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MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID SEDGWICK.RN Sedgwick24

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
2y24h	3.5000	Synthetic Curve	SCSTYPES	Type I 24hr
5y24h	4.5000	Synthetic Curve	SCSTYPES	Type I 24hr
100y24	7.9000	Synthetic Curve	SCSTYPES	Type I 24hr

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
 Max. Iterations = 35 loops
 ICPM Time Step = .0500 hrs
 Output Time Step = .0500 hrs
 ICPM Ending Time = 35.0000 hrs

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversi on;)
 (Trun= HYG Truncati on; Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
53RD COMMERCIAL	AREA	2	3.672		12.0500	52.15		
53RD COMMERCIAL	AREA	5	5.094		12.0500	71.19		
53RD COMMERCIAL	AREA	100	10.061		12.0500	135.17		
COMMERCIAL	AREA	2	6.120		12.0500	86.92		
COMMERCIAL	AREA	5	8.489		12.0500	118.66		
COMMERCIAL	AREA	100	16.768		12.0500	225.28		
EAST ENTRY LOTS	AREA	2	.868		12.0500	12.38		
EAST ENTRY LOTS	AREA	5	1.367		12.0500	19.82		
EAST ENTRY LOTS	AREA	100	3.301		12.0500	47.58		
ENTRY POND	POND	2	.868		12.0500	12.38		
ENTRY POND	POND	5	1.367		12.0500	19.82		
ENTRY POND	POND	100	3.301		12.0500	47.58		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversi on;)
(Trun= HYG Truncati on; Bl ank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol		Qpeak		Max WSEL ft	Max Pond ac-ft
			ac-ft	Trun	hrs	cfs		
-								
ENTRY POND	OUT POND	2	.837		12.3500	3.75	1333.54	.323
ENTRY POND	OUT POND	5	1.331		12.2000	11.78	1333.65	.386
ENTRY POND	OUT POND	100	3.253		12.1500	37.35	1333.98	.586
EXI STING	AREA	2	95.635		20.3500	90.23		
EXI STING	AREA	5	164.677		20.3000	158.97		
EXI STING	AREA	100	454.328		18.9000	449.30		
*EXI STING BOX	JCT	2	95.635		20.3500	90.23		
*EXI STING BOX	JCT	5	164.677		20.3000	158.97		
*EXI STING BOX	JCT	100	454.328		18.9000	449.30		
LONG POND	POND	2	96.309		12.0500	90.91		
LONG POND	POND	5	162.354		20.3000	137.58		
LONG POND	POND	100	436.463		20.3000	373.40		
LONG POND	OUT POND	2	93.238		20.8000	81.73	1329.63	8.982
LONG POND	OUT POND	5	158.169		20.7500	135.65	1330.28	12.772
LONG POND	OUT POND	100	428.758		20.6500	369.60	1332.48	26.410
MAI N POND	POND	2	17.649		12.0000	136.74		
MAI N POND	POND	5	27.134		12.0000	212.86		
MAI N POND	POND	100	63.480		12.0000	524.13		
MAI N POND	OUT POND	2	13.841		14.7500	13.66	1330.02	9.612
MAI N POND	OUT POND	5	21.987		14.1000	27.72	1330.48	14.182
MAI N POND	OUT POND	100	56.964		13.4500	100.16	1332.53	35.333
*NEW BOX	JCT	2	96.543		20.9500	82.46		
*NEW BOX	JCT	5	162.749		20.9000	136.58		
*NEW BOX	JCT	100	437.786		20.8500	371.08		
NORTH OFFSI TE	AREA	2	7.268		12.7000	37.03		
NORTH OFFSI TE	AREA	5	11.448		12.7000	60.33		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversi on;)
(Trun= HYG Truncati on: Bl ank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
NORTH OFFSITE	AREA	100		12.7000	148.71		
NORTHGATE SUBDVS	AREA	2		12.0500	95.95		
NORTHGATE SUBDVS	AREA	5		12.0500	153.62		
NORTHGATE SUBDVS	AREA	100		12.0500	368.71		
POND RAINFALL	AREA	2		11.9000	48.45		
POND RAINFALL	AREA	5		11.9000	63.69		
POND RAINFALL	AREA	100		11.9000	114.81		
SOUTH POND	POND	2		20.8000	82.48		
SOUTH POND	POND	5		20.7500	136.64		
SOUTH POND	POND	100		20.6500	371.40		
SOUTH POND	OUT POND	2		20.9500	82.46	1328.63	.930
SOUTH POND	OUT POND	5		20.9000	136.58	1329.29	1.352
SOUTH POND	OUT POND	100		20.8500	371.08	1331.47	3.266
WEST OFFSITE	AREA	2		20.3500	75.20		
WEST OFFSITE	AREA	5		20.3000	132.47		
WEST OFFSITE	AREA	100		18.9000	374.42		

Type... Design Storms
Name... Sedgwick24

File... C:\HAESTAD\PPKW\RAINFALL\SEDGWICK.RNO
Title...

