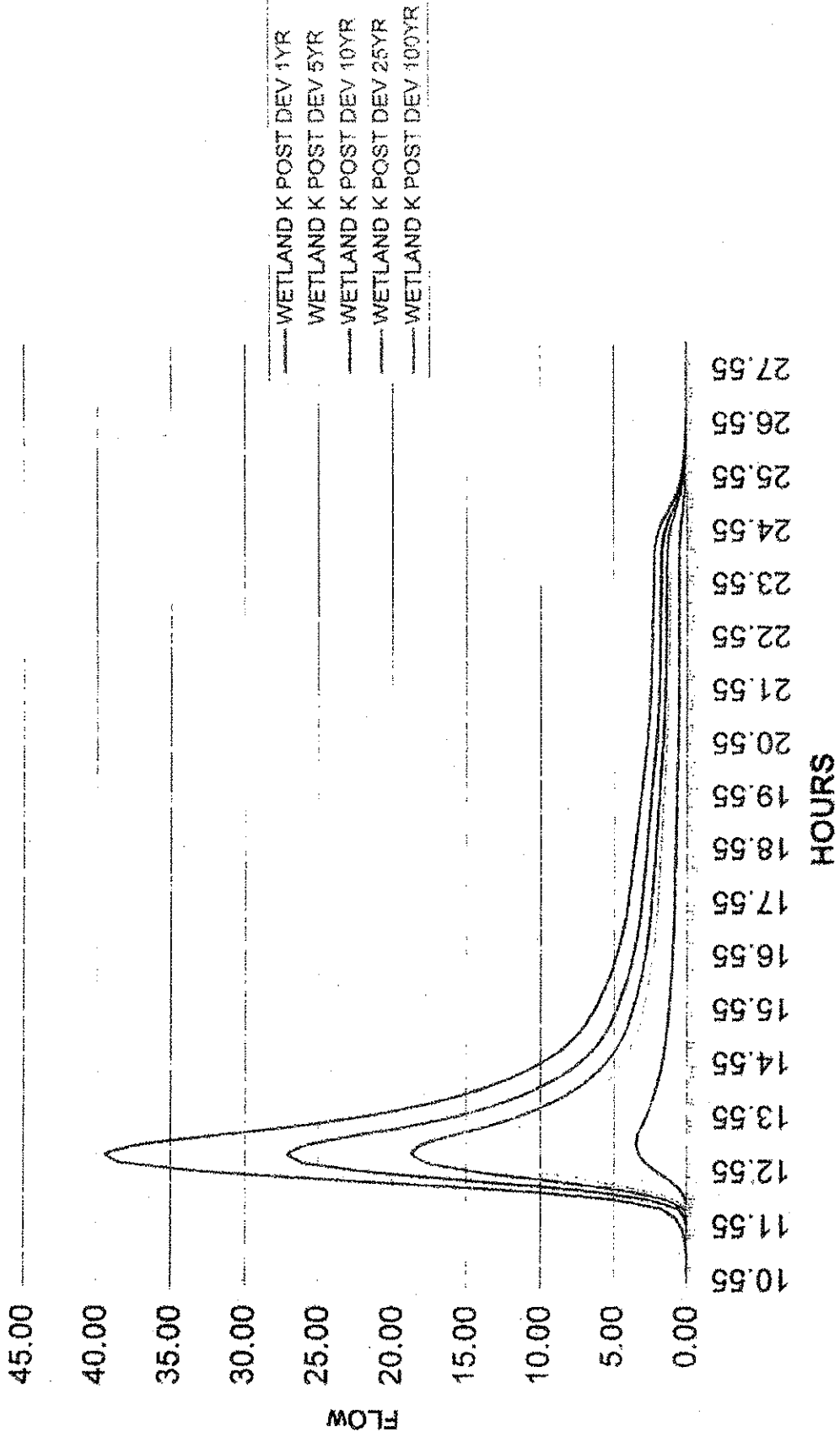


FIG 1

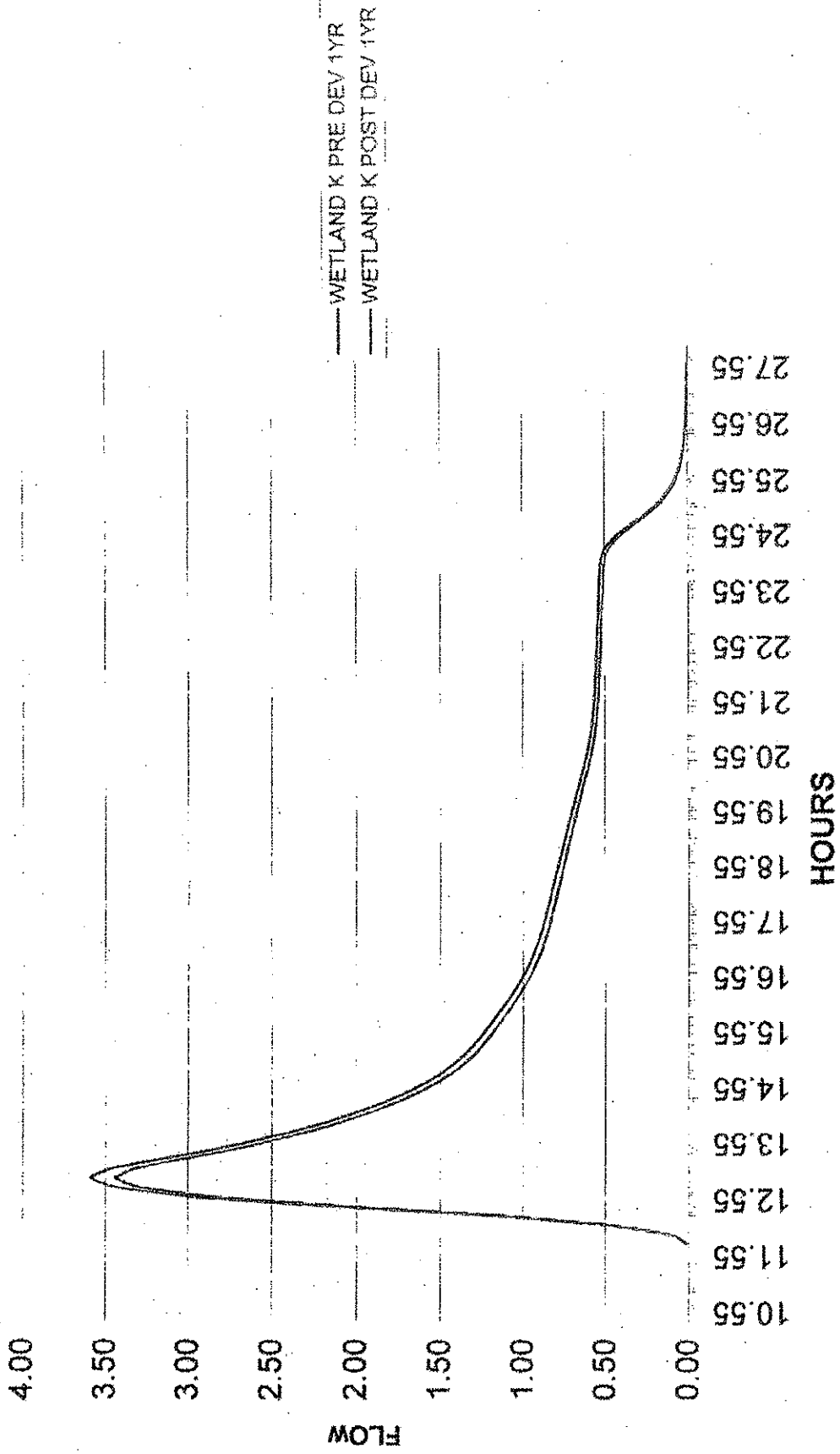
WETLAND K PRE DEV HYG



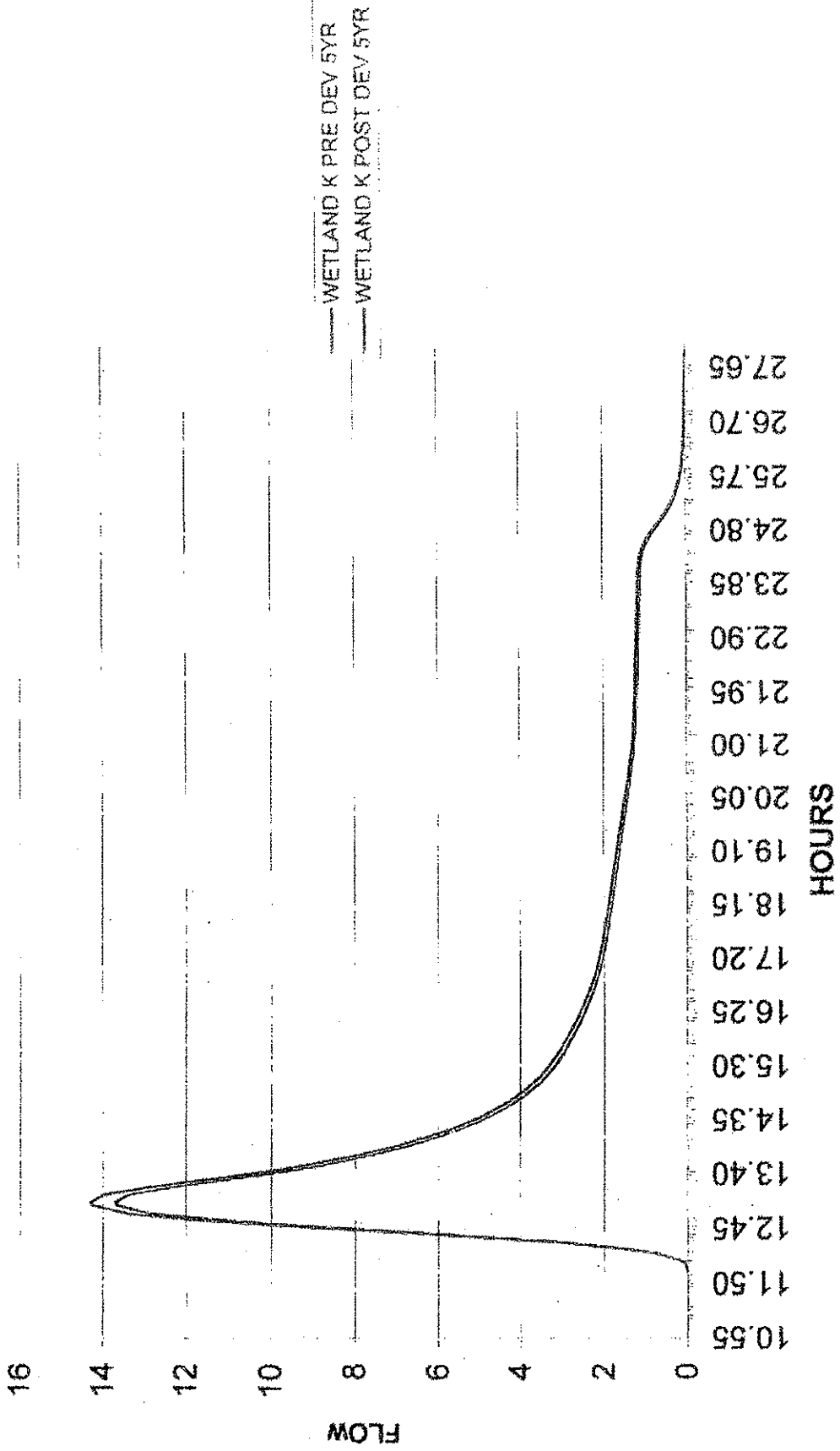
WETLAND K POST DEV HYG



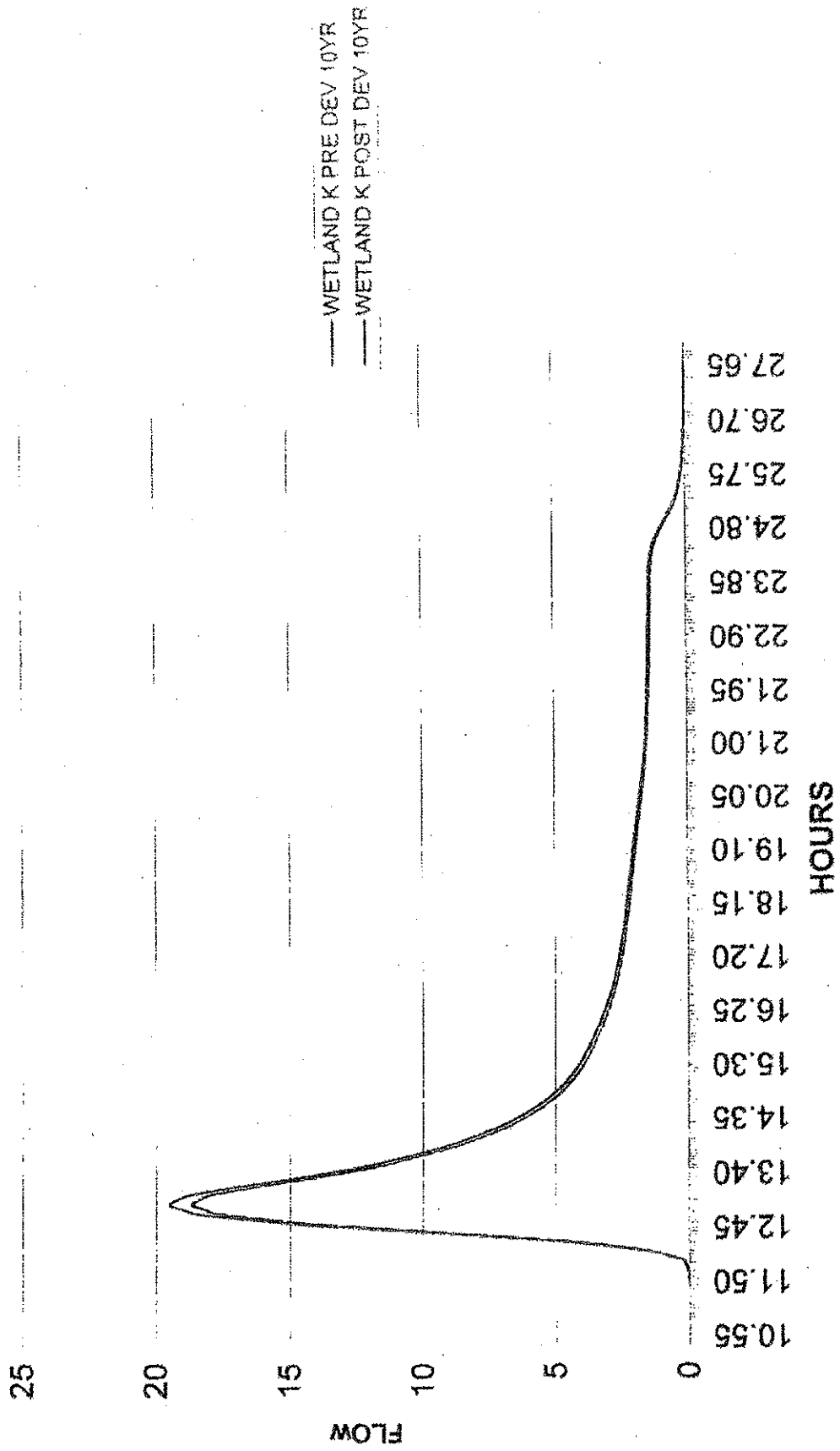
WETLAND K HYG COMPARISON



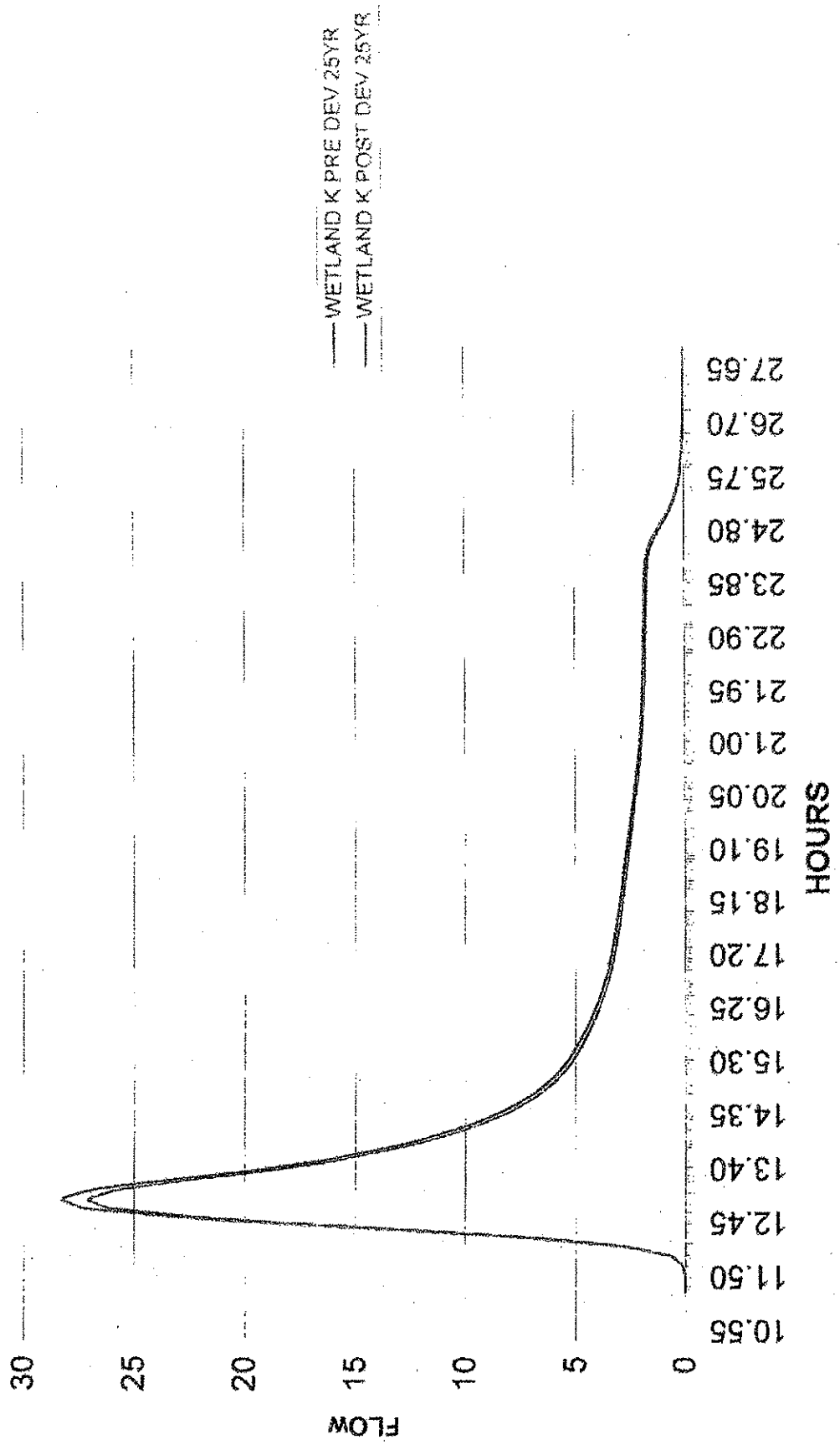
WETLAND K HYG COMPARISON



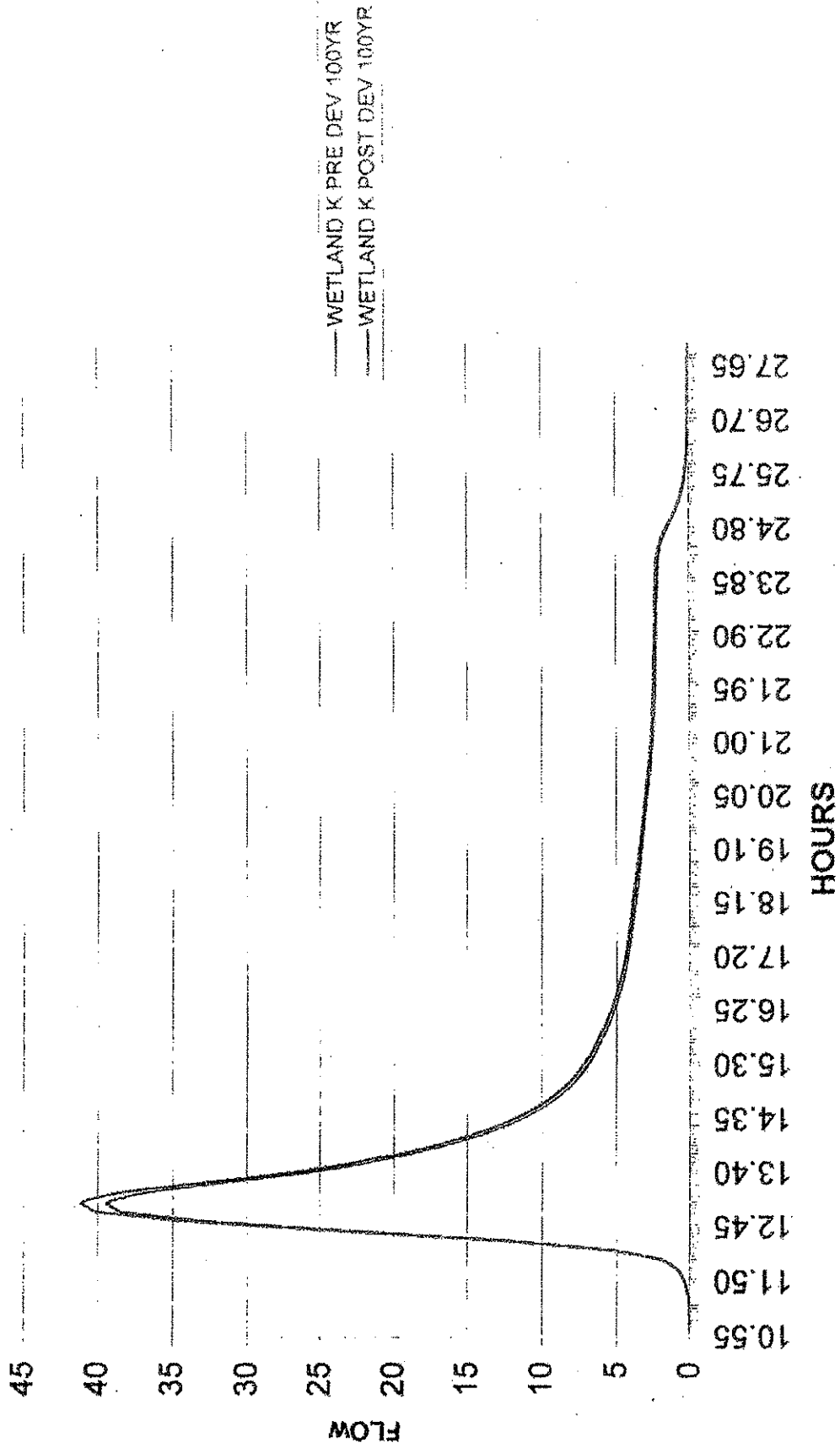
WETLAND K HYG COMPARISON



WETLAND K HYG COMPARISON



WETLAND K HYG COMPARISON



Appendix 1a: Pre Developed Runoff Calculations for wetland K

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***** CN CALCULATIONS *****

K..... Runoff CN-Area 4.01

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Scioto County

Return Event	Total Depth in	Rainfall Type	RNF ID
K.. 1	2.4000	Synthetic Curve	TypeII 24hr
K.. 2	2.7000	Synthetic Curve	TypeII 24hr
