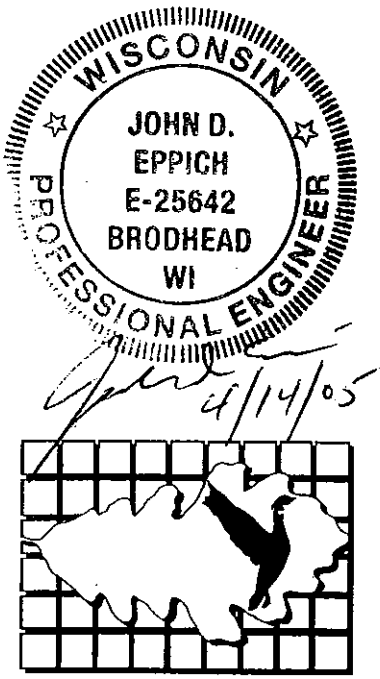
CMC SHOPS AREA REDEVELOPMENT

MILWAUKEE, WISCONSIN

STORMWATER MANAGEMENT REPORT



Prepared by:

Applied Ecological Services, Inc.

Revised April 14, 2005

The former CMC shops area site (104.9 acres) is proposed to be redeveloped with light industrial land uses. This redevelopment will be organized around a central water park, which will provide stormwater detention and treatment for about 80 percent of the site area. The water park will include a northern stormwater management area (SMA 1) with four treatment elements – sedimentation basin forebays (approximately three feet permanent water depth), treatment wetlands; natural vegetated infiltration areas and natural vegetated areas used for detention outside of the infiltration area zones; a central stormwater management area (SMA 2) with the same four treatment elements; and a swamp forest feature which will receive the treated and detained stormwater runoff from SMA 2 and disperse this water into the Menomonee River. A continuous crushed concrete gallery will be constructed under the infiltration beds to provide: 1) a reservoir for temporarily holding the infiltrated stormwater from SMA 1 and SMA 2 needed for base flow, 2) conveyance for the infiltrated stormwater to the swamp forest from SMA 1 and SMA 2 and 3) a calcium source for the infiltrated stormwater (to achieve the water chemistry required for the fen vegetation at the upper edge of the swamp forest).

An additional detention area is located in the southeastern area of the site (SMA 3) to provide detention for 3.4 acres of the eastern area of the site, which cannot be drained to the central water park.

The stormwater management system proposed for the CMC redevelopment will:

1. treat runoff from the developed areas of the site to both meet and exceed current City water quality criteria. The objectives of the system are to remove in excess of 80% of the total suspended solids and over half of the phosphorous, nitrogen and hydrocarbons from the stormwater runoff.

2. provide adequate stormwater detention for developed areas to comply with MMSD stormwater detention requirements, which specify that the flow volume discharged during the critical time period after maximum rainfall intensity be preserved.

3. provide a constant baseflow water supply to the swamp forest element (and the Menomonee River) using infiltration and underground reservoir storage.

Stormwater Management Analysis and System Descriptions

The hydrologic analysis was done using PondPack v9, a hydrologic model which incorporates SCS methodology with both SCS design rainfall and SEWRPC design rainfall events. Both the SCS 24-hour design storm (Type II rainfall distribution) and the SEWRPC design storms (3, 6, 12, and 24 hour duration storms) were analyzed and the storms producing the greatest detention requirements were used as the design control. Rainfall recurrence intervals of 2 and 100 years were modeled. Detailed results of the analysis are included in the attached Appendix and full output results area included in the CD attached to the Appendix.

Proposed Conditions

Within the site, the northern area of the site is planned to drain to SMA 1 (Figure 1). The SMA 1 watershed is 49.5 acres and the design Cn is 83. The available area for SMA 1was reduced to allow three soccer fields to be included in the project; therefore, available volume in SMA 2 was partially utilized to supplement the detention requirements for the SMA 1 watershed. SMA 1 will discharge to SMA 2 through culverts under Canal Street. The infiltrated water from SMA 1 will travel through the crushed concrete underdrain system to the southern swamp forest.

The southern area of the site is planned to drain to SMA 2. The SMA 2 watershed is 32.01 acres (Figure 1) and the design Cn is 88. Detention provided in SMA 2 is sufficient to reduce both the 2 and 100-year

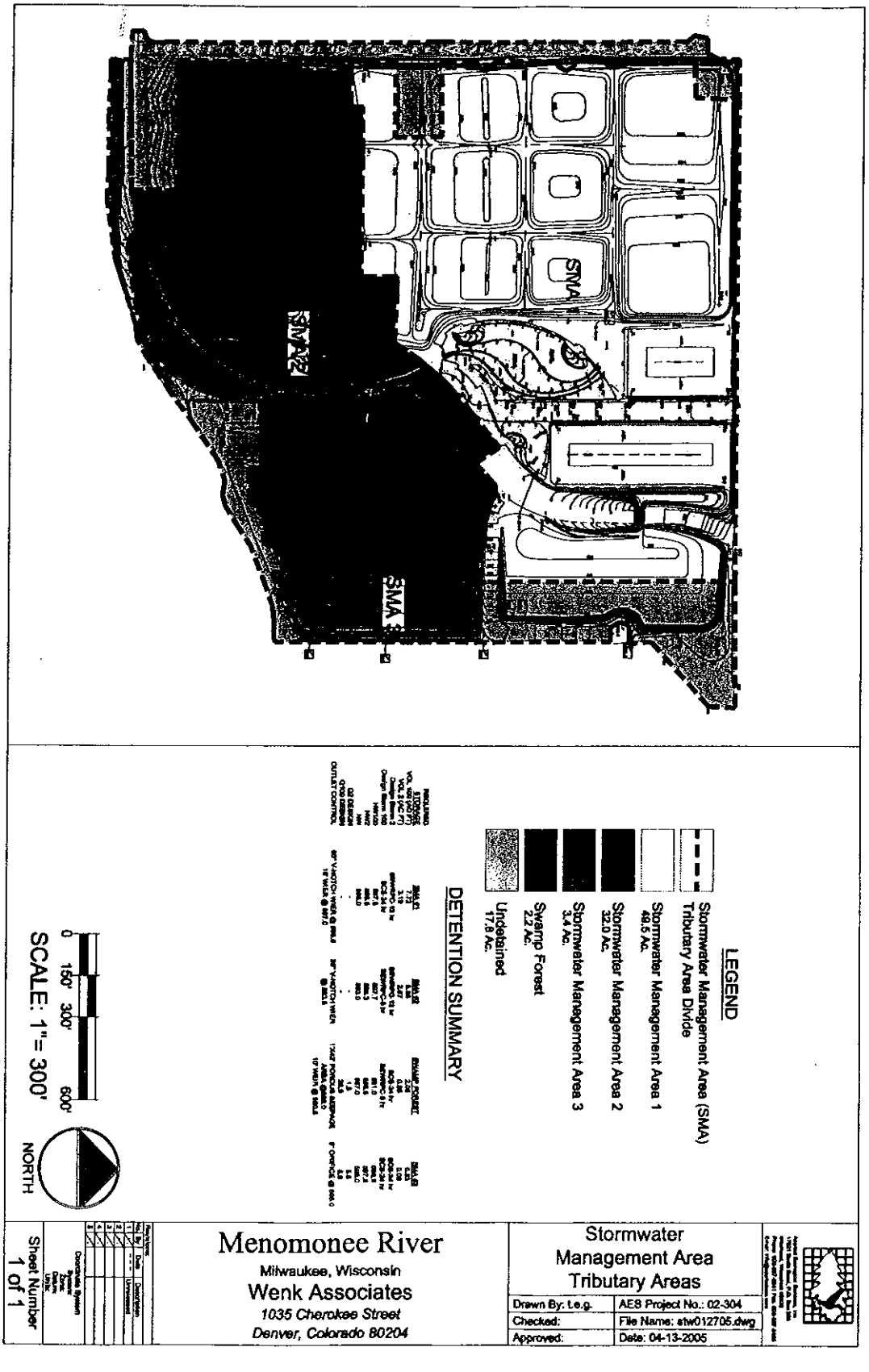
design stormwater release rates to below the City requirements. SMA 2 will discharge detained and treated stormwater to the swamp forest.

The swamp forest area is 2.22 acres (CN = 60). The outlet control invert will be set one foot above the bottom of the forest to provide the retention necessary for the swamp forest tree's water supply.

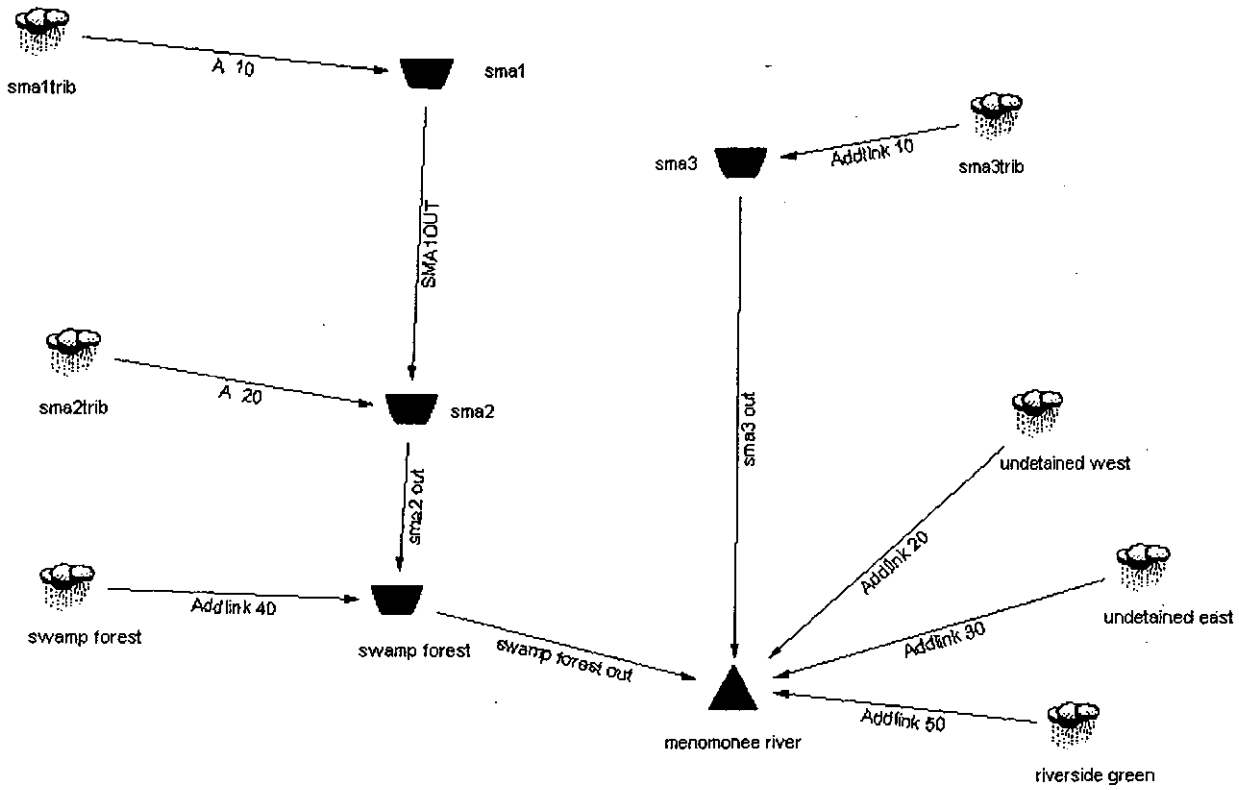
The southeastern area of the site is proposed to be drained to SMA 3 in the southeastern area of the site (Figure 1). The SMA 3 watershed is 3.42 acres and the design Cn is 92. The SMA 3 detention area will discharge directly to the Menomonee River.

Topographic constraints resulting from raising the developed site above existing floodplain elevations and consequently above the properties east and west of the site preclude stormwater runoff from the immediate areas adjacent to these sites from being detained. These areas and the area adjacent to the Menomonee River (17.8 acres) will have stormwater runoff routed directly to the River without detention. All water quality and runoff calculations and comparisons with existing conditions were made using undetained runoff from this 17.8 acre area.

FIGURE 1
DRAINAGE AREA MAP



. *FIGURE 2*
PROPOSED HYDROLOGIC MODEL SCHEMATIC



The hydrologic analysis showed that the proposed stormwater management system would enable the site to release less flow volume from the site compared with predevelopment conditions for the 9.5 hour critical period after the time of maximum storm intensity specified by MMSD.

TABLE 1
Critical Volume Duration Condition
(Ac.- Ft. of Runoff Volume During Critical Duration Period)

	2 Year Recurrence Interval Storm		100 Year Recurrence Interval Storm	
Storm Duration	**Predevelopment**	**Post-Development**	**Predevelopment**	**Post Development**
3 Hour	2.50	0.77	14.83	8.30
6 Hour	3.59	0.85	19.16	11.61
12 Hour	4.57	1.19	19.03	13.30
24 Hour	4.94	1.45	17.32	13.11
24 Hour SCS	5.84	2.76	25.81	17.97

Note: Critical duration is 9.5 hours for Menomonee River.

