

Stormwater Management Plan

Lexington Apartments St. Paul, MN

Prepared by Loucks December 9, 2020

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Loucks Project No. 19114.0A

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Lexington Apartments

St. Paul, Minnesota

Stormwater Management Plan

Introduction

This stormwater management plan was created for the Lexington Mixed-Use project located 411 & 417 Lexington Parkway North in St. Paul, Minnesota. The total project area encompasses 2.2 +/- acres.

The project generally consists of constructing an apartment building, with retail on the first floor, below ground parking and stormwater management systems.

Included in this plan are calculations for the proposed discharges of stormwater from each property area. The stormwater for all of the project area ultimately discharges to storm sewer in Lexington Parkway. A larger drainage area is analyzed based on the existing overall stormwater system in the shared road.

Requirements and Methodology

City of St. Paul and Capitol Region Watershed District Requirements

- Rate Control Peak rates shall not exceed 1.64 cubic feet per second per acre.
 Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2, 10, and 100-year critical storm events.
- Volume Control Stormwater runoff volume retention shall be achieved onsite in the amount equivalent to the runoff generated from 1.1-inch rainfall over the impervious surfaces of the development. The required stormwater runoff volume reduction shall be calculated as follows:

Required Volume (ft³) = Impervious Surfaces (ft²) \times 1.1 (in) \times 1/12 (ft/in)

<u>Methodology</u>

The stormwater calculations were made utilizing the stormwater-modeling program HydroCAD 10.00. Calculations were performed for the Type II 24-hour 100-year rainfall events of 5.90 inches to meet the city of St. Paul requirements and ATLAS 14 2-year, 10-year, and 100-year rainfall events of 2.81 inches, 4.19 inches, and 7.36 inches respectively to meet the watershed requirements.

Existing Conditions

The existing site is currently vacant with the shared private roads on the north and west side of the site. There are currently two vaults in the shared private roads that treat stormwater. Infiltration is was a part of design but not utilized since infiltration was not required at the time of original design. The original design was recreated using the previous hydrology report and

current storm events. The existing stormwater treatment system does account for the north half of the proposed lot being to the requirements at that time.

The As-built model was created based on the survey, noting that the survey says the weir wall was never installed on the ultimate outlet from the system.

Proposed Conditions

The proposed plan will have two main drainage areas and two runoff drainage areas. The two main areas are the proposed building roof that will drain to an underground 8-foot pipe system. The storm vault will provide infiltration of the storm water to assist in meeting the watershed requirement of 1.1 inches of rainfall over new impervious area, as well as rate control to the larger vault system. The remainder of the infiltration will come from adjusting outlets within the existing vault system to utilize infiltration. Outlying areas will drain off site to the streets or into drainage areas that are captured in the existing vault system. To accommodate our proposed building, we will need to make modifications to the existing storm vault in terms of outlet control structures only. We will be adjusting the outlet and overflow elevations of the two existing structures to meet infiltration and rate control needs. It is noted on the survey that the ultimate outlet control structure for the system was never constructed, just a manhole that allows it to free flow off site. This will be rectified with the replacement of the structure.

The site consists of 1.67 acres of disturbed impervious surface within the site including disturbed existing roadway. There is an additional 0.2 acres of replaced and disturbed impervious outside the site boundary.

Modeling was done with the as-built storm, as that is what is in place with great effort to meet original design rates and high water level elevations.

Rate Control

The rate control requirements are that peak rates shall not exceed existing rates for the 2, 10, and 100-year events or 1.64 cfs/acre for the St. Paul 100-year event, whichever is less. Rate control is not required for the central drainage area. City streets will only be held to water quality standards, not rate control.

City rate control for the current site is achieved but hard to quantify as the larger area goes to the same system. The building is less and can be quantified because it goes to its own treatment system. Direct off is offset by reducing the total offsite. There are three direct off areas with impervious that would affect the rate control. The south and east are their own areas and can be quantified, the north direct to street is quantified by the change in rate from the existing to proposed for the drainage area to determine how much is increases by the site improvements. The existing conditions took into account a possible future development on the north side of our site with runoff to the north with rate control, the proposed condition, reduces the runoff to the north, see table 1.1 below. Table 1.2 shows the reduction of the remainder of the site, through reduction of the overall from the existing system as the system is reduced by more than just from our site through additional infiltration and outlet alterations. The existing systems reduced rates, including almost half of the proposed site already, making the north half of the site doubly reduced.

	Existing	Proposed	Different
Street Rates	Runoff	Runoff	from
(not to meet City 5.9")	CFS	CFS	Proposed
SE.LEX	0.84	0.79	-0.05
SW.LEX	2.51	2.48	-0.03

Table 1.1 – City Rate Off Site North

Table 1.2 – City Rate Off Site Total Remainder

Site	Drainage	Proposed	Allowed
(to meet City 5.9")	Area	Runoff	Runoff
SE.LP	0.035	0.19	0.06
E.LP	0.051	0.4	0.1
PROP	1.377	2.27	2.24
Total Site	1.463	2.86	2.4
LEX. Existing		26.79	
LEX. Proposed		25.25	
		6.79-5.25	
Difference		= 1.54	
		2.86-1.54	
Total Runoff		=1.32	2.4

Tables 1.3-1.5 below compare the existing peak runoff rate, and proposed peak runoff rates.

Table 1.3 – Peak Runoff Rates, Existing Design

	Area	2-Yr Sto	rm Event	10-Yr Sto	10-Yr Storm Event		5.9" Storm Event		100-Yr Storm Event	
Drainage		Rate	Volume	Rate	Volume	Rate	Volume	Rate	Volume	
Area	(Ac.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	
E.HOU	0.01	0.01	0	0.02	0.001	0.05	0.002	0.07	0.003	
EXSO	0.89	0.42	0.043	1.16	0.105	2.26	0.197	3.29	0.284	
108"	1.05	0.68	0.134	0.93	0.23	1.41	0.36	7.22	0.475	
SYS	7.46	6.33	1.157	8.46	1.926	30.29	2.917	48.33	3.782	
TOTAL TO LEXINGTON	8.36	6.75	1.201	9.6	2.032	32.08	3.116	50.14	4.069	

	Area	2-Yr Sto	rm Event	10-Yr Sto	10-Yr Storm Event		5.9" Storm Event		100-Yr Storm Event	
Drainage		Rate	Volume	Rate	Volume	Rate	Volume	Rate	Volume	
Area	(Ac.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	
E.HOU	0.01	0.01	0	0.02	0.001	0.05	0.002	0.07	0.003	
EXSO	0.89	0.42	0.043	1.16	0.105	2.26	0.197	3.29	0.284	
108"	1.05	0.68	0.125	0.94	0.221	2.1	0.35	6.9	0.466	
SYS	7.46	6.08	1.179	7.83	1.948	24.67	2.938	40.2	3.803	
TOTAL TO LEXINGTON	8.36	6.5	1.223	8.96	2.054	26.79	3.138	40.22	4.09	

Table 1.4 – Peak Runoff Rates, Existing As-Built

Table 1.5 – Peak Runoff Rates, Proposed As-Built

	Area	2-Yr Sto	rm Event	10-Yr Sto	10-Yr Storm Event		5.9" Storm Event		100-Yr Storm Event	
Drainage		Rate	Volume	Rate	Volume	Rate	Volume	Rate	Volume	
Area	(Ac.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	(cfs)	(ac.ft.)	
E.LP	0.051	0.15	0.007	0.26	0.012	0.4	0.019	0.52	0.024	
SE.LP	0.035	0.04	0.002	0.1	0.004	0.19	0.008	0.27	0.012	
PROP	1.377	1.02	0.142	1.6	0.29	2.27	0.48	8.48	0.645	
108"	2.427	2.07	0.257	3.15	0.501	4.29	0.82	11.82	1.084	
SYS	8.261	6.44	1.113	8.22	1.961	25.1	3.058	39.44	4	
TOTAL TO LEXINGTON	8.35	6.47	1.122	8.26	1.978	25.23	3.085	39.64	4.036	

<u>Water Quality</u>

To provide additional water quality, infiltration will be provided.

Based on the soil boring logs an infiltration type design is proposed to treat the stormwater runoff. The boring within the new proposed pipe system area shows SP type soils at the bottom of the system. The previous model used 0.25 in/hr for the larger existing system and none for the 108-inch pipe system, with the outlets at the bottom. As-built survey shows outlet elevations higher for the 108-inch system and no outlet control for the larger system. We are proposing raising the outlet and continuing to use the 0.25 in/hr for all existing even though borings show that at least 0.45 in/hr is practical for this area.

The proposed underground stormwater tank system is designed to meet the Capitol Region Watershed districts requirement of retaining 1.1 inch of rainfall over the impervious surfaces of the development with a maximum drawdown time of 48 hours. The calculations for the required volumes are shown below:

Required Volume (ft^3)	= Impervious Surfaces (ft^2) * 1.1 (in) * 1/12 (ft/in) = 1.87 x 1.1 x 1/12 = 0.1714 AC-FT or 7,467 CF
Volume below outlets:	
SYS (881.35): 0.082 AC-FT	
108" (881.5): 0.017 AC-FT	

PROP (883.5): 0.091 AC-FT

The proposed volume under the outlets is = 0.190 AC-FT or 8,276 CF which is greater than required volume.

Best Management Practices

Best management practices (BMP's) will be implemented during construction per the project's stormwater pollution prevention plan. During construction, erosion control measures will include dust control, silt fencing, and a temporary rock construction entrance. Permanent BMP's will include stormwater management systems, surface pavements, and turf establishment (vegetation) of disturbed areas.

Conclusion

The proposed Stormwater Management Plan for the Lexington Apartment project provides an improved solution for the conveyance of stormwater on this site. The infiltration system will capture runoff and provide additional rate control and water quality on the site.

Appendix A

HydroCAD Report, Existing



Area Listing (all nodes)

Area	CN	Description				
(acres)		(subcatchment-numbers)				
4.316	98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, EXSO, HOU, NE.LEX, S.DRIVE, SWLEX,				
		W.ALDI, WILD)				
2.414	69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.HOU, EXSO, HOU, S.DRIVE, SWLEX,				
		W.ALDI, WILD)				
0.110	85	(WILD)				
0.190	69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)				
0.110	98	Paved parking, HSG B (NW.LEX)				
0.540	98	Paved parking, HSG C (TCF)				
0.250	96	ROADWAY (UNIV)				
0.350	98	ROOF (ROOF)				
0.080	98	Water Surface, HSG B (SE.LEX)				

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Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Width	Diam/Height	Inside-Fill
	Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)
1	CART	0.00	0.00	172.0	0.0100	0.013	0.0	12.0	0.0
2	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
3	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
4	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
5	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
6	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
7	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
8	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
9	108"	881.00	881.00	11.0	0.0000	0.013	0.0	24.0	0.0
10	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
11	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
12	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
13	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
14	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
15	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
16	SYS	879.31	878.81	50.0	0.0100	0.013	0.0	24.0	0.0

Pipe Listing (all nodes)

Summary for Subcatchment C.DRIVE:

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
_	0.140		92 Wei	ahted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	57% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	~ ~ ~	~ ~ ~	T			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 1.27 cfs @ 12.23 hrs, Volume= 0.093 af, Depth= 1.47"

Area (ac)		(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	ghted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imper∖	vious Area	
	Tc (min)	Lengt (feet	h S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	0.3	9:	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			

Summary for Subcatchment DOCK:

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac)	CN	Desc	cription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.010 69 14.29% Pervious Area			9% Pervio	us Area		
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtł (feet	ו :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	30	.0500	0.10		Sheet Flow,
	0.9	85	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 0.64 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 1.89"

	Area (ac)		CN	Desc	cription		
*	* 0.190 98		98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 1.32 cfs @ 12.23 hrs, Volume= 0.097 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90	Weig	phted Aver	age	
	0.150 69 26.32% Pervious Area					us Area	
	0.420 98 73.68% Impervious Area				8% Imperv	vious Area	
	Tc (min)	Length (feet	n ()	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	14.5	115	5 0.	.0300	0.13		Sheet Flow,
	0.7	100) ()	.0150	2.49		Grass: Dense n= 0.240 P2= 2.81" Shallow Concentrated Flow, Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.01 cfs @ 12.16 hrs, Volume= 0.000 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Desc	cription		
*	0.000	98				
*	0.010	69				
	0.010	69	Weig	hted Aver	age	
	0.010	69	100.	00% Pervi	ous Area	
	Tc Len	ngth	Slope	Velocity	Capacity	Description
	(min) (fe	eet)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 0.42 cfs @ 12.43 hrs, Volume= 0.043 af, Depth= 0.58"

MSE 24-hr 3	2-Year Rair	nfall=2.81"
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	Area (a	c) Cl	N Desc	cription					
*	0.00	06 9	8						
*	0.88	34 6 ^s	9						
	0.89	90 6	9 Weig	ghted Aver	age				
	0.88	64 6	9 99.3	3% Pervio	us Area				
	0.00	0.006 98 0.67% Impervious Area							
	Tc L	.ength	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	26.1	240	0.0300	0.15		Sheet Flow,			
						Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

_	Area ((ac)	CN	Desc	ription		
*	0.6	650	98				
*	0.0	080	69				
	0.730 95 Weighted Average						
	0.0	080	69	10.9	6% Pervio	us Area	
	0.650 98			89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (fee	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 1.83"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

TIYUIUCAL		40 5/11 02	010 @ 202		Fage 6						
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description						
1.0	12	0.2500	0.20		Sheet Flow,						
0.5	36	0.0240	1.13		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"						
1.5	48	Total									
	Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive										
Runoff	=	0.52 cfs	s@ 12.0	6 hrs, Volu	Ime= 0.024 af, Depth= 2.41"						
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"											
Area ((ac) C	N Dese	cription								
0.0	010 6 110 9	69 50-7 18 Pave	5% Grass ed parking	cover, Fair , HSG B	r, HSG B						
0. 0.0 0.	120 9 010 6 110 9	96 Weig 99 8.33 98 91.6	ghted Aver % Perviou 7% Imperv	age s Area /ious Area							
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description						
0.5 0.6	33 27	0.0215 0.0108	1.06 0.78		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"						
1.1	60	Total									
			Sum	mary for	Subcatchment ROOF:						
Runoff	=	1.62 cfs	s@ 12.0	6 hrs, Volu	ime= 0.075 af, Depth= 2.58"						
Runoff by MSE 24-I	/ SCS TF hr 3 2-Ye	R-20 meth ear Rainfa	nod, UH=S all=2.81"	SCS, Split P	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs						

_	1.0			_, /	· · ·		Direct Entry,
	(min)	(feet	t)	(ft/ft)	(ft/sec)	(cfs)	
	Тс	Lengt	h	Slope	Velocity	Capacity	Description
	0.	300	90	100.0	00% impe	NOUS AIEa	
	0	250	00	100	00% Impo	ruique Aroa	
*	0.	350	98	ROC)F		
	Area	(ac)	CN	Desc	cription		

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Summary for Subcatchment S.DRIVE:

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac) C	N Des	cription		
*	0.	130	98			
*	0.	070	69	9		
	0.	200	88 Weig	ghted Aver	age	
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.019 af, Depth= 1.91"

Area (ac) C	N Des	cription		
0.0	040 6	69 50-7	′5% Grass	cover, Fair	, HSG B
0.0)80 9	98 Wat	er Surface	, HSG B	
0.1	120 8	38 Wei	ghted Aver	age	
0.0)40 6	33.3	3% Pervio	us Area	
0.0	980 980	98 66.6	7% Imper	ious Area	
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac)	CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
0.190 98 57.58% Impervious Area				57.58	8% Imperv	vious Area	
	Tc (min)	Length (feet)	S	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.0	0150	0.06		Sheet Flow,
	0.7	48	0.0	0225	1.17		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59	To	otal			

Summary for Subcatchment TCF:

Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

Area	(ac)	CN	Desc	ription						
0.	540	98	Pave	Paved parking, HSG C						
0.	040	69	50-7	5% Grass	cover, Fair	r, HSG B				
0.	580	96	Weig	hted Aver	age					
0.040 69 6.90% Pervious Area										
0.	0.540 98 93.10% Impervious Area)% Imperv	vious Area					
Tc	Leng	th S	Slope	Velocity	Capacity	Description				
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)					
7.0						Direct Entry,				

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.10 cfs @ 12.10 hrs, Volume= 0.048 af, Depth= 1.81"

MSE 24-hr 3 2-Year Rainfall=2.81" Printed 12/9/2020 LLC Page 11

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	Area	(ac) (CN De	scription			
*	0.	250	96 RC	ADWAY			
	0.	070	69 50-	75% Grass	cover, Fair	, HSG B	
	0.	320	90 We	eighted Aver	age		
	0.	320	90 10	0.00% Pervi	ous Area		
	_						
	Тс	Length	Slope	e Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	7 1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	5 2.27		Shallow Concentrated Flow,	
						Paved Kv= 20.3 fps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

