STORM WATER MANAGEMENT PLAN

FOR

Oberlin Filter

831 Silvernail Road
Waukesha, Wisconsin

April 23, 2014

PREPARED BY:
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CJE Job No.: 1416R0-SWMP

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Introduction:

The proposed development will consists of removing the existing buildings and pavement and constructing a new building with surface parking, loading area and drives along the south side of Silvernail Road in the City of Waukesha. The existing site currently drains towards the northwest corner of the site. In order to meet to the storm water management requirements of NR 151 and the City of Waukesha a new storm water pond will be constructed north of the proposed building and pavement as part of this development. The runoff from the new building and pavement will be directly to pond through new storm sewer system. The proposed storm water pond has been designed to reduce the peak runoff rate to less then the peak rates under the existing conditions and to remove over 40% of total suspended sediment (for a redevelopment). This includes the proposed development as well as the future expansion. All the storm water facilities, include all new storm sewer have been sized for the 100-year design storm event. Based on the soil investigation the existing soils are not suitable for infiltration. The proposed development meets and exceeds the storm water management requirements of NR 151 and the City of Waukesha.

Developed Site: (See the Proposed Conditions Plan).

Soil Types:	Silt and Clay
Cover & CN:	CN 74, >75% Grass Cover, Good, HSG C. CN 98, Pavement & Roofs. CN 98, Pond – normal water surface
Area:	Site: 9.50 Acres Area to Pond: 8.56 Acres

24-Hour Rainfall Values:

2-Year: 2. 57”
10-Year: 3.62”
100-Year: 5.88”

All rainfall data is for 24-hour duration per SEWRPC recommended rainfall values

Method of Analysis:

The storm water runoff quantity was calculated using the methods outlines in TR-55 (“Urban Hydrology for Small Watersheds” by the U.S. Department of Agriculture’s Soil Conservation Services). Calculations were performed with the “HydroCAD 7.10” computer software. Water quality calculations were done using WinSLAMM for Windows version 9.4.0.

Drainage Summary: (See Summary of Calculations in Appendix)

Area	2 Year Storm	10 Year Storm	100 Year Storm
Existing Conditions			
Subcatchment 1 (Site area)	8.20 cfs	16.00 cfs	34.74 cfs
Proposed Conditions			
Subcatchment 1 – Site area to pond	18.69 cfs	28.29 cfs	48.68 cfs
Pond 1 – Flow out of pond	4.79 cfs	7.63 cfs	4.04 cfs
Subcatchment 2 – Site area not to pond	0.78 cfs	1.70 cfs	11.36 cfs
Reach – **Total Site Runoff**	**4.97 cfs**	**7.99 cfs**	**12.64 cfs**

Water Quality:

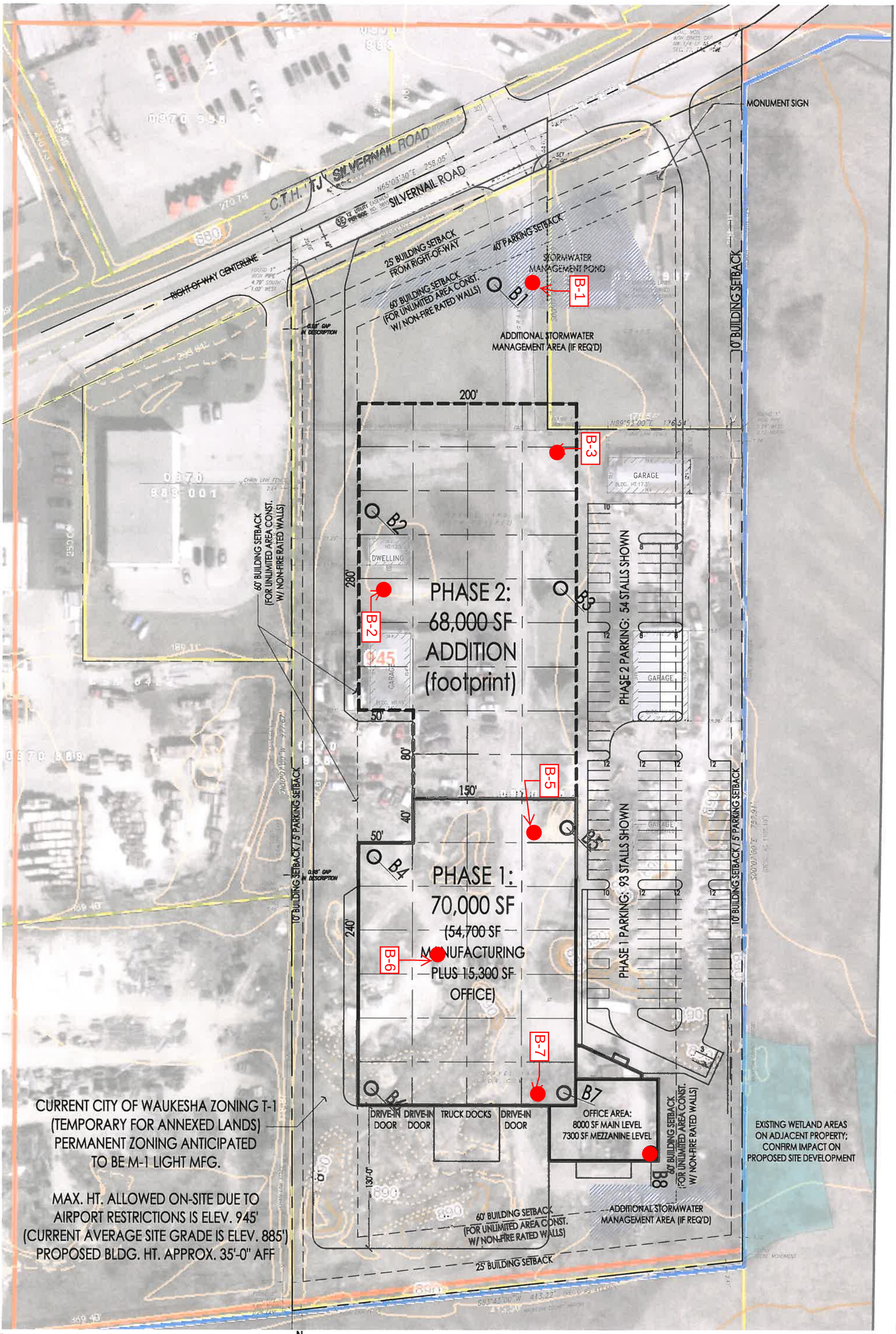
Based on the proposed construction of the new storm water pond, the site exceeds the City of Waukesha and WDNR requirements for water quality for redevelopment by removing over 40% of the total suspended solids (TSS) prior to discharge off site, as quantified using WinSLAMM for Windows version 9.4.0 (See appendix B for calculation results). The TSS out of each area and total removal of site is as summarized below:

	Before Drainage System	After Controls	% Reduction
Area to Pond	2589 lbs.	699 lbs.	73 %
Area not to Pond	70.9 lbs.	70.9 lbs.	0 %
Total site	2660 lbs.	770 lbs.	71 %

Conclusion:

The proposed peak runoff rates under post-development conditions are less than the existing peak rates under all storm events. The storm water pond will proved water quality so that the TTS removal will be over 40% from the total site runoff after development. Therefore, the proposed development meets and exceeds the storm water management and water quality requirements for the City of Waukesha and NR 151.

APPENDIX



SITE PLAN

1" = 80'

BRIOHN

www.briohn.com PHONE: 262.790.0500

OBERLIN FILTER - NEW FACILITY OPTION B

WAUKESHA, WISCONSIN

FEBRUARY 27, 2014

Wisconsin Department of Commerce
Division of Safety and Buildings

SOIL EVALUATION - STORM

in accordance with Comm 82.365 & 85, Wis. Adm. Code

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

County	Waukesha
Parcel I.D.	WAKC 0970988
Review by	Date

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s.15.04 (1) (m)).

Property Owner	Property Location
Mildred Tardif Revocable	Govt. Lot: NE 1/4 NW 1/4 S 27 T 7 N R 19 E
Property Owner's Mailing Address	Lot # / Block # / Subd. Name or CSM#
S20 W27387 Fenway Drive North	

City	State	Zip Code	Phone Number
Waukesha	WI	53188	

[X] City [ ] Village [ ] Town — Waukesha

Nearest Road: Silvernail Road

Drainage area: 8.58 [ ] sq. ft. [X] acres

Optional:

Test Site Suitable for (check all that apply)

[ ] Irrigation [ ] Bioretention trench [ ] Trench(es)
[ ] Rain Garden [ ] Grassed Swale [ ] Reuse
[ ] Infiltration trench [X] SDS (>15' wide) [ ] Other _____

Hydraulic Application Test Method

[X] Morphological Evaluation
[ ] Double-Ring Infiltrometer
[ ] Other (Specify)_____

1 Obs. # [X] Boring [ ] Pit — Ground Surface Elev. 885.5 ft — Depth to limiting factor 36 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
1	0-12	10YR2/2	None	FILL: SICL	2fsbk	mfr	as	<5	0.04
2	12-36	10YR3/3 & 5/4	None	SCL	2fsbk	mfi	cw	<5	0.11
3	36-48	2.5Y6/6	None	SIL	1fsbk	mfr	cw	<5	0.13
4	48-78	2.5Y6/4	c1d 2.5Y7/2	SIL	1fsbk	mfr	cw	<5	0.13
5	78-114	2.5Y6/4	None	SICL	1fsbk	mfi	cw	<5	0.04
6	114-210	2.5Y6/4	None	SIL	1fsbk	mfi	cw	<5	0.13
7	210-240	2.5Y6/4	None	SIL		mefi		5-12	0.13
		Groundwater encountered at 36 in. while drilling.							

Obs. # [ ] Boring [ ] Pit — Ground Surface Elev. _____ ft — Depth to limiting factor _____ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr

CST/PSS Name (Please Print)	Signature	CST Number
Nathan I. Springstead, CST	Nathan Springstead	1091739
Address	**Date Evaluation Conducted**	**Telephone Number**
336 S. Curtis Road, West Allis, WI 53214	3/12/2014	(414) 443-2000