The high-water elevations and peak discharge ratios for the four stormwater basins are shown by Table 2. The swamp forest and SMA3 discharge to the Menomonee River. SMA1 discharges to SMA2, which in turn discharges to the Swamp Forest.

TABLE 2
Proposed Peak Discharge and Highwater Elevations

Detention Basin	Q_2 Peak Outflow (cfs)	Q_2 Peak Elevation	Q_{100} Peak Outflow (cfs)	Q_{100} Peak Elevation	Q_{100} Storage (ac. ft.)
SMA 1	2.80	596.8	46.51	597.8	7.72
SMA 2	3.44	595.3	27.85	597.7	8.96
SMA 3	5.48	597.5	8.92	598.9	0.33
Swamp Forest	1.45	588.6	26.9	591.0	2.08
Total From Site (Includes Undetained Area Runoff)	40.50		110.88		

Water Quality Analysis

The water quality enhancement system proposed for the CMC Yards development emphasizes both water quality enhancements using the treatment elements within the SMA's and the maximization of infiltration and transport of the infiltrated stormwater to the Menomonee River as baseflow.

Analysis of the effectiveness of the proposed treatment basins was done by modeling the treatment areas and the tributary areas for a representative period. This was done using Milwaukee hourly rainfall and average daily temperature information for the period between January 1, 1991 and December 31, 1999 as model input. Pollutant loadings were based on the NURP database recommendations. The water quality evaluation model P-8 was used for the analysis and to calculate expected removal rates of total suspended solids, total phosphorous, Kjeldahl nitrogen, petroleum hydrocarbons and several representative heavy metals.

The analysis included 761 storm events over the analysis period. Precipitation included both rainfall and snowmelt. The rainfall amount was 260.07 inches and the snowmelt was 22.36 inches for the 761 events.

Detailed results of the analysis are included in the Appendix and the removal summary of the four analyzed pollutants is tabulated following (Table 3).

TABLE 3
POLLUTANT REMOVAL SUMMARY

	Total suspended solids	*Total Phosphorous*	*Kjeldahl Nitrogen (TKN)*	*Petroleum Hydrocarbons*	*Zinc*	*Cu*	*Pb*
SMA 1	*84.2%*	*61.4%*	*57.0%*	*78.9%*	*57.0%*	*57.0%*	*78.9%*
SMA 2	*76.5%*	*46.5%*	*41.1%*	*67.1%*	*41.1%*	*41.1%*	*67.1%*
SMA 3	*60.3%*	*26.1%*	*22.5%*	*54.3%*	*22.5%*	*22.5%*	*54.3%*
Swamp Forest	*59.9%*	*42.4%*	*39.5%*	*48.7%*	*39.5%*	*39.5%*	*48.7%*
Undetained	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
TOTAL	*79.4%**	*65.6%*	*62.2%*	*75.6%*	*62.2%*	*62.2%*	*75.6%*
Total Average Annual Mass Removed (lbs)	*34,761*	*95.1*	*410.1*	*828.2*	*43.7*	*9.3*	*6.6*

**Catch basins will be installed as part of the stormwater system for the paved undetained areas to remove sediment. The use of these catch basins will allow the overall CMC system to exceed 80% TSS removal.*

Infiltration Area Design Life – Phosphorous capture and retention for peat systems is typically in the range of 0.002 pounds of phosphorous per pound of peat. The peat mass in the CMC water park is designed to be 9.36 pounds of peat per square foot of infiltration surface area (Appendix) based on an average peat/sand thickness of 3 feet in the infiltration areas and 50% peat in the peat/sand admixture. Using the annual phosphorous mass loadings obtained from the P-8 water quality analysis, the design life for the peat system infiltration element will be at least 25 years (Table 4). Detailed design life calculations are included in the Appendix.

TABLE 4
INFILTRATION AREA DESIGN LIFE

Rain Garden	*Surface Area (sq. ft.)*	*Phosphorous Retention Capacity (lb. P)*	*annual P loading (lb. P/ yr)*	*Design Life (yr)*
SMA 1 (50% peat)	*62,291*	*1,166.1*	*44.0*	*26.5*
SMA 2 (25% peat)	*91,911*	*859.4*	*33.4*	*25.7*

Appendix

Hydrologic Analysis SEWRPC Storms

Proposed Conditions

Existing Conditions

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Table of Contents (continued)

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=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
SMA1TRIB	AREA	2	2.004		2.9000	25.64		
SMA1TRIB	AREA	100	9.031		2.7500	89.38		
SMA1TRIB	AREA	3	2.726		5.7000	16.66		
SMA1TRIB	AREA	101	11.972		5.4000	57.11		
SMA1TRIB	AREA	2	4.572		21.6000	6.44		
SMA1TRIB	AREA	100	16.409		20.4000	18.86		
SMA1TRIB	AREA	2	3.560		2.8500	41.00		
SMA1TRIB	AREA	100	14.021		10.2500	32.82		
SMA1TRIB	AREA	5	3.064		2.8500	36.25		
SMA1TRIB	AREA	6	4.044		5.4500	22.98		
SMA1TRIB	AREA	5	5.113		10.8000	14.07		
SMA1TRIB	AREA	5	6.432		21.6000	8.55		
SMA2	POND	2	2.071		2.8500	21.39		
SMA2	POND	100	11.847		2.9000	88.94		
SMA2	POND	3	2.834		5.7000	13.81		
SMA2	POND	101	15.908		5.6500	69.55		
SMA2	POND	2	4.666		22.8000	6.07		
SMA2	POND	100	21.142		21.6000	25.84		
SMA2	POND	2	3.881		2.8500	32.97		
SMA2	POND	100	18.504		10.5500	43.09		
SMA2	POND	5	3.275		2.8500	29.32		
SMA2	POND	6	4.422		5.7000	19.35		
SMA2	POND	5	5.629		11.4000	13.21		
SMA2	POND	5	6.956		22.8000	8.92		

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=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
SMA3	IN POND	2	.272		2.7500	2.68		
SMA3	IN POND	100	.858		2.6500	7.22		
SMA3	IN POND	3	.340		5.4000	1.63		
SMA3	IN POND	101	1.082		5.1500	4.48		
SMA3	IN POND	2	.501		20.3500	.57		
SMA3	IN POND	100	1.411		20.3500	1.43		
SMA3	IN POND	2	.414		2.7000	3.83		
SMA3	IN POND	100	1.235		10.2000	2.53		
SMA3	IN POND	5	.370		2.7500	3.49		
SMA3	IN POND	6	.456		5.1500	2.10		
SMA3	IN POND	5	.546		10.2000	1.23		
SMA3	IN POND	5	.654		20.4000	.72		
SMA3	OUT POND	2	.272		2.9000	2.61	596.90	.042
SMA3	OUT POND	100	.858		2.9500	6.52	597.84	.131
SMA3	OUT POND	3	.340		5.4500	1.61	596.69	.029
SMA3	OUT POND	101	1.082		5.3500	4.42	597.23	.066
SMA3	OUT POND	2	.501		20.2000	.57	596.40	.015
SMA3	OUT POND	100	1.411		20.1500	1.42	596.65	.027
SMA3	OUT POND	2	.414		2.8500	3.73	597.11	.057
SMA3	OUT POND	100	1.235		10.2500	2.52	596.89	.041
SMA3	OUT POND	5	.370		2.9000	3.39	597.05	.052
SMA3	OUT POND	6	.456		5.4500	2.08	596.80	.035
SMA3	OUT POND	5	.546		10.2500	1.22	596.60	.024
SMA3	OUT POND	5	.653		20.2000	.72	596.45	.017

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=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
SWAMP FOREST IN	POND	2	.301		3.2000	.92		
SWAMP FOREST IN	POND	100	8.131		3.4500	19.96		
SWAMP FOREST IN	POND	3	.668		6.1000	1.83		
SWAMP FOREST IN	POND	101	11.725		6.1000	28.58		
SWAMP FOREST IN	POND	2	1.460		24.0500	2.55		
SWAMP FOREST IN	POND	100	15.306		23.2500	19.57		
SWAMP FOREST IN	POND	2	1.438		3.1000	3.59		
SWAMP FOREST IN	POND	100	13.803		12.0500	26.19		
SWAMP FOREST IN	POND	5	1.016		3.1000	2.70		
SWAMP FOREST IN	POND	6	1.758		6.1000	3.98		
SWAMP FOREST IN	POND	5	2.499		12.0500	4.80		
SWAMP FOREST IN	POND	5	3.120		24.0500	4.64		
SWAMP FOREST OUT	POND	2	.000		2.3000	.00	587.53	.301
SWAMP FOREST OUT	POND	100	7.541		4.3500	17.54	590.83	1.964
SWAMP FOREST OUT	POND	3	.078		14.3500	.13	588.05	.621
SWAMP FOREST OUT	POND	101	11.135		6.3500	26.87	590.96	2.081
SWAMP FOREST OUT	POND	2	.870		27.2500	1.21	588.46	.892
SWAMP FOREST OUT	POND	100	14.716		23.5000	19.57	590.86	1.991
SWAMP FOREST OUT	POND	2	.848		8.3000	1.18	588.44	.882
SWAMP FOREST OUT	POND	100	13.213		12.1000	26.02	590.95	2.071
SWAMP FOREST OUT	POND	5	.426		9.2500	.61	588.23	.739
SWAMP FOREST OUT	POND	6	1.168		10.8500	1.57	588.59	.983
SWAMP FOREST OUT	POND	5	1.909		15.6500	2.41	588.91	1.210
SWAMP FOREST OUT	POND	5	2.530		26.3000	3.08	589.16	1.383

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Project Engineer: eppich
Project Title: cmc proposed conditions
Project Comments:
project as revised on April 14, 2005 to reflect site plan adjustments.

sewrpc storms

DESIGN STORMS SUMMARY

Design Storm File,ID = milwaukee sewrpc

Storm Tag Name = 2y3h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 2.3 yr
Total Rainfall Depth= 1.6800 in
Duration Multiplier = 3
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 100y3h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 100.3 yr
Total Rainfall Depth= 3.8900 in
Duration Multiplier = 3
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 2y6h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 2.6 yr
Total Rainfall Depth= 1.9500 in
Duration Multiplier = 6
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Storm Tag Name = 100y6h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 100.6 yr
Total Rainfall Depth= 4.7000 in
Duration Multiplier = 6
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Project Engineer: eppich
Project Title: cmc proposed conditions
Project Comments:
project as revised on April 14, 2005 to reflect site plan adjustments.

sewrpc storms

DESIGN STORMS SUMMARY

Design Storm File,ID = milwaukee sewrpc

Storm Tag Name = 5y3hr

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 5.3 yr
Total Rainfall Depth= 2.0700 in
Duration Multiplier = 3
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 5y6h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 5.6 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 6
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Storm Tag Name = 5y12h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 5.12 yr
Total Rainfall Depth= 2.7400 in
Duration Multiplier = 12
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= .6000 hrs End= 12.0000 hrs

Storm Tag Name = 5y24h

Data Type, File, ID = Synthetic Storm sewrpc
Storm Frequency = 5.24 yr
Total Rainfall Depth= 3.1400 in
Duration Multiplier = 24
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 6)
Output Time increment = .3000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0078	.0254	.0527	.0897
1.5000	.1365	.1931	.2613	.3393	.4271
3.0000	.5246	.6318	.7508	.8795	1.0179
4.5000	1.1661	1.3241	1.4937	1.6595	1.8174
6.0000	1.9500				

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 3)
Output Time increment = .1500 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0090	.0291	.0605	.1030
.7500	.1568	.2218	.3002	.3898	.4906
1.5000	.6026	.7258	.8624	1.0102	1.1693
2.2500	1.3395	1.5210	1.7158	1.9062	2.0877
3.0000	2.2400				

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 12)
Output Time increment = .6000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0110	.0356	.0740	.1260
3.0000	.1918	.2713	.3672	.4768	.6001
6.0000	.7371	.8878	1.0549	1.2357	1.4303
9.0000	1.6385	1.8605	2.0988	2.3317	2.5537
12.0000	2.7400				

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 3)
Output Time increment = .1500 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0083	.0269	.0559	.0952
.7500	.1449	.2049	.2774	.3602	.4533
1.5000	.5568	.6707	.7970	.9336	1.0805
2.2500	1.2379	1.4055	1.5856	1.7616	1.9292
3.0000	2.0700				

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 24)
Output Time increment = 1.2000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0235	.0764	.1588	.2705
6.0000	.4116	.5821	.7879	1.0231	1.2877
12.0000	1.5817	1.9051	2.2638	2.6519	3.0694
18.0000	3.5162	3.9925	4.5041	5.0039	5.4802
24.0000	5.8800				