_	Area	(ac) (CN D	escrip	otion		
*	0.	420	98				
*	0.	050	69				
	0.	470	95 W	eighte	ed Aver	age	
	0.	050	69 10).64%	Pervio	us Area	
	0.	420	98 89	9.36%	http://www.imperv	vious Area	
	Tc (min)	Length (feet)	Slop (ft/i	e V ft) (elocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.050	0	0.10		Sheet Flow,
	1.4	105	0.018	37	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	Total				

Summary for Subcatchment WILD:

Runoff = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Depth= 2.11"

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weig	hted Aver	age	
	0.	580	72	24.8	9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
	Тс	Lengtl	n :	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	5	30	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	120	50	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
		_					n= 0.013
	0.2	54	4 0	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 st Perim= 4.7' r= 0.38'
							N= 0.013

14.2 397 Total

Summary for Reach 2R: Lexington

Inflow A	rea =	8.360 ac, 6	64.55% Impervious	, Inflow Depth =	1.72	2" for 2-Y	ear event
Inflow	=	6.75 cfs @	12.43 hrs, Volum	ie= 1.201	af		
Outflow	=	6.75 cfs @	12.43 hrs, Volum	ie= 1.201	af, A	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	a =	2.330 ac, 7	75.11% Impe	rvious, Inflow De	epth = 2.11	" for 2-Y	ear event
Inflow	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af		
Outflow	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af, A	tten= 0%,	Lag= 0.0 min
Primary	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af		•

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.55' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.67 cfs @ 12.22 hrs HW=885.53' (Free Discharge) **1=Culvert** (Barrel Controls 5.67 cfs @ 4.05 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac, 8	39.04% Imper	vious, Inflow D	epth = 2	.36" for	2-Year event
Inflow	=	2.60 cfs @	12.14 hrs, V	/olume=	0.144 af		
Outflow	=	2.60 cfs @	12.14 hrs, V	/olume=	0.144 af	, Atten= 0)%, Lag= 0.0 min
Primary	=	2.60 cfs @	12.14 hrs, V	/olume=	0.144 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.05' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=885.03' (Free Discharge) **1=Culvert** (Barrel Controls 2.52 cfs @ 3.34 fps)

Summary for Pond 61: Stub-61

Inflow Area	ı =	0.580 ac, 9	93.10% Impe	ervious,	Inflow Depth	า= 2	.44" for	2-Ye	ear event	
Inflow	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	118 af				
Outflow	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	118 af	, Atten=	0%,	Lag= 0.0 r	min
Primary	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	118 af			-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.07 cfs @ 12.14 hrs HW=885.16' (Free Discharge) **1=Culvert** (Barrel Controls 2.07 cfs @ 3.14 fps)

Summary for Pond 108": (new Pond)

Inflow Are	ea =	1.050 ac, 50.48% Impervious, Inflow Depth = 1.58" for 2	-Year event
Inflow	=	1.90 cfs @ 12.23 hrs, Volume= 0.139 af	
Outflow	=	0.68 cfs @ 12.52 hrs, Volume= 0.134 af, Atten= 64	%, Lag= 17.7 min
Primary	=	0.68 cfs @_ 12.52 hrs, Volume= 0.134 af	•

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 883.76' @ 12.52 hrs Surf.Area= 0.023 ac Storage= 0.043 af

Plug-Flow detention time= 60.0 min calculated for 0.134 af (97% of inflow) Center-of-Mass det. time= 41.6 min (820.7 - 779.1)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	15.00'W x 66.00'L x 10.00'H Field A
			0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	CMP Round 108 x 3 Inside #1
			Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf
			Overall Size= 108.0"W x 108.0"H x 20.00'L
		0 142 of	Total Available Starage

0.143 af Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	24.0" Round Culvert L= 11.0' Ke= 0.500
			Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.68 cfs @ 12.52 hrs HW=883.76' (Free Discharge)

-1=Culvert (Passes 0.68 cfs of 17.14 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.68 cfs @ 7.75 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area	=	1.460 ac, 8	85.62% Impe	ervious,	Inflow Depth =	2.29	9" for 2-Y	ear event
Inflow	=	4.43 cfs @	12.09 hrs,	Volume	= 0.27	9 af		
Outflow	=	4.43 cfs @	12.09 hrs,	Volume	= 0.27	9 af, <i>1</i>	Atten= 0%,	Lag= 0.0 min
Primary	=	4.43 cfs @	12.09 hrs,	Volume	= 0.27	9 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.28' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.27 cfs @ 12.09 hrs HW=886.25' (Free Discharge) —1=Culvert (Inlet Controls 4.27 cfs @ 3.64 fps)

Summary for Pond 120:

Inflow Area	ı =	0.890 ac, 9	93.26% Imp	ervious,	Inflow Depth =	2.44"	for 2-Y	ear event
Inflow	=	3.69 cfs @	12.08 hrs,	Volume	= 0.18	1 af		
Outflow	=	3.69 cfs @	12.08 hrs,	Volume	= 0.18	1 af, At	ten= 0%,	Lag= 0.0 min
Primary	=	3.69 cfs @	12.08 hrs,	Volume	= 0.18	1 af		-

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Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.03' @ 12.08 hrs

 Device
 Routing
 Invert
 Outlet Devices

 #1
 Primary
 885.90'
 15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.48 cfs @ 12.08 hrs HW=886.99' (Free Discharge) -1=Culvert (Barrel Controls 3.48 cfs @ 4.11 fps)

Summary for Pond 130:

Inflow Area	=	0.420 ac, 9	7.62% Impe	ervious,	Inflow Depth =	2.53'	for 2-Y	ear event
Inflow	=	1.86 cfs @	12.06 hrs,	Volume	= 0.089) af		
Outflow	=	1.86 cfs @	12.06 hrs,	Volume	= 0.089) af, A ^r	tten= 0%,	Lag= 0.0 min
Primary	=	1.86 cfs @	12.06 hrs,	Volume	= 0.089) af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=887.52' (Free Discharge) —1=Culvert (Barrel Controls 1.78 cfs @ 4.00 fps)

Summary for Pond 140:

Inflow Area	=	0.070 ac, 8	35.71% Impe	ervious,	Inflow Dep	oth =	2.29"	for 2-Y	ear event	
Inflow	=	0.28 cfs @	12.09 hrs,	Volume	= C).013 a	af			
Outflow	=	0.28 cfs @	12.09 hrs,	Volume	= C	0.013	af, Atte	en= 0%,	Lag= 0.0 mi	n
Primary	=	0.28 cfs @	12.09 hrs,	Volume	= (0.013	af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.45' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=887.44' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.27 cfs @ 1.77 fps)

Summary for Pond CB31:

Inflow Area	=	0.080 ac, 6	2.50% Imperviou	is, Inflow De	pth = 1.83	" for 2-Ye	ear event
Inflow	=	0.26 cfs @	12.07 hrs, Volu	me=	0.012 af		
Outflow	=	0.26 cfs @	12.07 hrs, Volu	me=	0.012 af, A	Atten= 0%,	Lag= 0.0 min
Primary	=	0.26 cfs @	12.07 hrs, Volu	me=	0.012 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.50' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.07 hrs HW=884.49' (Free Discharge) **1=Culvert** (Barrel Controls 0.25 cfs @ 2.33 fps)

Summary for Pond CB41:

Inflow Area	a =	0.120 ac, 9	1.67% Impe	ervious,	Inflow Depth	n = 2.4	11" for 2-Y	ear event
Inflow	=	0.52 cfs @	12.06 hrs,	Volume	= 0.0	024 af		
Outflow	=	0.52 cfs @	12.06 hrs,	Volume	= 0.0	024 af,	Atten= 0%,	Lag= 0.0 min
Primary	=	0.52 cfs @	12.06 hrs,	Volume	= 0.0	024 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.58' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.06 hrs HW=884.57' (Free Discharge) **1=Culvert** (Barrel Controls 0.49 cfs @ 2.68 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Inflo	w Depth = 2.08" for 2-Year event
Inflow =	17.06 cfs @ 12.12 hrs, Volume=	1.292 af
Outflow =	6.39 cfs @ 12.42 hrs, Volume=	1.292 af, Atten= 63%, Lag= 18.5 min
Discarded =	0.05 cfs @ 6.25 hrs, Volume=	0.134 af
Primary =	6.33 cfs @ 12.42 hrs, Volume=	1.157 af
Secondary =	0.00 cfs $\overline{@}$ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 883.48' @ 12.42 hrs Surf.Area= 9,472 sf Storage= 17,198 cf

Plug-Flow detention time= 77.1 min calculated for 1.292 af (100% of inflow) Center-of-Mass det. time= 76.7 min (846.0 - 769.4)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	4.00'D x 2.00'H CBMH-30
#6	886.00'	29 cf	4.00'D x 2.29'H CBMH-31
#/	886.00'	35 cf	4.00'D x 2.82'H CBMH-40
#8	886.00'	40 cf	4.00 [°] D x 3.18 [°] H CBMH-41
#9 #40	886.00	57 CT	4.00 [°] D x 4.50 [°] H CBMH-50
#10 #44	886.00	59 CT	4.00'D X 4.70'H CBMH-51
#11	886.00	60 CT	4.00'D X 4.80'H CBMH-52
#12	886.00	62 CT	4.00 [°] D X 4.95 [°] H CBMH-60
#13	886.00	60 CI	
#14 #15	886.00	00 Cl 50 of	
#10 #16	886.00	59 CT	
#10 #17	000.00	02 Cl 9 117 of	4.00 D X 4.32 T CBMIT-100 Custom Stage Data (Pricmatic)) isted below (Possie)
#17	000.33	0,117 CI	Custom Staye Data (Fishalic)Listed Delow (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)					
888.33		15	0	0					
888.50		345	31	31					
889.00		3,000	836	867					
889.50		7,000	2,500	3,367					
890.00		12,000	4,750	8,117					
Device Routing		Invert	Outlet Devices						
#1	Discarded	880.50'	0.250 in/hr Exf	0.250 in/hr Exfiltration over Surface area					
#2	Primary	879.31'	24.0" Round Culvert L= 50.0' Ke= 0.500						
			Inlet / Outlet Inv	Inlet / Outlet Invert= 879.31' / 878.81' S= 0.0100 '/' Cc= 0.900					
			n= 0.013, Flow Area= 3.14 sf						
#3	Device 2	881.00'	6.0" Vert. Orifi	ce/Grate C=	0.600 Limited to weir flow at low heads				
#4	Device 2	881.00'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600				
			Limited to weir	flow at low hea	ads				
#5	Device 2	885.80'	7.0' long x 1.0 Head (feet) 0.2 2.50 3.00	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.50 3.00					

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 #6
 Secondary
 888.40'
 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

 #6
 Secondary
 888.40'
 5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50

 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.05 cfs @ 6.25 hrs HW=880.61' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=6.33 cfs @ 12.42 hrs HW=883.47' (Free Discharge) **2=Culvert** (Passes 6.33 cfs of 26.90 cfs potential flow)

3=Orifice/Grate (Orifice Controls 1.41 cfs @ 7.18 fps)

4=Orifice/Grate (Orifice Controls 4.92 cfs @ 7.04 fps)

5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge) 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN De	scription		
*	0.	.110	98			
*	0.	.030	69			
	0.	.140	92 We	ighted Ave	rage	
	0.030		69 21.	43% Pervic	us Area	
	0.	.110	98 78.	57% Imper	vious Area	
	Тс	Length	Slope	e Velocity	Capacity	Description
_	(min)	(feet	(ft/ft) (ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	5 2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	20	00	Tatal			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 2.25 cfs @ 12.23 hrs, Volume= 0.161 af, Depth= 2.54"

Area (ac)		(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	phted Aver	age	
	0.	420	69	55.2	.26% Pervious Area		
	0.	340	98	44.7	4% Imper∖	vious Area	
	Tc (min)	Lengtl (feet	h S :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19	Y	Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	0.3	93	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			

Summary for Subcatchment DOCK:

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.070 94 Weighted Average					age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtl (feet	ר :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	1:	3 0	.0500	0.10		Sheet Flow,
	0.9	8	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

	Area	(ac)	CN	Desc	cription		
*	0.	190	98				
*	0.100 6		69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
0.570 90 Weighted Average					hted Aver	age	
0.150 69 26.32% Pervious Area					2% Pervio	us Area	
0.420 98 73.68% Impervious Area				73.6	8% Imperv	vious Area	
	-		1	~		• ••	
	IC	Lengt	ņ	Slope	Velocity	Capacity	Description
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	14.5	11	50	.0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	10	0 0	.0150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Desc	cription		
*	0.000	98				
*	0.010	69				
	0.010	69	Weig	hted Aver	age	
	0.010	69	100.	00% Pervi	ous Area	
	Tc Ler	ngth	Slope	Velocity	Capacity	Description
	(min) (f	eet)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 1.16 cfs @ 12.40 hrs, Volume= 0.105 af, Depth= 1.41"

	Area	(ac)	CN	Desc	cription					
*	0.	006	98							
*	0.	884	69							
0.890 69 Weighted Average						age				
	0.	884	69	99.3	3% Pervio	us Area				
0.006 98 0.67% Impervious Area						ous Area				
	Tc (min)	Lengt (fee	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
_	26.1	24	0 0	0.0300	0.15		Sheet Flow,			
							Grass: Dense	n= 0.240	P2= 2.81"	
					Sum	mary for	Subcatchme	ent HOU:		

Runoff = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Desc	ription		
*	0.6	650	98				
*	0.0	080	69				
	0.730 95			Weig	hted Aver	age	
	0.080 69			10.96% Pervious Area			
	0.650		98	89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		Sheet Flow,
0.5	00	0.0040	4.40		Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
15	/18	Total			
1.0	-0	TOtal			
	Sı	ummary	for Sub	catchmei	nt NW.LEX: Lex. Ave. Entrance Drive
Runoff	=	0.79 cf	s@ 12.0	6 hrs, Volu	me= 0.037 af, Depth= 3.74"
Runoff by MSE 24-I	/ SCS TI nr 3 10-	R-20 metł Year Rair	nod, UH=S nfall=4.19"	CS, Split P	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area ((ac) C	N Des	cription		
0.0	010	59 50-7	5% Grass	cover, Fair	, HSG B
0.1	110 9	98 Pave	ed parking	, HSG B	
0.1	120	96 Weię	ghted Aver	age	
0.0	J10 0 110 0	09 8.33 08 016	% Perviou 7% Imper	s Area	
0.	110	50 51.0			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			
			Sum	mary for	Subcatchment ROOF:
Runoff	=	2.43 cf	s@ 12.0	6 hrs, Volu	ume= 0.115 af, Depth= 3.95"
Runoff by MSE 24-I	/ SCS TI hr 3 10-	R-20 meth Year Rair	nod, UH=S nfall=4.19"	SCS, Split P	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area (íac) (N Des	cription		
* 0.3	350 s	98 ROC)F		
0.3	350	98 100.	00% Impe	rvious Area	

Description

Direct Entry,

(cfs)

Slope Velocity Capacity

(ft/sec)

19114-overall ex

Tc Length

(min)

1.0

(feet)

(ft/ft)

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020

Summary for Subcatchment S.DRIVE:

Runoff = 1.06 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) C	CN Des	cription		
*	0.	130	98			
*	0.	070	69			
	0.200		88 Weig	ghted Aver	age	
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 3.10"

Area ((ac) (N Des	cription			
0.040 69 50-75% Grass cover, Fair, HSG B						
0.0	080	98 Wa	ter Surface	, HSG B		
0.1	120	88 We	ghted Aver	age		
0.0	040	69 33.3	33% Pervio	us Area		
0.0	080	98 66.	67% Imperv	vious Area		
-						
IC	Length	Slope	Velocity	Capacity	Description	
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)		
6.8	43	0.0280	0.11		Sheet Flow,	
					Grass: Dense n= 0.240 P2= 2.81"	
0.4	33	0.0333	1.27		Sheet Flow,	
					Smooth surfaces n= 0.011 P2= 2.81"	
7.2	76	Total				

Summary for Subcatchment SWLEX:

Runoff = 1.64 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
0.190 98 57.58% Impervious Area					8% Imperv	vious Area	
	Tc (min)	Length (feet	n 5)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.	0150	0.06		Sheet Flow,
	0.7	48	80.	0225	1.17		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59) To	otal			

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

Area	(ac)	CN	Desc	ription						
0.	540	98	Pave	vaved parking, HSG C						
0.	040	69	50-7	5% Grass	cover, Fair	r, HSG B				
0.580 96 Weighted Average										
0.	040	69	6.90	% Perviou	s Area					
0.540 98 93.10% Impervious Area					vious Area					
Tc	Leng	th S	Slope	Velocity	Capacity	Description				
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)					
7.0						Direct Entry,				

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 S LLC Page 26

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_	Area	(ac) (CN Des	cription			
*	* 0.250 96		96 RO/	ADWAY			
0.070 69 50-75% Grass cover, Fair, HSG B						, HSG B	
_	0.	320	90 Wei	ghted Aver	age		
	0.	320	90 100	.00% Pervi	ous Area		
	Тс	Length	Slope	Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow,	
						Paved Kv= 20.3 fps	
	10	405	Tatal				