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **1**
Surface Elevation (ft) **885.5**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						FILL: 12" Dark Brown Clayey Topsoil (OL)					
1		18	F	41		Dark Brown to Brown Lean CLAY; Little to Some Fine Sand, Trace Gravel, Few Organic/Topsoil Inclusions (CL) (Possible Fill)					
					▽						
2A/B		18	W	11	▼	Medium Dense, Brown Sandy SILT (ML)					
					5	Medium Dense, Brown Mottled SILT; Little Fine Sand, Trace to Little Clay (ML)					
3A/B		18	M/W	12		Soft to Medium Stiff, Brown Silty CLAY; Little Fine Sand, Trace Gravel, Few Wet Silt Seams and Layers (CL)	(0.5-0.75)				
4A/B		18	W	6			(0.25-0.5)				
					10	Loose to Medium Dense, Brown SILT; Little Fine Sand, Trace to Little Clay (ML)					
5A/B		18	W/M	24							
					15						
6		0		65		Very Dense, Brown Sandy SILT; Little Fine to Coarse Gravel (ML)					
					20	End of Boring at 20 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **3.0'**	Upon Completion of Drilling		**11.0'**	
Time After Drilling			**15 min.**	**30 min.**
Depth to Water			**4.5'**	**4.0'** ▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/14** End **3/12/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **2**
Surface Elevation (ft) **886.0**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						FILL: 8" Tan Crushed Stone/Gravel					
1A/B		18	F	50		FILL: Brown Silty Fine to Medium Sand, Little Fine to Coarse Gravel					
						FILL: Brown to Black Foundry Sand, Trace Slag and Metal Fragments					
2		12	M	21		FILL: Brown Sandy Silt, Little Fine to Coarse Gravel					
					5						
3		5	M	7		FILL: Black Organic Clay Mixed with Greenish Gray Lean Clay	(0.5-1.0)				
				▽		Dark Brown to Black Organic CLAY (OL)					
4		18	W	14		Medium Dense, Brown Mottled SILT; Little Fine Sand (ML)					
					10						
5		1	W	17		Medium Dense to Very Dense, Brown Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
					15						
6		10	W	100/ 15"							
					20	End of Boring & Auger Refusal at 21 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'** Upon Completion of Drilling **9.5'**
Time After Drilling **& rising**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/14** End **3/11/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **3**
Surface Elevation (ft) **885.5**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2" ASPHALT					
1		6	M	28		FILL: Dark Brown Sandy/Silty Clay, Little to Some Fine to Coarse Gravel					
				▽							
2		18	W	10		Loose to Medium Dense, Brown Mottled SILT; Little Fine Sand, Trace to Little Clay, Few Wet Fine to Medium Sand Seams (ML)					
					5						
3		18	W	26		No mottling below 5 ft					
4		18	W	15							
					10						
5		18	M/W	7		Loose, Gray Laminated SILT and CLAY (ML/CL)					
					15						
6		18	W	17		Medium Dense, Brown Fine to Medium SAND; Trace Silt and Gravel (SP)					
					20						
7		6	M	42/6"		Very Dense, Brown Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
					25	End of Boring & Spoon Refusal at 24 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **3.0'** Upon Completion of Drilling **5.0'**
Time After Drilling **& rising**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/14** End **3/11/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **4**
Surface Elevation (ft) **885.0**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						FILL: 4" Dark Brown Clayey Topsoil (OL)					
1		18	F	52		FILL: Dark Brown to Black Foundry Sand, Trace Slag					
2		18	M	8	5	Stiff to Very Stiff, Grayish Brown Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL) (Possible Fill)	(1.5-2.25)				
3		15	M	6		Loose, Grayish Brown Mottled Sandy SILT; Little Fine to Coarse Gravel, Trace Clay (ML) (Possible Fill)					
4		18	W/M	16	10	Medium Dense, Brown SILT; Little Fine Sand, Trace to Little Clay, Few Moist Lean Clay Seams and Layers (ML)	(1.5-3.0)				
5		18	W/M	14	15	Medium Dense, Gray Sandy SILT; Little Fine to Coarse Gravel (ML)					
6		12	M	32	20	Dense, Brown Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
						End of Boring & Auger Refusal at 21 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0' +/-** Upon Completion of Drilling **9.5'**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/14** End **3/11/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **5**
Surface Elevation (ft) **885.5**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						5" ASPHALT / 3" BASE COURSE					
1		12	F	64		Dark Brown Sandy Lean CLAY; Trace to Little Fine to Coarse Gravel, Trace Topsoil Inclusions (CL) (Possible Fill)					
2		18	M/W	15	5	Loose to Medium Dense, Brown Mottled SILT; Little Fine Sand, Trace to Little Clay, Few Moist to Wet Fine to Medium Sand Seams and Layers (ML)					
3		18	W	17							
4A/B		18	W/M	7	10	Soft to Medium Stiff, Brown Silty CLAY; Little Fine Sand, Trace Gravel, Few Wet Silt Seams and Layers (CL)	(0.5-0.75)				
5		18	W	3	15	Very Loose, Gray Sandy SILT; Trace to Little Clay and Fine to Coarse Gravel (ML)					
6		12	M	55	20	Very Dense, Gray Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
						End of Boring & Auger Refusal at 20.5 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **4.0'** Upon Completion of Drilling _____
Time After Drilling _____
Depth to Water _____ ▼
Depth to Cave in _____

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/14** End **3/1/11**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **6**
Surface Elevation (ft) **885.0**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						FILL: 8" Tan Crushed Stone/Gravel					
1		14	F	23		FILL: Brown Silty Fine to Medium Sand, Little Fine to Coarse Gravel					
						FILL: Black Sandy Organic Clay, Trace Tree Roots and Gravel					
2		0		11	5						
						Very Loose to Loose, Grayish Brown Mottled SILT; Little Fine Sand, Trace to Little Clay (ML)					
3		10	M	4							
						Loose, Brown Sandy SILT; Little Fine to Coarse Gravel (ML)					
4		7	W	8	10						
						Very Dense, Grayish Brown Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
5		15	M	58	15						
						End of Boring & Auger Refusal at 21 ft Backfilled with Bentonite Chips					
6		11	M	100/11"	20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'** Upon Completion of Drilling _____
Time After Drilling _____
Depth to Water _____ ▼
Depth to Cave in _____

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/14** End **3/11/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **7**
Surface Elevation (ft) **887.0**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						2" ASPHALT / 4" BASE COURSE					
1		11	F	100/11"		FILL: Brown Silty Fine to Medium Sand, Little Fine to Coarse Gravel					
						FILL: Black Organic Clay					
2		10	M	16		Very Stiff, Dark Brown Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(3.25)				
					5	Medium Dense, Grayish Brown Mottled Sandy SILT; Little Fine to Coarse Gravel, Trace Clay (ML)					
3		5	M	27							
					▽						
4		12	W	5		Loose, Brown SILT; Little Fine Sand, Trace to Little Clay (ML)					
					10						
5		18	M	15		Medium Dense, Brown Sandy SILT; Little to Some Fine to Coarse Gravel (ML)					
					15						
						Very Dense, Gray Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
6		6	M	29/6"							
					20	End of Boring & Auger Refusal at 19 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/14** End **3/12/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Oberlin Filter**
831-833 W. Silvernail Road
Location **Waukesha, Wisconsin**

Boring No. **8**
Surface Elevation (ft) **887.5**
Job No. **CM14019**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						FILL: Tan Crushed Stone/Gravel					
1		12	F	100		Dark Brown to Black Organic CLAY (OL) (Possible Fill)					
2A/B		18	M	14		Stiff to Very Stiff, Grayish Brown Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(1.75-2.0)				
3		2	M	31	5	Medium Dense to Dense, Grayish Brown Mottled Sandy SILT; Little Fine to Coarse Gravel, Trace Clay (ML)					
4		3	W	10		Loose to Medium Dense, Brown Sandy SILT; Little Fine to Coarse Gravel, Little Clay (ML)					
5		18	M	31	10	Dense to Very Dense, Brown Sandy SILT; Little to Some Fine to Coarse Gravel, Few Scattered Cobbles and Boulders (ML)					
6		7	M	100/9"	15						
					20	End of Boring at 19.25 ft Backfilled with Bentonite Chips					
					25						
					30						

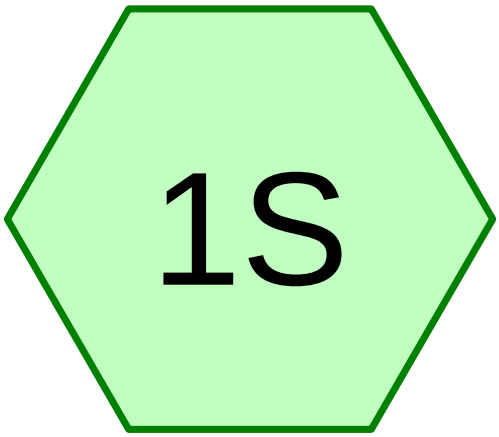
WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'** Upon Completion of Drilling **17.0'**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/14** End **3/12/14**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**



Existing Site

Subcat Reach Pond Link

Drainage Diagram for CJE1416-Exst
Prepared by CJ Engineering 4/23/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Site Runoff Area=9.500 ac Runoff Depth>0.79"
Flow Length=516' Tc=22.9 min CN=79 Runoff=8.20 cfs 0.629 af

Subcatchment 1S: Existing Site

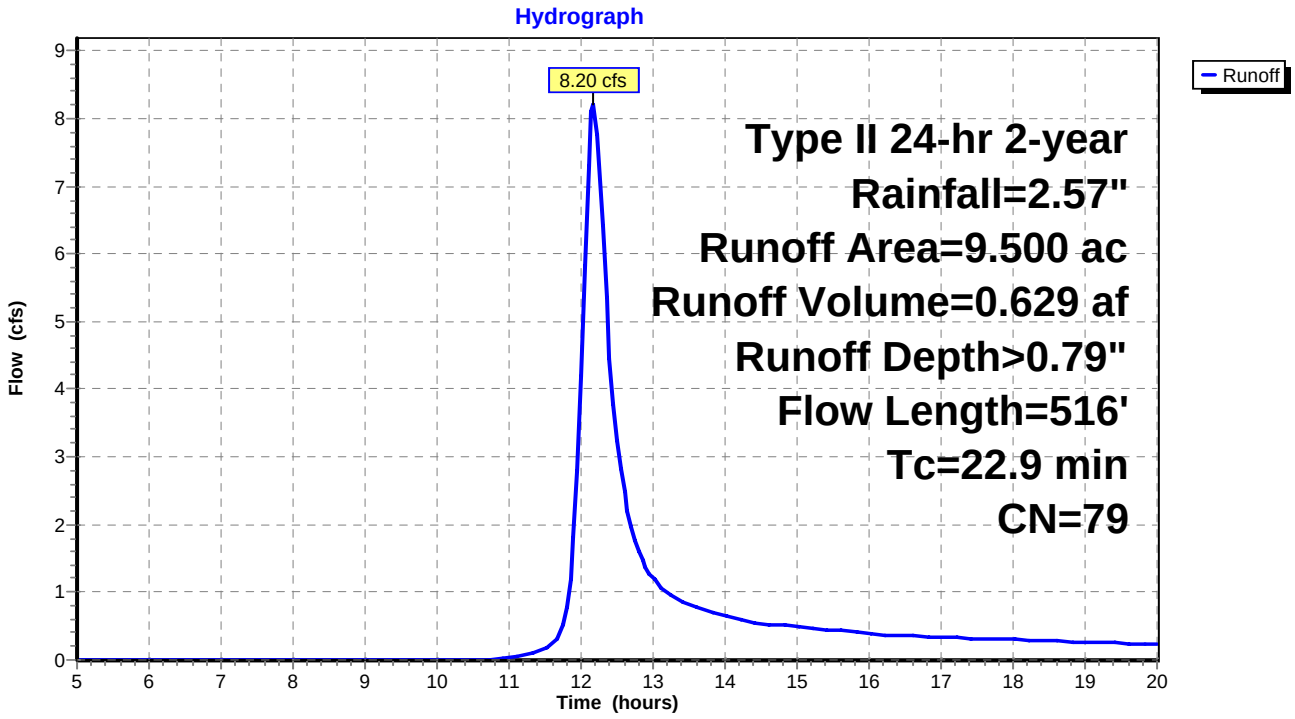
Runoff = 8.20 cfs @ 12.17 hrs, Volume= 0.629 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.57"

Area (ac)	CN	Description
0.450	98	Paved roads w/curbs & sewers
1.450	89	Gravel roads, HSG C
3.890	79	50-75% Grass cover, Fair, HSG C
3.710	74	>75% Grass cover, Good, HSG C
9.500	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	205	0.0185	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.5	26	0.0200	0.9		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
2.4	285	0.0150	2.0		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
22.9	516	Total			

Subcatchment 1S: Existing Site



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Site Runoff Area=9.500 ac Runoff Depth>1.51"
Flow Length=516' Tc=22.9 min CN=79 Runoff=16.00 cfs 1.197 af

Subcatchment 1S: Existing Site

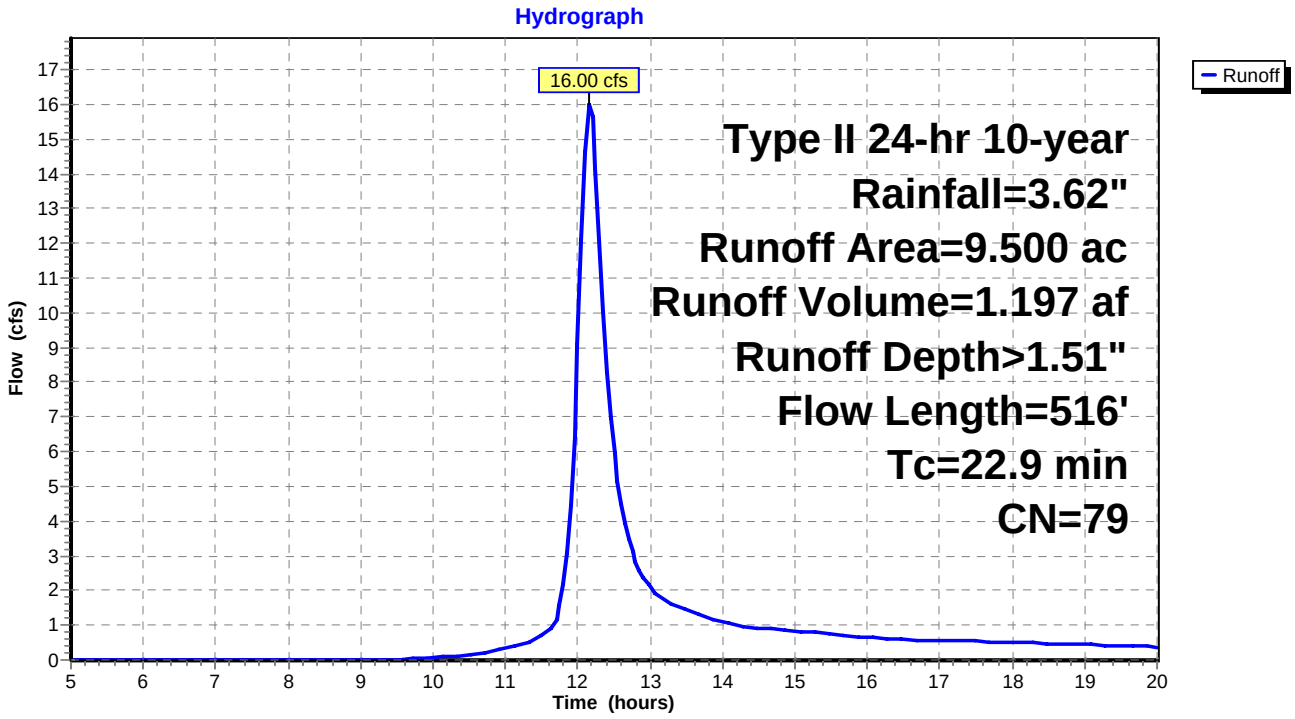
Runoff = 16.00 cfs @ 12.17 hrs, Volume= 1.197 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=3.62"

