

STORM WATER DETENTION BASIN CALCULATIONS

Beckett Kroger S.R. 747

The basin is designed as a Storm Water & Water Quality Basin

The drainage area for this basin includes the Kroger building, retail building, parking areas, fuel center and outlots = 19.3 Ac (see attached Pages 1 & 2).

Pre CN Calculations:

18.75 Ac	Open Space	74	1387.5
0.55 Ac	Impervious	98	53.9
19.3 Ac			1441.4/19.3 = 74.68
			Use 75

The Proposed development:	New Kroger, Retail, parking, fuel center and outlots
3.05	Ac open space = CN = 75 = 228.75
16.25	Ac impervious 98 = 1592.5
19.3	1821.25/19.3 = 94.36
	Use 95

Q1pre = 1.18 Ac/Ft (Page 3)
Q1post = 3.37 Ac/Ft (Page 4)

$\frac{3.37 - 1.18}{1.18} = 185\%$ use 25 yr @ CYS

PEAK FLOW TABLE Predevelopment

Pre-Development Allowable Release Detained (Page 5)		(Page 7) Out of Basin	Elevation
1 yr	10.88 CFS	25 yr 10.83 CFS	632.96
25 yr	37.44 CFS	50 yr 21.29 CFS	633.26
50 yr	44.00 CFS	100 yr 34.75 CFS	633.47

WQV = .75 in. (.65) 19.3 Ac/12 in/ft x 43560 Ft²/Ac = 34,153 x 1.2 = 40,984 WQV @ 628.45

MASTER DESIGN STORM SUMMARY

Network Storm Collection: oxford

Return Event	Total Depth in	Rainfall Type	RNF ID
Dev 1	2.6400	Synthetic Curve	TypeII 24hr
Dev 2	2.8800	Synthetic Curve	TypeII 24hr
Dev 5	3.6000	Synthetic Curve	TypeII 24hr
Dev 10	4.0800	Synthetic Curve	TypeII 24hr
Dev 25	4.8000	Synthetic Curve	TypeII 24hr
Dev 50	5.2800	Synthetic Curve	TypeII 24hr
Dev100	5.7600	Synthetic Curve	TypeII 24hr
Dev0.5	1.2500	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 cu.ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage cu.ft
*OUT 10	JCT	1	147047		12.7500	4.30		
*OUT 10	JCT	2	163401		12.6500	5.28		
*OUT 10	JCT	5	212791		12.6000	7.98		
*OUT 10	JCT	10	245904		12.6000	9.28		
*OUT 10	JCT	25	295752		12.6000	10.83		
*OUT 10	JCT	50	329067		12.4000	21.29		
*OUT 10	JCT	100	362431		12.3000	34.75		
*OUT 10	JCT	1	54939		16.5500	.31		



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 cu.ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage cu.ft
POND 10	IN	POND 1	147049		12.0500	46.49		
POND 10	IN	POND 2	163402		12.0500	51.34		
POND 10	IN	POND 5	212792		12.0500	65.81		
POND 10	IN	POND 10	245906		12.0500	75.40		
POND 10	IN	POND 25	295753		12.0500	89.71		
POND 10	IN	POND 50	329069		12.0500	99.21		
POND 10	IN	POND 100	362432		12.0500	108.69		
POND 10	IN	POND 1	54941		12.0500	18.18		
POND 10	OUT	POND 1	147047		12.7500	4.30	630.33	86208
POND 10	OUT	POND 2	163401		12.6500	5.28	630.66	95319
POND 10	OUT	POND 5	212791		12.6000	7.98	631.57	122836
POND 10	OUT	POND 10	245904		12.6000	9.28	632.15	141971
POND 10	OUT	POND 25	295752		12.6000	10.83	632.96	170895
POND 10	OUT	POND 50	329067		12.4000	21.29	633.26	182541
POND 10	OUT	POND 100	362431		12.3000	34.75	633.47	190899
POND 10	OUT	POND 1	54939		16.5500	.31	628.43	40449
SUBAREA 10	AREA	1	147049		12.0500	46.49		
SUBAREA 10	AREA	2	163402		12.0500	51.34		
SUBAREA 10	AREA	5	212792		12.0500	65.81		
SUBAREA 10	AREA	10	245906		12.0500	75.40		
SUBAREA 10	AREA	25	295753		12.0500	89.71		
SUBAREA 10	AREA	50	329069		12.0500	99.21		
SUBAREA 10	AREA	100	362432		12.0500	108.69		
SUBAREA 10	AREA	1	54941		12.0500	18.18		

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 625.00 ft
Increment = .20 ft
Max. Elev.= 634.00 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
Orifice-Circular	01	--->	TW	625.000	634.000
Orifice-Area	00	--->	TW	628.450	634.000
Weir-Rectangular	W0	--->	TW	633.000	634.000
TW SETUP, DS Channel					



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OUTLET STRUCTURE INPUT DATA

Structure ID = 01
Structure Type = Orifice-Circular

of Openings = 1
Invert Elev. = 625.00 ft
Diameter = .2100 ft
Orifice Coeff. = .610