4.0 195 Total

Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

_	Area	(ac)	CN	Desc	ription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.64	4% Pervio	us Area	
	0.420 98 89.36% Impervious Area						
	Tc (min)	Length (feet)	SI	lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.0)500	0.10		Sheet Flow,
	1.4	105	0.0)187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	To	tal			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 s LLC Page 27

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Area (ac) C		CN	Desc	cription			
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.330 92		92	Weig	hted Aver	age	
	0.	580	72	24.8	, 9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
	Тс	Lengt	h	Slope	Velocity	Capacity	Description
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	5	80	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	15	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	12	60	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	5	40	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013

14.2 397 Total

Summary for Reach 2R: Lexington

Inflow Ar	ea =	8.360 ac, 6	64.55% Impervious	, Inflow Depth = 2	2.92" for 10-1	Year event
Inflow	=	9.60 cfs @	12.43 hrs, Volum	e= 2.032 a	af	
Outflow	=	9.60 cfs @	12.43 hrs, Volum	e= 2.032 a	af, Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	a =	2.330 ac, 7	75.11% Impe	ervious,	Inflow Depth =	3.37"	for 10-`	Year event
Inflow	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af		
Outflow	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af, At	ten= 0%,	Lag= 0.0 min
Primary	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge) **1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac,	89.04% Impervious,	Inflow Depth =	3.67" for	10-Year event
Inflow	=	4.00 cfs @	12.14 hrs, Volume	e= 0.223	af	
Outflow	=	4.00 cfs @	12.14 hrs, Volume	e= 0.223	af, Atten= 0	%, Lag= 0.0 min
Primary	=	4.00 cfs @	12.14 hrs, Volume	e 0.223	af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.87 cfs @ 12.14 hrs HW=885.34' (Free Discharge) **1=Culvert** (Barrel Controls 3.87 cfs @ 3.78 fps)

Summary for Pond 61: Stub-61

Inflow Area	a =	0.580 ac, 9	3.10% Impe	ervious,	Inflow Depth	= 3.7	78" for ´	10-Year ev	vent
Inflow	=	3.26 cfs @	12.14 hrs,	Volume	= 0.1	83 af			
Outflow	=	3.26 cfs @	12.14 hrs,	Volume	= 0.1	83 af,	Atten= 0	%, Lag=(0.0 min
Primary	=	3.26 cfs @	12.14 hrs,	Volume	= 0.1	83 af		-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge) **1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108": (new Pond)

Inflow Ar	rea =	1.050 ac, 50.48% Impervious, Inflow Depth = 2.69" for 10-Year even	t
Inflow	=	3.29 cfs @ 12.23 hrs, Volume= 0.235 af	
Outflow	=	0.93 cfs @ 12.59 hrs, Volume= 0.230 af, Atten= 72%, Lag= 21	.5 min
Primary	=	0.93 cfs @ 12.59 hrs, Volume= 0.230 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.08' @ 12.59 hrs Surf.Area= 0.023 ac Storage= 0.081 af

Plug-Flow detention time= 58.0 min calculated for 0.230 af (98% of inflow) Center-of-Mass det. time= 46.4 min (822.4 - 776.0)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	15.00'W x 66.00'L x 10.00'H Field A
			0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	CMP Round 108 x 3 Inside #1
			Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf
			Overall Size= 108.0"W x 108.0"H x 20.00'L
		0 1 1 2 - f	Total Available Starsas

0.143 af Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	24.0" Round Culvert L= 11.0' Ke= 0.500
			Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.93 cfs @ 12.59 hrs HW=886.08' (Free Discharge)

-1=Culvert (Passes 0.93 cfs of 30.55 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.93 cfs @ 10.67 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area	ı =	1.460 ac, 8	85.62% Impe	rvious, Inflow D	epth = 3.59"	for 10-Year event
Inflow	=	6.81 cfs @	12.09 hrs,	Volume=	0.436 af	
Outflow	=	6.81 cfs @	12.09 hrs, 1	Volume=	0.436 af, Att	en= 0%, Lag= 0.0 min
Primary	=	6.81 cfs @	12.09 hrs, 1	Volume=	0.436 af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.56 cfs @ 12.09 hrs HW=886.97' (Free Discharge) ☐ 1=Culvert (Inlet Controls 6.56 cfs @ 5.35 fps)

Summary for Pond 120:

Inflow Area	=	0.890 ac, 9	93.26% Imp	ervious,	Inflow Depth =	3.78"	for 10-	Year event
Inflow	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af		
Outflow	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af, At	tten= 0%,	Lag= 0.0 min
Primary	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af		-
MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 LLC Page 30

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Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.78' @ 12.09 hrs

 Device
 Routing
 Invert
 Outlet Devices

 #1
 Primary
 885.90'
 15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge) ←1=Culvert (Barrel Controls 5.16 cfs @ 4.21 fps)

Summary for Pond 130:

Inflow Area	=	0.420 ac, 9	7.62% Impe	ervious,	Inflow Depth	= 3.8	39" for 1	0-Year event	
Inflow	=	2.81 cfs @	12.06 hrs,	Volume	= 0.13	36 af			
Outflow	=	2.81 cfs @	12.06 hrs,	Volume	= 0.13	36 af,	Atten= 0%	6, Lag= 0.0 n	nin
Primary	=	2.81 cfs @	12.06 hrs,	Volume	= 0.13	36 af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge) -1=Culvert (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Area	=	0.070 ac, 8	85.71% Impe	ervious,	Inflow De	pth =	3.59"	for 10)-Year e	vent
Inflow	=	0.44 cfs @	12.09 hrs,	Volume	=	0.021	af			
Outflow	=	0.44 cfs @	12.09 hrs,	Volume	=	0.021	af, At	ten= 0%	, Lag= (0.0 min
Primary	=	0.44 cfs @	12.09 hrs,	Volume	=	0.021	af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge) **1=Culvert** (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

 Inflow Area =
 0.080 ac, 62.50% Impervious, Inflow Depth = 2.99" for 10-Year event

 Inflow =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af

 Outflow =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af, Atten= 0%, Lag= 0.0 min

 Primary =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge) —1=Culvert (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Area	=	0.120 ac, 9	1.67% Impe	ervious,	Inflow Dept	h= 3.	.74" for	10-Year	event
Inflow	=	0.79 cfs @	12.06 hrs,	Volume	= 0.	037 af			
Outflow	=	0.79 cfs @	12.06 hrs,	Volume	= 0.	037 af,	, Atten= C	%, Lag	= 0.0 min
Primary	=	0.79 cfs @	12.06 hrs,	Volume	= 0.	037 af		-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.69' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge) —1=Culvert (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Inflow	Depth = 3.33" for 10-Year event
Inflow =	26.78 cfs @ 12.11 hrs, Volume=	2.067 af
Outflow =	8.52 cfs @ 12.47 hrs, Volume=	2.067 af, Atten= 68%, Lag= 21.2 min
Discarded =	0.05 cfs @ 4.85 hrs, Volume=	0.141 af
Primary =	8.46 cfs @ 12.47 hrs, Volume=	1.926 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.17' @ 12.47 hrs Surf.Area= 9,472 sf Storage= 28,404 cf

Plug-Flow detention time= 67.8 min calculated for 2.067 af (100% of inflow) Center-of-Mass det. time= 67.4 min (832.8 - 765.4)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 st x 2 rows
		05.6	12.50° Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	4.00 ^o D x 2.00 ^o H CBMH-30
#6 //7	886.00	29 cf	4.00 ^o D x 2.29 ^o H CBMH-31
#1	886.00	35 CT	4.00'D x 2.82'H CBMH-40
#8 #0	886.00	40 Cf	4.00'D X 3.18'H CBMH-41
#9 #10	886.00	57 Cl 50 of	
#10 #11	000.00	59 Cl	
#11 #10	000.00	60 Cl	
#12 #12	000.00 996.00'	02 CI 60 cf	
#13 #17	886.00'	00 Cl 66 cf	
#14	886.00'	50 cf	
#15	886 00'	62 cf	
#10 #17	888 33'	8 117 cf	Custom Stage Data (Prismatic) isted below (Recalc)
π 11	000.00	0,117 01	

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.33		15	0	0				
888.50		345	31	31				
889.0	00	3,000	836	867				
889.5	50	7,000	2,500	3,367				
890.0	00	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	Discarded	880.50'	0.250 in/hr Exf	iltration over	Surface area			
#2	Primary	879.31'	24.0" Round Culvert L= 50.0' Ke= 0.500					
			Inlet / Outlet Inv	/ert= 879.31' /	878.81' S= 0.0100 '/' Cc= 0.900			
			n= 0.013, Flow	n= 0.013, Flow Area= 3.14 sf				
#3	Device 2	881.00'	6.0" Vert. Orifi	ce/Grate C=	0.600 Limited to weir flow at low heads			
#4	Device 2	881.00'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600			
			Limited to weir	flow at low hea	ads			
#5	Device 2	885.80'	7.0' long x 1.0 Head (feet) 0.2 2.50 3.00	' breadth Bro 20 0.40 0.60	ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00			

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 #6 Secondary 888.40' 5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.05 cfs @ 4.85 hrs HW=880.61' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=8.46 cfs @ 12.47 hrs HW=885.17' (Free Discharge)

-2=Culvert (Passes 8.46 cfs of 33.35 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 1.87 cfs @ 9.53 fps)

-4=Orifice/Grate (Orifice Controls 6.58 cfs @ 9.43 fps)

-5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge) **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
_	0.	140	92 Wei	ahted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	57% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	~ ~ ~	~ ~ ~	T			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 4.76 cfs @ 12.23 hrs, Volume= 0.335 af, Depth= 5.29"

	Area	(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	phted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imper∖	vious Area	
	Tc (min)	Lengtl (feet	h S :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19	Y	Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	0.3	93	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			

Summary for Subcatchment DOCK:

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtł (feet	ר :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	3 0	.0500	0.10		Sheet Flow,
	0.9	85	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

	Area	(ac)	CN	Desc	cription		
*	0.	190	98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90	Weig	hted Aver	age	
	0.	150	69	26.3	2% Pervio	us Area	
	0.	420	98	73.6	8% Imperv	vious Area	
	-			~		• ••	
	IC	Lengt	1	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.5	11	50	.0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	10	0 C	.0150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac	c) CN	Desc	cription		
*	0.00	0 98				
*	0.01	0 69				
	0.01	0 69	Weig	phted Aver	age	
	0.01	0 69	100.	00% Pervi	ous Area	
	Tc Le	ength	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 3.29 cfs @ 12.38 hrs, Volume= 0.284 af, Depth= 3.83"

	Area	(ac)	CN	Desc	cription						
*	0.	006	98								
*	0.	884	69								
	0.	890	69	Weig	hted Aver	age					
	0.	884	69	99.3	3% Pervio	us Area					
	0.	006	98	0.67	% Impervi	ous Area					
	Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Capacity (cfs)	Description				
26.1 240 0.0300 0.15							Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"		
	Summary for Subcatchment HOU:										

Runoff = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Desc	ription		
*	0.6	650	98				
*	0.0	080	69				
	0.7	730	95	Weig	hted Aver	age	
	0.0	080	69	10.9	6% Pervio	us Area	
	0.6	650	98	89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

HydroCA	D® 10.	10-4	4b_s/n 02	676 © 202	0 HydroCAE	D Software Solutions LLC	Page 38				
Тс	Leng	th	Slope	Velocity	Capacity	Description					
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)						
1.0	1	2	0.2500	0.20		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 2.81"					
0.5	Э	86	0.0240	1.13		Sheet Flow,					
						Smooth surfaces n= 0.011 P2= 2.81"					
1.5	4	8	Total								
	;	Su	mmary	for Sub	catchmer	nt NW.LEX: Lex. Ave. Entrance Drive					
Runoff	=		1.43 cfs	s@ 12.0	6 hrs, Volu	ume= 0.068 af, Depth= 6.84"					
Runoff b MSE 24-	y SCS hr 3_1	TR 00-	R-20 meth Year Ra	nod, UH=S infall=7.36	CS, Split P "	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt	= 0.05 hrs				
Area	(ac)	CI	N Desc	cription							
<u> </u>	0.010 69 50-75% Grass cover, Fair, HSG B										
0.	110	9	8 Pave	ed parking	, HSG B	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
0.	120	9	6 Weig	phted Aver	age						
0.	010	6	9 8.33	% Perviou	s Area						
0.	110	9	8 91.6	7% Imper\	ious Area/						
Тс	Long	th	Slone	Velocity	Canacity	Description					
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)	Description					
0.5	3	33	0.0215	1.06	()	Sheet Flow.					
						Smooth surfaces n= 0.011 P2= 2.81"					
0.6	2	27	0.0108	0.78		Sheet Flow,					
						Smooth surfaces n= 0.011 P2= 2.81"					
1.1	6	60	Total								
				Sum	mary for	Subcatchment ROOF:					
Runoff	=		4.29 cfs	s@ 12.0	6 hrs, Volu	ume= 0.208 af, Depth= 7.12"					
Runoff b	v SCS	TR	R-20 meth	nod. UH=S	CS. Split P	Pervious/Imperv Time Span= 0.00-72.00 hrs. dt:	= 0.05 hrs				

MSE 24-hr 3 100-Year Rainfall=7.36"

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* 0.350 98 ROOF 0.350 98 100.00% Impervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)		Area	(ac)	CN	Desc	cription		
0.350 98 100.00% Impervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	*	0.	350	98	ROC)F		
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)		0.	350	98	100.	00% Impe	rvious Area	a
		Tc (min)	Lengt	h	Slope	Velocity	Capacity	Description
1.0 Direct Entry.		<u>(11111)</u> 1.0	(166)	.)	(1011)	(11/360)	(015)	Direct Entry.

Summary for Subcatchment S.DRIVE:

Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) C	CN Des	cription		
*	0.	130	98			
*	0.	070	69			
	0.	200	88 Weig	ghted Aver	age	
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 6.02"

Area (ac	c) C	N Dese	cription		
0.04	0 6	9 50-7	5% Grass	cover, Fair	, HSG B
0.08	0 9	8 Wate	er Surface,	HSG B	
0.12	0 8	8 Weig	ghted Aver	age	
0.04	0 6	9 33.3	3% Pervio	us Area	
0.08	0 9	66.6	7% Imperv	vious Area	
Tc Le	ength	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 3.28 cfs @ 12.10 hrs, Volume= 0.157 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN De	scription		
*	0.	190	98			
*	0.	140	69			
	0.	330	86 We	ighted Ave	rage	
	0.	140	69 42.	42% Pervio	us Area	
	0.	190	98 57.	58% Imperv	vious Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.0150	0.06		Sheet Flow,
	0.7	48	0.0225	5 1.17		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

Area	(ac)	CN	Desc	ription					
0.	540	98	Pave	vaved parking, HSG C					
0.	040	69	50-7	50-75% Grass cover, Fair, HSG B					
0.	580	96	Weig	hted Aver	age				
0.	040	69	6.90	% Perviou	s Area				
0.	540	98	93.10)% Imperv	vious Area				
Tc	Leng	th S	Slope	Velocity	Capacity	Description			
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)				
7.0						Direct Entry,			

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18"

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_	Area	(ac) C	N Des	cription			
*	0.	250	96 ROA	ADWAY			
	0.	070	69 50-7	'5% Grass	cover, Fair	, HSG B	
	0.	320	90 Wei	ghted Aver	age		
	0.	320	90 100.	00% Pervi	ous Area		
	Tc	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow,	
_						Paved Kv= 20.3 fps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN	Desc	cription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.64	4% Pervio	us Area	
	0.	420	98	89.30	6% Imperv	vious Area	
	Tc (min)	Length (feet)	SI (lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.0)500	0.10		Sheet Flow,
	1.4	105	0.0)187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	Tot	tal			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weig	phted Aver	age	
	0.	580	72	24.8	9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
	_						
	TC	Length	ן ו ג	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	30	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	50	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
		_					n= 0.013
	0.2	54	10	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 st Perim= 4.7' r= 0.38'
_							n= 0.013

14.2 397 Total

Summary for Reach 2R: Lexington

Inflow /	Area =	8.360 ac,	64.55% Impervious	, Inflow Depth = 5	.84" for 100-Year event
Inflow	=	50.14 cfs @	12.17 hrs, Volum 1	e= 4.069 af	
Outflow	v =	50.14 cfs @	12.17 hrs, Volum	e= 4.069 af	, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	ea =	2.330 ac, 7	5.11% Impervious,	Inflow Depth = 6	6.38" for 100-Ye	ar event
Inflow	=	17.27 cfs @	12.22 hrs, Volume	= 1.238 a	f	
Outflow	=	17.27 cfs @	12.22 hrs, Volume	e 1.238 a	f, Atten= 0%, Lag	g= 0.0 min
Primary	=	17.27 cfs @	12.22 hrs, Volume	= 1.238 a	f	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge) ☐ 1=Culvert (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac, 8	39.04% Impe	rvious,	Inflow Deptl	h= 6.7	76" for	100-Year event
Inflow	=	7.25 cfs @	12.14 hrs, '	Volume=	= 0.4	411 af		
Outflow	=	7.25 cfs @	12.14 hrs, '	Volume=	= 0.4	411 af,	Atten= 0	%, Lag= 0.0 min
Primary	=	7.25 cfs @	12.14 hrs, `	Volume=	= 0.4	411 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.02 cfs @ 12.14 hrs HW=886.13' (Free Discharge) **1=Culvert** (Barrel Controls 7.02 cfs @ 5.72 fps)