Area (ac)	CN	Description
0.450	98	Paved roads w/curbs & sewers
1.450	89	Gravel roads, HSG C
3.890	79	50-75% Grass cover, Fair, HSG C
3.710	74	>75% Grass cover, Good, HSG C
9.500	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	205	0.0185	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.5	26	0.0200	0.9		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
2.4	285	0.0150	2.0		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
22.9	516	Total			

Subcatchment 1S: Existing Site



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Site Runoff Area=9.500 ac Runoff Depth>3.30"
Flow Length=516' Tc=22.9 min CN=79 Runoff=34.74 cfs 2.612 af

Subcatchment 1S: Existing Site

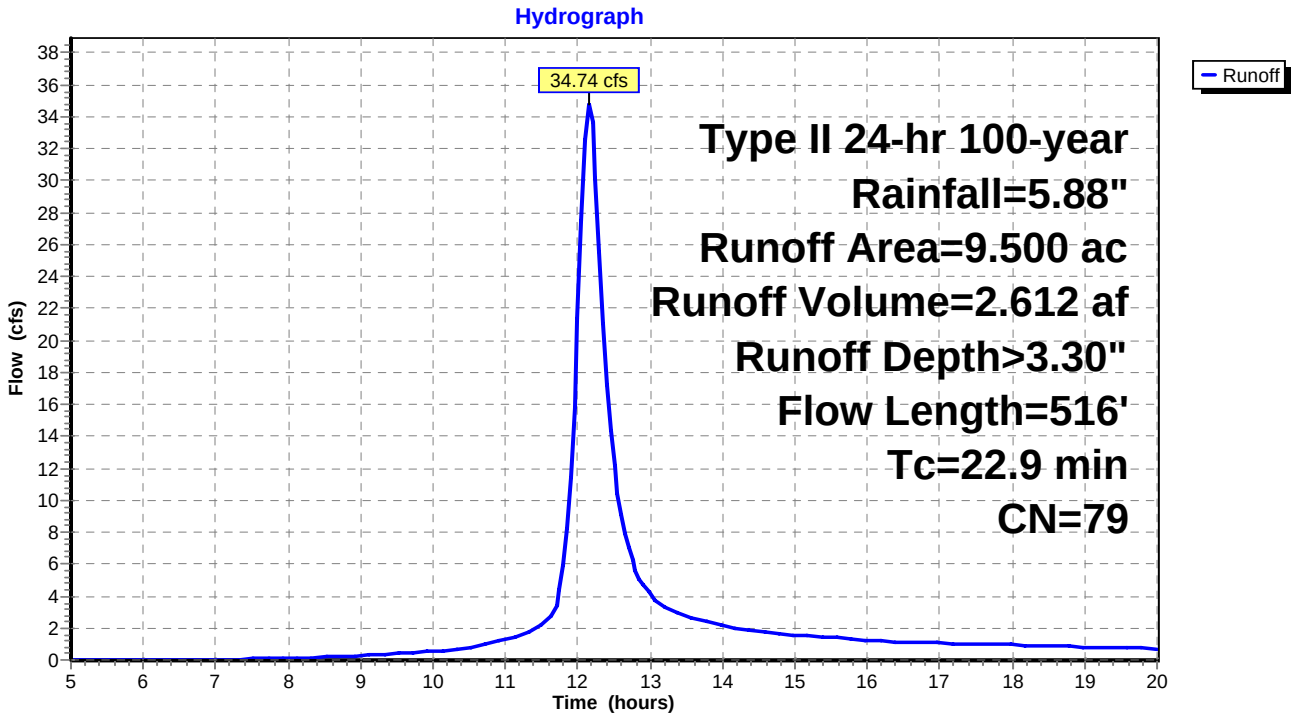
Runoff = 34.74 cfs @ 12.16 hrs, Volume= 2.612 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.88"

Area (ac)	CN	Description
0.450	98	Paved roads w/curbs & sewers
1.450	89	Gravel roads, HSG C
3.890	79	50-75% Grass cover, Fair, HSG C
3.710	74	>75% Grass cover, Good, HSG C
9.500	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	205	0.0185	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.5	26	0.0200	0.9		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
2.4	285	0.0150	2.0		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
22.9	516	Total			

Subcatchment 1S: Existing Site



OBERLIN FILTER

831 SILVER NAIL RD.   WAUKESHA, WI

SWMP - EXISTING CONDITIONS

APRIL 23, 2014

JOB NO.: CJE1416REX

CJ engineering
civil design and consulting
9205 W. Center Street
Suite 214
Milwaukee, WI 53222
PH. (414) 443-1312
FAX (414) 443-1317
www.cj-engineering.com

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OBERLIN FILTER

831 SILVER NAIL RD. WAUKESHA, WI

N

SUBCATCHMENT 1
FUTURE BUILDING ADDITION

SUBCATCHMENT 2

PROPOSED BUILDING
FIRST FLOOR ELEV. 109.00

POND 1

PROPOSED STORM POND
N.W.L. 101.00

TC ROUTING

A B C D E F

UNPLATTED LAND

METAL FENCE

END OF WALL ELEV. 107.0

T.O.W. 107.0 B.O.W. 104.5

T.O.W. 107.0 B.O.W. 103.0

EXST. 21" RCP E&W INV. = 95.7±

PROPOSED RET. WALL

T.O.W. 106.0 B.O.W. 102.0

T.O.W. 107.0 B.O.W. 102.0

T.O.W. 106.5 B.O.W. 103.0

8" PVC I.E. = 100.68

8" PVC I.E. = 101.51

N 00°07'00" W 933.60'

ASPHALT EDGE

3' WIDE CURB CUT

T.O.W. 106.5 B.O.W. 103.0

T.O.W. 104.5 B.O.W. 101.5

T.O.W. 105.5 B.O.W. 101.5

30" RCP I.E. = 98.94

30" RCP I.E. = 98.72

SANITARY MH
RIM EL = 103.22
8" PVC W INV. = 91.57
8" PVC N INV. = 91.64
8" PVC E INV. = 91.65

STORM MANHOLE
RIM EL = 102.94
21" RCP SE = 93.34
21" RCP W = 93.12

STORM INLET RIM 106.0

STORM INLET RIM 106.0

STORM INLET RIM 105.75

STORM INLET RIM 105.5

STORM INLET RIM 104.9

STORM INLET RIM 106.9

STORM INLET RIM 104.75

STORM INLET RIM 107.0

STORM INLET RIM 107.3

STORM INLET RIM 107.25

STORM INLET RIM 106.4

STORM INLET RIM 106.3

STORM INLET RIM 106.3

CURB RAMP WALK FLUSH W/ PARKING

CURB RAMP

FUTURE PARKING

FUTURE PARKING

3' WIDE CURB CUT

3' WIDE CURB CUT

POND OUTLET

10' WIDE SPILLWAY
ELEV. 103.6

18" CMP I.E. = 101.91

18" CMP I.E. = 102.51

24" RCP I.E. = 103.58

24" RCP I.E. = 104.54

SITE/PROJECT BENCHMARK
EXST. SANITARY MH #1
RIM EL = 108.26
8" PVC E INV. = 94.26
8" PVC W W INV. = 94.26

NE CORNER NW 1/4 SEC. 27-7-19
CONC. MON. W/BRASS CAP FND

SILVERNAIL ROAD
(PUBLIC RIGHT OF WAY WIDTH VARIES)

ASPHALT EDGE

GRAVEL EDGE

12" WATER MAIN (PLAN)

NORTH LINE OF THE NORTHWEST 1/4 SEC. 27-7-19 S 89°55'13" E 2660.43'

413.22' S 83°43'00" W

1523.43' SEC. 27-7-19 S 00°07'00" E 2646.64'

S 00°07'00" E 757.93'

S 00°07'00" E 365.28'

N 65°53'30" E 184.36'

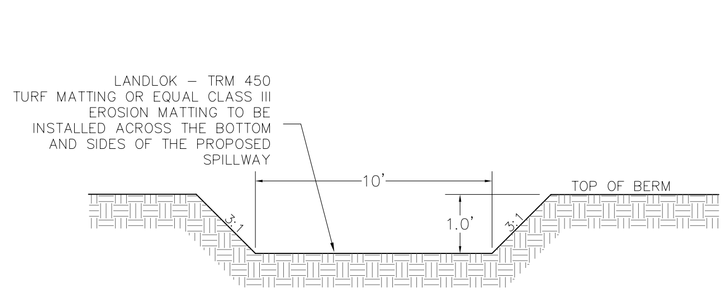
N 85°03'30" E 60.42'

METAL FENCE 1.9' E

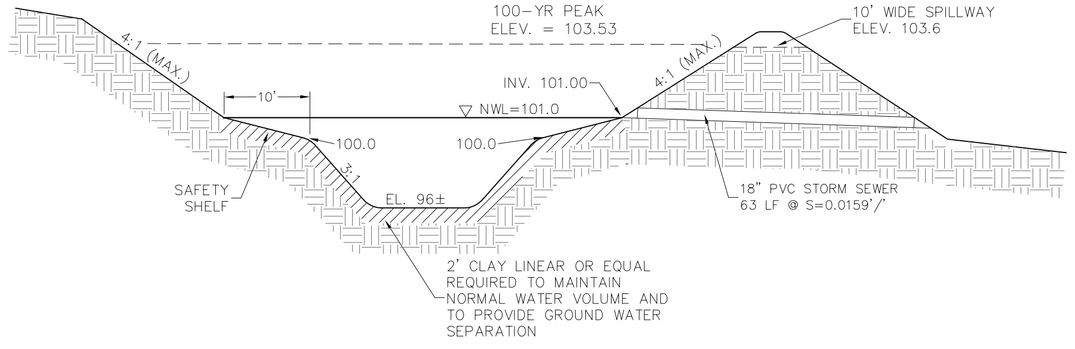
STORM SEWER ACCESS SHED
21" RCP E&W INV. = 96.99

LEGEND

107	EXISTING CONTOUR
105	PROPOSED CONTOUR
x106.5	PROPOSED ELEVATION
ST	EXISTING STORM SEWER
ST	PROPOSED STORM SEWER
	SUBCATCHMENT BOUNDARY
	TC ROUTING