CUMULATIVE RAINFALL DEPTHS (in)
(Duration was multiplied by: 6)
Output Time increment = .3000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0188	.0611	.1269	.2162
1.5000	.3290	.4653	.6298	.8178	1.0293
3.0000	1.2643	1.5228	1.8095	2.1197	2.4534
4.5000	2.8106	3.1913	3.6002	3.9997	4.3804
6.0000	4.7000				

Name.... SMA1TRIB

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RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
sma with good infiltration	30	6.750			30.00
green area	79	7.710			79.00
developed area	94	35.010			94.00
COMPOSITE AREA & WEIGHTED CN --->		49.470			82.93 (83)

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RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
developed area	94	2.860			94.00
green area detention	79	.560			79.00
COMPOSITE AREA & WEIGHTED CN --->		3.420			91.54 (92)

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RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
developed	94	4.060			94.00
green area	79	1.770			79.00-
COMPOSITE AREA & WEIGHTED CN --->		5.830			89.45 (89)

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
595.00	-----	1.2100	.0000	.000	.000
596.00	-----	1.4000	3.9115	1.304	1.304
597.00	-----	3.4300	7.0213	2.340	3.644
598.00	-----	6.6900	14.9103	4.970	8.614

POND VOLUME EQUATIONS

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

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*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

Name.... SMA3

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
596.00	-----	.0300	.0000	.000	.000
597.00	-----	.0700	.1458	.049	.049
598.00	-----	.1400	.3090	.103	.152
599.00	-----	.2800	.6180	.206	.358
600.00	-----	.4200	1.0429	.348	.705

POND VOLUME EQUATIONS

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

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*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.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 595.00 ft
Increment = .50 ft
Max. Elev.= 598.00 ft

****
OUTLET CONNECTIVITY
****

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

Structure	No.		Outfall	El, ft	E2, ft
Weir-Rectangular	w2	--->	TW	597.000	598.000
Weir-Vnotch	w1	--->	TW	595.500	598.000
Culvert-Circular	c	--->	TW	597.000	598.000

TW SETUP, DS Channel

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID	= c	
Structure Type	= Culvert-Circular	
No. Barrels	= 1	
Barrel Diameter	= .0010	ft
Upstream Invert	= 593.00	ft
Dnstream Invert	= 592.50	ft
Horiz. Length	= 300.00	ft
Barrel Length	= 300.00	ft
Barrel Slope	= .00167	ft/ft

OUTLET CONTROL DATA...

Mannings n	= .0130	
Ke	= .0500	(forward entrance loss)
Kb	= 312.736200	(per ft of full flow)
Kr	= .0500	(reverse entrance loss)
HW Convergence	= .001	+/- ft

INLET CONTROL DATA...

Equation form	= 1	
Inlet Control K	= .0078	
Inlet Control M	= 2.0000	
Inlet Control c	= .02920	
Inlet Control Y	= .7400	
T1 ratio (HW/D)	= .791	
T2 ratio (HW/D)	= 1.206	
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 =	593.00 ft	--->	Flow =	.00 cfs
At T2 Elev =	593.00 ft	--->	Flow =	.00 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = w
Structure Type = Weir-Vnotch

# of Openings = 1
Notch Elev. = 593.50 ft
Notch Angle = 35.000 degrees
Weir Coeff. = .580000

Weir TW effects (Use adjustment equation)

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

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = O1
Structure Type = Orifice-Circular

# of Openings = 1
Invert Elev. = 596.00 ft
Diameter = 1.2500 ft
Orifice Coeff. = .600

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

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = u1
Structure Type = User Defined Table

ELEV-FLOW RATING TABLE

Elev, ft	Flow, cfs
587.00	.00
588.00	.00
588.50	1.33
589.00	2.66
589.50	3.99
590.00	5.32
590.50	6.65
591.00	7.98
591.50	9.31
592.00	10.64

Structure ID = W1
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	592.00
.10	591.00
16.00	590.50
26.00	590.50
42.00	591.00
42.10	592.00

Lowest Elev. = 590.50 ft

Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Name.... SMA3
File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\miscellaneous\
Inflow HYG file = work_pad.hyg - SMA3 IN 2y3h
Outflow HYG file = work_pad.hyg - SMA3 OUT 2y3h

Pond Node Data = SMA3
Pond Volume Data = SMA3
Pond Outlet Data = SMA3OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	596.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
596.00	.00	.000	.0300	.00	.00	.00
596.10	.04	.003	.0332	.00	.04	1.57
596.20	.15	.007	.0367	.00	.15	3.37
596.30	.33	.010	.0402	.00	.33	5.41
596.40	.57	.015	.0440	.00	.57	7.69
596.50	.88	.019	.0479	.00	.88	10.22
596.60	1.24	.024	.0520	.00	1.24	13.00
596.70	1.64	.030	.0562	.00	1.64	16.02
596.80	2.10	.036	.0607	.00	2.10	19.31
596.90	2.59	.042	.0652	.00	2.59	22.85
597.00	3.11	.049	.0700	.00	3.11	26.64
597.10	3.66	.056	.0759	.00	3.66	30.71
597.20	4.22	.064	.0821	.00	4.22	35.10
597.30	4.85	.072	.0885	.00	4.85	39.86
597.40	5.20	.082	.0951	.00	5.20	44.65
597.50	5.53	.091	.1020	.00	5.53	49.74
597.60	5.83	.102	.1091	.00	5.83	55.16
597.70	6.12	.113	.1165	.00	6.12	60.91
597.80	6.40	.125	.1241	.00	6.40	67.01
597.90	6.67	.138	.1319	.00	6.67	73.47

Name.... SMA3
File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\miscellaneous\
Inflow HYG file = work_pad.hyg - SMA3 IN 2y3h
Outflow HYG file = work_pad.hyg - SMA3 OUT 2y3h

Pond Node Data = SMA3
Pond Volume Data = SMA3
Pond Outlet Data = SMA3OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	596.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
600.00	10.85	.705	.4200	.00	10.85	352.19

Name.... SWAMP FOREST
File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCPROPOSED041405.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\miscellaneous\
Inflow HYG file = work_pad.hyg - SWAMP FOREST IN 2y3h
Outflow HYG file = work_pad.hyg - SWAMP FOREST OUT 2y3h

Pond Node Data = SWAMP FOREST
Pond Volume Data = SWAMP FOREST
Pond Outlet Data = swampforest

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	587.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
589.00	2.66	1.279	.7400	.00	2.66	621.54
589.10	2.93	1.348	.6460	.00	2.93	655.32
589.20	3.19	1.408	.5583	.00	3.19	684.71
589.30	3.46	1.460	.4770	.00	3.46	710.00
589.40	3.72	1.504	.4021	.00	3.72	731.52
589.50	3.99	1.540	.3336	.00	3.99	749.56
589.60	4.26	1.571	.2715	.00	4.26	764.44
589.70	4.52	1.595	.2158	.00	4.52	776.48
589.80	4.79	1.614	.1665	.00	4.79	785.97
589.90	5.05	1.628	.1235	.00	5.05	793.23
590.00	5.32	1.639	.0870	.00	5.32	798.56
590.10	5.59	1.650	.1361	.00	5.59	804.18
590.20	5.85	1.667	.1961	.00	5.85	812.45
590.30	6.12	1.690	.2671	.00	6.12	823.87
590.40	6.38	1.720	.3490	.00	6.38	839.01
590.50	6.65	1.760	.4418	.00	6.65	858.36
590.60	8.08	1.809	.5455	.00	8.08	883.64
590.70	11.08	1.869	.6603	.00	11.08	915.78
590.80	15.71	1.941	.7859	.00	15.71	955.36
590.90	22.15	2.027	.9225	.00	22.15	1003.12

Job File: C:\Program Files\Haestad\PPKW\miscellaneous\CMCEXISTING041405.PPW
Rain Dir: C:\Program Files\Haestad\PPKW\miscellaneous\

==========
JOB TITLE
==========

Project Date: 4/14/2005
Project Engineer: eppich
Project Title: cmc existing conditions
Project Comments:
existing conditions per hntb analysis of preconstruction site conditions, added 11.63 acres of brush, woods on 4/14/05 for consistency with proposed conditions modeling.

sewrpc storms

File.... C:\Program Files\Haestad\PPKW\miscellaneous\
Title... Project Date: 4/14/2005
Project Engineer: eppich
Project Title: cmc existing conditions
Project Comments:
existing conditions per hntb analysis of
preconstruction site conditions, added 11.63 acres
of brush, woods on 4/14/05 for consistency with
proposed conditions modeling.

sewrpc storms

DESIGN STORMS SUMMARY

Design Storm File,ID = sewrpc storms

Storm Tag Name = 2y24h

Data Type, File, ID = Synthetic Storm sewerpc
Storm Frequency = 2.24 yr
Total Rainfall Depth= 2.5700 in
Duration Multiplier = 24
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

Storm Tag Name = 100y12

Data Type, File, ID = Synthetic Storm sewerpc
Storm Frequency = 100.12 yr
Total Rainfall Depth= 5.2500 in
Duration Multiplier = 12
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= .6000 hrs End= 12.0000 hrs

Storm Tag Name = 5y12h

Data Type, File, ID = Synthetic Storm sewerpc
Storm Frequency = 5.12 yr
Total Rainfall Depth= 2.7400 in
Duration Multiplier = 12
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= .6000 hrs End= 12.0000 hrs

Storm Tag Name = 2y12hr

Data Type, File, ID = Synthetic Storm sewerpc
Storm Frequency = 2.12 yr
Total Rainfall Depth= 2.2400 in
Duration Multiplier = 12
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= .6000 hrs End= 12.0000 hrs

Type.... Tc Calcs
Name.... EXISTING

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCEXISTING041405.PPW

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

==== SCS TR-55 Sheet Flow ====

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

Hydrologic Analysis SCS Storms

Proposed Conditions

Existing Conditions

Table of Contents

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=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
SMA1		POND	100	16.405		12.0000	261.55		
SMA1		POND	2	4.571		12.0000	74.36		
SMA1		POND	5	6.802		12.0000	110.99		
SMA1	OUT	POND	100	9.647		12.2500	46.51	597.82	7.715
SMA1	OUT	POND	2	1.030		13.7500	1.45	596.51	2.488
SMA1	OUT	POND	5	2.278		13.1500	3.86	596.99	3.611
SMA1TRIB		AREA	100	16.405		12.0000	261.55		
SMA1TRIB		AREA	2	4.571		12.0000	74.36		
SMA1TRIB		AREA	5	6.802		12.0000	110.99		
SMA2		POND	100	21.677		12.0000	205.32		
SMA2		POND	2	4.874		12.0000	62.68		
SMA2		POND	5	7.724		12.0000	88.50		
SMA2	OUT	POND	100	16.192		13.0500	26.62	597.59	8.737
SMA2	OUT	POND	2	1.906		14.4500	2.29	595.03	2.384
SMA2	OUT	POND	5	4.046		14.0500	4.97	595.58	3.442
SMA2TRIB		AREA	100	12.030		12.0000	186.49		
SMA2TRIB		AREA	2	3.845		12.0000	62.53		
SMA2TRIB		AREA	5	5.446		12.0000	87.74		
SMA3	IN	POND	100	1.411		12.0000	21.15		
SMA3	IN	POND	2	.501		12.0000	7.97		
SMA3	IN	POND	5	.683		12.0000	10.70		

File.... C:\Program Files\Haestad\PPKW\miscellaneous\
Title... Project Date: 4/14/2005
Project Engineer: eppich
Project Title: cmc proposed conditions
Project Comments:
project as revised on April 14, 2005 to reflect site plan adjustments.

scs storms

DESIGN STORMS SUMMARY

Design Storm File,ID = milwaukee 24 hou

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.8800 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.5700 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.2500 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Name.... milwaukee 24 hou

File.... C:\Program Files\Haestad\PPKW\miscellaneous\
Title... Project Date: 4/14/2005
Project Engineer: eppich
Project Title: cmc existing conditions
Project Comments:
existing conditions per hntb analysis of
preconstruction site conditions, added 11.63 acres
of brush, woods on 4/14/05 for consistency with
proposed conditions modeling.
scs storms

DESIGN STORMS SUMMARY

Design Storm File,ID = milwaukee 24 hou

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.8800 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.5700 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.2500 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... C:\Program Files\Haestad\PPKW\miscellaneous\CMCEXISTING041405.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

Existing Conditions Model Input Data
Volumetric Analysis for the Shops Site

Measured footprints of structures to determine impervious areas because many of the foundations were in place