K.. 5	3.5000	Synthetic Curve	TypeII 24hr
K.. 10	3.9000	Synthetic Curve	TypeII 24hr
K.. 25	4.5000	Synthetic Curve	TypeII 24hr
K.. 50	5.0000	Synthetic Curve	TypeII 24hr
K..100	5.3000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; †Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
JUNC 10	JCT	1	1.174		12.9500	3.59		
JUNC 10	JCT	2	1.691		12.9000	5.88		
JUNC 10	JCT	5	3.383		12.8000	14.29		
JUNC 10	JCT	10	4.369		12.7500	19.49		
JUNC 10	JCT	25	5.986		12.7500	28.25		
JUNC 10	JCT	50	7.440		12.7500	36.17		
JUNC 10	JCT	100	8.352		12.7500	41.15		
K	AREA	1	1.174		12.9500	3.59		
K	AREA	2	1.691		12.9000	5.88		
K	AREA	5	3.383		12.8000	14.29		
K	AREA	10	4.369		12.7500	19.49		
K	AREA	25	5.986		12.7500	28.25		
K	AREA	50	7.440		12.7500	36.17		
K	AREA	100	8.352		12.7500	41.15		

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*K OF	JCT	1	1.174		12.9500	3.59		
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*K OF	JCT	5	3.383		12.8000	14.29		
*K OF	JCT	10	4.369		12.7500	19.49		
*K OF	JCT	25	5.986		12.7500	28.25		
*K OF	JCT	50	7.440		12.7500	36.17		
*K OF	JCT	100	8.352		12.7500	41.15		

File... C:\Pond Pack Projects\E07-178 NSI\
Title... Project Date: 10/18/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = Scioto County

Storm Tag Name = K.. 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = K.. 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.7000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = K.. 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = K.. 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = K.. 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type.... Design Storms
Name.... Scioto County

Page 2.02

File.... C:\Pond Pack Projects\E07-178 NSI\
Title... Project Date: 10/18/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = Scioto County

Storm Tag Name = K.. 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 5.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = K..100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... C:\Pond Pack Projects\E07-178 NSI\WETLAND K PRE.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: 1.2770 hrs

Total Tc: 1.2770 hrs

File.... C:\Pond Pack Projects\E07-178-NSI\WETLAND K PRE.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\WETLAND K PRE.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
WOODS AND BRUSH	65	53.990			65.00

COMPOSITE AREA & WEIGHTED CN ---> 53.990 65.00 (65)

.....