SPILLWAY DETAIL (TYP.)
NOT TO SCALE

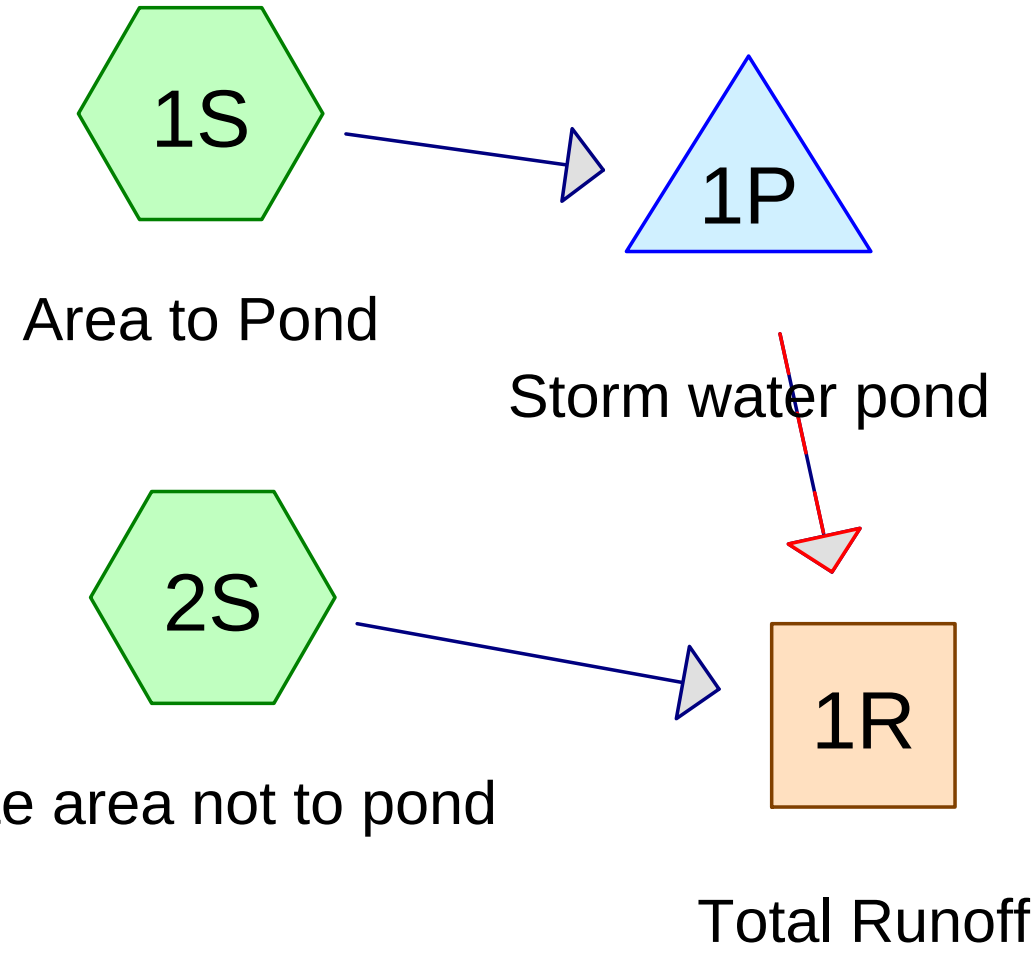


STORM WATER POND DETAIL
NOT TO SCALE

GRAPHIC SCALE
40 0 20 40 80
1 inch = 40 ft

APRIL 23, 2014
JOB NO.: CJE1416R1

SWMP - PROPOSED CONDITIONS



Subcat Reach Pond Link

Drainage Diagram for CJE1416-Proposed
Prepared by CJ Engineering 4/23/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area to Pond Runoff Area=8.563 ac Runoff Depth>1.72"
Flow Length=1,010' Tc=17.0 min CN=93 Runoff=18.69 cfs 1.228 af

Subcatchment 2S: Site area not to pond Runoff Area=0.937 ac Runoff Depth>0.58"
Flow Length=449' Tc=12.5 min CN=74 Runoff=0.78 cfs 0.045 af

Reach 1R: Total Runoff Inflow=4.97 cfs 1.119 af
Outflow=4.97 cfs 1.119 af

Pond 1P: Storm water pond Peak Elev=102.08' Storage=26,257 cf Inflow=18.69 cfs 1.228 af
Primary=4.79 cfs 1.074 af Secondary=0.00 cfs 0.000 af Outflow=4.79 cfs 1.074 af

Subcatchment 1S: Area to Pond

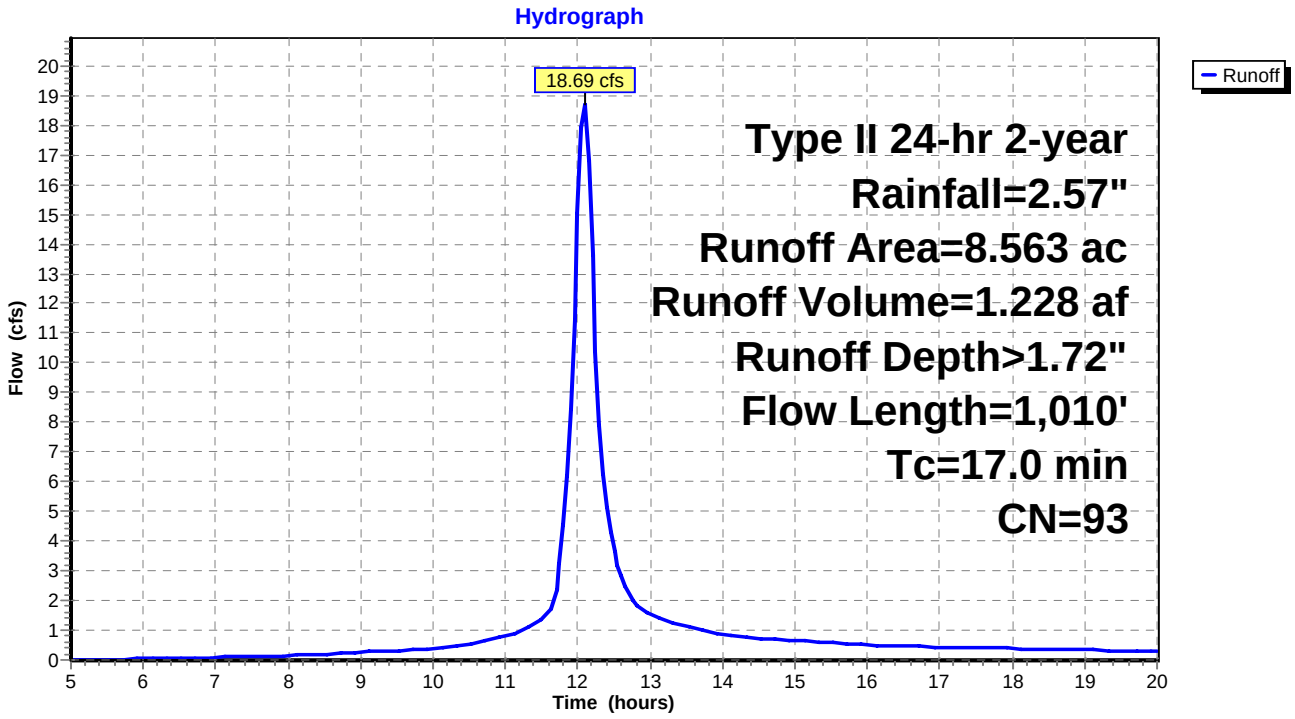
Runoff = 18.69 cfs @ 12.09 hrs, Volume= 1.228 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.57"

Area (ac)	CN	Description
4.643	98	Paved parking & roofs
1.586	98	Paved parking & roofs - Future
0.530	98	Pond - NWL
1.804	74	>75% Grass cover, Good, HSG C
8.563	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	80	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.7	115	0.0157	1.2		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
3.2	815	0.0052	4.3	7.57	**Circular Channel (pipe), C-D** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
17.0	1,010	Total			

Subcatchment 1S: Area to Pond



Subcatchment 2S: Site area not to pond

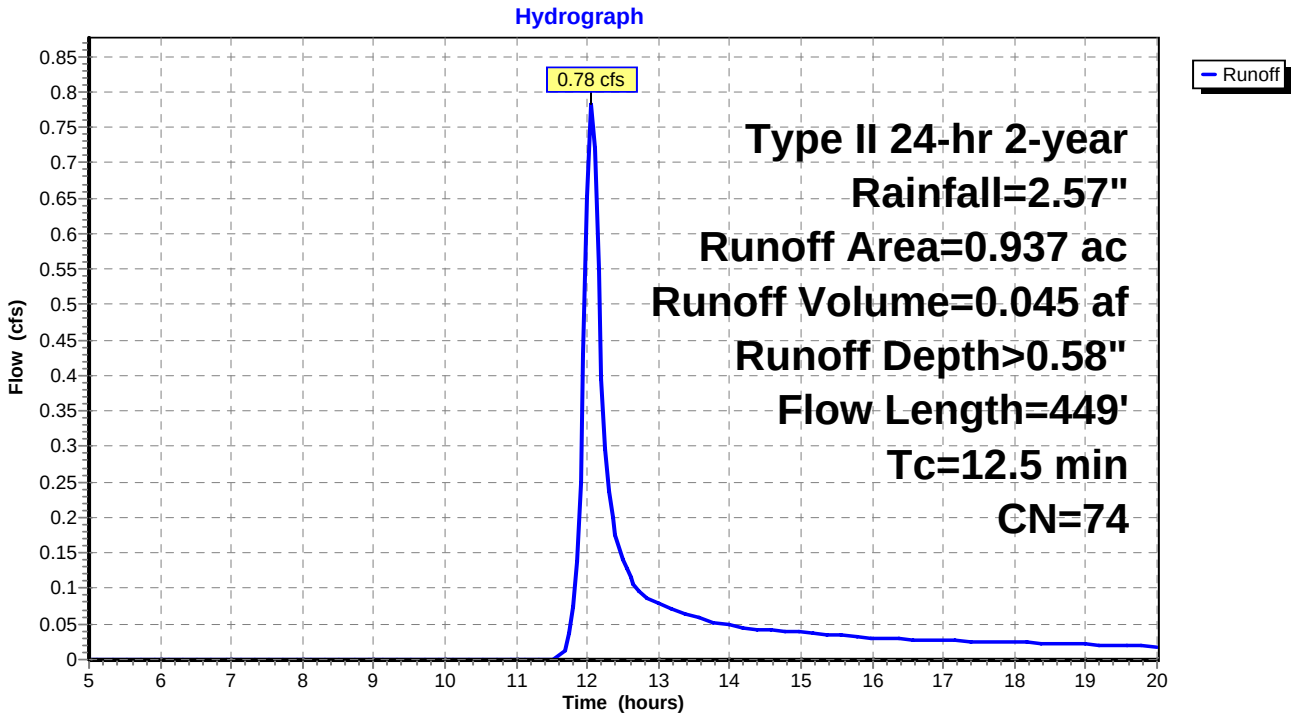
Runoff = 0.78 cfs @ 12.06 hrs, Volume= 0.045 af, Depth> 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.57"

Area (ac)	CN	Description
0.937	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	62	0.0242	0.1		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
5.6	387	0.0052	1.2		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
12.5	449	Total			

Subcatchment 2S: Site area not to pond

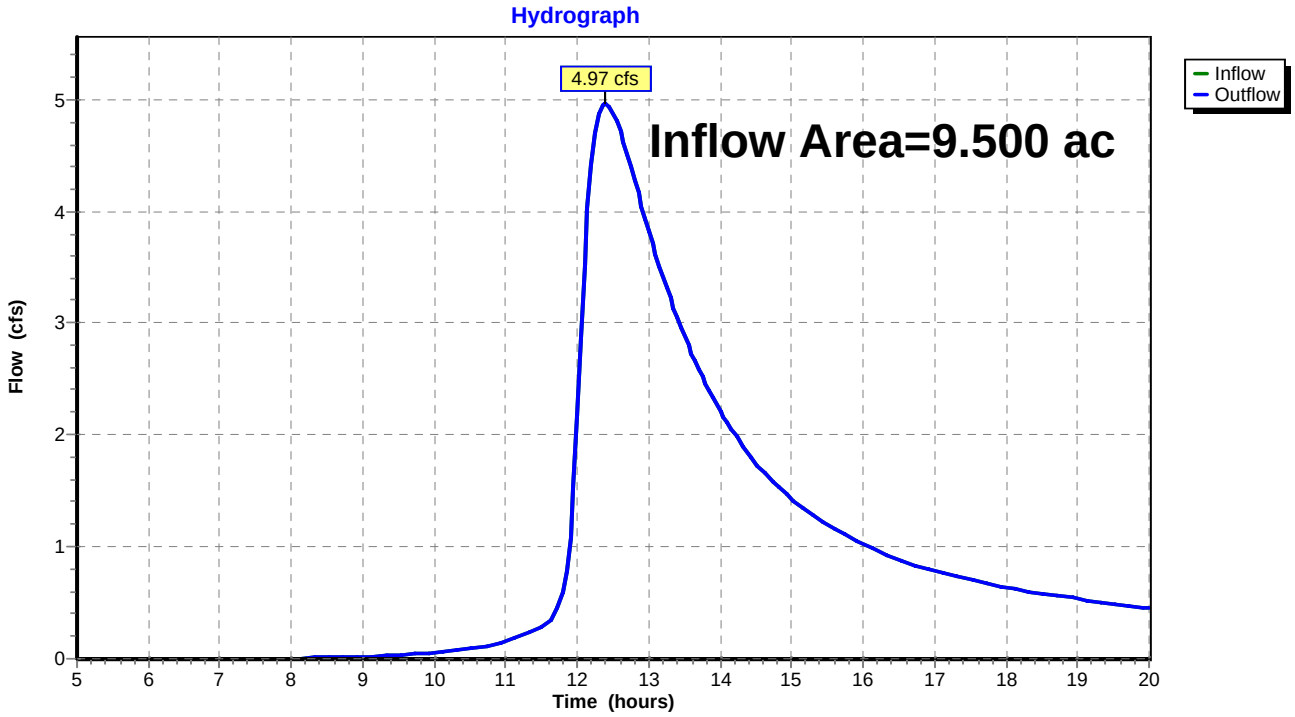


Reach 1R: Total Runoff

Inflow Area = 9.500 ac, Inflow Depth > 1.41" for 2-year event
Inflow = 4.97 cfs @ 12.40 hrs, Volume= 1.119 af
Outflow = 4.97 cfs @ 12.40 hrs, Volume= 1.119 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Runoff