Summary for Pond 61: Stub-61

Inflow Area	=	0.580 ac, 9	03.10% Impe	ervious,	Inflow Dept	h = 6	.89" for	100-Y	'ear event	
Inflow	=	5.85 cfs @	12.14 hrs,	Volume	= 0.	.333 af				
Outflow	=	5.85 cfs @	12.14 hrs,	Volume	= 0.	.333 af	, Atten= ()%, La	ag= 0.0 mii	n
Primary	=	5.85 cfs @	12.14 hrs,	Volume	= 0.	.333 af			-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge) **1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108": (new Pond)

Inflow Are	ea =	1.050 ac, 50.	.48% Impervious,	Inflow Depth = 5	5.48" for 100	-Year event
Inflow	=	6.79 cfs @ 1	2.23 hrs, Volume	= 0.480 at	f	
Outflow	=	7.22 cfs @ 1	2.35 hrs, Volume	= 0.475 at	f, Atten= 0%,	Lag= 7.5 min
Primary	=	7.22 cfs @ 1	2.35 hrs, Volume	= 0.475 at	f	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 892.18' @ 12.35 hrs Surf.Area= 0.023 ac Storage= 0.143 af

Plug-Flow detention time= 53.3 min calculated for 0.475 af (99% of inflow) Center-of-Mass det. time= 47.5 min (818.5 - 770.9)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	15.00'W x 66.00'L x 10.00'H Field A
			0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	CMP Round 108 x 3 Inside #1
			Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf
			Overall Size= 108.0"W x 108.0"H x 20.00'L
		0 1 1 2 - f	Tatal Available Starsas

0.143 af Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	24.0" Round Culvert L= 11.0' Ke= 0.500
			Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.21 cfs @ 12.35 hrs HW=892.17' (Free Discharge)

-1=Culvert (Passes 7.21 cfs of 48.25 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.39 cfs @ 15.97 fps)

-3=Broad-Crested Rectangular Weir (Weir Controls 5.81 cfs @ 4.35 fps)

Summary for Pond 110:

Inflow Area	a =	1.460 ac, 8	5.62% Impe	rvious, Inflow De	epth = 6.64"	' for 100-	-Year event
Inflow	=	12.36 cfs @	12.09 hrs, \	Volume=	0.808 af		
Outflow	=	12.36 cfs @	12.09 hrs, \	Volume=	0.808 af, At	tten= 0%,	Lag= 0.0 min
Primary	=	12.36 cfs @	12.09 hrs, \	Volume=	0.808 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 890.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=11.93 cfs @ 12.09 hrs HW=890.40' (Free Discharge) **1=Culvert** (Barrel Controls 11.93 cfs @ 9.72 fps)

Summary for Pond 120:

Inflow Area	a =	0.890 ac, 9	3.26% Imp	ervious,	Inflow Depth	= 6.9	0" for 10	0-Year event
Inflow	=	10.09 cfs @	12.08 hrs,	Volume	= 0.5	12 af		
Outflow	=	10.09 cfs @	12.08 hrs,	Volume	= 0.5	12 af,	Atten= 0%,	Lag= 0.0 min
Primary	=	10.09 cfs @	12.08 hrs,	Volume	= 0.5	12 af		-

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Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.51 cfs @ 12.08 hrs HW=890.63' (Free Discharge) -1=Culvert (Barrel Controls 9.51 cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Area	=	0.420 ac, 9	7.62% Impe	ervious,	Inflow Depth :	= 7.0	04" for 1	00-Year event
Inflow	=	4.99 cfs @	12.06 hrs,	Volume	= 0.24	6 af		
Outflow	=	4.99 cfs @	12.06 hrs,	Volume	= 0.24	6 af,	Atten= 0%	ն, Lag= 0.0 min
Primary	=	4.99 cfs @	12.06 hrs,	Volume	= 0.24	6 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge) **1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area	=	0.070 ac,	85.71% Impe	ervious,	Inflow Dep	oth =	6.65" t	for 100	-Year event	t
Inflow	=	0.80 cfs @	12.09 hrs,	Volume	= Č).039 a	af			
Outflow	=	0.80 cfs @	12.09 hrs,	Volume	= C).039 a	af, Atter	ו= 0%,	Lag= 0.0 m	in
Primary	=	0.80 cfs @	12.09 hrs,	Volume	= C).039 a	af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area	=	0.080 ac, 6	2.50% Impervious	Inflow Depth =	5.88" fo	or 100-Year event
Inflow	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af	
Outflow	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af, Atten=	= 0%, Lag= 0.0 min
Primary	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Area	a =	0.120 ac, 9	1.67% Impe	ervious,	Inflow Depth =	= 6.84	4" for 100	-Year event
Inflow	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af		
Outflow	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af, A	Atten= 0%,	Lag= 0.0 min
Primary	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.90' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge) **1=Culvert** (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	7.460 ac, 7	2.25% Impervious,	Inflow Depth = 6.3	32" for 100-Year event
Inflow =	49.68 cfs @	12.11 hrs, Volume	= 3.930 af	
Outflow =	48.39 cfs @	12.17 hrs, Volume	= 3.930 af,	Atten= 3%, Lag= 3.5 min
Discarded =	0.06 cfs @	12.16 hrs, Volume	= 0.148 af	
Primary =	47.65 cfs @	12.17 hrs, Volume	= 3.778 af	
Secondary =	0.84 cfs @	12.15 hrs, Volume	= 0.004 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.88' @ 12.17 hrs Surf.Area= 12,000 sf Storage= 35,687 cf

Plug-Flow detention time= 49.6 min calculated for 3.930 af (100% of inflow) Center-of-Mass det. time= 49.2 min (809.2 - 760.0)

MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 ns LLC Page 47

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 st x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= $\pm 10.00^{\circ} \times 19.63^{\circ}$ st x 2 rows
ur-		05.5	12.50° Header x 19.63 sf x 1 = 245.4 cf Inside
#5 #0	886.00	25 CT	4.00 [°] D X 2.00 [°] H CBMH-30
#0 #7		29 Cl	4.00 [°] D X 2.29 [°] H CBMH-31
#1 #0	880.00	30 Cl	
#0 #0	000.00 886.00'	40 Cl 57 of	
#9 #10	886.00'	50 cf	
#10 #11	886.00'	59 Cl	
#11 #12	886.00'	62 cf	
#12 #13	886.00'	60 cf	$4.00 \text{ D} \times 4.35 \text{ H} \text{ CBMH-70}$
#14	886.00'	66 cf	4 00'D x 5 26'H CBMH-80
#15	886.00'	59 cf	4 00'D x 4 70'H CBMH-90
#16	886.00'	62 cf	4.00'D x 4.92'H CBMH-100
#17	888.33'	8,117 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
888.33		15	0	0			
888.50		345	31	31			
889.00		3,000	836	867			
889.50		7,000	2,500	3,367			
890.00		12,000	4,750	8,117			
		lusiont	Outlat Daviasa				
Device Routing Invert		Invert	Outlet Devices				
#1 Discarde		880.50'	0.250 in/hr Exfiltration over Surface area				
#2	Primary	879.31'	24.0" Round Culvert L= 50.0' Ke= 0.500				
			Inlet / Outlet Inv	/ert= 879.31' /	878.81' S= 0.0100 '/' Cc= 0.900		
			n= 0.013, Flow	Area= 3.14 st	F		
#3	Device 2	881.00'	6.0" Vert. Orific	ce/Grate C=	0.600 Limited to weir flow at low heads		
#4	Device 2	881.00'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600		
			Limited to weir	flow at low hea	ads		
#5 Device		885.80'	7.0' long x 1.0 Head (feet) 0.2 2.50 3.00	breadth Bro 0 0.40 0.60	ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00		

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 #6 Secondary 888.40' 5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.06 cfs @ 12.16 hrs HW=888.55' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=43.30 cfs @ 12.17 hrs HW=888.50' (Free Discharge)

-2=Culvert (Inlet Controls 43.30 cfs @ 13.78 fps)

-3=Orifice/Grate (Passes < 2.55 cfs potential flow)

-4=Orifice/Grate (Passes < 9.00 cfs potential flow)

-5=Broad-Crested Rectangular Weir (Passes < 103.14 cfs potential flow)

Secondary OutFlow Max=0.81 cfs @ 12.15 hrs HW=888.57' (Free Discharge) **6=Broad-Crested Rectangular Weir** (Weir Controls 0.81 cfs @ 0.96 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	ription		
*	0.	.110	98				
*	0.	.030	69				
	0.	.140	92	Weig	hted Aver	age	
	0.	.030	69	21.4	3% Pervio	us Area	
	0.	.110	98	78.57	7% Imperv	vious Area	
	Tc (min)	Length (feet	n SI	lope 'ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	3.0	13	3 0.0	200	0.07		Sheet Flow.
							Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	5 0.0	200	0.71		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0	170	0.97		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	6 0.0	195	2.83		Shallow Concentrated Flow,
_							Paved Kv= 20.3 fps
	~ ~	~ ~ ~	т.4	41			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 3.58 cfs @ 12.23 hrs, Volume= 0.253 af, Depth= 3.99"

Area	(ac)	CN	Desc	cription		
0.340		98				
0.	420	69				
0.	760	82	Weig	ghted Aver	age	
0.	420	69	55.2	6% Pervio	us Area	
0.	340	98	44.7	4% Imperv	vious Area	
Tc (min)	Lengt (feet	h S	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	15	6 0.	.0615	0.19		Sheet Flow,
	-					Grass: Dense n= 0.240 P2= 2.81"
0.3	9	30.	.1150	5.09		Shallow Concentrated Flow,
	4 -				0 50	Grassed Waterway Kv= 15.0 fps
0.6	173	2 0.	.0100	4.54	3.56	Pipe Channel,
						12.0 Round Alea - 0.0 St Perim = 3.1 1= 0.25
14.8	42	1 T	otal			1- 0.013
	Area 0. 0. 0. 0. 0. Tc (min) 13.9 0.3 0.6	Area (ac) 0.340 0.420 0.760 0.420 0.760 0.420 0.340 Tc Lengtl (min) (feet) 13.9 150 0.3 90 0.6 172 14.8 42	Area (ac) CN 0.340 98 0.420 69 0.760 82 0.420 69 0.340 98 Tc Length (min) (feet) 13.9 156 0 0.3 93 0 0.6 172 0	Area (ac) CN Desc 0.340 98 0.420 69 0.760 82 Weig 0.420 69 55.2 0.340 98 44.7 Tc Length Slope (min) (feet) (ft/ft) 13.9 156 0.0615 0.3 93 0.1150 0.6 172 0.0100	Area (ac) CN Description 0.340 98 0.420 69 0.760 82 Weighted Aver 0.420 69 55.26% Pervio 0.420 69 55.26% Pervio 0.340 98 44.74% Impervio 0.340 98 44.74% Impervion Tc Length Slope Velocity (min) (feet) (ft/ft) (ft/sec) 13.9 156 0.0615 0.19 0.3 93 0.1150 5.09 0.6 172 0.0100 4.54	Area (ac) CN Description 0.340 98

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtl (feet	ר :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	1:	3 0	.0500	0.10		Sheet Flow,
	0.9	8	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

	Area	(ac)	CN	Desc	ription		
*	* 0.190 98		98				
*	* 0.100 69		69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.48	8% Pervio	us Area	
	0.	190	98	65.52	2% Imperv	vious Area	
	Tc (min)	Length (feet	n S)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150	0.0	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	7 0.0	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	5 0.0	0200	6.42	5.04	Pipe Channel,
							12.0 Round Area = 0.8 SI Perim = 3.1° r = 0.25°
_	1/1	153	<u>а т</u> а	stal			1-0.013
	14.1	400	, 10	λαι			

Summary for Subcatchment E.ALDI:

Runoff = 3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac) (CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.570 90 Weighted Average						
	0.150 69 26.32% Pervious Area						
	0.420 98 73.68% Impervious Area				8% Imperv	vious Area	
	Тс	Length	S	Slope	Velocity	Capacity	Description
	(min)	(feet)		(ft/ft)	(ft/sec)	(cfs)	
	14.5	115	0.0	0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	100	0.0	0150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (a	c) CN	Desc	cription		
*	0.00	00 98				
*	0.01	10 69				
	0.01	10 69	Weig	ghted Aver	age	
	0.01	10 69	100.	00% Pervi	ous Area	
	Tc L (min)	ength (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0	//				Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 2.26 cfs @ 12.39 hrs, Volume= 0.197 af, Depth= 2.66"

	Area (ac)	CN	Desc	cription					
*	0.006	98							
*	0.884	69							
	0.890	69	Weig	ghted Aver	age				
	0.884 69 99.33% Pervious Area								
	0.006	98	0.67	% Impervi	ous Area				
			~.		•				
	Tc Leng	gth	Slope	Velocity	Capacity	Description			
	<u>(min) (fe</u>	et)	(ft/ft)	(ft/sec)	(cfs)				_
	26.1 2	240 0	0.0300	0.15		Sheet Flow,			
						Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area ((ac)	CN	Desc	ription		
*	0.6	650	98				
*	0.0	080	69				
	0.7	730	95	Weig	hted Aver	age	
	0.0	0.080 69 10.96% Pervious Area					
	0.6	650	98	89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
0.5	30	0.0240	1.13		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			
	Su	mmary	for Sub	catchmer	nt NW.LEX: Lex. Ave. Entrance Drive
Runoff	=	1.13 cfs	s@ 12.0	6 hrs, Volu	me= 0.054 af, Depth= 5.41"
Runoff b MSE 24-	y SCS TF hr 3 100	R-20 meth -Year St.	nod, UH=S Paul Rain	SCS, Split P fall=5.90"	ervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area	(ac) C	N Desc	cription		
0. 0.	.010 6 .110 9	9 50-7 8 Pave	5% Grass ed parking	cover, Fair , HSG B	, HSG B
0.	.120 9 .010 6 .110 9	6 Weig 9 8.33 8 91.6	ghted Aver % Perviou 7% Imperv	age s Area vious Area	
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			
			Sum	mary for	Subcatchment ROOF:
Runoff	=	3.44 cfs	s@ 12.0	6 hrs, Volu	me= 0.165 af, Depth= 5.66"
Runoff b MSE 24-	y SCS TF hr 3 100	R-20 meth -Year St.	nod, UH=S Paul Rain	SCS, Split P fall=5.90"	ervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area	(ac) C	N Desc	cription		
* 0.	.350 9	8 ROC)F		
0.	.350 9	8 100.	00% Impe	rvious Area	
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cf <u>s)</u>	Description

MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

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Summary for Subcatchment S.DRIVE:

Runoff = 1.59 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac) (CN Des	cription		
*	0.	130	98			
*	0.	070	69			
	0. 0.	200 070	88 Wei 69 35.0	ghted Aver	age us Area	
	0.	130	98 65.0	0% Imperv	vious Area	
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(leet)	(11/11)	(II/sec)	(CIS)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow.
	5					Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 4.65"

Area (a	ac) C	N Des	cription		
0.0	40 (59 50- ⁻	75% Grass	cover, Fair	, HSG B
0.0	80 9	98 Wa [:]	er Surface	, HSG B	
0.1	20	38 We	ghted Aver	age	
0.0	40 (39 33.	33% Pervio	us Area	
0.0	80	98 66.6	37% Imperv	/ious Area	
-		0	N/ 1 ⁻¹	0	
IC	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 2.51 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
	0.190 98 57.58% Impervious Area		vious Area				
	Tc (min)	Length (feet	n 5)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.	0150	0.06		Sheet Flow,
	0.7	48	80.	0225	1.17		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59) To	otal			

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (a	ac)	CN	Desc	ription							
0.5	540	98	Pave	ved parking, HSG C							
0.0)40	69	50-7	5% Grass cover, Fair, HSG B							
0.5	580	96	Weig	hted Aver	age						
0.0)40	69	6.90	% Perviou	s Area						
0.5	0.540 98 93.10% Impervious Area										
Тс	Lengtl	h S	Slope	Velocity	Capacity	Description					
<u>(min)</u>	(feet	t)	(ft/ft)	(ft/sec)	(cfs)						
7.0						Direct Entry,					

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

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	Area	(ac)	CN	Desc	ription		
*	0.1	250	96	ROA	DWAY		
	0.	070	69	50-75	5% Grass	cover, Fair,	HSG B
	0.	320	90	Weig	hted Aver	age	
	0.	320	90	100.0	00% Pervi	ous Area	
	Tc (min)	Length (feet	ר S)	lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	2.3	15	5 0.0)500	0.11	· · · ·	Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	1.3	130	0.0	0307	1.61		Sheet Flow,
	0.4	-			0.07		Smooth surfaces n= 0.011 P2= 2.81"
	0.4	50	0.0	J125	2.27		Shallow Concentrated Flow,
_	1.0	4.01					Paved KV-20.5 lps
	4.0	195	o Io	tal			

Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac) (CN De	scription			
*	0.	420	98				
*	0.	050	69				
	0.470 95 Weighted Average		rage				
	0.050 69 10.64% Pervious Area				us Area		
	0.420 98 89.36% Impervious Area				vious Area		
	_						
	Tc	Length	Slope	e Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
	2.1	13	0.0500	0.10		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.4	105	0.0187	' 1.27		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	3.5	118	Total				
				0		Outrantahun ant MILD.	