Index of Starting Page Numbers for ID Names

----- K -----
K... 3.01, 4.01

----- S -----
Scioto County... 2.01

----- W -----
Watershed... 1.01

Appendix 1b: Post Developed Runoff Calculations for wetland K

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***** MASTER SUMMARY *****

Watershed..... Master Network Summary 1.01

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Scioto County... Design Storms 2.01

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***** CN CALCULATIONS *****

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MASTER DESIGN STORM SUMMARY

Network Storm Collection: Scioto County

Return Event	Total Depth in	Rainfall Type	RNF ID
L.. 1	2.4000	Synthetic Curve	TypeII 24hr
L.. 2	2.7000	Synthetic Curve	TypeII 24hr
L.. 5	3.5000	Synthetic Curve	TypeII 24hr
L.. 10	3.9000	Synthetic Curve	TypeII 24hr
L.. 25	4.5000	Synthetic Curve	TypeII 24hr
L.. 50	5.0000	Synthetic Curve	TypeII 24hr
L..100	5.3000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; *Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
JUNC 10	JCT	1	1.125		12.9500	3.44		
JUNC 10	JCT	2	1.621		12.9000	5.64		
JUNC 10	JCT	5	3.243		12.8000	13.70		
JUNC 10	JCT	10	4.188		12.7500	18.68		
JUNC 10	JCT	25	5.737		12.7500	27.07		
JUNC 10	JCT	50	7.131		12.7500	34.67		
JUNC 10	JCT	100	8.005		12.7500	39.44		
K	AREA	1	1.125		12.9500	3.44		
K	AREA	2	1.621		12.9000	5.64		
K	AREA	5	3.243		12.8000	13.70		
K	AREA	10	4.188		12.7500	18.68		
K	AREA	25	5.737		12.7500	27.07		
K	AREA	50	7.131		12.7500	34.67		
K	AREA	100	8.005		12.7500	39.44		

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*K OF	JCT	1	1.125		12.9500	3.44		
*K OF	JCT	2	1.621		12.9000	5.64		
*K OF	JCT	5	3.243		12.8000	13.70		
*K OF	JCT	10	4.188		12.7500	18.68		
*K OF	JCT	25	5.737		12.7500	27.07		
*K OF	JCT	50	7.131		12.7500	34.67		
*K OF	JCT	100	8.005		12.7500	39.44		

File.... C:\Pond Pack Projects\E07-178 NSI\
Title... Project Date: 10/18/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = Scioto County

Storm Tag Name - L.. 1

Data Type, File, ID Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = L.. 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.7000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = L.. 5

Data Type, File, ID Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = L.. 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = L.. 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... C:\Pond Pack Projects\E07-178 NST\
Title... Project Date: 10/18/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File.ID = Scioto County

Storm Tag Name = L.. 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 5.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = L..100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... C:\Pond Pack Projects\E07-178 NSI\WETLAND K POST.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: 1.2770 hrs

=====
Total Tc: 1.2770 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\WETLAND K POST.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... K

File.... C:\Pond Pack Projects\607-178 NSI\WETLAND K POST.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
WOODS AND BRUSH	65	51.750			65.00

COMPOSITE AREA & WEIGHTED CN ---> 51.750 65.00 (65)

.....

Index of Starting Page Numbers for ID Names

----- K -----
K... 3.01, 4.01

----- S -----
Scioto County... 2.01

----- W -----
Watershed... 1.01

Appendix 2: Basin 1 Detention Basin and Runoff Calculations

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***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... 100
I-D-F Table 3.01

10yr..... 10
I-D-F Table 3.02

25yr..... 25
I-D-F Table 3.03

50yr..... 50
I-D-F Table 3.04

5yr..... 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 1..... POST
Tc Calcs 4.01

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI - MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN OHIO

Storm Tag Name = 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Freq. = 5 yr

Storm Tag Name = 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Freq. = 10 yr

Storm Tag Name = 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Freq. = 25 yr

Storm Tag Name = 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Freq. = 50 yr

Storm Tag Name = 100

File: Type, ID = : I-D-F Storm... 100yr
Storm Freq. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: 100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: 100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 4:19 PM

Date: 11/15/2007

Type.... I-D-F Table
Name.... 10yr Tag: 10
File.... C:\Pond Pack Projects\R07-178 NSI\RATIONAL\
Storm... 10yr Tag: 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

S/N: 321E01B070C9

PondPack Ver. 09.00.077.00

McCarty Associates

Time: 4:19 PM

Date: 11/15/2007

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type.... I-D-F Table
Name.... 50yr Tag: 50
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: 50

Rainfall-Intensity-Duration Curve

Time, hrs	Intens.. in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 1 LOPLO.FPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .5000 hrs

Total Tc: .5000 hrs

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 1 LOFLO.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

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100yr 100... 3.01

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25yr 25... 3.03

----- 5 -----

50yr 50... 3.04

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SOUTHERN OHIO... 2.01

----- W -----

Watershed... 1.01

Appendix 3: Basin 2 Detention Basin and Runoff Calculations

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***** MASTER SUMMARY *****		
Watershed.....	Mod. Rational Grand Summary	1.01
***** DESIGN STORMS SUMMARY *****		
SOUTHERN OHIO...	Rational Storms	2.01
***** RAINFALL DATA *****		
100yr.....	A.. 100 I-D-F Table	3.01
10yr.....	A.. 10 I-D-F Table	3.02
25yr.....	A.. 25 I-D-F Table	3.03
50yr.....	A.. 50 I-D-F Table	3.04
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BASIN 2..... POST
C and Area 5.02

S/N: 321E01B070C9

PondPack Ver. 09.00.077.00

McCarty Associates

Time: 3:11 PM

Date: 11/15/2007

 *
 *
 *
 * MODIFIED RATIONAL METHOD *
 * ---- Grand Summary For All Storm Frequencies ---- *
 *
 *

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

Area = 8.800 acres Tc = .0833 hrs

VOLUMES							
Freq. years	Adjusted 'C'	Duration hrs	I in/hr	Qpeak cfs	Allowable cfs	Inflow ac-ft	Storage ac-ft
5	.510	.4000	3.1480	14.25	10.90	.471	.253
10	.510	.4000	3.5560	16.09	12.32	.537	.286
25	.510	.4167	3.9867	18.04	14.16	.621	.329
50	.510	.6500	3.4470	15.60	15.44	.838	.370
100	.510	.6667	3.7200	16.83	16.77	.928	.408

Name.... SOUTHERN OHIO

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Freq. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Freq. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Freq. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID : : I-D-F Storm... 50yr
Storm Freq. = 50 yr

Storm Tag Name = A.. 100

File: Type, ID = : I-D-F Storm... 100yr
Storm Freq. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6500

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

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McCarty Associates
Time: 3:11 PM

Date: 11/15/2007

Type... I-D-F Table
Name... 25yr Tag: A.. 25
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Name.... 50yr Tag: A.. 50
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Page 3.00
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Type... 1-D-F Table
Name... 5yr Tag: A.. 5
File... C:\Pond Pack Projects\E07-178 NSI\RA\TIONAL\
Storm... 5yr Tag: A.. 5

Page 3.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

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Time: 3:11 PM

Date: 11/15/2007

Name.... BASIN 2

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: User Defined

Segment #1 Time: .4160 hrs

Total Tc: .4160 hrs

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... BASIN 2

Tag: POST

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .0830 hrs

=====
Total Tc: .0830 hrs
Calculated Tc < Min.Tc:
Use Minimum Tc...
Use Tc = .0833 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... BASIN 2

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM LAND	.4000	8.800	3.520
WEIGHTED C & TOTAL AREA --->	.4000	8.800	3.520

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 2.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL SITE AND LAWN	.5100	8.800	4.488
WEIGHTED C & TOTAL AREA --->	.5100	8.800	4.488

.....