Pond 1P: Storm water pond

Inflow Area = 8.563 ac, Inflow Depth > 1.72" for 2-year event
Inflow = 18.69 cfs @ 12.09 hrs, Volume= 1.228 af
Outflow = 4.79 cfs @ 12.42 hrs, Volume= 1.074 af, Atten= 74%, Lag= 19.9 min
Primary = 4.79 cfs @ 12.42 hrs, Volume= 1.074 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 102.08' @ 12.42 hrs Surf.Area= 25,890 sf Storage= 26,257 cf
Plug-Flow detention time= 123.8 min calculated for 1.074 af (87% of inflow)
Center-of-Mass det. time= 84.0 min (854.3 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	101,531 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

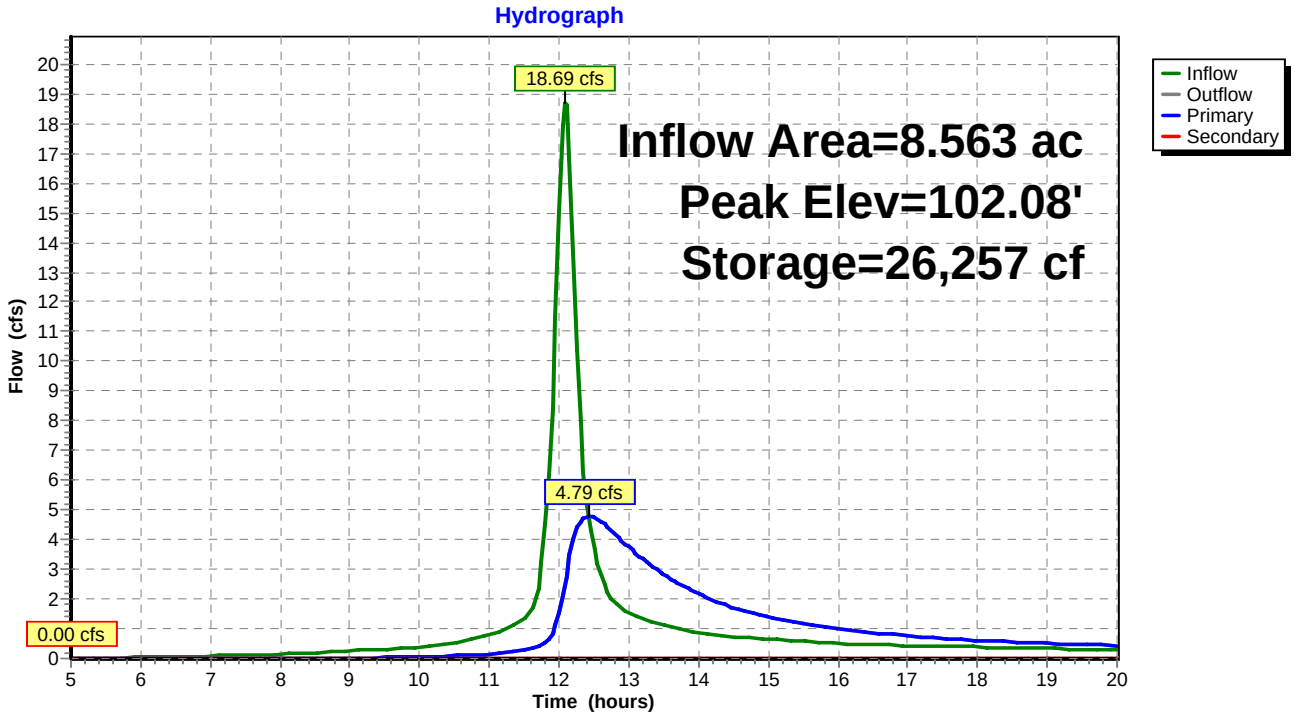
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	22,905	0	0
102.00	25,670	24,288	24,288
103.00	28,550	27,110	51,398
104.00	34,363	31,457	82,854
104.50	40,345	18,677	101,531

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**18.0" x 63.0' long Culvert** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 100.00' S= 0.0159 '/' Cc= 0.900 n= 0.010
#2	Secondary	103.60'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.79 cfs @ 12.42 hrs HW=102.08' (Free Discharge)
1=Culvert (Inlet Controls 4.79 cfs @ 3.5 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Storm water pond



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area to Pond Runoff Area=8.563 ac Runoff Depth>2.67"
Flow Length=1,010' Tc=17.0 min CN=93 Runoff=28.29 cfs 1.903 af

Subcatchment 2S: Site area not to pond Runoff Area=0.937 ac Runoff Depth>1.20"
Flow Length=449' Tc=12.5 min CN=74 Runoff=1.70 cfs 0.093 af

Reach 1R: Total Runoff Inflow=7.99 cfs 1.815 af
Outflow=7.99 cfs 1.815 af

Pond 1P: Storm water pond Peak Elev=102.55' Storage=38,946 cf Inflow=28.29 cfs 1.903 af
Primary=7.63 cfs 1.722 af Secondary=0.00 cfs 0.000 af Outflow=7.63 cfs 1.722 af

Subcatchment 1S: Area to Pond

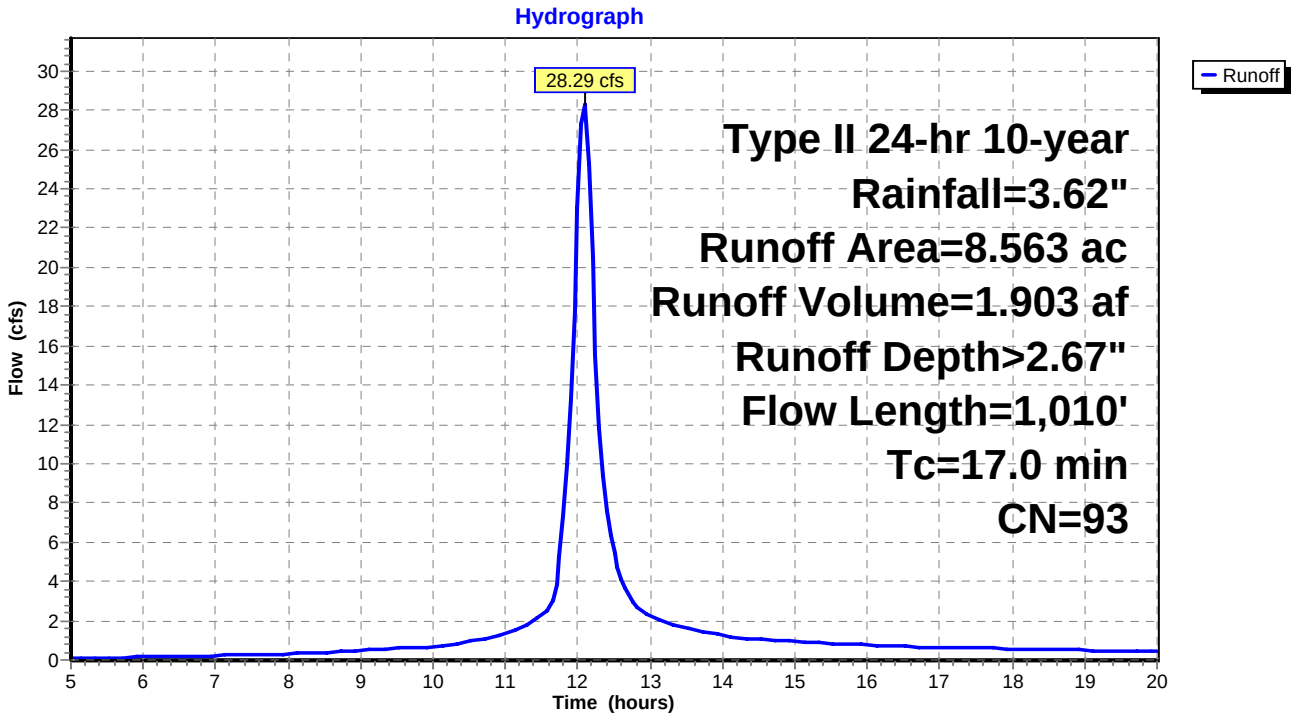
Runoff = 28.29 cfs @ 12.09 hrs, Volume= 1.903 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=3.62"

Area (ac)	CN	Description
4.643	98	Paved parking & roofs
1.586	98	Paved parking & roofs - Future
0.530	98	Pond - NWL
1.804	74	>75% Grass cover, Good, HSG C
8.563	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	80	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.7	115	0.0157	1.2		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
3.2	815	0.0052	4.3	7.57	**Circular Channel (pipe), C-D** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
17.0	1,010	Total			

Subcatchment 1S: Area to Pond



Subcatchment 2S: Site area not to pond

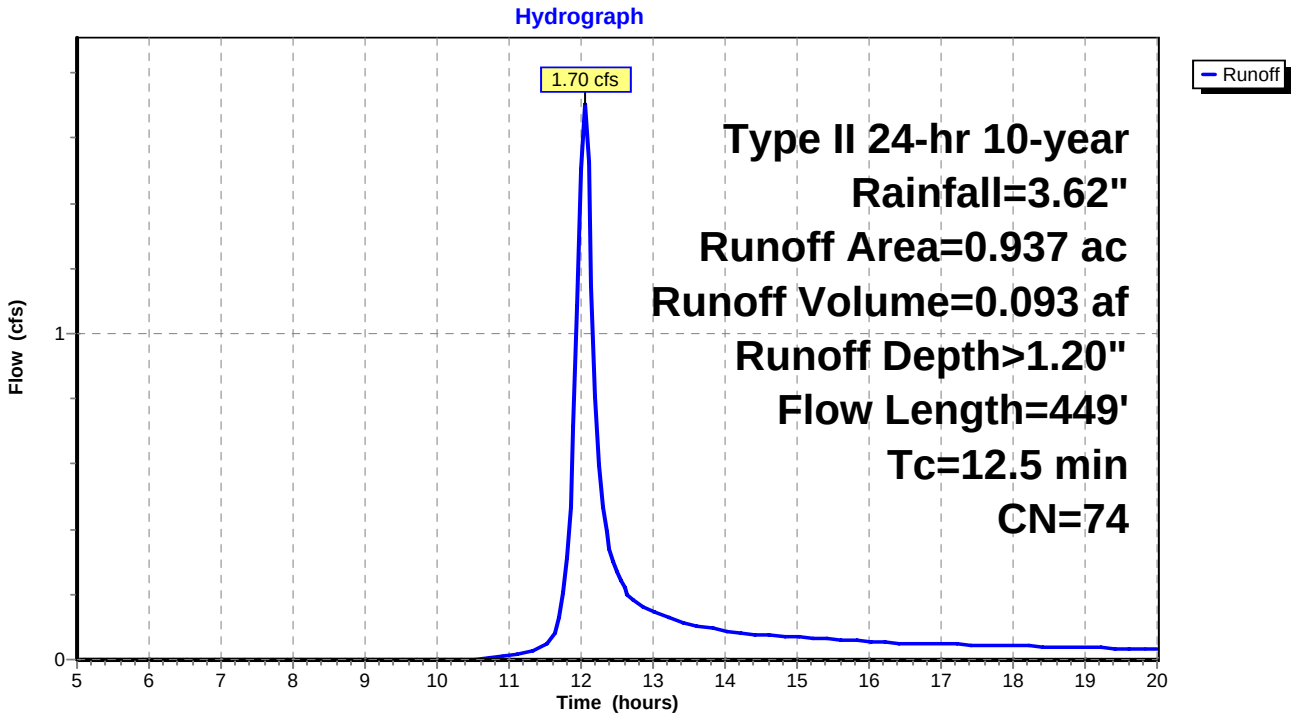
Runoff = 1.70 cfs @ 12.05 hrs, Volume= 0.093 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=3.62"