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weig	phted Aver	age	
	0.	580	72	24.8	9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
					-		
	Тс	Length	ו	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	30	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	6 O	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	1 0	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 st Perim= 4.7' r= 0.38'
							n= 0.013

14.2 397 Total

Summary for Reach 2R: Lexington

Inflow .	Area =	8.360 ac, 64.55% Impervious, Inflow	Depth = 4.47" for 100-Year S	St. Paul event
Inflow	=	32.08 cfs @ 12.26 hrs, Volume=	3.116 af	
Outflov	v =	32.08 cfs @ 12.26 hrs, Volume=	3.116 af, Atten= 0%, Lag= 0	.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Ar	rea =	2.330 ac, 75.11% Impervious,	Inflow Depth = 4.98"	for 100-Year St. Paul event
Inflow	=	13.52 cfs @ 12.22 hrs, Volume=	0.966 af	
Outflow	=	13.52 cfs @ 12.22 hrs, Volume=	e 0.966 af, Atte	n= 0%, Lag= 0.0 min
Primary	=	13.52 cfs @ 12.22 hrs, Volume=	= 0.966 af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge) **1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

 Inflow Area =
 0.730 ac, 89.04% Impervious, Inflow Depth =
 5.33" for 100-Year St. Paul event

 Inflow =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af

 Outflow =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af, Atten= 0%, Lag= 0.0 min

 Primary =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.85' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.56 cfs @ 12.14 hrs HW=885.80' (Free Discharge) -1=Culvert (Barrel Controls 5.56 cfs @ 4.53 fps)

Summary for Pond 61: Stub-61

Inflow A	vrea =	0.580 ac, 93.10% Impervious, Inflow I	Depth = 5.45" for 100-Year St. Paul event
Inflow	=	4.65 cfs @ 12.14 hrs, Volume=	0.264 af
Outflow	- =	4.65 cfs @ 12.14 hrs, Volume=	0.264 af, Atten= 0%, Lag= 0.0 min
Primary	- =	4.65 cfs @ 12.14 hrs, Volume=	0.264 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge) —1=Culvert (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108": (new Pond)

Inflow A	Area =	1.050 ac, 50.48% Impervious, Inflow	Depth = 4.16" for 100-Year St. Paul event
Inflow	=	5.15 cfs @ 12.23 hrs, Volume=	0.364 af
Outflow	/ =	1.41 cfs @_ 12.60 hrs, Volume=	0.360 af, Atten= 73%, Lag= 22.2 min
Primary	/ =	1.41 cfs @ 12.60 hrs, Volume=	0.360 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 889.77' @ 12.60 hrs Surf.Area= 0.023 ac Storage= 0.137 af

Plug-Flow detention time= 61.9 min calculated for 0.360 af (99% of inflow) Center-of-Mass det. time= 53.9 min (827.0 - 773.1)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	15.00'W x 66.00'L x 10.00'H Field A
			0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	CMP Round 108 x 3 Inside #1
			Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf
			Overall Size= 108.0"W x 108.0"H x 20.00'L
		0 142 of	Total Available Storage

0.143 af Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	24.0" Round Culvert L= 11.0' Ke= 0.500
			Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.40 cfs @ 12.60 hrs HW=889.77' (Free Discharge)

-1=Culvert (Passes 1.40 cfs of 42.16 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.23 cfs @ 14.12 fps)

-3=Broad-Crested Rectangular Weir (Weir Controls 0.17 cfs @ 1.25 fps)

Summary for Pond 110:

Inflow Ar	rea =	1.460 ac, 85.62% Impervious, Inflow I	Depth = 5.23" for 100-Year St. Paul event
Inflow	=	9.79 cfs @ 12.09 hrs, Volume=	0.636 af
Outflow	=	9.79 cfs @ 12.09 hrs, Volume=	0.636 af, Atten= 0%, Lag= 0.0 min
Primary	=	9.79 cfs $\overline{@}$ 12.09 hrs, Volume=	0.636 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge) **1=Culvert** (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area =		0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul ever	nt
Inflow	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af	
Outflow	=	$3.03 \text{ cfs} (\tilde{a}) = 12.08 \text{ hrs, Volume} = 0.405 \text{ af, Atten} = 0\%, \text{ Lag} = 0.0 \text{ min}$	
Primary	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 889.34' @ 12.08 hrs

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Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge) **1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)

Summary for Pond 130:

Inflow Area	a =	0.420 ac, 97.62% Impervious, Inflow Depth = 5.59" for 100-Year St. Paul event
Inflow	=	.99 cfs @ 12.06 hrs, Volume= 0.196 af
Outflow	=	.99 cfs @ 12.06 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary	=	.99 cfs @ 12.06 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge) **1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow Area	a =	0.070 ac, 85.71% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow	=	.63 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow	=	.63 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary	=	.63 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge) **1=Culvert** (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

 Inflow Area =
 0.080 ac, 62.50% Impervious, Inflow Depth = 4.53" for 100-Year St. Paul event

 Inflow =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af

 Outflow =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af, Atten= 0%, Lag= 0.0 min

 Primary =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge) -1=Culvert (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Area	a =	0.120 ac, 91.67% Impervious, Inflow Depth = 5.41" for 100-Year St. Paul event
Inflow	=	.13 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow	=	.13 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary	=	.13 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.80' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge) —1=Culvert (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Infl	ow Depth = 4.93" for 100-Year St. Paul event
Inflow =	39.07 cfs @ 12.11 hrs, Volume=	3.063 af
Outflow =	30.34 cfs @ 12.26 hrs, Volume=	3.063 af, Atten= 22%, Lag= 8.5 min
Discarded =	0.06 cfs @_ 12.20 hrs, Volume=	0.146 af
Primary =	30.29 cfs @_ 12.26 hrs, Volume=	2.917 af
Secondary =	0.00 cfs $\overline{@}$ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.79' @ 12.26 hrs Surf.Area= 9,623 sf Storage= 34,839 cf

Plug-Flow detention time= 57.4 min calculated for 3.063 af (100% of inflow) Center-of-Mass det. time= 57.0 min (819.9 - 762.9)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 st x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00 x 19.63 st x 2 rows
		05 6	12.50° Header x 19.63 st x 1 = 245.4 ct Inside
#5	886.00	25 cf	4.00°D x 2.00°H CBMH-30
#b	886.00	29 cf	4.00 ^o D x 2.29 ^o H CBMH-31
#/	886.00	35 CT	4.00'D x 2.82'H CBMH-40
#8 #0	886.00	40 Cf	4.00'D X 3.18'H CBMH-41
#9	886.00	57 Cl	
#10 #11	000.00	59 Cl	
#11 #10	000.00	60 Cl	
#12 #12	000.00 996.00'	02 CI 60 cf	
#13 #14	886 00'	00 CI 66 cf	
#14 #15	886.00'	50 cf	
#15 #16	886.00'	62 cf	$4.00 \text{ D} \times 4.00 \text{ H} \text{ CBMH} -30$
#17	888 33'	8 117 cf	Custom Stage Data (Prismatic) isted below (Recalc)
		e, er	

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevatio (fee	Elevation Surf.Area (feet) (sq-ft)		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
888.	33	15	0	0	
888.	50	345	31	31	
889.0	00	3,000	836	867	
889.	50	7,000	2,500	3,367	
890.0	00	12,000	4,750	8,117	
Device	Routing	Invert	Outlet Devices		
#1	Discarded	880.50'	0.250 in/hr Exf	iltration over	Surface area
#2	Primary	879.31'	24.0" Round C	Culvert L= 50	.0' Ke= 0.500
			Inlet / Outlet Inv	/ert= 879.31' /	878.81' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow	Area= 3.14 st	F
#3	Device 2	881.00'	6.0" Vert. Orifi	ce/Grate C=	0.600 Limited to weir flow at low heads
#4	Device 2	881.00'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600
			Limited to weir	flow at low hea	ads
#5	Device 2	885.80'	7.0' long x 1.0 Head (feet) 0.2 2.50 3.00	breadth Bro 20 0.40 0.60	ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00

19114-overall exMSE 24-hr 3 100-Year St. Paul Rainfall=5.90"Prepared by {enter your company name here}Printed 12/9/2020HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLCPage 63

 #6
 Secondary
 888.40'
 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.32

 #6
 Secondary
 888.40'
 5.0' long x 5.0' breadth Broad-Crested Rectangular Weir

 Head (feet)
 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

 2.50 3.00 3.50 4.00 4.50 5.00 5.50

 Coef. (English)
 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65

 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.06 cfs @ 12.20 hrs HW=886.17' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=28.58 cfs @ 12.26 hrs HW=886.73' (Free Discharge)

2=Culvert (Passes 28.58 cfs of 38.34 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 2.21 cfs @ 11.28 fps)

-4=Orifice/Grate (Orifice Controls 7.81 cfs @ 11.19 fps)

5=Broad-Crested Rectangular Weir (Weir Controls 18.55 cfs @ 2.84 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge) 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Area Listing (all nodes)

	Area	CN	Description
((acres)		(subcatchment-numbers)
	4.316	98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, EXSO, HOU, NE.LEX, S.DRIVE, SWLEX,
	2.414	69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.HOU, EXSO, HOU, S.DRIVE, SWLEX,
			W.ALDI, WILD)
	0.110	85	(WILD)
	0.190	69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)
	0.110	98	Paved parking, HSG B (NW.LEX)
	0.540	98	Paved parking, HSG C (TCF)
	0.250	96	ROADWAY (UNIV)
	0.350	98	ROOF (ROOF)
	0.080	98	Water Surface, HSG B (SE.LEX)
	0.080	98	Water Sufface, HSG B (SELEX)
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Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Width	Diam/Height	Inside-Fill
	Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)
1	CART	0.00	0.00	172.0	0.0100	0.013	0.0	12.0	0.0
2	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
3	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
4	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
5	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
6	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
7	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
8	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
9	108"	882.45	882.15	20.0	0.0150	0.013	0.0	24.0	0.0
10	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
11	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
12	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
13	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
14	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
15	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
16	SYS	880.39	879.47	50.0	0.0184	0.013	0.0	24.0	0.0
17	SYS-AS	880.39	879.47	50.0	0.0184	0.013	0.0	12.0	0.0

Pipe Listing (all nodes)

Summary for Subcatchment C.DRIVE:

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
_	0.	140	92 Wei	ahted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	57% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	~ ~ ~	~ ~ ~	T			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 1.27 cfs @ 12.23 hrs, Volume= 0.093 af, Depth= 1.47"

	Area	(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	ghted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imper∖	vious Area	
	Tc (min)	Lengt (feet	h S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	0.3	9:	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			

Summary for Subcatchment DOCK:

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac)	CN	Desc	cription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtl (feet	ר ()	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	1:	30	.0500	0.10		Sheet Flow,
	0.9	8	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	8 T	otal			

Summary for Subcatchment DUN:

Runoff = 0.64 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 1.89"

	Area	(ac)	CN D	escription		
*	0.	190	98			
*	0.	100	69			
	0.	290	88 W	eighted Ave	erage	
	0.	100	69 34	1.48% Pervi	ous Area	
	0.	190	98 65	5.52% Impe	rvious Area	
	Tc (min)	Length (feet	n Slop) (ft/i	e Velocity ft) (ft/sec)	Capacity (cfs)	Description
	12.8	150	0.070	0 0.20		Sheet Flow,
	0.9	137	0.031	0 2.64		Grass: Dense n= 0.240 P2= 2.81" Shallow Concentrated Flow.
						Grassed Waterway Kv= 15.0 fps
	0.4	166	0.020	6.42	5.04	Pipe Channel,
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
_						n= 0.013
	14.1	453	3 Total			

Summary for Subcatchment E.ALDI:

Runoff = 1.32 cfs @ 12.23 hrs, Volume= 0.097 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

Area	(ac)	CN	Desc	ription		
0.	420	98				
0.	150	69				
0.	570	90	Weig	hted Aver	age	
0.	150	69	26.3	2% Pervio	us Area	
0.	420	98	73.68	8% Imperv	vious Area	
Тс	Length	1	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
14.5	115	0	.0300	0.13		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.	.0150	2.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	Area 0. 0. 0. 0. 0. Tc (min) 14.5 0.7	Area (ac) 0.420 0.150 0.570 0.150 0.420 Tc Length (min) (feet) 14.5 115 0.7 100	Area (ac) CN 0.420 98 0.150 69 0.570 90 0.150 69 0.420 98 Tc Length (min) (feet) 14.5 115 0 0.7 100 0	Area (ac) CN Desc 0.420 98 0.150 69 0.570 90 Weig 0.150 69 26.33 0.420 98 73.68 73.68 73.68 Tc Length Slope (ft/ft) 14.5 115 0.0300 0.7	Area (ac) CN Description 0.420 98 0.150 69 0.570 90 Weighted Aver 0.150 69 26.32% 0.420 98 73.68% 0.420 98 73.68% Tc Length Slope Velocity (min) (feet) (ft/ft) (ft/sec) 14.5 115 0.0300 0.13 0.7 100 0.0150 2.49	Area (ac) CN Description 0.420 98 0.150 69 0.570 90 Weighted Average 0.150 69 26.32% Pervious Area 0.420 98 73.68% Impervious Area 0.420 98 73.68% Impervious Area Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs) 14.5 115 0.0300 0.13 0.7 100 0.0150 2.49

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.01 cfs @ 12.16 hrs, Volume= 0.000 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Desc	cription		
*	0.000	98				
*	0.010	69				
	0.010	69	Weig	hted Aver	age	
	0.010	69	100.	00% Pervi	ous Area	
	Tc Ler	ngth	Slope	Velocity	Capacity	Description
	(min) (f	eet)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 0.42 cfs @ 12.43 hrs, Volume= 0.043 af, Depth= 0.58"

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	Area ((ac) (CN	Desc	cription					
*	0.0	006	98							
*	0.8	884	69							
	0.8	890	69	Weig	hted Aver	age				
	0.8	884	69	99.3	3% Pervio	us Area				
	0.0	006	98	0.67	% Impervi	ous Area				
	Тс	Length	ç	Slope	Velocity	Capacity	Description			
	(min)	(feet)		(ft/ft)	(ft/sec)	(cfs)	-			
	26.1	240	0.	0300	0.15		Sheet Flow,			
							Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (a	ac)	CN	Desc	cription		
*	0.6	50	98				
*	0.0	80	69				
	0.7	'30	95	Weig	ghted Aver	age	
	0.0	80	69	10.9	6% Pervio	us Area	
	0.6	50	98	89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (feet	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 1.83"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	lotal			
	c		for Sub	aatahma	nt NW/LEV/Lov Ave Entrenee Drive
	3	ummary		catchine	III NVV.LEA. LEX. AVE. EIIITAIICE DIIVE
Runoff	=	0.52 cf	s@ 12.0	6 hrs, Volu	ume= 0.024 af, Depth= 2.41"
Runoff b		R-20 meti	hod UH=9	SCS Solit F	Pervious/Imperv Time Span= 0.00-72.00 hrs. dt= 0.05 hrs.
MSE 24	-hr 3 2-1	ear Rainf	all=2.81"	oo, opiit i	
	-		-		
Area	(ac) (CN Des	cription		
0	.010	69 50-7	'5% Grass	cover, Fair	r, HSG B
0	.110	98 Pav	ed parking	, HSG B	
0	.120	96 Wei	ghted Ave	age	
0	.010	69 8.33	% Perviou	s Area	
0	. 1 10	98 91.0	mper	lious Area	
Тс	l enath	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
0.5	33	0.0215	1.06	X/	Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			
			•	-	
			Sum	mary for	Subcatchment ROOF:
Runoff	=	1.62 cf	s @ 12.0	6 hrs, Volu	ume= 0.075 af, Depth= 2.58"
Runoff h	V SCS T	R-20 metl	hod. UH=S	SCS, Split F	Pervious/Imperv., Time Span= 0.00-72.00 hrs. dt= 0.05 hrs.
MSE 24	.hr 3 2-1	ear Rainf	all=2.81"	ee, opiiri	
			-		
Area	(ac) (CN Des	cription		
* ^	050	~~ ~~			

MSE 24-hr 3 2-Year Rainfall=2.81"

*	0.	350	98	ROC)F		
	0.	350	98	100.	00% Impe	rvious Area	
	Tc	Lengt	h	Slope	Velocity	Capacity	Description
(<u>1.0</u>	(iee	.)	(11/11)	(II/Sec)	(015)	Direct Entry.