S/N: 321E01B070C9
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McCarty Associates
Time: 3:11 PM

Date: 11/15/2007

Index of Starting Page Numbers for ID Names

----- 1 -----
100yr A..100... 3.01
10yr A.. 10... 3.02

----- 2 -----
25yr A.. 25... 3.03

----- 5 -----
50yr A.. 50... 3.04
5yr A.. 5... 3.05

----- B -----
BASIN 2 PRE... 4.01, 5.01, 4.03,
5.02

----- S -----
SOUTHERN OHIO... 2.01

----- W -----
Watershed... 1.01

Appendix 4: Basin 3 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A.. 100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 3..... PRE
Tc Calcs 4.01

BASIN 3..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 3..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 3..... POST
C and Area 5.02

```

*****
*****
*
*
*          MODIFIED RATIONAL METHOD          *
*    ---- Grand Summary For All Storm Frequencies ----    *
*
*
*****
*****
  
```

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

Area = 23.600 acres Tc = .5000 hrs

Freq. years	Adjusted 'C'	Duration hrs	I in/hr	Qpeak cfs	Allowable cfs	VOLUMES	
						Inflow ac-ft	Storage ac-ft
5	.610	.7833	2.0990	30.47	15.90	1.973	1.130
10	.610	.8000	2.3660	34.34	18.37	2.271	1.284
25	.610	.8000	2.7560	40.01	21.51	2.645	1.489
50	.610	.8167	3.0103	43.70	24.08	2.949	1.639
100	.610	.8333	3.2600	47.32	26.65	3.259	1.791

Name.... SOUTHERN OHIO

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\

Title... Project Date: 11/15/2007

Project Engineer: Ryan Jeter PE

Project Title: NSI-MMK

Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Frequ. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Frequ. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Frequ. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Frequ. = 50 yr

Storm Tag Name = A..100

File: Type, ID = : I-D-F Storm... 100yr
Storm Frequ. = 100 yr

Name... 100yr Tag: A..100
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Name... 10yr Tag: A.. 10
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: A.. 10

Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

S/N: 321E01B070C9
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McCarty Associates
Time: 9:59 AM

Date: 11/16/2007

Name... 25yr Tag: A.. 25
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Name.... 50yr Tag: A.. 50
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 9:59 AM

Date: 11/16/2007

Name... 5yr Tag: A.. 5
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 5yr Tag: A.. 5

Page 2.00
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

Name.... BASIN 3

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 3.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: 1.0000 hrs

=====
Total Tc: 1.0000 hrs
=====

S/N: 321E01B070C9

PondPack Ver. 09.00.077.00

McCarty Associates

Time: 9:59 AM

Date: 11/16/2007

File: C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 3.PPW

Tc Equations used...

*** User Defined *****

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... BASIN 3

Tag: POST

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 3.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .5000 hrs

Total Tc: .5000 hrs
=====

Name.... BASIN 3 Tag: POST

File.... C:\Pond Pack Projects\E07-178 NST\RATIONAL\BASIN 3.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... BASIN 3

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 3.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM LAND	.4000	23.600	9.440
WEIGHTED C & TOTAL AREA --->	.4000	23.600	9.440

.....

S/N: 321E01B070C9

PondPack Ver. 09.00.077.00

McCarty Associates

Time: 9:59 AM

Date: 11/16/2007

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 3.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA AND LAWN	.6100	23.600	14.396

WEIGHTED C & TOTAL AREA ---> .6100 23.600 14.396
.....

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 9:59 AM

Date: 11/16/2007

Index of Starting Page Numbers for ID Names

----- 1 -----
100yr A..100... 3.01
10yr A.. 10... 3.02

----- 2 -----
25yr A.. 25... 3.03

----- 5 -----
50yr A.. 50... 3.04
5yr A.. 5... 3.05

----- B -----
BASIN 3 PRE... 4.01, 5.01, 4.03,
5.02

----- S -----
SOUTHERN OHIO... 2.01

----- W -----
Watershed... 1.01

Appendix 5: Basin 4 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A.. 100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 4..... PRE
Tc Calcs 4.01

BASIN 4..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 4..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 4..... POST
C and Area 5.02

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID : SOUTHERN OHTO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Frequ. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Frequ. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Frequ. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Frequ. = 50 yr

Storm Tag Name = A..100

File: Type, ID = : I-D-F Storm... 100yr
Storm Frequ. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 3:21 PM

Date: 11/15/2007

Type... 1-D-F Table
Name... 25yr Tag: A.. 25
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type... 1-D-R Table
Name... 50yr Tag: A.. 50
File... C:\Pond Pack Projects\F07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Type... I-D-F Table
Name... 5yr Tag: A.. 5
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 5yr Tag: A.. 5

Page 3.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

S/N: 321E01B070C9
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McCarty Associates
Time: 3:21 PM

Date: 11/15/2007

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 4.EPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: 1.0000 hrs

=====
Total Tc: 1.0000 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 4.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 4.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .2500 hrs

=====
Total Tc: .2500 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 4.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 4.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM GROUND	.4000	23.200	9.280
WEIGHTED C & TOTAL AREA --->	.4000	23.200	9.280

.....

File.... C:\Pond Pack Projects\E07-178 NS1\RATIONAL\BASIN 4.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA	.6100	23.200	14.152
WEIGHTED C & TOTAL AREA --->	.6100	23.200	14.152

.....

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 3:21 PM

Date: 11/15/2007

Index of Starting Page Numbers for ID Names

----- 1 -----

100yr A..100... 3.01
10yr A.. 10... 3.02

----- 2 -----

25yr A.. 25... 3.03

----- 5 -----

50yr A.. 50... 3.04
5yr A.. 5... 3.05

----- B -----

BASIN 4 PRE... 4.01, 5.01, 4.03,
5.02

----- S -----

SOUTHERN OHIO... 2.01

----- W -----

Watershed... 1.01

Appendix 6: Basin 5 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A.. 100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 5..... PRE
Tc Calcs 4.01

BASIN 5..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 5..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 5..... POST
C and Area 5.02

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Frequ. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Frequ. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Frequ. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Frequ. = 50 yr

Storm Tag Name = A..100

File: Type, ID = : I-D-F Storm... 100yr
Storm Frequ. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

Type.... I-D-F Table
Name.... 25yr Tag: A.. 25
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type... I-I-R Table
Name... 50yr Tag: A.. 50
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Page 3.04
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 3:24 PM

Date: 11/15/2007

Type... I-D-F Table
Name... 5yr Tag: A.. 5
File... C:\Pond Pack Projects\E07-178 NST\RATIONAL\
Storm... 5yr Tag: A.. 5

Page 3.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 5.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .7500 hrs

Total Tc: .7500 hrs

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 5.PFW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 5.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .0830 hrs

=====
Total Tc: .0830 hrs

Calculated Tc < Min.Tc:
Use Minimum Tc...
Use Tc = .0833 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NS1\RATIONAL\BASIN 5.PPW

Tc Equations used...