	Area	
ID	sq. ft.	acres
Wheel house (tracks)	78,000	1.79
LD-35	103,720	2.38
CD-59	1,186	0.03
LD-36	92,065	2.11
LD-37	76,945	1.77
CD-25/26	43,903	1.01
LD-41	6,456	0.15
LD-42	10,175	0.23
CD-71	12,576	0.29
CD-75	3,742	0.09
SD-33	1,490	0.03
SD-37	9,715	0.22
SD-17	7,000	0.16
SD-43	111,279	2.55
LD-32	16,700	0.38
SD-27	8,447	0.19
SD-27	5,429	0.12
CD-72	3,429	0.08
RR	10,380	0.24
RR	13,664	0.31
RR	10,528	0.24
RR	6,324	0.15
RR	10,189	0.23
Total	**643,342**	**14.77**

Curve Number Determination

Brush/weeds/grass, B soils(foundry sand, fill), good

CN = 48
Approximate Area = 15.6 Acres

Impervious Surfaces

CN = 98
Approximate Area = 14.77 Acres

Open space, rubble, B soils, poor

CN = 79
Approximate Area = 74.5 Acres

Total Area = 104.87 Acres
Composite CN 77.1

Tc Information

Dense underbrush in areas,
other areas with broken up concrete,
rubble and some vegetation -> n = 0.41

Sheet flow:

Length = 300 ft.
P2 = 2.57 in.
Slope = 0.001

No Shallow Concentrated Flow

Pipe:

Length = 1715 ft.
Slope = 0.003 approx.
Velocity = 3 ft/sec

Hydrologic Analysis – Volumetric Detention Calculations

Proposed Conditions

Existing Conditions

Proposed Condition
2-Year Recurrence Interval
SEWRPC 3-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
2.3	10.6	11.15	11.7	12.2	12.8					
2.55	13.38	13.83	14.12	14.33	14.49	0.054	0.110	0.168	0.227	0.286
2.8	14.52	14.52	14.41	13.94	13.37	0.346	0.406	0.466	0.525	0.581
3.05	12.12	9	5.52	3.3	2.07	0.634	0.677	0.707	0.726	0.737
3.3	1.35	0.92	0.65	0.48	0.36	0.744	0.748	0.752	0.754	0.756
3.55	0.29	0.24	0.19	0.16	0.14	0.757	0.758	0.759	0.760	0.760
3.8	0.12	0.11	0.09	0.08	0.07	0.761	0.761	0.762	0.762	0.763
4.05	0.06	0.05	0.05	0.04	0.04	0.763	0.763	0.763	0.763	0.764
4.3	0.04	0.03	0.03	0.03	0.03	0.764	0.764	0.764	0.764	0.764
4.55	0.03	0.03	0.02	0.02	0.02	0.764	0.765	0.765	0.765	0.765
4.8	0.02	0.02	0.02	0.02	0.02	0.765	0.765	0.765	0.765	0.765
5.05	0.02	0.02	0.02	0.01	0.01	0.765	0.765	0.765	0.766	0.766
5.3	0.01	0.01	0.01	0.01	0.01	0.766	0.766	0.766	0.766	0.766
5.55	0.01	0.01	0.01	0.01	0.01	0.766	0.766	0.766	0.766	0.766
5.8	0.01	0.01	0.01	0.01	0.01	0.766	0.766	0.766	0.766	0.766
6.05	0.01	0.01	0.01	0.01	0.01	0.766	0.766	0.766	0.766	0.766
6.3	0	0	0	0	0	0.766	0.766	0.766	0.766	0.766
6.55	0	0	0	0	0	0.766	0.766	0.766	0.766	0.766
6.8	0	0				0.766	0.766	0.766	0.766	0.766

Proposed Condition
100-Year Recurrence Interval
SEWRPC 3-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
2.5	38.66	39.88	40.68	41.06	41.25		0.162	0.329	0.498	0.668
2.75	41.33	41.1	40.8	40.25	38.79	0.838	1.009	1.178	1.345	1.509
3	37.39	34.22	26.06	17.18	11.8	1.666	1.814	1.938	2.028	2.088
3.25	8.93	6.82	5.55	4.8	4.4	2.131	2.163	2.189	2.210	2.229
3.5	4.26	4.32	4.57	5.09	6.15	2.247	2.265	2.283	2.303	2.326
3.75	6.66	7.24	8.81	10.77	12.62	2.353	2.381	2.415	2.455	2.503
4	14.12	15.23	16.07	16.72	17.15	2.559	2.619	2.684	2.752	2.822
4.25	17.4	17.54	17.59	17.58	17.52	2.893	2.965	3.038	3.110	3.183
4.5	17.43	17.31	17.17	17.01	16.84	3.255	3.327	3.398	3.469	3.539
4.75	16.66	16.47	16.29	16.09	15.9	3.608	3.676	3.744	3.811	3.877
5	15.71	15.53	15.35	15.17	14.98	3.942	4.007	4.071	4.134	4.196
5.25	14.79	14.6	14.41	14.21	14.02	4.258	4.318	4.378	4.437	4.496
5.5	13.82	13.63	13.43	13.24	13.04	4.553	4.610	4.666	4.721	4.775
5.75	12.85	12.67	12.49	12.32	12.16	4.829	4.881	4.933	4.985	5.035
6	12	11.84	11.68	11.53	11.38	5.085	5.134	5.183	5.231	5.278
6.25	11.24	11.09	10.97	10.86	10.73	5.325	5.371	5.417	5.462	5.507
6.5	10.61	10.49	10.36	10.23	10.1	5.551	5.594	5.637	5.680	5.722
6.75	9.98	9.85	9.72	9.59	9.47	5.763	5.804	5.845	5.885	5.924
7	9.34	9.22	9.09	8.97	8.85	5.963	6.001	6.039	6.076	6.113
7.25	8.73	8.61	8.49	8.37	8.26	6.149	6.185	6.221	6.255	6.290
7.5	8.14	8.05	7.98	7.9	7.82	6.324	6.357	6.390	6.423	6.456
7.75	7.74	7.65	7.57	7.48	7.39	6.488	6.520	6.551	6.582	6.613
8	7.29	7.2	7.11	7.02	6.92	6.643	6.673	6.703	6.732	6.761
8.25	6.83	6.73	6.65	6.62	6.6	6.789	6.817	6.845	6.872	6.899
8.5	6.57	6.55	6.52	6.48	6.45	6.927	6.954	6.981	7.008	7.034
8.75	6.42	6.38	6.34	6.29	6.24	7.061	7.087	7.114	7.140	7.166
9	6.19	6.14	6.07	6.01	5.94	7.191	7.217	7.242	7.267	7.292
9.25	5.87	5.78	5.68	5.59	5.47	7.316	7.340	7.364	7.387	7.410
9.5	5.35	5.23	5.12	5.02	4.95	7.432	7.454	7.476	7.496	7.517
9.75	4.88	4.8	4.75	4.7	4.64	7.537	7.557	7.577	7.597	7.616
10	4.59	4.54	4.5	4.46	4.42	7.635	7.654	7.673	7.691	7.709
10.25	4.38	4.34	4.3	4.26	4.23	7.728	7.746	7.763	7.781	7.799
10.5	4.19	4.16	4.13	4.1	4.06	7.816	7.833	7.850	7.867	7.884
10.75	4.03	3.99	3.97	3.94	3.91	7.901	7.918	7.934	7.950	7.967
11	3.88	3.85	3.82	3.79	3.76	7.983	7.999	8.015	8.030	8.046
11.25	3.73	3.71	3.68	3.66	3.63	8.061	8.077	8.092	8.107	8.122
11.5	3.6	3.58	3.55	3.53	3.5	8.137	8.152	8.167	8.181	8.196
11.75	3.47	3.45	3.42	3.4	3.38	8.210	8.225	8.239	8.253	8.267
12	3.36	3.33	3.31	3.28	3.26	8.281	8.295			

Proposed Condition
2-Year Recurrence Interval
SEWRPC 6-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
4.95	8.37	8.54	8.68	8.78	8.85			0.036	0.072	0.108
5.2	8.88	8.9	8.93	8.97	9.02	0.145	0.181	0.218	0.255	0.292
5.45	9.03	8.98	8.91	8.88	8.88	0.330	0.367	0.404	0.441	0.477
5.7	8.9	8.82	8.51	8.15	7.93	0.514	0.551	0.587	0.621	0.654
5.95	7.82	7.74	7.18	5.35	3.3	0.687	0.719	0.750	0.776	0.793
6.2	1.97	1.25	0.82	0.58	0.42	0.804	0.811	0.815	0.818	0.820
6.45	0.32	0.25	0.2	0.17	0.14	0.822	0.823	0.824	0.825	0.825
6.7	0.12	0.11	0.1	0.08	0.07	0.826	0.826	0.827	0.827	0.827
6.95	0.06	0.06	0.05	0.04	0.04	0.828	0.828	0.828	0.828	0.828
7.2	0.04	0.03	0.03	0.03	0.03	0.829	0.829	0.829	0.829	0.829
7.45	0.03	0.03	0.03	0.02	0.02	0.829	0.829	0.830	0.830	0.830
7.7	0.02	0.02	0.02	0.02	0.02	0.830	0.830	0.830	0.830	0.830
7.95	0.02	0.02	0.02	0.01	0.01	0.830	0.830	0.830	0.830	0.830
8.2	0.01	0.01	0.01	0.01	0.01	0.831	0.831	0.831	0.831	0.831
8.45	0.01	0.01	0.01	0.01	0.01	0.831	0.831	0.831	0.831	0.831
8.7	0.01	0.01	0.01	0.01	0.01	0.831	0.831	0.831	0.831	0.831
8.95	0.01	0.01	0.01	0.01	0.01	0.831	0.831	0.831	0.831	0.831
9.2	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
9.45	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
9.7	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
9.95	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
10.2	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
10.45	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
10.7	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
10.95	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
11.2	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
11.45	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
11.7	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
11.95	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
12.2	0	0	0	0	0	0.831	0.831	0.831	0.831	0.831
12.45	0.01	0.01	0.02	0.02	0.03	0.831	0.831	0.831	0.832	0.832
12.7	0.04	0.04	0.05	0.05	0.06	0.832	0.832	0.832	0.832	0.833
12.95	0.06	0.07	0.07	0.07	0.08	0.833	0.833	0.833	0.834	0.834
13.2	0.08	0.09	0.09	0.09	0.1	0.834	0.835	0.835	0.835	0.836
13.45	0.1	0.1	0.1	0.11	0.11	0.836	0.837	0.837	0.837	0.838
13.7	0.11	0.11	0.12	0.12	0.12	0.838	0.839	0.839	0.840	0.840
13.95	0.12	0.12	0.12	0.12	0.13	0.841	0.841	0.842	0.842	0.843
14.2	0.13	0.13	0.13	0.13	0.13	0.843	0.844	0.844	0.845	0.845
14.45	0.13	0.13	0.13	0.13	0.13	0.846	0.847	0.847	0.848	
14.7	0.13	0.13	0.13	0.13	0.13					

Proposed Condition
100-Year Recurrence Interval
SEWRPC 6-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
4.9	24.82	25.57	26.17	26.64	27.03					0.111
5.15	27.34	27.52	27.68	27.89	28.15	0.223	0.337	0.451	0.565	0.681
5.4	28.43	28.63	28.64	28.65	28.83	0.798	0.916	1.034	1.153	1.271
5.65	29.22	29.89	31	30.72	31.9	1.391	1.514	1.639	1.767	1.896
5.9	34.76	37.85	40.8	41.67	38.48	2.034	2.184	2.346	2.517	2.682
6.15	34.14	31.31	29.78	28.87	28.27	2.833	2.968	3.094	3.215	3.333
6.4	27.8	27.4	27.03	26.67	26.32	3.449	3.563	3.676	3.787	3.896
6.65	25.98	25.65	25.33	25.03	24.75	4.004	4.111	4.216	4.320	4.423
6.9	24.49	24.24	24	23.77	23.54	4.525	4.625	4.725	4.824	4.921
7.15	23.3	23.06	22.81	22.55	22.3	5.018	5.114	5.209	5.303	5.395
7.4	22.05	21.81	21.58	21.34	21.11	5.487	5.577	5.667	5.756	5.843
7.65	20.87	20.64	20.41	20.17	19.93	5.930	6.016	6.101	6.185	6.268
7.9	19.69	19.45	19.21	18.97	18.74	6.349	6.430	6.510	6.589	6.667
8.15	18.5	18.28	18.06	17.84	17.62	6.744	6.820	6.895	6.969	7.042
8.4	17.41	17.19	16.98	16.76	16.55	7.115	7.186	7.257	7.327	7.395
8.65	16.34	16.12	15.91	15.7	15.52	7.463	7.530	7.597	7.662	7.726
8.9	15.33	15.14	14.95	14.75	14.55	7.790	7.853	7.915	7.977	8.037
9.15	14.35	14.15	13.95	13.75	13.55	8.097	8.156	8.214	8.271	8.327
9.4	13.35	13.15	12.95	12.76	12.58	8.383	8.438	8.492	8.545	8.597
9.65	12.4	12.23	12.07	11.91	11.75	8.649	8.700	8.750	8.799	8.848
9.9	11.59	11.44	11.29	11.14	11.01	8.897	8.944	8.991	9.037	9.083
10.15	10.9	10.77	10.65	10.53	10.4	9.128	9.173	9.217	9.261	9.304
10.4	10.27	10.14	10.01	9.89	9.76	9.347	9.389	9.431	9.472	9.513
10.65	9.63	9.5	9.38	9.25	9.13	9.553	9.592	9.631	9.670	9.708
10.9	9.01	8.88	8.76	8.64	8.52	9.745	9.782	9.819	9.855	9.890
11.15	8.41	8.29	8.17	8.07	8	9.925	9.960	9.994	10.027	10.060
11.4	7.92	7.84	7.76	7.67	7.59	10.093	10.126	10.158	10.190	10.221
11.65	7.5	7.41	7.32	7.22	7.13	10.253	10.283	10.314	10.344	10.373
11.9	7.04	6.94	6.85	6.75	6.66	10.403	10.432	10.460	10.488	10.516
12.15	6.63	6.61	6.58	6.55	6.52	10.543	10.571	10.598	10.625	10.652
12.4	6.49	6.46	6.42	6.39	6.34	10.679	10.706	10.732	10.759	10.785
12.65	6.3	6.25	6.2	6.15	6.09	10.811	10.837	10.863	10.888	10.914
12.9	6.02	5.95	5.88	5.79	5.7	10.939	10.963	10.988	11.012	11.036
13.15	5.61	5.49	5.37	5.25	5.13	11.059	11.082	11.105	11.126	11.148
13.4	5.03	4.96	4.89	4.81	4.76	11.169	11.190	11.210	11.230	11.250
13.65	4.7	4.65	4.6	4.55	4.5	11.269	11.289	11.308	11.327	11.345
13.9	4.46	4.42	4.38	4.34	4.3	11.364	11.382	11.400	11.418	11.436
14.15	4.26	4.23	4.2	4.17	4.13	11.454	11.471	11.489	11.506	11.523
14.4	4.1	4.07	4.03	4	3.97	11.540	11.557	11.574	11.590	11.607