Summary for Subcatchment S.DRIVE:

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac) C	CN Des	cription		
*	0.	130	98			
*	0.	070	69			
	0.	200	88 Weig	3 Weighted Average		
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Impervious Area		
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.019 af, Depth= 1.91"

Area (ac) C	N Des	cription		
0.0	040 6	69 50-7	′5% Grass	cover, Fair	, HSG B
0.0)80 9	98 Wat	er Surface	, HSG B	
0.1	120 8	38 Wei	ghted Aver	age	
0.0)40 6	33.3	3% Pervio	us Area	
0.0	980 980	98 66.6	7% Imper	ious Area	
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

	Area	(ac) (CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
	0.	190	98	57.58	3% Imperv	vious Area	
	Tc (min)	Length (feet)	S	lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.0	0150	0.06		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	48	0.0)225	1.17		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59	То	otal			

Summary for Subcatchment TCF:

Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

Area	(ac)	CN	Desc	ription				
0.	540	98	Pave	aved parking, HSG C				
0.	040	69	50-7	-75% Grass cover, Fair, HSG B				
0.	580	96	Weig	hted Aver	age			
0.	040	69	6.90	6.90% Pervious Area				
0.	540	98	93.10)% Imperv	vious Area			
Tc	Leng	th S	Slope	Velocity	Capacity	Description		
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)			
7.0						Direct Entry,		

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.10 cfs @ 12.10 hrs, Volume= 0.048 af, Depth= 1.81"

MSE 24-hr 3 2-Year Rainfall=2.81" Printed 12/9/2020 LLC Page 11

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	Area	(ac) C	N Des	cription			
*	0.	250 9	96 ROA	ADWAY			
	0.	070 (69 50-7	'5% Grass	cover, Fair	, HSG B	
	0.	320 9	90 Weig	ghted Aver	age		
	0.	320 9	90 100.	00% Pervi	ous Area		
	Тс	Length	Slope	Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow,	
						Paved Kv= 20.3 tps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 2-Year Rainfall=2.81"

_	Area	(ac) (CN D	escr	iption		
*	0.	420	98				
*	0.	050	69				
	0.	470	95 V	/eigh	nted Aver	age	
	0.	050	69 1	0.64	% Pervio	us Area	
	0.	420	98 8	9.369	% Imperv	vious Area	
	Tc (min)	Length (feet)	Sloj (ft/	ce ' ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.05	00	0.10		Sheet Flow,
	1.4	105	0.018	37	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	Tota				

Summary for Subcatchment WILD:

Runoff = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Depth= 2.11"

MSE 24-hr 3 2-Year Rainfall=2.81" Printed 12/9/2020 LLC Page 12

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weid	hted Aver	age	
	0.	580	72	24.8	, 9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
					•		
	Тс	Lengt	h .	Slope	Velocity	Capacity	Description
	(min)	(feet	t)	(ft/ft)	(ft/sec)	(cfs)	·
	13.0	5	80	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	15	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	12	60	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	4 0	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013

14.2 397 Total

Summary for Reach 2R: (new Reach)

Inflow Ar	ea =	8.360 ac, 6	64.55% Impervious,	Inflow Depth = 1.	76" for 2-Year event
Inflow	=	6.50 cfs @	12.44 hrs, Volume	e= 1.223 af	
Outflow	=	6.50 cfs @	12.44 hrs, Volume	e= 1.223 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area	a =	2.330 ac, 7	5.11% Impe	rvious, Inflow De	pth = 2.11"	for 2-Y	ear event
Inflow	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af		
Outflow	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af, At	ten= 0%,	Lag= 0.0 min
Primary	=	5.78 cfs @	12.22 hrs, \	Volume=	0.410 af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.55' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.67 cfs @ 12.22 hrs HW=885.53' (Free Discharge) **1=Culvert** (Barrel Controls 5.67 cfs @ 4.05 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac, 8	9.04% Impervi	ous, Inflow De	pth = 2	2.36" f	or 2-Year event	
Inflow	=	2.60 cfs @	12.14 hrs, Vol	lume=	0.144 at	f		
Outflow	=	2.60 cfs @	12.14 hrs, Vol	lume=	0.144 at	f, Atten	= 0%, Lag= 0.0 mii	n
Primary	=	2.60 cfs @	12.14 hrs, Vol	lume=	0.144 at	f	-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.05' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=885.03' (Free Discharge) ☐ 1=Culvert (Barrel Controls 2.52 cfs @ 3.34 fps)

Summary for Pond 61: Stub-61

Inflow Area	=	0.580 ac, 9	93.10% Impe	ervious,	Inflow Depth	= 2.4	44" for 2	2-Year e	event
Inflow	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	18 af			
Outflow	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	18 af,	Atten= 0	%, Lag=	= 0.0 min
Primary	=	2.14 cfs @	12.14 hrs,	Volume	= 0.1	18 af		•	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.07 cfs @ 12.14 hrs HW=885.16' (Free Discharge) **1=Culvert** (Barrel Controls 2.07 cfs @ 3.14 fps)

Summary for Pond 108": (new Pond)

Inflow Ar	ea =	1.050 ac, 50	0.48% Impervious,	Inflow Depth =	1.58" for	⁻ 2-Year event
Inflow	=	1.90 cfs @	12.23 hrs, Volume	e= 0.139 a	af	
Outflow	=	0.68 cfs @	12.52 hrs, Volume	e= 0.125 a	af, Atten=	64%, Lag= 17.7 min
Primary	=	0.68 cfs @	12.52 hrs, Volume	e= 0.125 a	af	•

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.07' @ 12.52 hrs Surf.Area= 0.021 ac Storage= 0.052 af

Plug-Flow detention time= 96.4 min calculated for 0.125 af (90% of inflow) Center-of-Mass det. time= 52.5 min (831.6 - 779.1)

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Volume	Inve	rt Avail.Stora	ge Storage Description
#1	881.4	5' 0.088	af 108.0" Round Pipe Storage Inside #2 L= 60.0' S= 0.0123 '/'
#2	881.00	0.052	af 14.00'W x 66.00'L x 10.25'H Prismatoid 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140	af Total Available Storage
Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2 #3	Device 1 Device 1	882.30' 890.79'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.5' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.67 2.69 2.72 2.76 2.83
Primary 1=Cu 2= 3=	OutFlow Ivert (Pas Orifice/Gr Broad-Cre	Max=0.68 cfs @ ses 0.68 cfs of 1 ate (Orifice Con ested Rectangu	9 12.52 hrs HW=885.06' (Free Discharge) 8.67 cfs potential flow) trols 0.68 cfs @ 7.76 fps) I lar Weir (Controls 0.00 cfs)
			Summary for Pond 110:
Inflow A Inflow Outflow Primary	rea = = = =	1.460 ac, 85.6 4.43 cfs @ 12 4.43 cfs @ 12 4.43 cfs @ 12	2% Impervious, Inflow Depth = 2.29" for 2-Year event .09 hrs, Volume= 0.279 af .09 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.0 min .09 hrs, Volume= 0.279 af
Routing Peak Ele	by Stor-Inc ev= 886.28	l method, Time \$ ' @ 12.09 hrs	Span= 0.00-72.00 hrs, dt= 0.05 hrs
Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
Primary	OutFlow	Max=4.27 cfs @	2 12.09 hrs HW=886.25' (Free Discharge)

1=Culvert (Inlet Controls 4.27 cfs @ 3.64 fps)

Summary for Pond 120:

Inflow Area	ı =	0.890 ac,	93.26% Imp	ervious,	Inflow De	epth =	2.44"	for 2-Y	ear ever	nt
Inflow	=	3.69 cfs @	12.08 hrs,	Volume	=	0.181	af			
Outflow	=	3.69 cfs @	12.08 hrs,	Volume	=	0.181	af, At	ten= 0%,	Lag= 0.0	0 min
Primary	=	3.69 cfs @	12.08 hrs,	Volume	=	0.181	af		•	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 887.03' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
Primary 1=Cι	/ OutFlow J Ivert (Bar	Max=3.48 cfs @ rel Controls 3.48	ۇ 12.08 hrs HW=886.99' (Free Discharge) 3 cfs @ 4.11 fps)
			Summary for Pond 130:
Inflow A Inflow Outflow	rea = = =	0.420 ac, 97.6 1.86 cfs @ 12 1.86 cfs @ 12	32% Impervious, Inflow Depth = 2.53" for 2-Year event 2.06 hrs, Volume= 0.089 af 2.06 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

 Outflow
 =
 1.86 cfs @
 12.06 hrs, Volume=
 0.089 af, Atten= 0%,

 Primary
 =
 1.86 cfs @
 12.06 hrs, Volume=
 0.089 af

 Routing by Stor-Ind method, Time Span=
 0.00-72.00 hrs, dt= 0.05 hrs
 0.05 hrs

Peak Elev= 887.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=887.52' (Free Discharge) —1=Culvert (Barrel Controls 1.78 cfs @ 4.00 fps)

Summary for Pond 140:

Inflow Are	ea =	0.070 ac, 8	5.71% Impe	rvious,	Inflow Depth =	2.29"	for 2-Y	ear event	
Inflow	=	0.28 cfs @	12.09 hrs, V	Volume=	= 0.013	af			
Outflow	=	0.28 cfs @	12.09 hrs, \	Volume=	= 0.013	af, At	ten= 0%,	Lag= 0.0 ı	min
Primary	=	0.28 cfs @	12.09 hrs, \	Volume=	= 0.013	af		-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.45' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=887.44' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.27 cfs @ 1.77 fps)

Summary for Pond CB31:

Inflow Area	ı =	0.080 ac, 6	2.50% Impervious,	Inflow Depth =	1.83" for	2-Year event
Inflow	=	0.26 cfs @	12.07 hrs, Volume	÷= 0.012	af	
Outflow	=	0.26 cfs @	12.07 hrs, Volume	÷= 0.012	af, Atten= 0	%, Lag= 0.0 min
Primary	=	0.26 cfs @	12.07 hrs, Volume	e 0.012	af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.50' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.07 hrs HW=884.49' (Free Discharge) **1=Culvert** (Barrel Controls 0.25 cfs @ 2.33 fps)

Summary for Pond CB41:

Inflow Area	=	0.120 ac, 9	1.67% Impe	ervious, Inflo	w Depth = 2	2.41" for 2	2-Year event
Inflow	=	0.52 cfs @	12.06 hrs,	Volume=	0.024 a	f	
Outflow	=	0.52 cfs @	12.06 hrs,	Volume=	0.024 a	f, Atten= 0	%, Lag= 0.0 min
Primary	=	0.52 cfs @	12.06 hrs,	Volume=	0.024 a	f	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.58' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.06 hrs HW=884.57' (Free Discharge) -1=Culvert (Barrel Controls 0.49 cfs @ 2.68 fps)

Summary for Pond SYS: (new Pond)

MSE 24-hr 3 2-Year Rainfall=2.81" Printed 12/9/2020 LLC Page 17

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	18.50'W x 316.00'L x 6.00'H Field A
			0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	18.50'W x 196.00'L x 6.00'H Field B
			0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	4.00'D x 2.00'H CBMH-30
#6	886.25'	0.001 af	4.00'D x 2.29'H CBMH-31
#7	886.25'	0.001 af	4.00'D x 2.82'H CBMH-40
#8	886.25'	0.001 af	4.00'D x 3.18'H CBMH-41
#9	886.25'	0.001 af	4.00'D x 4.50'H CBMH-50
#10	886.25'	0.001 af	4.00'D x 4.70'H CBMH-51
#11	886.25'	0.001 af	4.00'D x 4.80'H CBMH-52
#12	886.25'	0.001 af	4.00'D x 4.95'H CBMH-60
#13	886.25'	0.001 af	4.00'D x 4.75'H CBMH-70
#14	886.25'	0.002 af	4.00'D x 5.26'H CBMH-80
#15	886.25'	0.001 af	4.00'D x 4.70'H CBMH-90
#16	886.25'	0.001 af	4.00'D x 4.92'H CBMH-100

0.811 af Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	0.250 in/hr Exfiltration over Surface area
#2	Primary	880.39'	24.0" Round Culvert L= 50.0' Ke= 0.500
	-		Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#5	Device 2	886.05'	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
			3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs) -3=Orifice/Grate (Controls 0.00 cfs) -4=Orifice/Grate (Controls 0.00 cfs)

-5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area	=	7.460 ac, 7	2.25% Imp	ervious, I	Inflow Depth =	2.06"	for 2-Ye	ar event	
Inflow	=	17.06 cfs @	12.12 hrs,	Volume=	= 1.282	af			
Outflow	=	6.13 cfs @	12.44 hrs,	Volume=	= 1.282	af, Atte	en= 64%,	Lag= 19.2	min
Discarded	=	0.05 cfs @	6.25 hrs,	Volume=	.103	af		·	
Primary	=	6.08 cfs @	12.44 hrs,	Volume=	= 1.179	af			
Secondary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000	af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 883.47' @ 12.44 hrs Surf.Area= 9,472 sf Storage= 15,463 cf

Plug-Flow detention time= 43.5 min calculated for 1.281 af (100% of inflow) Center-of-Mass det. time= 43.8 min (813.9 - 770.1)

MSE 24-hr 3 2-Year Rainfall=2.81" Printed 12/9/2020 LLC Page 19

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
<i></i>	000 051	05.6	12.50° Header x 19.63 st x 1 = 245.4 cf Inside
#5	886.25	25 cf	4.00°D x 2.00°H CBMH-30
#0 #7	886.25	29 Cf	4.00 [°] D X 2.29 [°] H CBMH-31
#1 #0	880.25	30 Cl	
#8 #0	000.20 006.25'	40 Cl 57 of	
#9 #10	000.20	57 Cl	
#10 #11	000.20 996.25'	09 Cl	
#11 #12	886.25'	00 Cl 62 cf	
#12 #13	886 25'	02 CI 60 cf	
#13 #11	886 25'	66 cf	$4.00 \text{ D} \times 4.75 \text{ H} \text{ CBMH-}70$
#1 4 #15	886 25'	59 cf	4.00 D x 3.20 H CBMH-90
#16	886 25'	62 cf	4 00'D x 4 92'H CBMH-100
#17	888.33'	8,117 cf	Low Road cb (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevatio (fee	on Si et)	urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.3	33	15	0	0				
888.5	50	345	31	31				
889.0	00	3,000	836	867				
889.5	50	7,000	2,500	3,367				
890.0	00	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	Discarded	880.75'	0.250 in/hr Exfi	Itration over S	Surface	area		
#2	Primary	880.39'	12.0" Round Culvert L= 50.0' Ke= 0.500					
			Inlet / Outlet Inve	ert= 880.39' / 8	379.47'	S= 0.0184	'/' Cc= 0.900	
			n= 0.013, Flow Area= 0.79 sf					
#3	Device 2	880.89'	24.0" Vert. Orifi	ce/Grate C=	0.600			
			Limited to weir fl	ow at low head	ds			
#4 Secondary		888.50'	10.0' long x 10	.0' breadth Br	oad-Cr	ested Recta	angular Weir	
			Head (feet) 0.20	0.40 0.60 0).80 1.0	0 1.20 1.4	0 1.60	
			Coef. (English)	2.49 2.56 2.7	0 2.69	2.68 2.69	2.67 2.64	

Discarded OutFlow Max=0.05 cfs @ 6.25 hrs HW=880.86' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=6.07 cfs @ 12.44 hrs HW=883.47' (Free Discharge) 2=Culvert (Inlet Controls 6.07 cfs @ 7.73 fps) 3=Orifice/Grate (Passes 6.07 cfs of 19.01 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge) 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	ription		
*	0.	.110	98				
*	0.	.030	69				
	0.	.140	92	Weighted Average			
	0.030 69		69	21.4	3% Pervio	us Area	
	0.110 98		98	78.57	7% Imperv	vious Area	
	Tc (min)	Length (feet	n SI	lope 'ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	3.0	13	3 0.0	200	0.07		Sheet Flow.
							Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	5 0.0	200	0.71		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0	170	0.97		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	6 0.0	195	2.83		Shallow Concentrated Flow,
_							Paved Kv= 20.3 fps
	~ ~	~ ~ ~	т.4	41			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 2.25 cfs @ 12.23 hrs, Volume= 0.161 af, Depth= 2.54"

Area (ac)		(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	ghted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imper∖	vious Area	
	Tc (min)	Lengt (feet	h S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	0.3	9:	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			

Summary for Subcatchment DOCK:

Runoff 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) (CN De	scription		
*	0.	060	98			
*	0.	010	69			
	0.	070	94 We	eighted Ave	rage	
	0.	010	69 14.	29% Pervic	us Area	
0.060 98 85.71% Impervious Area				71% Imper	vious Area	
	Tc (min)	Length (feet)	Slope (ft/ft	e Velocity) (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.0500	0.10		Sheet Flow,
	0.9	85	0.0400) 1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

	Area (ac)		CN	Desc	cription		
*	* 0.190 98						
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
0.570 90 Weighted Average				Weig	hted Aver	age	
0.150 69 26.32% Pervious Area				26.3	2% Pervio	us Area	
	0.420 98 73.68% Impervious Area				8% Imperv	vious Area	
	-		1	~		• ••	
	IC	Lengt	ņ	Slope	Velocity	Capacity	Description
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	14.5	11	50	.0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	10	0 0	.0150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Desc	cription		
*	0.000	98				
*	0.010	69				
	0.010	69	Weig	hted Aver	age	
	0.010	69	100.	00% Pervi	ous Area	
	Tc Len	ngth	Slope	Velocity	Capacity	Description
	(min) (fe	eet)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 1.16 cfs @ 12.40 hrs, Volume= 0.105 af, Depth= 1.41"

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 S LLC Page 24

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	Area (a	ac) C	N Dese	cription					
*	0.0	06 9	8						
*	0.8	84 6	9						
	0.8	90 6	9 Weig	ghted Aver	age				
	0.8	84 6	9 99.3	3% Pervio	us Area				
	0.0	06 9	8 0.67	% Impervi	ous Area				
	_		~		• •				
	IC	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	26.1	240	0.0300	0.15		Sheet Flow,			
						Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (a	ac)	CN	Desc	ription		
*	0.6	650	98				
*	0.0	080	69				
	0.7	730	95	Weig	hted Aver	age	
	0.0	0.080 69 10.96% Pervious Area				us Area	
	0.6).650 98 89.04% Impervious Area			4% Imperv	vious Area	
	Tc (min)	Lengt (feet	h : t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
1.0 12 0.2500 0.20 Sheet Flow,	
Grass: Dense n= 0.240 P2= 2.81" 0.5 36 0.0240 1.13 Sheet Flow, Smooth surfaces n= 0.011 P2= 2.8	31"
1.5 48 Total	
Summary for Subcatchment NW.LEX: Lex. Ave. Entrance	Drive
Runoff = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Depth= 3.74"	
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.0 MSE 24-hr 3 10-Year Rainfall=4.19"	00 hrs, dt= 0.05 hrs
Area (ac) CN Description	
0.010 69 50-75% Grass cover, Fair, HSG B 0.110 98 Paved parking HSG B	
0.120 96 Weighted Average	
0.010 69 8.33% Pervious Area	
0.110 98 91.67% Impervious Area	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
0.5 33 0.0215 1.06 Sheet Flow, Smooth surfaces n= 0.011 P2= 2.8	31"
0.6 27 0.0108 0.78 Sheet Flow, Smooth surfaces n= 0.011 P2= 2.8	31"
1.1 60 Total	
Summary for Subcatchment ROOF:	
•	
Runoff = 2.43 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 3.95"	
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.0 MSE 24-hr 3 10-Year Rainfall=4.19"	00 hrs, dt= 0.05 hrs
Area (ac) CN Description	
* 0.350 98 ROOF	
0.350 98 100.00% Impervious Area	

MSE 24-hr 3 10-Year Rainfall=4.19"

	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
_	1.0					Direct Entry

19114-overall ex asbuilt cr

Direct Entry,

Summary for Subcatchment S.DRIVE:

Runoff = 1.06 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) C	N Des	cription		
*	0.	130	98			
*	0.	070	69			
	0.	200	88 Weig	ghted Aver	age	
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Imperv	ious Area/	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 3.10"

Area (a	ac) C	N Des	cription		
0.04	40 6	69 50-7	5% Grass	cover, Fair	, HSG B
0.08	80 9	8 Wat	er Surface,	HSG B	
0.12	20 8	8 Weig	ghted Aver	age	
0.04	40 6	⁶⁹ 33.3	3% Pervio	us Area	
0.08	80 9	66.6	7% Imperv	vious Area	
Tc L	_ength	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 1.64 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
	0.	190	98	57.58	8% Imperv	vious Area	
	Tc (min)	Length (feet)	S	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.9	11	0.0	0150	0.06	(010)	Sheet Flow.
			•••				Grass: Dense n= 0.240 P2= 2.81"
	0.7	48	0.0	0225	1.17		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59) To	otal			

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

Area	(ac)	CN	Desc	ription		
0.	540	98	Pave	d parking,	HSG C	
0.	040	69	50-7	5% Grass	cover, Fair	r, HSG B
0.	580	96	Weig	hted Aver	age	
0.	0.040 69 6.90% Pervious Area					
0.	540	98	93.10)% Imperv	vious Area	
Tc	Leng	th S	Slope	Velocity	Capacity	Description
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)	
7.0						Direct Entry,

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

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	Area	(ac) C	N Des	cription			
*	0.	250 9	96 ROA	ADWAY			
	0.	070 (69 50-7	'5% Grass	cover, Fair	, HSG B	
	0.	320 9	90 Weig	ghted Aver	age		
	0.	320 9	90 100.	00% Pervi	ous Area		
	-		0		0		
	IC	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow,	
						Paved Kv= 20.3 fps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

_	Area	(ac)	CN	Desc	ription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.64	4% Pervio	us Area	
	0.	420	98	89.30	6% Imperv	vious Area	
	Tc (min)	Length (feet)	SI	lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.0)500	0.10		Sheet Flow,
	1.4	105	0.0)187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	To	tal			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weig	hted Aver	age	
	0.	580	72	24.8	, 9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
					•		
	Тс	Length	า 3	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	30.	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0.	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	6 0.	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	1 0.	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013

14.2 397 Total

Summary for Reach 2R: (new Reach)

Inflow Ar	rea =	8.360 ac, 6	4.55% Imperviou	s, Inflow Depth =	2.95	" for 10-`	Year event
Inflow	=	8.96 cfs @	12.43 hrs, Volur	ne= 2.054	l af		
Outflow	=	8.96 cfs @	12.43 hrs, Volur	ne= 2.054	laf, A	tten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	a =	2.330 ac, 7	75.11% Impe	ervious,	Inflow Depth =	3.37"	for 10-`	Year event
Inflow	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af		
Outflow	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af, At	ten= 0%,	Lag= 0.0 min
Primary	=	9.18 cfs @	12.22 hrs,	Volume	= 0.654	af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge) **1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac,	89.04% Impervi	ous, Inflow De	epth = 🔅	3.67" f	or 10-1	/ear event
Inflow	=	4.00 cfs @	12.14 hrs, Vo	lume=	0.223 a	af		
Outflow	=	4.00 cfs @	12.14 hrs, Vo	lume=	0.223 a	af, Atten	= 0%,	Lag= 0.0 min
Primary	=	4.00 cfs @	12.14 hrs, Vo	lume=	0.223 a	af		-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.87 cfs @ 12.14 hrs HW=885.34' (Free Discharge) **1=Culvert** (Barrel Controls 3.87 cfs @ 3.78 fps)

Summary for Pond 61: Stub-61

Inflow Area	=	0.580 ac, 9	3.10% Impe	ervious,	Inflow Depth	= 3.7	78" for ⁻	10-Year e	event
Inflow	=	3.26 cfs @	12.14 hrs,	Volume=	= 0.1	83 af			
Outflow	=	3.26 cfs @	12.14 hrs,	Volume=	= 0.1	83 af,	Atten= 0	%, Lag=	0.0 min
Primary	=	3.26 cfs @	12.14 hrs,	Volume=	= 0.1	83 af		-	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge) **1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108": (new Pond)

Inflow Are	a =	1.050 ac, 5	0.48% Impervious	, Inflow Depth =	2.69" for	10-Year event
Inflow	=	3.29 cfs @	12.23 hrs, Volum	e= 0.235 a	af	
Outflow	=	0.94 cfs @	12.58 hrs, Volum	e= 0.221 a	af, Atten= 7	'1%, Lag= 21.3 min
Primary	=	0.94 cfs @	12.58 hrs, Volum	e= 0.221 a	af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.46' @ 12.58 hrs Surf.Area= 0.021 ac Storage= 0.089 af

Plug-Flow detention time= 85.5 min calculated for 0.221 af (94% of inflow) Center-of-Mass det. time= 55.8 min (831.8 - 776.0)

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Volume	Inve	rt Avail.Storage	e Storage Description				
#1	881.4	5' 0.088 a	f 108.0" Round Pipe Storage Inside #2				
#2	881.00)' 0.052 a	f 14.00'W x 66.00'L x 10.25'H Prismatoid 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids				
		0.140 a	f Total Available Storage				
Device	Routing	Invert C	Dutlet Devices				
#1	Primary	882.45' 2 Ir n	4.0" Round Culvert L= 20.0' Ke= 0.500 hlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 = 0.013. Flow Area= 3.14 sf				
#2 #3	Device 1 Device 1	882.30' 4 890.79' 0 H 2 C 2	.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads .5' long x 6.0' breadth Broad-Crested Rectangular Weir lead (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 .50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 .65 2.66 2.67 2.69 2.72 2.76 2.83				
Primary 1=Cu 2= 3=	OutFlow Ivert (Pas Orifice/Gr Broad-Cre	Max=0.94 cfs @ 1 ses 0.94 cfs of 30 ate (Orifice Contro ested Rectangula	I2.58 hrs HW=887.45' (Free Discharge) .26 cfs potential flow) ols 0.94 cfs @ 10.75 fps) a r Weir (Controls 0.00 cfs)				
			Summary for Pond 110:				
Inflow Ai Inflow Outflow Primary	rea = = = =	1.460 ac, 85.62 6.81 cfs @ 12.0 6.81 cfs @ 12.0 6.81 cfs @ 12.0	% Impervious, Inflow Depth = 3.59" for 10-Year event 9 hrs, Volume= 0.436 af 9 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min 9 hrs, Volume= 0.436 af				
Routing Peak Ele	by Stor-Ind ev= 887.05	l method, Time Sp ' @ 12.09 hrs	oan= 0.00-72.00 hrs, dt= 0.05 hrs				
Device	Routing	Invert C	Dutlet Devices				
#1	Primary	885.11' 1 Ir n	5.0" Round Culvert L= 86.0' Ke= 0.500 hlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 = 0.013, Flow Area= 1.23 sf				
Primary [€] —1=Cu	OutFlow Ivert (Inlet	Max=6.56 cfs @ 1 Controls 6.56 cfs	12.09 hrs HW=886.97' (Free Discharge) a @ 5.35 fps)				
	Summary for Pond 120:						

Inflow Area	ı =	0.890 ac,	93.26% Impe	ervious,	Inflow Depth =	3.78	8" for 10-	Year event
Inflow	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af		
Outflow	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af, <i>1</i>	Atten= 0%,	Lag= 0.0 min
Primary	=	5.62 cfs @	12.08 hrs,	Volume	= 0.280) af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 887.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices			
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf			
Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge) -1=Culvert (Barrel Controls 5.16 cfs @ 4.21 fps)						

Summary for Pond 130:

Inflow A	rea =	0.420 ac, 97.62% Impervious, Inflov	w Depth = 3.89" for 10-Year event	
Inflow	=	2.81 cfs @ 12.06 hrs, Volume=	0.136 af	
Outflow	=	2.81 cfs @ 12.06 hrs, Volume=	0.136 af, Atten= 0%, Lag= 0.0 m	in
Primary	=	2.81 cfs @ 12.06 hrs, Volume=	0.136 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge) **1=Culvert** (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Are	ea =	0.070 ac, 85.71% Impervious,	Inflow Depth = 3.5	9" for 10-Year event
Inflow	=	0.44 cfs @ 12.09 hrs, Volume	e= 0.021 af	
Outflow	=	0.44 cfs @ 12.09 hrs, Volume	e= 0.021 af,	Atten= 0%, Lag= 0.0 min
Primary	=	0.44 cfs @ 12.09 hrs, Volume	e= 0.021 af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge) **1=Culvert** (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

 Inflow Area =
 0.080 ac, 62.50% Impervious, Inflow Depth = 2.99" for 10-Year event

 Inflow =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af

 Outflow =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af, Atten= 0%, Lag= 0.0 min

 Primary =
 0.43 cfs @ 12.07 hrs, Volume=
 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge) **1=Culvert** (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Area	=	0.120 ac, 9	1.67% Impe	ervious,	Inflow Depth	= 3.7	'4" for 10-	Year event
Inflow	=	0.79 cfs @	12.06 hrs,	Volume	= 0.0	37 af		
Outflow	=	0.79 cfs @	12.06 hrs,	Volume	= 0.0	37 af,	Atten= 0%,	Lag= 0.0 min
Primary	=	0.79 cfs @	12.06 hrs,	Volume	= 0.0	37 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.69' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge) **1=Culvert** (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond SYS: (new Pond)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	18.50'W x 316.00'L x 6.00'H Field A
			0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	18.50'W x 196.00'L x 6.00'H Field B
			0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	4.00'D x 2.00'H CBMH-30
#6	886.25'	0.001 af	4.00'D x 2.29'H CBMH-31
#7	886.25'	0.001 af	4.00'D x 2.82'H CBMH-40
#8	886.25'	0.001 af	4.00'D x 3.18'H CBMH-41
#9	886.25'	0.001 af	4.00'D x 4.50'H CBMH-50
#10	886.25'	0.001 af	4.00'D x 4.70'H CBMH-51
#11	886.25'	0.001 af	4.00'D x 4.80'H CBMH-52
#12	886.25'	0.001 af	4.00'D x 4.95'H CBMH-60
#13	886.25'	0.001 af	4.00'D x 4.75'H CBMH-70
#14	886.25'	0.002 af	4.00'D x 5.26'H CBMH-80
#15	886.25'	0.001 af	4.00'D x 4.70'H CBMH-90
#16	886.25'	0.001 af	4.00'D x 4.92'H CBMH-100

0.811 af Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	0.250 in/hr Exfiltration over Surface area
#2	Primary	880.39'	24.0" Round Culvert L= 50.0' Ke= 0.500
	-		Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#5	Device 2	886.05'	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
			3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs) -3=Orifice/Grate (Controls 0.00 cfs) -4=Orifice/Grate (Controls 0.00 cfs)

-5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area :	=	7.460 ac, 7	2.25% Impervi	ious, Inflow l	Depth =	3.31"	for 10-Y	ear event
Inflow =	=	26.77 cfs @	12.11 hrs, Vo	olume=	2.058	af		
Outflow =	=	7.89 cfs @	12.49 hrs, Vo	olume=	2.058	af, Atte	n= 71%,	Lag= 22.7 min
Discarded =	=	0.05 cfs @	4.85 hrs, Vo	olume=	0.110	af		•
Primary =	=	7.83 cfs @	12.49 hrs, Vo	olume=	1.948	af		
Secondary =	=	0.00 cfs @	0.00 hrs, Vo	olume=	0.000	af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.21' @ 12.49 hrs Surf.Area= 9,472 sf Storage= 27,094 cf

Plug-Flow detention time= 46.5 min calculated for 2.058 af (100% of inflow) Center-of-Mass det. time= 45.8 min (812.0 - 766.2)

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Volume	Invert	Avail.Storage	Storage Description		
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A		
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids		
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1		
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf		
			Overall Size= 60.0"W x 60.0"H x 20.00'L		
			30 Chambers in 2 Rows		
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside		
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B		
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids		
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3		
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf		
			Overall Size= 60.0"W x 60.0"H x 20.00'L		
			Row Length Adjustment= +10.00' x 19.63 st x 2 rows		
		05.6	12.50° Header x 19.63 st x 1 = 245.4 ct Inside		
#5	886.25	25 cf	4.00 ^o D x 2.00 ^o H CBMH-30		
#6	886.25	29 cf	4.00 ^o D x 2.29 ^o H CBMH-31		
#1	886.25	35 CT	4.00'D x 2.82'H CBMH-40		
#8 #0	886.25	40 Cf	4.00'D X 3.18'H CBMH-41		
#9 #10	000.20 006.25	57 Cl 50 of			
#10 #11	000.20	59 Cl			
#11 #10	000.20	60 Cl			
#12 #12	000.20 996.25'	62 CI			
#13	000.20 996 25'	00 CI 66 cf			
#14 #15	000.20 996 25'	00 Cl 50 cf			
#15	886 25'	59 Cl			
#10 #17	888 33'	8 117 cf	Low Road ch (Prismatic) listed helow (Recalc)		
$\pi \Pi$	000.00	0,117.01			