: == User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 5.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM GROUND	.4000	8.000	3.200
WEIGHTED C & TOTAL AREA --->	.4000	8.000	3.200

.....

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 5.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA	.6200	8.000	4.960
WEIGHTED C & TOTAL AREA --->	.6200	8.000	4.960

.....

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 3:24 PM

Date: 11/15/2007

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10yr A.. 10... 3.02

----- 2 -----
25yr A.. 25... 3.03

----- 5 -----
50yr A.. 50... 3.04
5yr A.. 5... 3.05

----- B -----
BASIN 5 PRE... 4.01, 5.01, 4.03,
5.02

----- S -----
SOUTHERN OHIO... 2.01

----- W -----
Watershed... 1.01

Appendix 7: Basin 6 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A.. 100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 6..... PRE
Tc Calcs 4.01

BASIN 6..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 6..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 6..... POST
C and Area 5.02

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID : SOUTHERN OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Freq. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Freq. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Freq. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Freq. = 50 yr

Storm Tag Name = A..100

File: Type, ID = : I-D-F Storm... 100yr
Storm Freq. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONALA
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

Type.... I-D-F Table
Name.... 25yr Tag: A.. 25
File.... C:\Pond Pack Projects\E07-178 NSI\RAPIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type.... I-D-F Table
Name.... 50yr
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Page 3.04
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Type.... 1-D-F Table
Name.... 5yr Tag: A.. 5
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONALA
Storm... 5yr Tag: A.. 5

Page 1.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

S/N: J21E01B070C9
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McCarty Associates
Time: 3:29 PM

Date: 11/15/2007

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 6.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: 1.0000 hrs

=====
Total Tc: 1.0000 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 6.PPW

Tc Equations used...

User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 6.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .2500 hrs

=====
Total Tc: .2500 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 6.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 6.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil?/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM GROUND	.4000	13.400	5.360
WEIGHTED C & TOTAL AREA --->	.4000	13.400	5.360

.....

File.... C:\Pond Pack Projects\F07-178 NSI\RATIONAL\BASIN 6.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA	.8800	13.400	11.792
WEIGHTED C & TOTAL AREA --->	.8800	13.400	11.792

.....

S/N: 321E01B070C9
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Date: 11/15/2007

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10yr A.. 10... 3.02

----- 2 -----

25yr A.. 25... 3.03

----- 5 -----

50yr A.. 50... 3.04

5yr A.. 5... 3.05

----- B -----

BASIN 6 PRE... 4.01, 5.01, 4.03,

5.02

----- S -----

SOUTHERN OHIO... 2.01

----- W -----

Watershed... 1.01

Appendix 8: Basin 7 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****		
Watershed.....	Mod. Rational Grand Summary	1.01
***** DESIGN STORMS SUMMARY *****		
SOUTHERN OHIO...	Rational Storms	2.01
***** RAINFALL DATA *****		
100yr.....	100 I-D-F Table	3.01
10yr.....	10 I-D-F Table	3.02
25yr.....	25 I-D-F Table	3.03
50yr.....	50 I-D-F Table	3.04
5yr.....	5 I-D-F Table	3.05
***** TC CALCULATIONS *****		
BASIN 7.....	POST Tc Calcs	4.01

```

*****
*****
*
*
*          MODIFIED RATIONAL METHOD
*    ---- Grand Summary For All Storm Frequencies ----
*
*
*****
*****
  
```

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

Area = 42.800 acres Tc = .2500 hrs

						VOLUMES	
Freq. years	Adjusted 'C'	Duration hrs	I in/hr	Qpeak cfs	Allowable cfs	Inflow ac-ft	Storage ac-ft
5	.750	.8167	2.0330	65.80	25.00	4.441	3.339
10	.750	.8500	2.2570	73.05	25.00	5.132	3.995
25	.750	.8833	2.5493	82.52	25.00	6.024	4.853
50	.750	1.5333	1.9753	63.94	25.00	8.102	6.260
100	.750	1.5667	2.2540	69.72	25.00	9.027	7.150

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN OHIO

Storm Tag Name = 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Freq. = 5 yr

Storm Tag Name = 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Freq. = 10 yr

Storm Tag Name = 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Freq. = 25 yr

Storm Tag Name = 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Freq. = 50 yr

Storm Tag Name = 100

File: Type, ID = : I-D-F Storm... 100yr
Storm Freq. = 100 yr

Name.... 100yr Tag: 100
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 100yr Tag: 100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type... Rational
Name... 10yr Tag: 10
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: 10

page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

Type.... I-D-F Table
Name.... 25yr Tag: 25
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

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Type.... I-D-F Table
Name.... 50yr Tag: 50
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: 50

Page 3.04
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Type.... I-D-F Table
Name.... 5yr Tag: 5
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 5yr Tag: 5

Page 3.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

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McCarty Associates
Time: 6:22 PM

Date: 11/15/2007

File.... C:\Pond Pack Projects\07-178 NST\RATIONAL\BASIN 7.FPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .2500 hrs

=====
Total Tc: .2500 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 7.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Index of Starting Page Numbers for ID Names

----- 1 -----
100yr 100... 3.01
10yr 10... 3.02

----- 2 -----
25yr 25... 3.03

----- 5 -----
50yr 50... 3.04
5yr 5... 3.05, 4.01

----- S -----
SOUTHERN OHIO... 2.01

----- W -----
Watershed... 1.01

Appendix 9: Basin 8 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A.. 100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 8..... PRE
Tc Calcs 4.01

BASIN 8..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 8..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 8..... POST
C and Area 5.02

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONALA
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File.ID = SOUTHERN OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Frequ. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Frequ. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Frequ. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Frequ. = 50 yr

Storm Tag Name = A..100

File: Type, ID = : I-D-F Storm... 100yr
Storm Frequ. = 100 yr

Type.... I-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NSI\RA\T\ONAL\
Storm... 100yr Tag: A..100

Page 3.01
Event: 100 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0630	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

Type.... I-D-F Table
Name.... 25yr Tag: A.. 25
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type.... I-D-F Table
Name.... 50yr Tag: A.. 50
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Page 3.00
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

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Date: 11/15/2007

Name.... 5yr Tag: A.. 5
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 5yr Tag: A.. 5

Page 3.05
Event: 5 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

File.... C:\Pond Pack Projects\F07-178.NST\RATIONAL\BASIN 8.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .7500 hrs

=====
Total Tc: .7500 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 8.PPW

Tc Equations used...