Proposed Condition
2-Year Recurrence Interval
SEWRPC 12-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
10	5.31	5.33	5.35	5.37	5.39			0.022	0.044	0.066
10.25	5.4	5.39	5.37	5.36	5.37	0.089	0.111	0.133	0.155	0.178
10.5	5.38	5.39	5.4	5.41	5.42	0.200	0.222	0.244	0.267	0.289
10.75	5.44	5.45	5.44	5.39	5.34	0.312	0.334	0.357	0.379	0.401
11	5.3	5.29	5.29	5.29	5.3	0.423	0.445	0.467	0.489	0.511
11.25	5.3	5.31	5.32	5.33	5.28	0.532	0.554	0.576	0.598	0.620
11.5	5.08	4.86	4.72	4.64	4.6	0.642	0.662	0.682	0.701	0.720
11.75	4.58	4.57	4.57	4.56	4.56	0.739	0.758	0.777	0.796	0.815
12	4.55	4.22	3.15	1.94	1.17	0.834	0.852	0.867	0.878	0.884
12.25	0.76	0.51	0.37	0.28	0.22	0.888	0.891	0.892	0.894	0.895
12.5	0.17	0.14	0.13	0.11	0.1	0.896	0.896	0.897	0.897	0.898
12.75	0.08	0.07	0.06	0.06	0.05	0.898	0.898	0.899	0.899	0.899
13	0.04	0.04	0.04	0.03	0.03	0.899	0.899	0.900	0.900	0.900
13.25	0.03	0.03	0.03	0.03	0.03	0.900	0.900	0.900	0.900	0.901
13.5	0.02	0.02	0.02	0.02	0.02	0.901	0.901	0.901	0.901	0.901
13.75	0.02	0.02	0.03	0.06	0.09	0.901	0.901	0.901	0.901	0.902
14	0.11	0.14	0.16	0.19	0.21	0.902	0.903	0.903	0.904	0.905
14.25	0.24	0.26	0.28	0.3	0.32	0.906	0.907	0.908	0.909	0.910
14.5	0.34	0.36	0.38	0.4	0.42	0.912	0.913	0.915	0.916	0.918
14.75	0.43	0.45	0.46	0.48	0.49	0.920	0.922	0.923	0.925	0.927
15	0.51	0.52	0.53	0.55	0.56	0.930	0.932	0.934	0.936	0.938
15.25	0.57	0.58	0.59	0.6	0.61	0.941	0.943	0.945	0.948	0.950
15.5	0.62	0.63	0.64	0.65	0.65	0.953	0.956	0.958	0.961	0.964
15.75	0.66	0.66	0.67	0.68	0.68	0.966	0.969	0.972	0.974	0.977
16	0.69	0.69	0.7	0.7	0.71	0.980	0.983	0.986	0.989	0.992
16.25	0.71	0.71	0.72	0.72	0.72	0.995	0.998	1.000	1.003	1.006
16.5	0.72	0.73	0.73	0.73	0.73	1.009	1.012	1.015	1.018	1.021
16.75	0.73	0.73	0.73	0.73	0.73	1.024	1.027	1.030	1.034	1.037
17	0.73	0.73	0.73	0.73	0.73	1.040	1.043	1.046	1.049	1.052
17.25	0.73	0.73	0.73	0.73	0.73	1.055	1.058	1.061	1.064	1.067
17.5	0.73	0.73	0.73	0.73	0.73	1.070	1.073	1.076	1.079	1.082
17.75	0.72	0.72	0.72	0.72	0.72	1.085	1.088	1.091	1.094	1.097
18	0.72	0.72	0.71	0.71	0.71	1.100	1.103	1.106	1.109	1.111
18.25	0.71	0.71	0.7	0.7	0.7	1.114	1.117	1.120	1.123	1.126
18.5	0.7	0.69	0.69	0.69	0.69	1.129	1.132	1.135	1.137	1.140
18.75	0.68	0.68	0.68	0.67	0.67	1.143	1.146	1.149	1.152	1.154
19	0.67	0.67	0.66	0.66	0.66	1.157	1.160	1.163	1.165	1.168
19.25	0.65	0.65	0.65	0.64	0.64	1.171	1.173	1.176	1.179	1.181
19.5	0.64	0.63	0.63	0.62	0.62	1.184	1.187			

Proposed Condition
100-Year Recurrence Interval
SEWRPC 12-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
9.95	18.63	19.01	19.49	20.31	21.04					
10.2	21.44	21.84	22.95	24.59	26.13	0.088	0.177	0.270	0.368	0.473
10.45	27.77	29.12	30.26	31.34	32.29	0.584	0.702	0.824	0.952	1.083
10.7	33.09	33.78	34.39	34.9	35.23	1.218	1.356	1.497	1.640	1.785
10.95	35.51	35.81	36.15	36.49	36.85	1.931	2.079	2.227	2.378	2.529
11.2	37.2	37.53	37.85	38.15	38.44	2.682	2.836	2.992	3.149	3.307
11.45	38.55	38.24	37.84	37.62	37.56	3.467	3.625	3.782	3.938	4.094
11.7	37.57	37.61	37.67	37.74	37.83	4.249	4.404	4.560	4.715	4.872
11.95	37.91	37.97	37.16	34.32	30.99	5.028	5.185	5.340	5.488	5.623
12.2	28.77	27.43	26.53	25.9	25.41	5.746	5.862	5.974	6.082	6.188
12.45	25.01	24.67	24.38	24.11	23.85	6.292	6.395	6.496	6.597	6.696
12.7	23.6	23.35	23.1	22.84	22.58	6.794	6.891	6.987	7.082	7.175
12.95	22.31	22.06	21.81	21.57	21.33	7.268	7.360	7.450	7.540	7.629
13.2	21.09	20.86	20.62	20.39	20.15	7.716	7.803	7.889	7.973	8.057
13.45	19.91	19.67	19.43	19.19	18.95	8.140	8.222	8.303	8.382	8.461
13.7	18.72	18.48	18.26	18.04	17.82	8.539	8.616	8.692	8.767	8.841
13.95	17.6	17.39	17.17	16.96	16.74	8.914	8.986	9.058	9.128	9.198
14.2	16.53	16.31	16.1	15.89	15.69	9.267	9.334	9.401	9.468	9.533
14.45	15.5	15.31	15.12	14.93	14.73	9.597	9.661	9.724	9.786	9.847
14.7	14.53	14.33	14.13	13.93	13.73	9.908	9.967	10.026	10.084	10.141
14.95	13.53	13.33	13.13	12.93	12.74	10.197	10.253	10.308	10.361	10.414
15.2	12.56	12.38	12.21	12.05	11.89	10.467	10.518	10.569	10.619	10.669
15.45	11.73	11.58	11.42	11.28	11.13	10.717	10.766	10.813	10.860	10.906
15.7	11	10.88	10.76	10.64	10.51	10.952	10.997	11.042	11.086	11.130
15.95	10.38	10.26	10.13	10	9.87	11.173	11.216	11.258	11.299	11.340
16.2	9.74	9.62	9.49	9.36	9.24	11.381	11.421	11.460	11.499	11.538
16.45	9.12	8.99	8.87	8.75	8.63	11.576	11.613	11.650	11.687	11.722
16.7	8.51	8.39	8.28	8.16	8.06	11.758	11.793	11.827	11.861	11.895
16.95	7.99	7.91	7.83	7.75	7.66	11.928	11.961	11.993	12.025	12.057
17.2	7.58	7.49	7.4	7.3	7.21	12.089	12.120	12.151	12.181	12.211
17.45	7.12	7.02	6.93	6.84	6.74	12.241	12.270	12.299	12.327	12.355
17.7	6.65	6.63	6.6	6.58	6.55	12.383	12.410	12.438	12.465	12.492
17.95	6.52	6.49	6.45	6.42	6.38	12.519	12.546	12.573	12.599	12.626
18.2	6.34	6.29	6.24	6.19	6.14	12.652	12.678	12.704	12.730	12.755
18.45	6.08	6.01	5.94	5.87	5.78	12.780	12.805	12.830	12.854	12.878
18.7	5.69	5.6	5.47	5.35	5.23	12.902	12.925	12.948	12.971	12.993
18.95	5.12	5.02	4.95	4.88	4.81	13.014	13.035	13.055	13.076	13.096
19.2	4.75	4.7	4.65	4.59	4.54	13.116	13.135	13.154	13.173	13.192
19.45	4.5	4.46	4.42	4.38	4.34	13.211	13.230	13.248	13.266	13.284
19.7	4.3	4.26	4.23	4.19	4.16	13.302	13.320	13.337	13.355	13.372

Proposed Condition
2-Year Recurrence Interval
SEWRPC 24-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
20.3	3.23	3.23	3.24	3.24	3.22		-	0.013	0.027	0.040
20.55	3.21	3.2	3.19	3.19	3.2	0.053	0.067	0.080	0.093	0.106
20.8	3.2	3.2	3.2	3.21	3.21	0.119	0.133	0.146	0.159	0.172
21.05	3.21	3.22	3.22	3.22	3.23	0.186	0.199	0.212	0.226	0.239
21.3	3.23	3.23	3.24	3.24	3.24	0.252	0.266	0.279	0.292	0.306
21.55	3.25	3.25	3.24	3.21	3.17	0.319	0.333	0.346	0.359	0.372
21.8	3.15	3.14	3.13	3.13	3.13	0.386	0.399	0.411	0.424	0.437
22.05	3.13	3.13	3.13	3.13	3.14	0.450	0.463	0.476	0.489	0.502
22.3	3.14	3.14	3.14	3.15	3.15	0.515	0.528	0.541	0.554	0.567
22.55	3.15	3.15	3.16	3.16	3.16	0.580	0.593	0.606	0.619	0.632
22.8	3.16	3.13	3.01	2.88	2.79	0.645	0.658	0.671	0.683	0.695
23.05	2.75	2.72	2.71	2.7	2.69	0.706	0.718	0.729	0.740	0.751
23.3	2.69	2.69	2.69	2.69	2.69	0.762	0.773	0.784	0.796	0.807
23.55	2.69	2.69	2.69	2.69	2.69	0.818	0.829	0.840	0.851	0.862
23.8	2.69	2.73	2.77	2.81	2.85	0.873	0.885	0.896	0.907	0.919
24.05	2.71	2.11	1.44	1.02	0.81	0.931	0.941	0.948	0.953	0.957
24.3	0.71	0.66	0.64	0.63	0.64	0.960	0.963	0.965	0.968	0.971
24.55	0.65	0.67	0.68	0.7	0.72	0.973	0.976	0.979	0.982	0.985
24.8	0.74	0.75	0.77	0.79	0.81	0.988	0.991	0.994	0.997	1.000
25.05	0.83	0.85	0.87	0.89	0.9	1.004	1.007	1.011	1.014	1.018
25.3	0.92	0.94	0.95	0.97	0.98	1.022	1.026	1.030	1.034	1.038
25.55	1	1.01	1.02	1.04	1.05	1.042	1.046	1.050	1.054	1.059
25.8	1.06	1.07	1.08	1.09	1.1	1.063	1.067	1.072	1.076	1.081
26.05	1.11	1.12	1.13	1.14	1.14	1.085	1.090	1.095	1.099	1.104
26.3	1.15	1.16	1.16	1.17	1.18	1.109	1.114	1.118	1.123	1.128
26.55	1.18	1.19	1.19	1.19	1.2	1.133	1.138	1.143	1.148	1.153
26.8	1.2	1.2	1.21	1.21	1.21	1.158	1.163	1.168	1.173	1.178
27.05	1.21	1.22	1.22	1.22	1.22	1.183	1.188	1.193	1.198	1.203
27.3	1.22	1.22	1.22	1.22	1.22	1.208	1.213	1.218	1.223	1.228
27.55	1.22	1.21	1.21	1.21	1.21	1.233	1.238	1.243	1.248	1.253
27.8	1.21	1.2	1.2	1.2	1.2	1.258	1.263	1.268	1.273	1.278
28.05	1.19	1.19	1.19	1.18	1.18	1.283	1.288	1.293	1.297	1.302
28.3	1.17	1.17	1.17	1.16	1.16	1.307	1.312	1.317	1.322	1.326
28.55	1.15	1.15	1.14	1.14	1.13	1.331	1.336	1.341	1.345	1.350
28.8	1.12	1.12	1.11	1.11	1.1	1.355	1.359	1.364	1.369	1.373
29.05	1.1	1.09	1.08	1.08	1.07	1.378	1.382	1.387	1.391	1.396
29.3	1.07	1.06	1.06	1.05	1.04	1.400	1.404	1.409	1.413	1.418
29.55	1.04	1.03	1.03	1.02	1.01	1.422	1.426	1.430	1.435	1.439
29.8	1.01	1	1	0.99	0.98	1.443	1.447	1.451		