Area (ac)	CN	Description
0.937	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	62	0.0242	0.1		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
5.6	387	0.0052	1.2		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
12.5	449	Total			

Subcatchment 2S: Site area not to pond

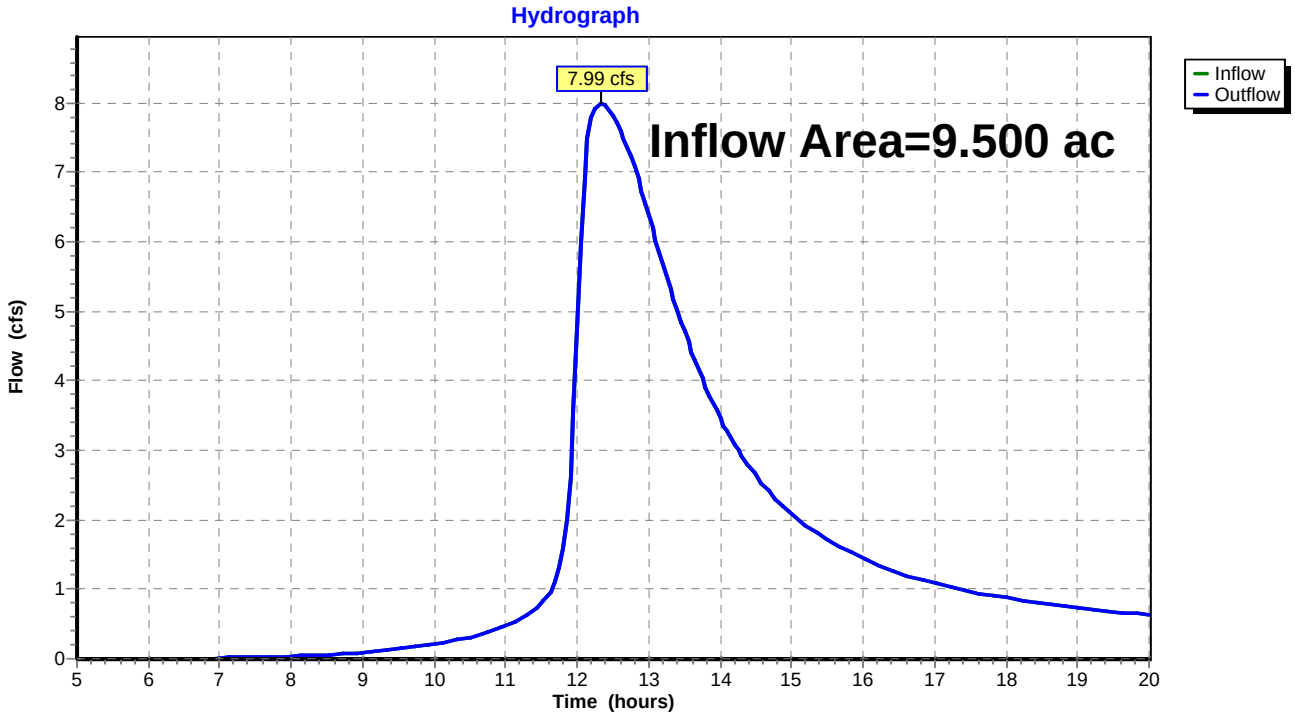


Reach 1R: Total Runoff

Inflow Area = 9.500 ac, Inflow Depth > 2.29" for 10-year event
Inflow = 7.99 cfs @ 12.35 hrs, Volume= 1.815 af
Outflow = 7.99 cfs @ 12.35 hrs, Volume= 1.815 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Runoff



Pond 1P: Storm water pond

Inflow Area = 8.563 ac, Inflow Depth > 2.67" for 10-year event
Inflow = 28.29 cfs @ 12.09 hrs, Volume= 1.903 af
Outflow = 7.63 cfs @ 12.40 hrs, Volume= 1.722 af, Atten= 73%, Lag= 19.0 min
Primary = 7.63 cfs @ 12.40 hrs, Volume= 1.722 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 102.55' @ 12.40 hrs Surf.Area= 27,265 sf Storage= 38,946 cf
Plug-Flow detention time= 110.5 min calculated for 1.716 af (90% of inflow)
Center-of-Mass det. time= 78.1 min (838.8 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	101,531 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

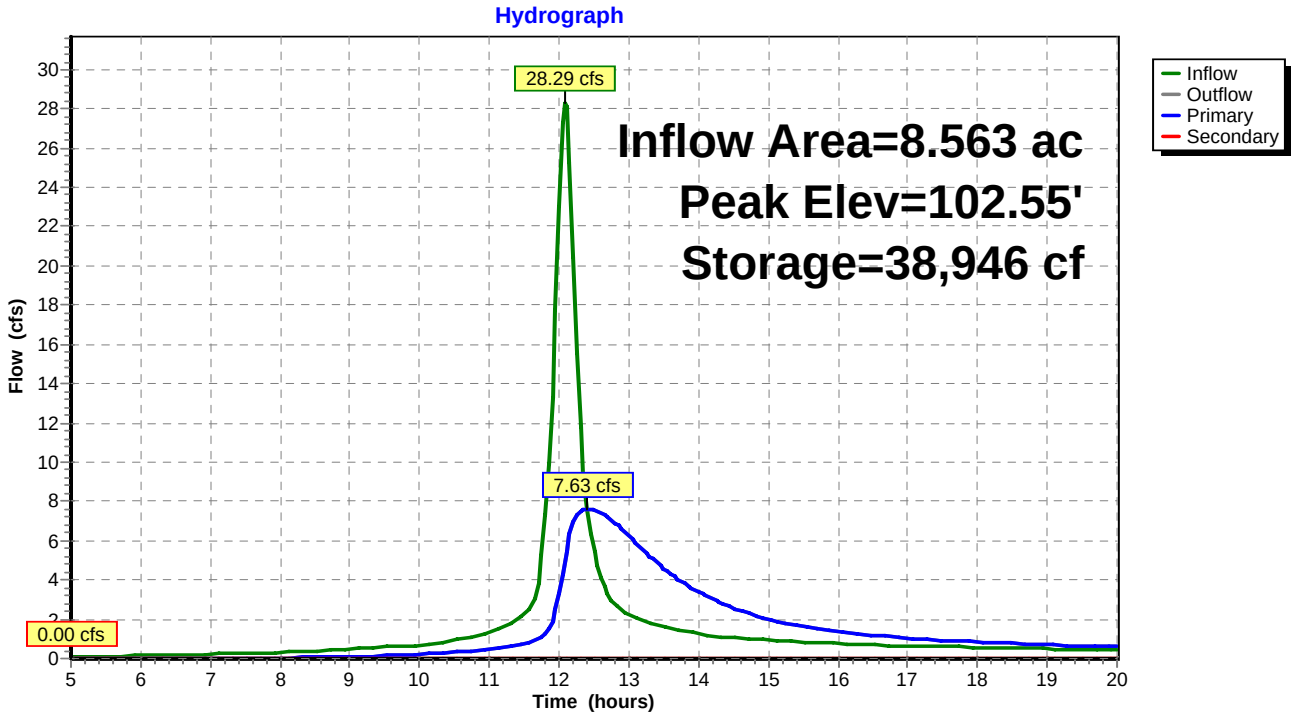
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	22,905	0	0
102.00	25,670	24,288	24,288
103.00	28,550	27,110	51,398
104.00	34,363	31,457	82,854
104.50	40,345	18,677	101,531

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**18.0" x 63.0' long Culvert** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 100.00' S= 0.0159 '/' Cc= 0.900 n= 0.010
#2	Secondary	103.60'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.63 cfs @ 12.40 hrs HW=102.55' (Free Discharge)
1=Culvert (Inlet Controls 7.63 cfs @ 4.3 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Storm water pond



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area to Pond Runoff Area=8.563 ac Runoff Depth>4.73"
Flow Length=1,010' Tc=17.0 min CN=93 Runoff=48.68 cfs 3.374 af

Subcatchment 2S: Site area not to pond Runoff Area=0.937 ac Runoff Depth>2.84"
Flow Length=449' Tc=12.5 min CN=74 Runoff=4.04 cfs 0.222 af

Reach 1R: Total Runoff Inflow=12.64 cfs 3.365 af
Outflow=12.64 cfs 3.365 af

Pond 1P: Storm water pond Peak Elev=103.53' Storage=67,408 cf Inflow=48.68 cfs 3.374 af
Primary=11.36 cfs 3.143 af Secondary=0.00 cfs 0.000 af Outflow=11.36 cfs 3.143 af

Subcatchment 1S: Area to Pond

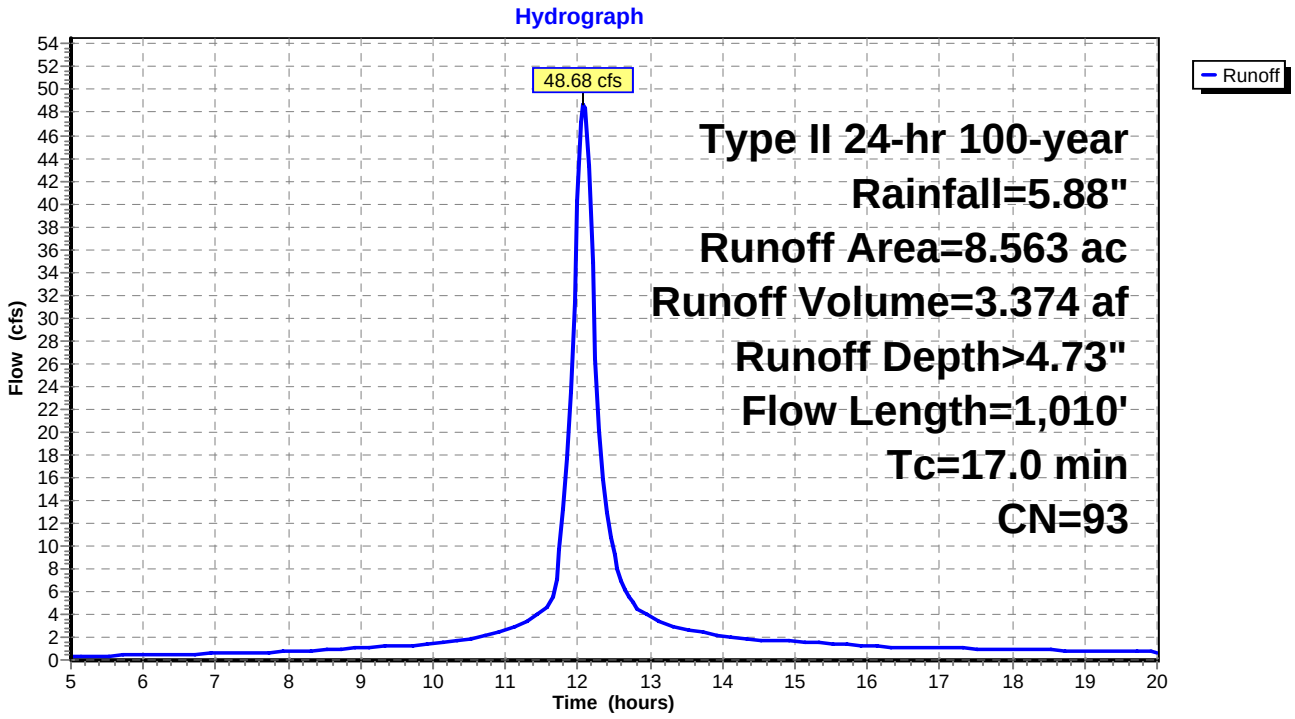
Runoff = 48.68 cfs @ 12.08 hrs, Volume= 3.374 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.88"

Area (ac)	CN	Description
4.643	98	Paved parking & roofs
1.586	98	Paved parking & roofs - Future
0.530	98	Pond - NWL
1.804	74	>75% Grass cover, Good, HSG C
8.563	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	80	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.7	115	0.0157	1.2		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
3.2	815	0.0052	4.3	7.57	**Circular Channel (pipe), C-D** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
17.0	1,010	Total			