JOB TITLE NOT SPECIFIED
Click Project Summary on the File Menu to enter title

DESIGN STORMS SUMMARY

Design Storm File, ID = SEDGWICK.RNO Sedgwick24

Storm Tag Name = 2y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeI 24hr
Storm Frequency = 2 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 = 5y24h
Description: Sedgwick County 5-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeI 24hr
Storm Frequency = 5 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

Storm Tag Name = 100y24
Description: Sedgwick County 100-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeI 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.9000 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... Sedgwick24
File... C:\HAESTAD\PPKW\RAI NFALL\SEDGWICK.RNQ
Storm... Typell 24hr Tag: 2y24h

Page 2.02
Event: 2 yr

DESIGN STORMS SUMMARY

Design Storm File, ID = SEDGWICK.RNQ Sedgwick24

Storm Tag Name = 2y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF Typell 24hr
Storm Frequency = 2 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 = 5y24h
Description: Sedgwick County 5-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF Typell 24hr
Storm Frequency = 5 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

Storm Tag Name = 100y24
Description: Sedgwick County 100-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF Typell 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File. . . . F:\HYDRO\PROJECTS\NORTHGATE\PONDPACK\PONDS-TK7-26.PPW

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

Segment #1: Tc: TR-55 Shallow

Hydraulic Length 2300.00 ft
Slope .001000 ft/ft
Unpaved

Avg. Velocity .51 ft/sec

Segment #1 Time: 1.2522 hrs

=====
Total Tc: 1.2522 hrs
=====

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Tc Equations used. . .

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf^{**0.5})$$

Paved surface:

$$V = 20.3282 * (Sf^{**0.5})$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

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

Segment #1: Tc: TR-55 Shallow

Hydraulic Length 20000.00 ft
Slope .001000 ft/ft
Unpaved

Avg. Velocity .51 ft/sec

Segment #1 Time: 10.8886 hrs

=====
Total Tc: 10.8886 hrs
=====

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Tc Equations used. . .

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf^{**0.5})$$

Paved surface:

$$V = 20.3282 * (Sf^{**0.5})$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File. . . . F:\HYDRO\PROJECTS\NORTHGATE\PONDPACK\PONDS-TK7-26.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1333.00	-----	.5000	.0000	.000	.000
1334.00	-----	.7000	1.7916	.597	.597
1335.00	-----	.9000	2.3937	.798	1.395
1336.00	-----	1.1000	2.9950	.998	2.393

POND VOLUME EQUATIONS

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

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

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

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Elevation (ft)	Planimeter (sq. in)	Area (acres)	A1+A2+sq. rt.(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1328.00	-----	5.4000	.0000	.000	.000
1329.00	-----	5.5000	16.3498	5.450	5.450
1330.00	-----	5.8000	16.9480	5.649	11.099
1331.00	-----	6.1000	17.8481	5.949	17.049
1332.00	-----	6.4000	18.7482	6.249	23.298
1333.00	-----	6.7000	19.6483	6.549	29.847
1334.00	-----	7.0000	20.5484	6.849	36.697
1335.00	-----	7.2000	21.2993	7.100	43.797

POND VOLUME EQUATIONS

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

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

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

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Elevation (ft)	Planimeter (sq. in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Vol ume (ac-ft)	Vol ume Sum (ac-ft)
1329.00	-----	9.3000	.0000	.000	.000
1330.00	-----	9.6000	28.3488	9.450	9.450
1331.00	-----	10.1000	29.5468	9.849	19.299
1332.00	-----	10.5000	30.8981	10.299	29.598
1333.00	-----	11.0000	32.2471	10.749	40.347
1334.00	-----	11.4000	33.5982	11.199	51.546
1335.00	-----	12.0000	35.0962	11.699	63.245

POND VOLUME EQUATIONS

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

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

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

File. . . . F:\HYDRO\PROJECTS\NORTHGATE\PONDPACK\PONDS-TK7-26.PPW

Elevation (ft)	Planimeter (sq. in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1327.00	-----	.5000	.0000	.000	.000
1328.00	-----	.6000	1.6477	.549	.549
1329.00	-----	.6000	1.8000	.600	1.149
1330.00	-----	.8000	2.0928	.698	1.847
1331.00	-----	1.0000	2.6944	.898	2.745
1332.00	-----	1.2000	3.2954	1.098	3.843

POND VOLUME EQUATIONS

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

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

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

File... F:\HYDRO\PROJECTS\NORTHGATE\PONDPACK\PONDS-TK7-26.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev. = 1327.00 ft
Increment = .50 ft
Max. Elev. = 1332.00 ft

OUTLET CONNECTIVITY

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.	Outfall	E1, ft	E2, ft
----- Culvert-Box TW SETUP, DS Channel	----- BX	---> TW	----- 1327.000	----- 1332.000

OUTLET STRUCTURE INPUT DATA

Structure ID = BX
Structure Type = Culvert-Box

No. Barrels = 2
Barrel Height = 4.00 ft
Barrel Width = 8.00 ft
Upstream Invert = 1327.00 ft
Dnstream Invert = 1324.50 ft
Horiz. Length = 600.00 ft
Barrel Length = 600.01 ft
Barrel Slope = .00417 ft/ft

OUTLET CONTROL DATA...

Mannings n = .0130
Ke = .5000 (forward entrance loss)
Kb = .003356 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0260
Inlet Control M = 1.0000
Inlet Control c = .03850
Inlet Control Y = .8100
T1 ratio (HW/D) = 1.176
T2 ratio (HW/D) = 1.424
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 1331.70 ft ---> Flow = 224.00 cfs
At T2 Elev = 1332.70 ft ---> Flow = 256.00 cfs

Type... Outlet Input Data
Name... NEW BOX

Page 5.03

File... F:\HYDRO\PROJECTS\NORTHGATE\PONDPACK\PONDS-TK7-26.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

Index of Starting Page Numbers for ID Names

----- E -----

ENTRY POND... 4.01

----- L -----

LONG POND... 4.02

----- M -----

MAIN POND... 4.03

----- N -----

NEW BOX... 5.01

NORTH OFFSITE... 3.01

----- S -----

Sedgwick24... 2.01, 2.02

SOUTH POND... 4.04

----- W -----

Watershed... 1.01

WEST OFFSITE... 3.03