Proposed Condition
100-Year Recurrence Interval
SEWRPC 24-hr

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
20.2	22.27	22.42	22.57	22.73	22.88					0.094
20.45	23.02	23.12	23.21	23.32	23.44	0.189	0.284	0.380	0.476	0.573
20.7	23.57	23.7	23.83	23.96	24.1	0.670	0.768	0.866	0.965	1.064
20.95	24.24	24.39	24.52	24.66	24.79	1.164	1.264	1.365	1.467	1.569
21.2	24.91	25.03	25.16	25.27	25.39	1.672	1.775	1.879	1.983	2.088
21.45	25.51	25.62	25.73	25.84	25.92	2.193	2.298	2.404	2.511	2.618
21.7	25.93	25.92	25.95	26.01	26.08	2.725	2.832	2.939	3.047	3.154
21.95	26.16	26.24	26.32	26.4	26.49	3.262	3.371	3.479	3.588	3.697
22.2	26.57	26.65	26.73	26.81	26.88	3.807	3.917	4.027	4.138	4.249
22.45	26.96	27.03	27.1	27.16	27.23	4.360	4.472	4.583	4.695	4.808
22.7	27.29	27.35	27.4	27.37	27.11	4.920	5.033	5.147	5.260	5.372
22.95	26.8	26.6	26.5	26.45	26.42	5.484	5.594	5.704	5.813	5.922
23.2	26.4	26.39	26.39	26.39	26.39	6.031	6.140	6.250	6.359	6.468
23.45	26.39	26.39	26.39	26.39	26.39	6.577	6.686	6.795	6.904	7.013
23.7	26.39	26.39	26.39	26.39	26.38	7.122	7.231	7.340	7.449	7.558
23.95	26.38	26.37	25.89	24.2	22.29	7.667	7.776	7.884	7.988	8.084
24.2	20.99	20.19	19.66	19.26	18.93	8.173	8.258	8.340	8.421	8.500
24.45	18.65	18.4	18.16	17.94	17.72	8.577	8.654	8.730	8.804	8.878
24.7	17.5	17.29	17.07	16.86	16.64	8.951	9.022	9.093	9.164	9.233
24.95	16.43	16.22	16.01	15.8	15.61	9.301	9.369	9.435	9.501	9.566
25.2	15.43	15.24	15.05	14.85	14.66	9.630	9.693	9.756	9.818	9.879
25.45	14.46	14.26	14.06	13.86	13.67	9.939	9.998	10.057	10.114	10.171
25.7	13.47	13.27	13.07	12.88	12.69	10.227	10.282	10.337	10.391	10.443
25.95	12.51	12.34	12.17	12.01	11.85	10.495	10.547	10.597	10.647	10.697
26.2	11.7	11.54	11.39	11.24	11.1	10.745	10.793	10.841	10.887	10.934
26.45	10.98	10.86	10.74	10.62	10.49	10.979	11.024	11.069	11.113	11.157
26.7	10.36	10.23	10.11	9.98	9.85	11.200	11.242	11.284	11.326	11.367
26.95	9.72	9.6	9.47	9.34	9.22	11.407	11.447	11.487	11.525	11.564
27.2	9.09	8.97	8.85	8.73	8.61	11.602	11.639	11.676	11.712	11.748
27.45	8.49	8.37	8.26	8.14	8.05	11.783	11.818	11.852	11.886	11.920
27.7	7.98	7.9	7.82	7.73	7.65	11.953	11.986	12.018	12.050	12.082
27.95	7.56	7.47	7.38	7.29	7.2	12.114	12.145	12.175	12.206	12.236
28.2	7.1	7.01	6.92	6.82	6.73	12.265	12.294	12.323	12.351	12.379
28.45	6.65	6.62	6.6	6.57	6.54	12.407	12.434	12.462	12.489	12.516
28.7	6.51	6.48	6.45	6.42	6.38	12.543	12.570	12.597	12.623	12.650
28.95	6.33	6.28	6.23	6.18	6.13	12.676	12.702	12.728	12.753	12.779
29.2	6.07	6	5.93	5.86	5.77	12.804	12.829	12.854	12.878	12.902
29.45	5.68	5.59	5.46	5.34	5.22	12.926	12.949	12.972	12.994	13.016
29.7	5.11	5.02	4.94	4.87	4.8	13.037	13.058	13.079	13.099	13.119

Proposed Condition
2-Year Recurrence Interval
SCS Type II

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
11.75	11.48	15.84	21.72	30.46	38.26		0.056	0.134	0.242	0.384
12	40.5	37.53	29.71	21.31	15.98	0.547	0.708	0.847	0.952	1.029
12.25	12.75	10.55	9.01	7.83	6.91	1.089	1.137	1.177	1.212	1.242
12.5	6.11	5.46	4.93	4.52	4.21	1.269	1.293	1.315	1.334	1.352
12.75	3.97	3.77	3.61	3.45	3.32	1.369	1.385	1.400	1.415	1.429
13	3.18	3.06	2.94	2.85	2.76	1.442	1.455	1.468	1.480	1.491
13.25	2.69	2.61	2.55	2.48	2.42	1.502	1.513	1.524	1.534	1.545
13.5	2.35	2.29	2.23	2.18	2.12	1.554	1.564	1.573	1.582	1.591
13.75	2.07	2.03	1.98	1.93	1.89	1.600	1.608	1.617	1.625	1.633
14	1.84	1.8	1.76	1.73	1.7	1.640	1.648	1.655	1.663	1.670
14.25	1.68	1.66	1.65	1.63	1.61	1.677	1.683	1.690	1.697	1.704
14.5	1.6	1.58	1.56	1.55	1.53	1.710	1.717	1.723	1.730	1.736
14.75	1.52	1.5	1.49	1.47	1.45	1.743	1.749	1.755	1.761	1.767
15	1.44	1.42	1.41	1.39	1.38	1.773	1.779	1.785	1.791	1.796
15.25	1.36	1.34	1.33	1.31	1.33	1.802	1.808	1.813	1.819	1.824
15.5	1.35	1.38	1.4	1.42	1.44	1.830	1.835	1.841	1.847	1.853
15.75	1.46	1.47	1.49	1.51	1.52	1.859	1.865	1.871	1.877	1.883
16	1.54	1.55	1.57	1.59	1.6	1.890	1.896	1.902	1.909	1.916
16.25	1.62	1.64	1.66	1.68	1.7	1.922	1.929	1.936	1.943	1.950
16.5	1.72	1.74	1.76	1.77	1.79	1.957	1.964	1.971	1.978	1.986
16.75	1.81	1.82	1.84	1.85	1.87	1.993	2.001	2.008	2.016	2.024
17	1.88	1.89	1.91	1.92	1.93	2.031	2.039	2.047	2.055	2.063
17.25	1.94	1.96	1.97	1.98	1.99	2.071	2.079	2.087	2.095	2.103
17.5	2	2.01	2.01	2.02	2.03	2.112	2.120	2.128	2.137	2.145
17.75	2.04	2.05	2.05	2.06	2.07	2.153	2.162	2.170	2.179	2.187
18	2.07	2.08	2.08	2.09	2.09	2.196	2.204	2.213	2.222	2.230
18.25	2.1	2.1	2.11	2.11	2.11	2.239	2.248	2.256	2.265	2.274
18.5	2.12	2.12	2.12	2.12	2.12	2.282	2.291	2.300	2.309	2.317
18.75	2.13	2.13	2.13	2.13	2.13	2.326	2.335	2.344	2.353	2.361
19	2.13	2.13	2.13	2.13	2.13	2.370	2.379	2.388	2.397	2.405
19.25	2.13	2.12	2.12	2.12	2.12	2.414	2.423	2.432	2.441	2.449
19.5	2.12	2.11	2.11	2.11	2.11	2.458	2.467	2.476	2.484	2.493
19.75	2.1	2.1	2.09	2.09	2.09	2.502	2.510	2.519	2.528	2.536
20	2.08	2.08	2.08	2.07	2.07	2.545	2.554	2.562	2.571	2.579
20.25	2.07	2.07	2.07	2.06	2.06	2.588	2.596	2.605	2.613	2.622
20.5	2.06	2.06	2.06	2.05	2.05	2.630	2.639	2.647	2.656	2.664
20.75	2.05	2.05	2.05	2.04	2.04	2.673	2.681	2.690	2.698	2.707
21	2.04	2.03	2.03	2.03	2.03	2.715	2.724	2.732	2.740	2.749
21.25	2.02	2.02	2.02	2.01	2.01	2.757	2.765			

Proposed Condition
100-Year Recurrence Interval
SCS Type II

	Flow (cfs)					Volume (ac-ft)				
Time (hrs)	0	0.05	0.1	0.15	0.2	0	0.05	0.1	0.15	0.2
11.55	11.38	14.61	19.78	28.01	38.27					
11.8	51.16	67.07	89.92	108.48	110.88	0.185	0.429	0.753	1.163	1.617
12.05	100.03	76.96	53.46	39.24	31.77	2.052	2.418	2.687	2.879	3.026
12.3	27.64	25.22	23.5	22.19	21	3.148	3.258	3.358	3.453	3.542
12.55	19.98	19.12	18.41	17.9	17.6	3.627	3.707	3.785	3.860	3.933
12.8	17.57	18.29	17.88	19.86	22.79	4.006	4.080	4.155	4.233	4.321
13.05	25.5	27.77	29.38	30.58	31.43	4.421	4.531	4.649	4.773	4.901
13.3	31.95	32.24	32.36	32.36	32.27	5.032	5.164	5.298	5.432	5.565
13.55	32.12	31.93	31.73	31.5	31.27	5.698	5.830	5.962	6.093	6.222
13.8	31.02	30.78	30.53	30.28	30.04	6.351	6.479	6.605	6.731	6.856
14.05	29.8	29.58	29.37	29.19	29.01	6.979	7.102	7.224	7.345	7.465
14.3	28.86	28.71	28.56	28.41	28.27	7.585	7.704	7.822	7.940	8.057
14.55	28.13	27.98	27.83	27.68	27.52	8.173	8.289	8.404	8.519	8.633
14.8	27.35	27.18	26.99	26.81	26.61	8.747	8.859	8.971	9.082	9.193
15.05	26.42	26.22	26.03	25.83	25.63	9.302	9.411	9.519	9.626	9.732
15.3	25.45	25.27	25.08	24.9	24.73	9.838	9.943	10.047	10.150	10.253
15.55	24.55	24.38	24.2	24.03	23.85	10.354	10.456	10.556	10.656	10.754
15.8	23.67	23.49	23.31	23.12	22.93	10.853	10.950	11.047	11.143	11.238
16.05	22.74	22.56	22.38	22.2	22.03	11.332	11.426	11.519	11.611	11.702
16.3	21.86	21.69	21.52	21.36	21.2	11.793	11.883	11.972	12.061	12.149
16.55	21.04	20.89	20.73	20.58	20.44	12.236	12.323	12.409	12.494	12.579
16.8	20.29	20.13	19.98	19.83	19.68	12.663	12.746	12.829	12.911	12.993
17.05	19.53	19.37	19.22	19.07	18.91	13.074	13.154	13.234	13.313	13.392
17.3	18.76	18.61	18.46	18.3	18.15	13.470	13.547	13.623	13.699	13.775
17.55	18.01	17.88	17.74	17.6	17.46	13.849	13.923	13.997	14.070	14.143
17.8	17.32	17.17	17.03	16.88	16.74	14.214	14.286	14.356	14.426	14.496
18.05	16.59	16.45	16.3	16.16	16.01	14.565	14.633	14.701	14.768	14.834
18.3	15.87	15.73	15.58	15.44	15.3	14.900	14.965	15.030	15.094	15.158
18.55	15.16	15.01	14.87	14.73	14.6	15.221	15.283	15.345	15.406	15.466
18.8	14.47	14.35	14.23	14.11	13.99	15.526	15.586	15.645	15.704	15.762
19.05	13.87	13.76	13.65	13.53	13.42	15.819	15.876	15.933	15.989	16.045
19.3	13.31	13.2	13.08	12.97	12.86	16.100	16.155	16.209	16.263	16.316
19.55	12.77	12.67	12.57	12.47	12.37	16.369	16.422	16.474	16.526	16.577
19.8	12.27	12.17	12.07	11.96	11.86	16.628	16.678	16.728	16.778	16.827
20.05	11.75	11.65	11.55	11.46	11.36	16.876	16.924	16.972	17.020	17.067
20.3	11.27	11.18	11.09	11	10.91	17.114	17.160	17.206	17.252	17.297
20.55	10.83	10.74	10.65	10.57	10.48	17.342	17.387	17.431	17.475	17.518
20.8	10.4	10.32	10.24	10.15	10.07	17.561	17.604	17.647	17.689	17.730
21.05	9.99	9.91	9.84	9.76	9.68	17.772	17.813	17.854	17.894	17.935
21.3	9.6	9.55	9.5	9.44	9.39	17.974				