==== User Defined =====

Tc - Value entered by user

Where: Tc = Time of concentration

Tag: POST

File.... C:\Pond Pack Projects\E07-178 NST\RATIONAL\BASIN 8.PPW

.....
TIME OF CONCENTRATION CALCULATION
.....

Segment #1: Tc: User Defined

Segment #1 Time: .1700 hrs

Total Tc: .1700 hrs

File.... C:\Pond Pack Projects\F07-178 NSI\RATIONAL\BASIN 8.FPW

Tc Equations used...

==== User Defined

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 8.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM GROUND	.4000	19.500	7.800
WEIGHTED C & TOTAL AREA --->	.4000	19.500	7.800

.....

File.... C:\Pond Pack Projects\E07-178 NS1\RATIONAL\BASIN 8.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA	.6800	19.500	13.260

WEIGHTED C & TOTAL AREA ---> .6800 19.500 13.260

.....

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100yr A.. 100... 3.01

10yr A.. 10... 3.02

----- 2 -----

25yr A.. 25... 3.03

----- 5 -----

50yr A.. 50... 3.04

5yr A.. 5... 3.05

----- B -----

BASIN 8 PRE... 4.01, 5.01, 4.03,

5.02

----- S -----

SOUTHERN OHIO... 2.01

----- W -----

Watershed... 1.01

Appendix 10: Basin 9 Detention Basin and Runoff Calculations

Table of Contents

***** MASTER SUMMARY *****

Watershed..... Mod. Rational Grand Summary 1.01

***** DESIGN STORMS SUMMARY *****

SOUTHERN OHIO... Rational Storms 2.01

***** RAINFALL DATA *****

100yr..... A..100
I-D-F Table 3.01

10yr..... A.. 10
I-D-F Table 3.02

25yr..... A.. 25
I-D-F Table 3.03

50yr..... A.. 50
I-D-F Table 3.04

5yr..... A.. 5
I-D-F Table 3.05

***** TC CALCULATIONS *****

BASIN 9..... PRE
Tc Calcs 4.01

BASIN 9..... POST
Tc Calcs 4.03

***** RATIONAL METHOD CALCS *****

BASIN 9..... PRE
C and Area 5.01

Table of Contents (continued)

BASIN 9..... POST
C and Area 5.02

Type.... Rational Storms
Name.... SOUTHERN OHIO

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Title... Project Date: 11/15/2007
Project Engineer: Ryan Jeter PE
Project Title: NSI-MMK
Project Comments:

I-D-F DESIGN STORM SUMMARY

Storm Queue File, ID = SOUTHERN.OHIO

Storm Tag Name = A.. 5

File: Type, ID = : I-D-F Storm... 5yr
Storm Frequ. = 5 yr

Storm Tag Name = A.. 10

File: Type, ID = : I-D-F Storm... 10yr
Storm Frequ. = 10 yr

Storm Tag Name = A.. 25

File: Type, ID = : I-D-F Storm... 25yr
Storm Frequ. = 25 yr

Storm Tag Name = A.. 50

File: Type, ID = : I-D-F Storm... 50yr
Storm Frequ. = 50 yr

Storm Tag Name = A.. 100

File: Type, ID = : I-D-F Storm... 100yr
Storm Frequ. = 100 yr

Type.... 1-D-F Table
Name.... 100yr Tag: A..100
File.... C:\Pond Pack Projects\E07-178 NST\RATIONAL\
Storm... 100yr Tag: A..100

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	9.3600
.1700	7.0200
.2500	5.8000
.5000	4.1800
1.0000	2.8000
2.0000	1.6600

Type.... I-D-F Table
Name.... 10yr Tag: A.. 10
File.... C:\Pond Pack Projects\E07-178 NST\RATIONAL\
Storm... 10yr Tag: A.. 10

Page 3.02
Event: 10 yr

Rainfall-Intensity-Duration Curve

Time. hrs	Intens., in/hr
.0830	6.8400
.1700	4.7800
.2500	4.3600
.5000	3.0200
1.0000	1.9300
2.0000	1.1200

S/N: 321E01B070C9
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McCarty Associates
Time: 3:42 PM

Date: 11/15/2007

Type.... I-D-F Table
Name.... 25yr Tag: A.. 25
File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 25yr Tag: A.. 25

Page 3.03
Event: 25 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	7.8000
.1700	6.0000
.2500	4.9600
.5000	3.5000
1.0000	2.2600
2.0000	1.3200

Type... I-D-F Table
Name... 50yr Tag: A.. 50
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 50yr Tag: A.. 50

Page 3.04
Event: 50 yr

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	8.6400
.1700	6.5400
.2500	5.3600
.5000	3.8400
1.0000	2.5300
2.0000	1.4900

Name... 5yr Tag: A.. 5
File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\
Storm... 5yr Tag: A.. 5

Rainfall-Intensity-Duration Curve

Time, hrs	Intens., in/hr
.0830	6.1200
.1700	4.7800
.2500	3.8800
.5000	2.6600
1.0000	1.6700
2.0000	.9700

Tag: PRE

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 9.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .7500 hrs

=====
Total Tc: .7500 hrs
=====

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 9.PPW

Tc Equations used...

* = User Defined -----

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 9.PPW

.....
TIME OF CONCENTRATION CALCULATOR
.....

Segment #1: Tc: User Defined

Segment #1 Time: .1700 hrs

=====
Total Tc: .1700 hrs
=====

File... C:\Pond Pack Projects\E07-178 NSJ\RATIONAL\BASIN 9.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Pond Pack Projects\E07-178 NS:\RATIONAL\BASIN 9.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
ROW CROPS AND FARM GROUND	.4000	14.300	5.720

WEIGHTED C & TOTAL AREA ---> .4000 14.300 5.720

.....

File... C:\Pond Pack Projects\E07-178 NSI\RATIONAL\BASIN 9.PPW

RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
INDUSTRIAL AREA	.6600	14.300	9.438
WEIGHTED C & TOTAL AREA --->	.6600	14.300	9.438

S/N: 321E01B070C9
PondPack Ver. 09.00.077.00

McCarty Associates
Time: 3:42 PM

Date: 11/15/2007

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----- 1 -----
100yr A.. 100... 3.01
10yr A.. 10... 3.02

----- 2 -----
25yr A.. 25... 3.03

----- 5 -----
50yr A.. 50... 3.04
5yr A.. 5... 3.05

----- R -----
BASIN 9 PRE... 4.01, 5.01, 4.03,
5.02

----- S -----
SOUTHERN OHIO... 2.01

----- W -----
Watershed... 1.01