Structure ID = 00
Structure Type = Orifice-Area

of Openings = 1
Invert Elev. = 628.45 ft
Area = 1.2300 sq.ft
Top of Orifice = 630.50 ft
Datum Elev. = 630.00 ft
Orifice Coeff. = .610

Structure ID = W0
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 633.00 ft
Weir Length = 20.00 ft
Weir Coeff. = 3.500000

Weir TW effects (Use adjustment equation)

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

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

Name.... POND 10

File.... C:\Haestad\PROJECTS\7757_KROGER_POST_W-DRIVE_19_3_WQ.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Haestad\PROJECTS\
 Inflow HYG file = NONE STORED - POND 10 IN Dev 1
 Outflow HYG file = NONE STORED - POND 10 OUT Dev 1

Pond Node Data = POND 10
 Pond Volume Data = POND 10
 Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

 Starting WS Elev = 625.00 ft
 Starting Volume = 0 cu.ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout = .00 cfs
 Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage cu.ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + O cfs
625.00	.00	0	.0000	.00	.00	.00
625.20	.05	27	.0088	.00	.05	.35
625.40	.09	199	.0334	.00	.09	2.31
625.60	.12	656	.0739	.00	.12	7.40
625.80	.14	1534	.1303	.00	.14	17.18
626.00	.16	2972	.2025	.00	.16	33.18
626.20	.18	4846	.2281	.00	.18	54.02
626.40	.19	6950	.2552	.00	.19	77.42
626.60	.21	9297	.2839	.00	.21	103.51
626.80	.22	11900	.3140	.00	.22	132.45
627.00	.23	14773	.3457	.00	.23	164.38
627.20	.25	17867	.3644	.00	.25	198.76
627.40	.26	21125	.3836	.00	.26	234.98
627.60	.27	24551	.4033	.00	.27	273.06
627.80	.28	28152	.4234	.00	.28	313.08
628.00	.29	31931	.4441	.00	.29	355.07
628.20	.30	35864	.4588	.00	.30	398.78
628.40	.31	39926	.4738	.00	.31	443.93
628.45	.31	40962	.4776	.00	.31	455.44
628.60	.63	44119	.4890	.00	.63	490.84

Name.... POND 10

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HYG Dir = C:\Haestad\PROJECTS\
 Inflow HYG file = NONE STORED - POND 10 IN Dev 1
 Outflow HYG file = NONE STORED - POND 10 OUT Dev 1

Pond Node Data = POND 10
 Pond Volume Data = POND 10
 Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

 Starting WS Elev = 625.00 ft
 Starting Volume = 0 cu.ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage cu.ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + O cfs
628.80	1.05	48447	.5045	.00	1.05	539.35
629.00	1.48	52910	.5202	.00	1.48	589.37
629.20	1.90	57509	.5356	.00	1.90	640.89
629.40	2.32	62244	.5512	.00	2.32	693.92
629.60	2.75	67114	.5671	.00	2.75	748.46
629.80	3.17	72125	.5832	.00	3.17	804.55
630.00	3.59	77276	.5995	.00	3.59	862.22
630.20	4.02	82570	.6158	.00	4.02	921.46
630.40	4.44	88007	.6323	.00	4.44	982.29
630.60	5.06	93587	.6490	.00	5.06	1044.91
630.80	5.79	99314	.6659	.00	5.79	1109.28
631.00	6.43	105191	.6831	.00	6.43	1175.22
631.20	7.01	111216	.7002	.00	7.01	1242.75
631.40	7.55	117392	.7175	.00	7.55	1311.90
631.60	8.04	123718	.7351	.00	8.04	1382.69
631.80	8.51	130200	.7529	.00	8.51	1455.18
632.00	8.96	136837	.7708	.00	8.96	1529.37
632.20	9.38	143631	.7886	.00	9.38	1605.28
632.40	9.78	150580	.8066	.00	9.78	1682.89
632.60	10.17	157684	.8248	.00	10.17	1762.21

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Name.... POND 10

File.... C:\Haestad\PROJECTS\7757_KROGER_POST_W-DRIVE_19_3_WQ.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Haestad\PROJECTS\
 Inflow HYG file = NONE STORED - POND 10 IN Dev 1
 Outflow HYG file = NONE STORED - POND 10 OUT Dev 1

Pond Node Data = POND 10
 Pond Volume Data = POND 10
 Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

 Starting WS Elev = 625.00 ft
 Starting Volume = 0 cu.ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout = .00 cfs
 Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage cu.ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + Q cfs
632.80	10.54	164950	.8431	.00	10.54	1843.32
633.00	10.90	172377	.8617	.00	10.90	1926.20
633.20	17.51	180028	.8948	.00	17.51	2017.82
633.40	29.30	187970	.9284	.00	29.30	2117.85
633.60	44.44	196205	.9627	.00	44.44	2224.50
633.80	62.32	204743	.9975	.00	62.32	2337.25
634.00	82.54	213589	1.0331	.00	82.54	2455.75