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SPECIALISTS IN ENVIRONMENTAL MANAGEMENT AND RESEARCH

DATE: 11/4/03
BY: JDB
CHECKED:
PROJECT:
PROJ. #

Culvert Connection Between SWMA 1 & SWMA 2

24 hr. SCS Type II Storm is Control for SWMA #1

The high water elevation for SWMA #1 = 597.91 at 12.25 hours

The high water elevation in SWMA #2 at 12.25 hr is 596.52

(Ref. Pond Pack hydrologic model which was run with back water controls on restrictor)

Try 2 - 29"x45" Elliptical Pipes (RCP)

Capacity = 75.4 cfs

Reqd Capacity = Q_{100} = 62.3 cfs ← OK

Check 6 hr. SCSRPC design storm (100 year recurrence interval)

HW for SWMA #1 = 597.79 @ 6.0 hours

HW for SWMA #2 at 6.0 hr. = 597.5

(Ref. Pond Pack hydrologic model which was run with backwater controls on restrictor)

For the 2 - 29" x 45" RCP Elliptical Pipes

Capacity = 34.4 cfs

Reqd capacity for Q_{100} = 42.7 cfs

(This indicates that SWMA will pond higher for 6 hr. storm than modeled to provide sufficient head for the 42.7 cfs

Pond elevation to provide 42.7 cfs = 597.95

∴ The design HW for SWMA should be 598 due to culvert capacity constraints

Culvert Calculator Report
cmcsma1

olve For: Discharge (SCS 24hr duration - 100 yr recurrence interval storm)

Culvert Summary					
Allowable HW Elevation	597.91	ft	Headwater Depth/ Height	2.05	
Computed Headwater Elevation	597.91	ft	Discharge	75.39	cfs
Inlet Control HW Elev	596.52	ft	Tailwater Elevation	596.52	ft
Outlet Control HW Elev	597.91	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	593.00	ft	Downstream Invert	592.50	ft
Length	300.00	ft	Constructed Slope	0.001667	ft/ft

Hydraulic Profile					
Profile	Pressure		Depth, Downstream	4.02	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	1.62	ft
Velocity Downstream	5.09	ft/s	Critical Slope	0.004047	ft/ft

Section				
Section Shape	Horizontal Ellipse	Mannings Coefficient	0.013	
Section Material	Concrete	Span	3.79	ft
Section Size	29x45 inch	Rise	2.40	ft
Number Sections	2			

Outlet Control Properties					
Outlet Control HW Elev	597.91	ft	Upstream Velocity Head	0.40	ft
Ke	0.50		Entrance Loss	0.20	ft

Inlet Control Properties					
Inlet Control HW Elev	596.52	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge with headwall		Area Full	14.8	ft²
K	0.01000		HDS 5 Chart	29	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

john douglas eppich
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

```
case title      = wet detention pond
case data file  = cmc1.cas
storm data file = milwauke.pcp
particle file   = NURP50.PAR
air temp file   = milwauke.tmp


precipitation volume factor          =   1.000
number of passes through precip file =       3
dates <yyyymmdd>  start = 19910101, keep = 19910101, stop = 19991231

case notes:
          cmc site

          sized for 85% tss removal


          nurp50 particle matrix



other coefficients:
min. inter-event time (hrs)       =        10
maximum continuity error %        =      2.00
snowfall temperature (deg-f)      =     32.00
snowmelt temperature (deg-f)      =     32.00
snowmelt coef (in/degF-day)       =     .0600
soil freeze temp  (deg-f)         =     32.00
abstraction factor for snowmelt   =     1.000
perv. load factor for snowmelt    =      .000
imperv. load factor for snowmelt  =      .000
growing season months             =         5        10
growing season                 =       1.40       2.10
non-growing season             =        .50       1.10


watershed      =  1  sma1
surface runoff device =  1  sma 1
percolation device    =  0

watershed area                    acres    =    49.500
scs curve number (pervious portion)        =    74.000
scale factor for perv. area runoff load    =     1.000
impervious area data                                swept not swept
impervious fraction                        =      .000       .620
impervious depression storage    inches    =      .020       .020
impervious runoff coefficient              =     1.000      1.000
scale factor for particle loads    -       =     1.000      1.000
sweeping frequency              times/week =      .000
sweeping efficiency scale factor           =     1.000
sweeping start date                  mmdd  =      101.
sweeping stop date                   mmdd  =     1231.


watershed      =  2  sma2
surface runoff device =  2  sma 2
percolation device    =  0

watershed area                    acres    =    32.010
scs curve number (pervious portion)        =    74.000
scale factor for perv. area runoff load    =     1.000
impervious area data                                swept not swept
impervious fraction                        =      .000       .580
impervious depression storage    inches    =      .000       .000
impervious runoff coefficient              =     1.000      1.000
scale factor for particle loads    -       =     1.000      1.000
sweeping frequency              times/week =      .000
sweeping efficiency scale factor           =     1.000
sweeping start date                  mmdd  =      101.
sweeping stop date                   mmdd  =     1231.
```

```
weir discharge coefficient          =      .000
perforated riser height      feet   =      .000
number of holes in riser            =      .000
hole diameter                inches =      .000
particle removal scale factor       =     1.000

outlet: 1 infiltration     routed to device:  0  OUT
outlet: 2 normal outlet    routed to device:  2  sma 2
outlet: 3 spillway         routed to device:  2  sma 2

device =  2  sma 2     type   =  1  pond

bottom elevation             feet   =   591.000
bottom area                  acres  =      .070
permanent pool area          acres  =      .490
permanent pool volume        ac-ft  =      .560
perm. pool infiltration rate in/hr  =   .000000
flood pool area              acres  =     2.110
flood pool volume            ac-ft  =    11.050
flood pool infiltration rate in/hr  =  1.000000
flood pool drain time        hours  =    34.000
outlet orifice diameter      inches =      .000
orifice discharge coefficient       =      .600
outlet weir length           feet   =      .000
weir discharge coefficient          =     3.300
perforated riser height      feet   =      .000
number of holes in riser            =      .000
hole diameter                inches =      .000
particle removal scale factor       =     1.000

outlet: 1 infiltration     routed to device:  0  OUT
outlet: 2 normal outlet    routed to device:  4  swamp
outlet: 3 spillway         routed to device:  4  swamp

device =  3  sma 3     type   =  1  pond

bottom elevation             feet   =   596.000
bottom area                  acres  =      .030
permanent pool area          acres  =      .000
permanent pool volume        ac-ft  =      .000
perm. pool infiltration rate in/hr  =   .000000
flood pool area              acres  =      .100
flood pool volume            ac-ft  =      .330
flood pool infiltration rate in/hr  =   .050000
flood pool drain time        hours  =      .000
outlet orifice diameter      inches =    15.000
orifice discharge coefficient       =      .600
outlet weir length           feet   =      .000
weir discharge coefficient          =     3.300
perforated riser height      feet   =      .000
number of holes in riser            =      .000
hole diameter                inches =      .000
particle removal scale factor       =     1.000

outlet: 1 infiltration     routed to device:  0  OUT
outlet: 2 normal outlet    routed to device:  0  OUT
outlet: 3 spillway         routed to device:  0  OUT

device =  4  swamp     type   =  1  pond

bottom elevation             feet   =   587.000
bottom area                  acres  =      .540
permanent pool area          acres  =      .640
permanent pool volume        ac-ft  =      .590
perm. pool infiltration rate in/hr  =   .100000
flood pool area              acres  =     1.070
flood pool volume            ac-ft  =     1.537
flood pool infiltration rate in/hr  =   .000000
flood pool drain time        hours  =    38.300
outlet orifice diameter      inches =      .000
```

wet detention pond cmc1.cas 19910115 19991231

removal efficiencies (%) vs. device and particle class

device	1 P0%	2 P10%	3 P30%	4 P50%	5 P80%
1 sma 1	30.8	56.4	76.1	90.9	98.7
2 sma 2	16.3	41.7	72.3	92.3	99.3
3 sma 3	1.0	6.7	34.9	69.4	95.3
4 swamp	31.0	49.1	78.5	89.0	93.2
5 offsite	.0	.0	.0	.0	.0
49 OVERALL	41.7	65.3	79.6	83.2	84.5

removal efficiencies (%) vs. device and water quality component

device	tss	tp	tkn	cu	pb	zn	hc
1 sma 1	84.2	61.4	57.0	57.0	78.9	57.0	78.9
2 sma 2	76.5	46.5	41.1	41.1	67.1	41.1	67.1
3 sma 3	60.3	26.1	22.5	22.5	54.3	22.5	54.3
4 swamp	59.9	42.4	39.5	39.5	48.7	39.5	48.7
5 offsite	.0	.0	.0	.0	.0	.0	.0
49 OVERALL	79.4	65.6	62.2	62.2	75.6	62.2	75.6

device = 1 sma 1 , type = pond , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	716.99	66.36	.0341
03 infiltrate	246.04	13.29	.0199
04 exfiltrate	246.04	.91	.0014
05 filtered	.00	12.38	.0000
06 normal outlet	338.29	18.94	.0206
07 spillway outlet	133.14	8.66	.0239
08 sedimen + decay	.00	25.47	.0000
09 total inflow	716.99	66.36	.0341
10 surface outflow	471.43	27.60	.0215
11 groundw outflow	246.04	.91	.0014
12 total outflow	717.47	28.51	.0146
13 total trapped	.00	37.85	
14 storage increase	.00	.00	
15 mass balance check	-.48	.00	

load removal efficiency = 57.04 %, adjusted = 57.04 %
continuity errors: volume = -.07 %, load = .00 %

device = 1 sma 1 , type = pond , variable = pb

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	716.99	39.06	.0200
03 infiltrate	246.04	3.60	.0054
04 exfiltrate	246.04	.13	.0002
05 filtered	.00	3.47	.0000
06 normal outlet	338.29	5.32	.0058
07 spillway outlet	133.14	2.81	.0078
08 sedimen + decay	.00	27.34	.0000
09 total inflow	716.99	39.06	.0200
10 surface outflow	471.43	8.13	.0063
11 groundw outflow	246.04	.13	.0002
12 total outflow	717.47	8.26	.0042
13 total trapped	.00	30.80	
14 storage increase	.00	.00	
15 mass balance check	-.48	.00	

load removal efficiency = 78.86 %, adjusted = 78.86 %
continuity errors: volume = -.07 %, load = .00 %

device = 1 sma 1 , type = pond , variable = zn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	716.99	312.27	.1602
03 infiltrate	246.04	62.53	.0935
04 exfiltrate	246.04	4.27	.0064
05 filtered	.00	58.26	.0000
06 normal outlet	338.29	89.14	.0970
07 spillway outlet	133.14	40.74	.1126
08 sedimen + decay	.00	119.85	.0000
09 total inflow	716.99	312.27	.1602
10 surface outflow	471.43	129.88	.1014
11 groundw outflow	246.04	4.27	.0064
12 total outflow	717.47	134.16	.0688
13 total trapped	.00	178.11	
14 storage increase	.00	.00	
15 mass balance check	-.48	.00	