Subcatchment 1S: Area to Pond



Subcatchment 2S: Site area not to pond

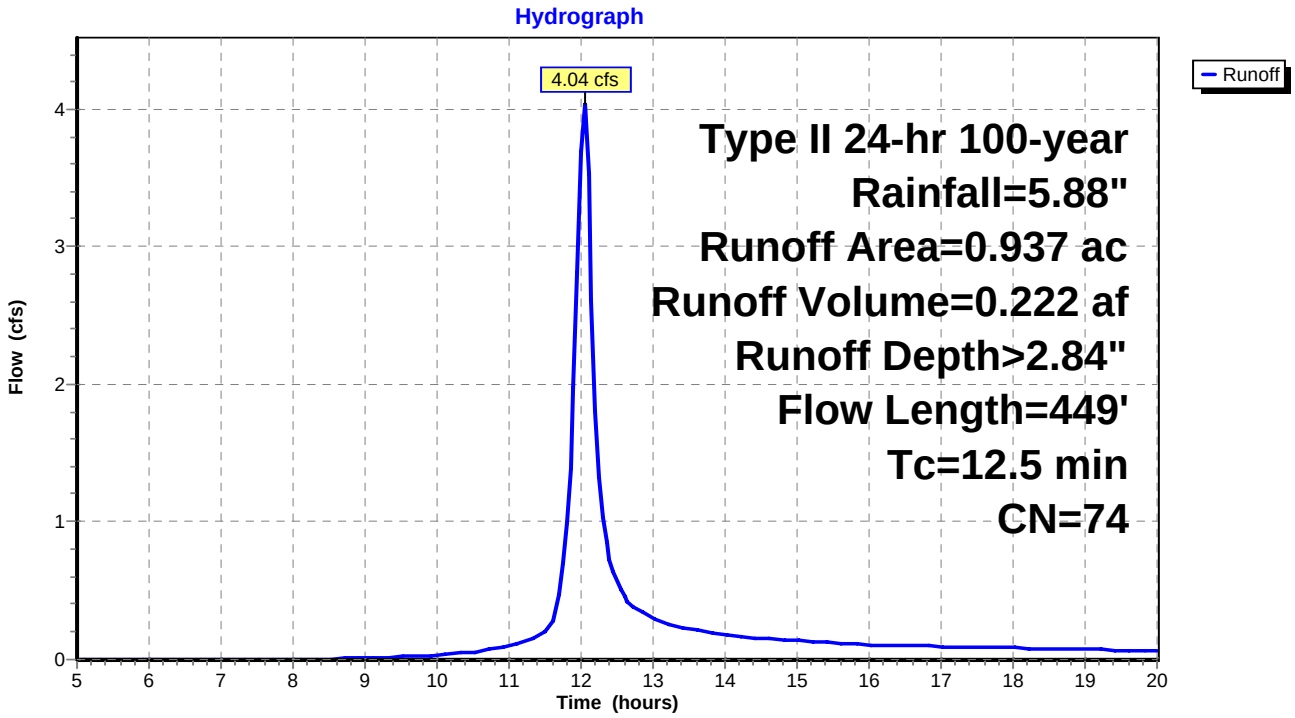
Runoff = 4.04 cfs @ 12.05 hrs, Volume= 0.222 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.88"

Area (ac)	CN	Description
0.937	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	62	0.0242	0.1		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
5.6	387	0.0052	1.2		**Shallow Concentrated Flow, F-G** Unpaved Kv= 16.1 fps
12.5	449	Total			

Subcatchment 2S: Site area not to pond

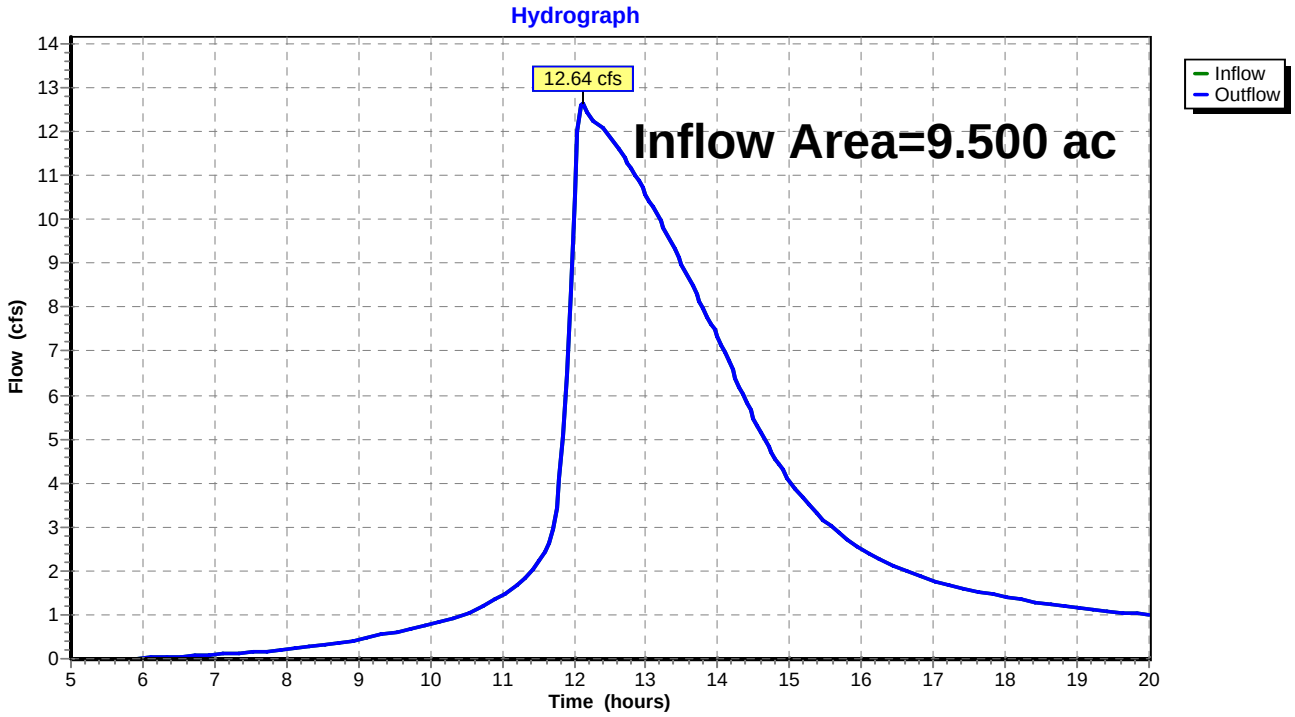


Reach 1R: Total Runoff

Inflow Area = 9.500 ac, Inflow Depth > 4.25" for 100-year event
Inflow = 12.64 cfs @ 12.12 hrs, Volume= 3.365 af
Outflow = 12.64 cfs @ 12.12 hrs, Volume= 3.365 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Runoff



Pond 1P: Storm water pond

Inflow Area = 8.563 ac, Inflow Depth > 4.73" for 100-year event
Inflow = 48.68 cfs @ 12.08 hrs, Volume= 3.374 af
Outflow = 11.36 cfs @ 12.44 hrs, Volume= 3.143 af, Atten= 77%, Lag= 21.2 min
Primary = 11.36 cfs @ 12.44 hrs, Volume= 3.143 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 103.53' @ 12.44 hrs Surf.Area= 31,642 sf Storage= 67,408 cf
Plug-Flow detention time= 103.4 min calculated for 3.132 af (93% of inflow)
Center-of-Mass det. time= 78.0 min (828.5 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	101,531 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

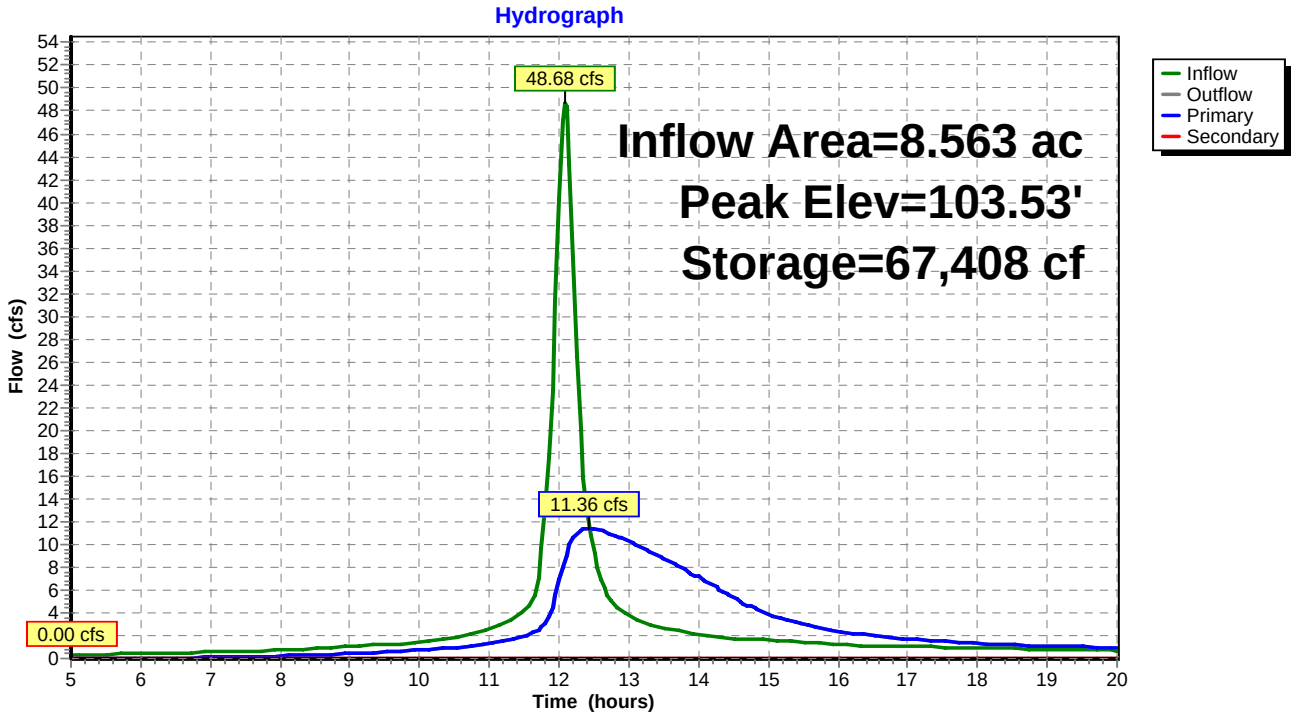
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	22,905	0	0
102.00	25,670	24,288	24,288
103.00	28,550	27,110	51,398
104.00	34,363	31,457	82,854
104.50	40,345	18,677	101,531

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**18.0" x 63.0' long Culvert** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 100.00' S= 0.0159 '/' Cc= 0.900 n= 0.010
#2	Secondary	103.60'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.36 cfs @ 12.44 hrs HW=103.53' (Free Discharge)
1=Culvert (Inlet Controls 11.36 cfs @ 6.4 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Storm water pond



SLAMM for Windows Version 9.4.0

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1416R0 area to proposed pond.dat
Data file description: cje1226
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 03/28/69 Model Run End Date: 12/06/69
Date of run: 04-21-2014 Time of run: 09:24:57
Total Area Modeled (acres): 8.56
Years in Model Run: 0.67

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	502527	0 %	82.53	2589	0 %
Total Before Drainage System:	502527	0.00%	82.53	2589	0.00%
Total After Drainage System:	502527	0.00%	82.53	2589	0.00%
Total After Outfall Controls:	502527	0.00%	22.28	699.0	73.00%
Annualized Total After Outfall Controls:	754825			1050	

SLAMM for Windows Version 9.4.0

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1416R0 - Area not to pond.dat
Data file description: CJE1308
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 04-21-2014 Time of run: 09:30:32
Total Area Modeled (acres): 0.94
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	5002	0 %	227.0	70.88	0 %
Total Before Drainage System:	5002	0.00%	227.0	70.89	-0.01%
Total After Drainage System:	5002	0.00%	227.0	70.89	-0.01%
Total After Outfall Controls:	5002	0.00%	227.0	70.89	-0.01%
Annualized Total After Outfall Controls:	5071			71.87	