load removal efficiency = 57.04 %, adjusted = 57.04 %
continuity errors: volume = -.07 %, load = .00 %

device = 1 sma 1 , type = pond , variable = hc

mass-balance term	flow acre-ft	load lbs	conc ppm

03 infiltrate	169.07	389.86	.8484
04 exfiltrate	169.07	27.57	.0600
05 filtered	.00	362.29	.0000
06 normal outlet	757.29	1764.58	.8573
07 spillway outlet	4.31	12.31	1.0510
08 sedimen + decay	.00	898.38	.0000
09 total inflow	930.64	3065.13	1.2118
10 surface outflow	761.59	1776.89	.8584
11 groundw outflow	169.07	27.57	.0600
12 total outflow	930.66	1804.46	.7134
13 total trapped	.00	1260.67	-
14 storage increase	.00	.00	
15 mass balance check	-.02	.00	

load removal efficiency = 41.13 %, adjusted = 41.13 %
continuity errors: volume = .00 %, load = .00 %

device = 2 sma 2 , type = pond , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	459.21	41.88	.0336
02 upstream device	471.43	27.60	.0215
03 infiltrate	169.07	8.84	.0192
04 exfiltrate	169.07	.62	.0014
05 filtered	.00	8.21	.0000
06 normal outlet	757.29	40.00	.0194
07 spillway outlet	4.31	.28	.0238
08 sedimen + decay	.00	20.36	.0000
09 total inflow	930.64	69.48	.0275
10 surface outflow	761.59	40.28	.0195
11 groundw outflow	169.07	.62	.0014
12 total outflow	930.66	40.90	.0162
13 total trapped	.00	28.58	
14 storage increase	.00	.00	
15 mass balance check	-.02	.00	

load removal efficiency = 41.13 %, adjusted = 41.13 %
continuity errors: volume = .00 %, load = .00 %

device = 2 sma 2 , type = pond , variable = pb

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	459.21	24.47	.0196
02 upstream device	471.43	8.13	.0063
03 infiltrate	169.07	2.30	.0050
04 exfiltrate	169.07	.09	.0002
05 filtered	.00	2.21	.0000
06 normal outlet	757.29	10.53	.0051
07 spillway outlet	4.31	.09	.0081
08 sedimen + decay	.00	19.67	.0000
09 total inflow	930.64	32.59	.0129
10 surface outflow	761.59	10.62	.0051
11 groundw outflow	169.07	.09	.0002
12 total outflow	930.66	10.71	.0042
13 total trapped	.00	21.88	
14 storage increase	.00	.00	
15 mass balance check	-.02	.00	

load removal efficiency = 67.13 %, adjusted = 67.13 %
continuity errors: volume = .00 %, load = .00 %

device = 2 sma 2 , type = pond , variable = zn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	459.21	197.06	.1579
02 upstream device	471.43	129.88	.1014
03 infiltrate	169.07	41.58	.0905

09 total inflow	58.79	52.21	.3267
10 surface outflow	53.72	38.33	.2625
11 groundw outflow	.60	.02	.0111
12 total outflow	54.32	38.35	.2597
13 total trapped	.00	13.63	
14 storage increase	.00	.22	
15 mass balance check	4.47	.00	

load removal efficiency = 26.11 %, adjusted = 26.11 %
continuity errors: volume = 7.60 %, load = .00 %

device = 3 sma 3 , type = pond , variable = tkn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	58.79	237.65	1.4872
03 infiltrate	.60	1.75	1.0659
04 exfiltrate	.60	.11	.0672
05 filtered	.00	1.64	.0000
06 normal outlet	53.72	182.95	1.2530
08 sedimen + decay	.00	51.83	.0000
09 total inflow	58.79	237.65	1.4872
10 surface outflow	53.72	182.95	1.2530
11 groundw outflow	.60	.11	.0672
12 total outflow	54.32	183.06	1.2398
13 total trapped	.00	53.47	
14 storage increase	.00	1.12	
15 mass balance check	4.47	.00	

load removal efficiency = 22.50 %, adjusted = 22.50 %
continuity errors: volume = 7.60 %, load = .00 %

device = 3 sma 3 , type = pond , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	58.79	5.39	.0337
03 infiltrate	.60	.04	.0242
04 exfiltrate	.60	.00	.0015
05 filtered	.00	.04	.0000
06 normal outlet	53.72	4.15	.0284
08 sedimen + decay	.00	1.17	.0000
09 total inflow	58.79	5.39	.0337
10 surface outflow	53.72	4.15	.0284
11 groundw outflow	.60	.00	.0015
12 total outflow	54.32	4.15	.0281
13 total trapped	.00	1.21	
14 storage increase	.00	.03	
15 mass balance check	4.47	.00	

load removal efficiency = 22.50 %, adjusted = 22.50 %
continuity errors: volume = 7.60 %, load = .00 %

device = 3 sma 3 , type = pond , variable = pb

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	58.79	3.16	.0197
03 infiltrate	.60	.01	.0071
04 exfiltrate	.60	.00	.0002
05 filtered	.00	.01	.0000
06 normal outlet	53.72	1.43	.0098
08 sedimen + decay	.00	1.70	.0000
09 total inflow	58.79	3.16	.0197
10 surface outflow	53.72	1.43	.0098
11 groundw outflow	.60	.00	.0002
12 total outflow	54.32	1.43	.0097
13 total trapped	.00	1.71	
14 storage increase	.00	.01	

device = 4 swamp , type = pond , variable = tp

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	3.67	2.41	.2409
02 upstream device	761.59	342.21	.1653
03 infiltrate	263.50	80.60	.1125
04 exfiltrate	263.50	7.09	.0099
05 filtered	.00	73.52	.0000
06 normal outlet	428.73	160.39	.1376
07 spillway outlet	73.04	31.10	.1567
08 sedimen + decay	.00	72.52	.0000
09 total inflow	765.27	344.62	.1657
10 surface outflow	501.78	191.49	.1404
11 groundw outflow	263.50	7.09	.0099
12 total outflow	765.27	198.58	.0955
13 total trapped	.00	146.04	
14 storage increase	.00	.00	
15 mass balance check	-.01	.00	

load removal efficiency = 42.38 %, adjusted = 42.38 %
continuity errors: volume = .00 %, load = .00 %

device = 4 swamp , type = pond , variable = tkn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	3.67	11.51	1.1529
02 upstream device	761.59	1776.89	.8584
03 infiltrate	263.50	467.43	.6527
04 exfiltrate	263.50	42.95	.0600
05 filtered	.00	424.48	.0000
06 normal outlet	428.73	874.64	.7506
07 spillway outlet	73.04	163.77	.8249
08 sedimen + decay	.00	282.56	.0000
09 total inflow	765.27	1788.40	.8598
10 surface outflow	501.78	1038.42	.7614
11 groundw outflow	263.50	42.95	.0600
12 total outflow	765.27	1081.36	.5199
13 total trapped	.00	707.04	
14 storage increase	.00	.00	
15 mass balance check	-.01	.00	

load removal efficiency = 39.53 %, adjusted = 39.53 %
continuity errors: volume = .00 %, load = .00 %

device = 4 swamp , type = pond , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	3.67	.26	.0261
02 upstream device	761.59	40.28	.0195
03 infiltrate	263.50	10.60	.0148
04 exfiltrate	263.50	.97	.0014
05 filtered	.00	9.62	.0000
06 normal outlet	428.73	19.83	.0170
07 spillway outlet	73.04	3.71	.0187
08 sedimen + decay	.00	6.40	.0000
09 total inflow	765.27	40.54	.0195
10 surface outflow	501.78	23.54	.0173
11 groundw outflow	263.50	.97	.0014
12 total outflow	765.27	24.51	.0118
13 total trapped	.00	16.03	
14 storage increase	.00	.00	
15 mass balance check	-.01	.00	

load removal efficiency = 39.53 %, adjusted = 39.53 %
continuity errors: volume = .00 %, load = .00 %

device = 4 swamp , type = pond , variable = pb

mass-balance term	acre-ft	lbs	ppm
01 watershed inflows	227.19	60041.69	97.2315
06 normal outlet	227.19	59980.50	97.1324
09 total inflow	227.19	60041.69	97.2315
10 surface outflow	227.19	59980.50	97.1324
12 total outflow	227.19	59980.50	97.1324
14 storage increase	.00	61.14	
15 mass balance check	.00	.00	

load removal efficiency = .00 %, adjusted = .00 %
continuity errors: volume = .00 %, load = .00 %

device = 5 offsite , type = pipe , variable = tp

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	227.19	199.83	.3236
06 normal outlet	227.19	199.59	.3232
09 total inflow	227.19	199.83	.3236
10 surface outflow	227.19	199.59	.3232
12 total outflow	227.19	199.59	.3232
14 storage increase	.00	.24	
15 mass balance check	.00	.00	

load removal efficiency = .00 %, adjusted = .00 %
continuity errors: volume = .00 %, load = .00 %

device = 5 offsite , type = pipe , variable = tkn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	227.19	910.88	1.4751
06 normal outlet	227.19	909.71	1.4732
09 total inflow	227.19	910.88	1.4751
10 surface outflow	227.19	909.71	1.4732
12 total outflow	227.19	909.71	1.4732
14 storage increase	.00	1.17	
15 mass balance check	.00	.00	

load removal efficiency = .00 %, adjusted = .00 %
continuity errors: volume = .00 %, load = .00 %

device = 5 offsite , type = pipe , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	227.19	20.65	.0334
06 normal outlet	227.19	20.62	.0334
09 total inflow	227.19	20.65	.0334
10 surface outflow	227.19	20.62	.0334
12 total outflow	227.19	20.62	.0334
14 storage increase	.00	.03	
15 mass balance check	.00	.00	

load removal efficiency = .00 %, adjusted = .00 %
continuity errors: volume = .00 %, load = .00 %

device = 5 offsite , type = pipe , variable = pb

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	227.19	12.04	.0195
06 normal outlet	227.19	12.03	.0195
09 total inflow	227.19	12.04	.0195
10 surface outflow	227.19	12.03	.0195
12 total outflow	227.19	12.03	.0195
14 storage increase	.00	.01	
15 mass balance check	.00	.00	

13 total trapped	.00	856.05
14 storage increase	.00	.47
15 mass balance check	3.96	.00

load removal efficiency = 65.64 %, adjusted = 65.64 %
continuity errors: volume = .27 %, load = .00 %

device = 49 OVERALL , type = , variable = tkn

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	1465.86	5935.02	1.4896
03 infiltrate	679.21	1445.25	.7829
04 exfiltrate	679.21	110.67	.0599
05 filtered	.00	1334.58	.0000
06 normal outlet	709.65	1967.31	1.0200
07 spillway outlet	73.04	163.77	.8249
08 sedimen + decay	.00	2356.39	.0000
09 total inflow	1465.86	5935.02	1.4896
10 surface outflow	782.69	2131.08	1.0018
11 groundw outflow	679.21	110.67	.0599
12 total outflow	1461.90	2241.75	.5642
13 total trapped	.00	3690.97	
14 storage increase	.00	2.29	
15 mass balance check	3.96	.01	

load removal efficiency = 62.19 %, adjusted = 62.19 %
continuity errors: volume = .27 %, load = .00 %

device = 49 OVERALL , type = , variable = cu

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	1465.86	134.53	.0338
03 infiltrate	679.21	32.76	.0177
04 exfiltrate	679.21	2.51	.0014
05 filtered	.00	30.25	.0000
06 normal outlet	709.65	44.59	.0231
07 spillway outlet	73.04	3.71	.0187
08 sedimen + decay	.00	53.41	.0000
09 total inflow	1465.86	134.53	.0338
10 surface outflow	782.69	48.30	.0227
11 groundw outflow	679.21	2.51	.0014
12 total outflow	1461.90	50.81	.0128
13 total trapped	.00	83.66	
14 storage increase	.00	.05	
15 mass balance check	3.96	.00	

load removal efficiency = 62.19 %, adjusted = 62.19 %
continuity errors: volume = .27 %, load = .00 %

device = 49 OVERALL , type = , variable = pb

mass-balance term	flow acre-ft	load lbs	conc ppm
01 watershed inflows	1465.86	78.86	.0198
03 infiltrate	679.21	7.80	.0042
04 exfiltrate	679.21	.37	.0002
05 filtered	.00	7.43	.0000
06 normal outlet	709.65	17.90	.0093
07 spillway outlet	73.04	.94	.0047
08 sedimen + decay	.00	52.20	.0000
09 total inflow	1465.86	78.86	.0198
10 surface outflow	782.69	18.84	.0089
11 groundw outflow	679.21	.37	.0002
12 total outflow	1461.90	19.21	.0048
13 total trapped	.00	59.63	
14 storage increase	.00	.02	
15 mass balance check	3.96	.00	