CJE1416R0 area to proposed pond.INP

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1416R0 area to proposed pond.dat
SLAMM Version 9.4.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Seed for random number generator: -42
Study period starting date: 03/28/69 Study period ending date: 12/06/69
Date: 04-21-2014 Time: 09:25:23
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0
Site information:
cje1226

	|<===== Areas for each Source (acres) =====>|				
Source Area	Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.000	0.000	1.840	0.000	0.000
Roofs 2	0.000	0.000	1.290	0.000	0.000
Roofs 3	0.000	0.000	0.000	0.000	0.000
Roofs 4	0.000	0.000	0.000	0.000	0.000
Roofs 5	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 1	0.000	0.000	2.800	0.000	0.000
Paved Parking/Storage 2	0.000	0.000	0.300	0.000	0.000
Paved Parking/Storage 3	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 1	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 2	0.000	0.000	0.000	0.000	0.000
Playground 1	0.000	0.000	0.000	0.000	0.000
Playground 2	0.000	0.000	0.000	0.000	0.000
Driveways 1	0.000	0.000	0.000	0.000	0.000
Driveways 2	0.000	0.000	0.000	0.000	0.000
Driveways 3	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 1	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 2	0.000	0.000	0.000	0.000	0.000
Street Area 1	0.000	0.000	0.000	0.000	0.000
Street Area 2	0.000	0.000	0.000	0.000	0.000
Street Area 3	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 1	0.000	0.000	1.800	0.000	0.000
Large Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Undeveloped Area	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 2	0.000	0.000	0.000	0.000	0.000

Small Landscaped Area 3	0.000	0.000	0.000	0.000	0.000
Isolated/Water Body Area	0.000	0.000	0.530	0.000	0.000
Other Pervious Area	0.000	0.000	0.000	0.000	0.000
Other Dir Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Other Part Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	8.560	0.000	0.000

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.000
Pavd Lane & Shldr Area 2	0.000
Pavd Lane & Shldr Area 3	0.000
Pavd Lane & Shldr Area 4	0.000
Pavd Lane & Shldr Area 5	0.000
Large Turf Areas	0.000
Undeveloped Areas	0.000
Other Pervious Areas	0.000
Other Directly Conctd Imp	0.000
Other Partially Conctd Imp	0.000
Total	0.000

Total of All Source Areas	8.560
Total of All Source Areas less All Isolated Areas	8.030

Source Area Control Practice Information

Land Use: Commercial

Roofs 1 Source area number: 61
The roof is flat
The Source Area is directly connected or draining to a directly connected area

Roofs 2 Source area number: 62
The roof is flat
The Source Area is directly connected or draining to a directly connected area

Paved Parking/Storage 1 Source area number: 66
The Source Area is directly connected or draining to a directly connected area

Paved Parking/Storage 2 Source area number: 67
The Source Area is directly connected or draining to a directly connected area

Large Landscaped Area 1 Source area number: 81
The SCS Hydrologic Soil Type is Silty

Isolated/Water Body Area Source area number: 87
The source area is a water body where all rainfall is considered to be runoff, with no particulate solids loading

Drainage System

Outfall

Control Practice 1 : Wet Detention Ponds
1. Area served by detention ponds (acres)= 8.56
2. Particle Size Distribution file name: C:\PROGRAM FILES\WINSLAMM\NURP.CPZ
3. Initial stage elevation (ft): 6
4. Peak to Average Flow Ratio: 3.8
5. Maximum flow allowed into pond (cfs): No maximum value entered
6. Outlet Characteristics:
Outlet number 1
Outlet type: Orifice
1. Orifice diameter (ft): 1.5

2. Invert elevation above datum (ft): 6

Outlet number 2

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Discharge Coefficient (ft): 0
4. Height of weir opening (cfs): 1
5. Height from datum to bottom of weir opening: 8.5

7. Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	1.00	0.2200	0.00	0.00
2	2.00	0.2600	0.00	0.00
3	3.00	0.3000	0.00	0.00
4	4.00	0.3400	0.00	0.00
5	5.00	0.3800	0.00	0.00
6	6.00	0.5300	0.00	0.00
7	7.00	0.5900	0.00	0.00
8	8.00	0.6600	0.00	0.00
9	9.00	0.7900	0.00	0.00
10	9.50	0.9300	0.00	0.00

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1416R0 - Area not to pond.dat
SLAMM Version 9.4.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 04-21-2014 Time: 09:30:41
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0
Site information:
CJE1308

	|<===== Areas for each Source (acres) =====>|				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.000	0.000	0.000	0.000	0.000
Roofs 2	0.000	0.000	0.000	0.000	0.000
Roofs 3	0.000	0.000	0.000	0.000	0.000
Roofs 4	0.000	0.000	0.000	0.000	0.000
Roofs 5	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 1	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 2	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 3	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 1	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 2	0.000	0.000	0.000	0.000	0.000
Playground 1	0.000	0.000	0.000	0.000	0.000
Playground 2	0.000	0.000	0.000	0.000	0.000
Driveways 1	0.000	0.000	0.000	0.000	0.000
Driveways 2	0.000	0.000	0.000	0.000	0.000
Driveways 3	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 1	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 2	0.000	0.000	0.000	0.000	0.000
Street Area 1	0.000	0.000	0.000	0.000	0.000
Street Area 2	0.000	0.000	0.000	0.000	0.000
Street Area 3	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 1	0.000	0.000	0.940	0.000	0.000
Large Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Undeveloped Area	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 1	0.000	0.000	0.000	0.000	0.000

CJE1416R0 - Area not to pond.INP

Small Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 3	0.000	0.000	0.000	0.000	0.000
Isolated/Water Body Area	0.000	0.000	0.000	0.000	0.000
Other Pervious Area	0.000	0.000	0.000	0.000	0.000
Other Dir Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Other Part Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.940	0.000	0.000

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.000
Pavd Lane & Shldr Area 2	0.000
Pavd Lane & Shldr Area 3	0.000
Pavd Lane & Shldr Area 4	0.000
Pavd Lane & Shldr Area 5	0.000
Large Turf Areas	0.000
Undeveloped Areas	0.000
Other Pervious Areas	0.000
Other Directly Conctd Imp	0.000
Other Partially Conctd Imp	0.000
Total	0.000

Total of All Source Areas	0.940
Total of All Source Areas less All Isolated Areas	0.940

Source Area Control Practice Information

Land Use: Commercial

Large Landscaped Area 1 Source area number: 81

The SCS Hydrologic Soil Type is Silty

Drainage System

Outfall

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Computations For Sewers of Drainage System

Project Name Oberlin Filter **Project Location** Waukesha, WI **Date** 04/21/14

CJE Job No. CJE1416 **Designed By** **Checked By** CJ **Sheet** 1 **of** 1

Location of Sewer			Drainage Area			Rainfall and Runoff Data					Total Runoff	Design Computations							Time of Flow in Sewer		Remarks		
			a	A	C	Ca	Σ Ca			I	Q												
In	From	To	Individual Area in Acres	Accumulated Area in Acres	Individual Impervious Coefficient	Individual Ca	Accumulated Ca	Rainfall Frequency Curve Used (years)	Initial Time of Concentration (min.)	Rainfall Intensity in. per hr. = I	Total Runoff Cu. Ft. per Sec. CIA=Q	Length of Sewer (ft)	Inside Size of Sewer (in)	Necessary Drop in Length Given (ft)	Actual Drop in Length Given (ft)	Mannings Roughness Coefficient	Parts Full for Actual Drop	Velocity fft. per sec. for Actual Drop	Time of Flow in Section (min.)	Total Elapsed Time at End of Section (min.)	Invert (In)	Invert (Out)	Slope
	1	3	0.15	0.15	0.8	0.12	0.12	100	10.0	7.29	0.88	135	8	0.42	0.50	0.010	0.75	3.10	0.7	10.7	104	103.50	0.00370
	2	3	1.84	1.84	0.9	1.66	1.66	100	10.0	7.29	12.08	45	18	0.59	0.60	0.013	0.82	7.82	0.1	10.1	104.1	103.50	0.01333
	3	4	0.28	2.27	0.8	0.22	2.00	100	10.7	7.12	14.25	257	24	1.01	1.05	0.013	0.81	5.24	0.8	11.5	103.25	102.20	0.00409
	4	5	0.40	2.67	0.8	0.32	2.32	100	11.5	6.94	16.10	126	27	0.34	0.35	0.013	0.81	4.68	0.4	11.9	102.15	101.80	0.00278
	5	6	0.22	2.89	0.8	0.18	2.50	100	11.9	6.85	17.10	145	27	0.44	0.45	0.013	0.81	4.94	0.5	12.4	101.8	101.35	0.00310
	6	7	0.17	3.06	0.8	0.14	2.63	100	12.4	6.74	17.75	100	27	0.33	0.35	0.013	0.79	5.25	0.3	12.7	101.35	101.00	0.00350
	8	9	0.21	0.21	0.8	0.17	0.17	100	10.0	7.29	1.23	175	10	0.32	0.40	0.010	0.74	2.82	1.0	11.0	103.75	103.35	0.00229
	9	10	0.19	0.40	0.8	0.15	0.32	100	11.0	7.05	2.26	95	12	0.22	0.25	0.010	0.78	3.44	0.5	11.5	103.25	103.00	0.00263
	10	12	0.40	0.80	0.8	0.32	0.64	100	11.5	6.94	4.44	185	18	0.33	0.40	0.013	0.75	3.13	1.0	12.5	102.8	102.40	0.00216
	11	12	0.20	0.20	0.8	0.16	0.16	100	10.0	7.29	1.17	33	8	0.18	0.25	0.010	0.71	4.39	0.1	10.1	102.7	102.45	0.00758
	12	14	0.25	1.25	0.8	0.20	1.00	100	12.5	6.72	6.72	148	24	0.13	0.30	0.013	0.59	3.46	0.7	13.2	102.35	102.05	0.00203
	13	14	0.07	0.07	0.8	0.06	0.06	100	10.0	7.29	0.41	100	8	0.07	0.25	0.010	0.51	2.27	0.7	10.7	102.5	102.25	0.00250
	14	15	0.42	1.74	0.8	0.34	1.39	100	13.2	6.58	9.15	193	24	0.31	0.35	0.013	0.78	3.49	0.9	14.1	102.05	101.70	0.00181
	15	16	0.45	2.19	0.6	0.27	1.66	100	14.1	6.40	10.64	215	24	0.47	0.50	0.013	0.80	3.96	0.9	15.0	101.7	101.20	0.00233
	16	17	0.26	2.45	0.6	0.16	1.82	100	15.0	6.23	11.33	75	24	0.19	0.20	0.013	0.79	4.23	0.3	15.3	101.2	101.00	0.00267

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OBERLIN FILTER

831 SILVER NAIL RD. WAUKESHA, WI

N

PROPOSED BUILDING
FIRST FLOOR ELEV. 109.00

FUTURE BUILDING ADDITION

FUTURE PARKING

FUTURE PARKING

PROPOSED STORM POND
N.W.L. 101.00

SILVERNAIL ROAD
(PUBLIC Right OF WAY WIDTH VARIES)

N 00°07'00" W 933.60'

S 83°43'00" W 413.22'

S 00°07'00" E 757.93'

S 00°07'00" E 365.28'

N 85°03'30" E 1945.91'

N 85°03'30" E 258.05'

1523.43'

NW 1/4 SEC. 27-7-19 S 00°07'00" E 2646.64'

NORTH LINE OF THE NORTHWEST 1/4 SEC. 27-7-19 S 89°53'37" E 2660.43'

STORM MANHOLE
RIM EL = 102.94
21" RCP SE = 93.34
21" RCP W = 93.12

SANITARY MH
RIM EL = 103.22
8" PVC W INV. = 91.5'
8" PVC N INV. = 91.64
8" PVC E INV. = 91.65

SITE/PROJECT BENCHMARK
EXST. SANITARY MH #1
RIM EL = 108.26
8" PVC E INV. = 94.26
8" PVC W W INV. = 94.26

NE CORNER NW 1/4 SEC 27-7-19 CONC. MON. W/BRASS CAP FND

STORM SEWER ACCESS SHED
21" RCP E&W INV. = 96.99

APRIL 23, 2014
JOB NO.: CJE1416R1

LEGEND

- 107 — EXISTING CONTOUR
- 105 — PROPOSED CONTOUR
- x 106.5 — PROPOSED ELEVATION
- ST — EXISTING STORM SEWER
- ST — PROPOSED STORM SEWER
- STORM SEWER AREAS

GRAPHIC SCALE
40 0 20 40 80
1 inch = 40 ft

STORM SEWER AREAS