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevatio (fee	n Si t)	urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.3	3	15	0	0				
888.5	0	345	31	31				
889.0	0	3,000	836	867				
889.5	60	7,000	2,500	3,367				
890.0	0	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	Discarded	880.75'	0.250 in/hr Exfi	Itration over	Surface	area		
#2	#2 Primary 880.		12.0" Round C	ulvert L= 50.	0' Ke=	0.500		
	-		Inlet / Outlet Inve	ert= 880.39' / 8	879.47'	S= 0.0184	4 '/'	Cc= 0.900
			n= 0.013, Flow	Area= 0.79 sf				
#3	Device 2	880.89' 24.0" Vert. Orifice/Grate C= 0.600						
			Limited to weir fl	ow at low hea	ds			
#4	Secondary	888.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir					
			Head (feet) 0.20	0.40 0.60 0	0.80 1.0	0 1.20 1.	40 1	.60
			Coef. (English)	2.49 2.56 2.7	70 2.69	2.68 2.69) 2.6	7 2.64

Discarded OutFlow Max=0.05 cfs @ 4.85 hrs HW=880.86' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=7.83 cfs @ 12.49 hrs HW=885.21' (Free Discharge) 2=Culvert (Barrel Controls 7.83 cfs @ 9.97 fps) 3=Orifice/Grate (Passes 7.83 cfs of 27.56 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge) 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
	0.	140	92 Wei	ghted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	57% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	20	0.0	Tatal			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 4.76 cfs @ 12.23 hrs, Volume= 0.335 af, Depth= 5.29"

	Area	(ac)	CN	Desc	cription		
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	ghted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imperv	vious Area	
	Tc (min)	Lengt (feet	h S	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.9	15	6 0.	0615	0.19		Sheet Flow, Grass: Dense, n= 0.240, P2= 2.81"
	0.3	9:	3 0.	1150	5.09		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fps
	0.6	17:	2 0.	0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	14.8	42	1 To	otal			
Summary for Subcatchment DOCK:

Runoff 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.060 98 85.71% Impervious Area				1% Imperv	vious Area	
	та	l e se est le	0		Valacity	Consolt	Description
	IC (maine)	Lengin	5	ope		Capacity	Description
_	(min)	(leet)	(<u>II/II)</u>	(It/sec)	(CIS)	
	2.1	13	0.0	500	0.10		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	85	0.0	400	1.65		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	Tot	al			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

	Area	(ac)	CN	Desc	cription		
*	0.	190	98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

4.01 cfs @ 12.23 hrs, Volume= Runoff = 0.297 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90	Weig	hted Aver	age	
	0.	150	69	26.3	2% Pervio	us Area	
	0.	420	98	73.6	8% Imperv	vious Area	
	Тс	Lengtl	٦	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.5	11:	50	.0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	100	0 (.0150	2.49		Shallow Concentrated Flow,
_							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Desc	ription		
*	0.000	98				
*	0.010	69				
	0.010	69	Weig	hted Aver	age	
	0.010	69	100.0	00% Pervi	ous Area	
	Tc Leng	gth S	Slope	Velocity	Capacity	Description
	(min) (fe	et)	(ft/ft)	(ft/sec)	(cfs)	
	7.0					Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 3.29 cfs @ 12.38 hrs, Volume= 0.284 af, Depth= 3.83"

MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 ns LLC Page 41

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_	Area (a	ac) C	N Dese	cription					
*	0.0	06 9	8						
*	0.8	84 6	9						
	0.8	90 6	9 Weig	ghted Aver	age				
	0.8	84 6	9 99.3	3% Pervio	us Area				
	0.0	06 9	8 0.67	% Impervi	ous Area				
	Tc I (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	26.1	240	0.0300	0.15		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac	c) CN	Desc	cription		
*	0.65	0 98				
*	0.08	0 69				
	0.730 95 Weighted Average					
	0.08	0 69	10.9	6% Pervio	us Area	
	0.650 98		89.0	4% Imperv	vious Area	
	Tc Le (min)	ength (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0					Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Tc (min)	Length (feet	n Slope) (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
1.0	12	2 0.2500	0.20	, <i>i</i>	Sheet Flow,					
0.5	36	6 0.0240	1.13		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"					
1.5	48	3 Total								
	c		for Sub	ootohmou	at NIM LEXIL av Ava Entrance Drive					
	Summary for Subcatchment NW.LEA. Lex. Ave. Entrance Drive									
Runoff	=	1.43 cf	s@ 12.0	6 hrs, Volu	me= 0.068 af, Depth= 6.84"					
Runoff b MSE 24-	y SCS 1 hr 3 10	ſR-20 metł 0-Year Ra	nod, UH=S infall=7.36	SCS, Split P	ervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs					
Area	(ac)	CN Des	cription							
0.	010	69 50-7	5% Grass	cover, Fair	, HSG B					
0.	110	98 Pave	ed parking	, HSG B						
0.	120	96 Wei	ghted Aver	age						
0.	110	09 0.00 98 91 6	7% Imperviou	/ious Area						
0.		00 01.0	r /o import							
Tc (min)	Length (feet	n Slope) (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
0.5	33	0.0215	1.06		Sheet Flow,					
					Smooth surfaces n= 0.011 P2= 2.81"					
0.6	27	0.0108	0.78		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.91"					
1.1	60) Total								
			Sum	mary for	Subcatchment ROOF:					
Runoff	=	4.29 cf	s@ 12.0	6 hrs, Volu	me= 0.208 af, Depth= 7.12"					
Runoff b MSE 24-	Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs VSE 24-hr 3 100-Year Rainfall=7.36"									
Area	(aa)		orintion							

MSE 24-hr 3 100-Year Rainfall=7.36"

	1.0						Direct Entry,
	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)	- -
	Тс	Leng	th	Slope	Velocity	Capacity	Description
	0.	350	98	100.	00% Impe	rvious Area	3
*	0.	.350	98	ROC)F		
_	Area	(ac)	CN	Desc	cription		

Summary for Subcatchment S.DRIVE:

Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) C	N Des	cription		
*	0.	130	98			
*	0.	070	69			
	0.	200	88 Weig	ghted Aver	age	
	0.	070	69 35.0	0% Pervio	uš Area	
	0.	130	98 65.0	0% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.8	19	0.0520	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 6.02"

Area (a	ac) C	N Des	cription		
0.0	40 6	69 50-7	5% Grass	cover, Fair	, HSG B
0.0	80 9	8 Wat	er Surface	, HSG B	
0.1	20 E	8 Weig	ghted Aver	age	
0.0	40 6	⁶⁹ 33.3	3% Pervio	us Area	
0.0	80 9	66.6	7% Imperv	vious Area	
Tc I	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 3.28 cfs @ 12.10 hrs, Volume= 0.157 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.330 86 Weighted Average			hted Aver	age		
	0.	140	69	42.42	2% Pervio	us Area	
	0.190 98 57.58% Impervious Area			3% Imperv	vious Area		
	_		_				
	Tc	Length	S	lope	Velocity	Capacity	Description
_	(min)	(feet)		<u>(ft/ft)</u>	(ft/sec)	(cfs)	
	2.9	11	0.0	0150	0.06		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	48	0.0	0225	1.17		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59	To	otal			

Summary for Subcatchment TCF:

Runoff = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

Area	(ac)	CN	Desc	ription					
0.	540	98	Pave	aved parking, HSG C					
0.	040	69	50-7	0-75% Grass cover, Fair, HSG B					
0.	580	96	Weig	hted Aver	age				
0.	040	69	6.90	% Perviou	s Area				
0.	540	98	93.10)% Imperv	vious Area				
Tc	Leng	th S	Slope	Velocity	Capacity	Description			
(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)				
7.0						Direct Entry,			

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18"

MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 ns LLC Page 45

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	Area	(ac) C	N Des	cription			
*	0.	250 9	96 ROA	ADWAY			
	0.	070 (69 50-7	'5% Grass	cover, Fair	, HSG B	
	0.	320 9	90 Weig	ghted Aver	age		
	0.	320 9	90 100.	00% Pervi	ous Area		
	-		0		0		
	IC	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.3	15	0.0500	0.11		Sheet Flow,	
						Grass: Dense n= 0.240 P2= 2.81"	
	1.3	130	0.0307	1.61		Sheet Flow,	
						Smooth surfaces n= 0.011 P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow,	
						Paved Kv= 20.3 fps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area ((ac) (CN De	scription		
*	0.4	420	98			
*	0.0	050	69			
	0.4	470	95 We	eighted Avei	age	
	0.0	050	69 10	.64% Pervio	us Area	
	0.4	420	98 89	.36% Imperv	∕ious Area	
(n	Tc nin)	Length (feet)	Slop (ft/fl	e Velocity) (ft/sec)	Capacity (cfs)	Description
	2.1	13	0.050	0.10		Sheet Flow,
	1.4	105	0.018	7 1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 ns LLC Page 46

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weid	hted Aver	age	
	0.	580	72	24.8	, 9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
					•		
	Тс	Lengt	h .	Slope	Velocity	Capacity	Description
	(min)	(feet	t)	(ft/ft)	(ft/sec)	(cfs)	·
	13.0	5	80	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	15	90	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	12	60	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	4 0	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013

14.2 397 Total

Summary for Reach 2R: (new Reach)

Inflow /	Area =	:	8.360 ac, 6	64.55% Imp	ervious,	Inflow Depth =	5.8	37" for 100)-Year event
Inflow	=		40.22 cfs @	12.23 hrs,	Volume	= 4.090	af		
Outflov	v =		40.22 cfs @	12.23 hrs,	Volume	= 4.090	af,	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	ea =	2.330 ac, 7	5.11% Impervious,	Inflow Depth =	6.38" for	⁻ 100-Year event
Inflow	=	17.27 cfs @	12.22 hrs, Volume	= 1.238	af	
Outflow	=	17.27 cfs @	12.22 hrs, Volume	= 1.238	af, Atten=	0%, Lag= 0.0 min
Primary	=	17.27 cfs @	12.22 hrs, Volume	= 1.238	af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge) ☐ 1=Culvert (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Inflow Area	=	0.730 ac, 8	39.04% Impe	ervious,	Inflow Depth	= 6.7	6" for 10	00-Year event
Inflow	=	7.25 cfs @	12.14 hrs,	Volume	= 0.4	11 af		
Outflow	=	7.25 cfs @	12.14 hrs,	Volume	= 0.4	11 af, .	Atten= 0%	, Lag= 0.0 min
Primary	=	7.25 cfs @	12.14 hrs,	Volume	= 0.4	11 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 886.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.02 cfs @ 12.14 hrs HW=886.13' (Free Discharge) **1=Culvert** (Barrel Controls 7.02 cfs @ 5.72 fps)

Summary for Pond 61: Stub-61

Inflow Area	=	0.580 ac, 9	93.10% Impe	ervious,	Inflow Depth	= 6.8	39" for 1	00-Year eve	ent
Inflow	=	5.85 cfs @	12.14 hrs,	Volume	= 0.3	33 af			
Outflow	=	5.85 cfs @	12.14 hrs,	Volume	= 0.3	33 af,	Atten= 0%	6, Lag= 0.0	min
Primary	=	5.85 cfs @	12.14 hrs,	Volume	= 0.3	33 af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge) **1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108": (new Pond)

Inflow Area	a =	1.050 ac,	50.48% Impe	ervious,	Inflow Depth :	= 5.4	8" for 10	0-Year event
Inflow	=	6.79 cfs @	12.23 hrs,	Volume	= 0.48	0 af		
Outflow	=	6.90 cfs @	12.31 hrs,	Volume	= 0.46	6 af,	Atten= 0%	, Lag= 4.9 min
Primary	=	6.90 cfs @	12.31 hrs,	Volume	= 0.46	6 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 893.46' @ 12.31 hrs Surf.Area= 0.021 ac Storage= 0.140 af

Plug-Flow detention time= 67.9 min calculated for 0.465 af (97% of inflow) Center-of-Mass det. time= 51.7 min (822.7 - 770.9)

MSE 24-hr 3 100-Year Rainfall=7.36"

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Volume	Invert	Avail.Stora	ge Storage Description
#1	881.45'	0.088	af 108.0" Round Pipe Storage Inside #2
#2	881 00'	0.052	L= 60.0' S= 0.0123 '/' of 14.00'W x 66.00'L x 10.25'H Brismatoid
#2	001.00	0.052	0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140	af Total Available Storage
Dovice	Douting	Invert	Outlet Devices
Device #1	Primary	882 45'	24.0" Round Culvert 1 = 20.0' Ke= 0.500
πı	i iiiiai y	002.40	Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device I	690.79	Head (feet) 0 20 0 40 0 60 0 80 1 00 1 20 1 40 1 60 1 80 2 00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
Primary	OutFlow M	lax=6.31 cfs @) 12.31 hrs HW=893.19' (Free Discharge)
1 =Cu	lvert (Passe	es 6.31 cfs of 4	17.21 cfs potential flow)
<u>-2</u> =	Orifice/Gra	te (Orifice Con	itrols 1.38 cfs @ 15.77 fps) Itar Woir (Weir Controls 4.94 cfs @ 4.12 fps)
-3-	DIUdu-Cies	steu Rectangu	
			Summary for Pond 110:
Inflow A	rea =	1.460 ac. 85.6	2% Impervious, Inflow Depth = 6.64" for 100-Year event
Inflow	= 12	2.36 cfs @ 12	.09 hrs, Volume= 0.808 af
Outflow	= 12	2.36 cfs @ 12	.09 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min
Primary	= 12	2.36 CTS @ 12	.09 hrs, volume= 0.808 at
Routing	by Stor-Ind ı	method, Time	Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Ele	ev= 890.74' (@ 12.09 hrs	
Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500
	,, ,		Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf
Primary	OutFlow M Ivert (Barre	lax=11.93 cfs (I Controls 11.9	@ 12.09 hrs HW=890.40' (Free Discharge) /3 cfs @ 9.72 fps)
			Summary for Pond 120:
Inflow A	· · · · ·	0.800 ac 03.3	16% Impervious Inflow Depth = 6.90" for 100 Year overt
IIIIOW AI	ca -	0.030 ac, 33.2	

Inflow Area	1 =	0.890 ac, 9	3.26% Imp	ervious,	Inflow	Depth =	6.90"	tor 10	0-Year ev	ent
Inflow	=	10.09 cfs @	12.08 hrs,	Volume	=	0.512	af			
Outflow	=	10.09 cfs @	12.08 hrs,	Volume	=	0.512	af, Att	en= 0%,	Lag= 0.0) min
Primary	=	10.09 cfs @	12.08 hrs,	Volume	=	0.512	af			

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
Primary [€] —1=Cu	r OutFlow M Ilvert (Barrel	ax=9.51 cfs @ Controls 9.51) 12.08 hrs HW=890.63' (Free Discharge) l cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Ar	ea =	0.420 ac, 97.62% Impervious, Inflow	Depth = 7.04"	for 100-Year event
Inflow	=	4.99 cfs @ 12.06 hrs, Volume=	0.246 af	
Outflow	=	4.99 cfs @ 12.06 hrs, Volume=	0.246 af, Atte	en= 0%, Lag= 0.0 min
Primary	=	4.99 cfs @ 12.06 hrs, Volume=	0.246 af	-

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge) **1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area	a =	0.070 ac, 8	35.71% Imp	ervious,	Inflow Depth =	6.65	" for 100	-Year event
Inflow	=	0.80 cfs @	12.09 hrs,	Volume	= 0.039) af		
Outflow	=	0.80 cfs @	12.09 hrs,	Volume	= 0.039) af, A	tten= 0%,	Lag= 0.0 min
Primary	=	0.80 cfs @	12.09 hrs,	Volume	= 0.039) af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area	=	0.080 ac, 6	2.50% Impervious	Inflow Depth =	5.88" fo	or 100-Year event
Inflow	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af	
Outflow	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af, Atten=	= 0%, Lag= 0.0 min
Primary	=	0.85 cfs @	12.07 hrs, Volum	e= 0.039	af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Area	a =	0.120 ac, 9	1.67% Impe	ervious,	Inflow Depth =	6.8	84" for 10	0-Year event
Inflow	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af		
Outflow	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af,	Atten= 0%,	Lag= 0.0 min
Primary	=	1.43 cfs @	12.06 hrs,	Volume	= 0.06	8 af		

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.90' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge) **1=Culvert** (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond SYS: (new Pond)

 MSE 24-hr 3
 100-Year Rainfall=7.36"

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	18.50'W x 316.00'L x 6.00'H Field A
			0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	18.50'W x 196.00'L x 6.00'H Field B
			0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	4.00'D x 2.00'H CBMH-30
#6	886.25'	0.001 af	4.00'D x 2.29'H CBMH-31
#7	886.25'	0.001 af	4.00'D x 2.82'H CBMH-40
#8	886.25'	0.001 af	4.00'D x 3.18'H CBMH-41
#9	886.25'	0.001 af	4.00'D x 4.50'H CBMH-50
#10	886.25'	0.001 af	4.00'D x 4.70'H CBMH-51
#11	886.25'	0.001 af	4.00'D x 4.80'H CBMH-52
#12	886.25'	0.001 af	4.00'D x 4.95'H CBMH-60
#13	886.25'	0.001 af	4.00'D x 4.75'H CBMH-70
#14	886.25'	0.002 af	4.00'D x 5.26'H CBMH-80
#15	886.25'	0.001 af	4.00'D x 4.70'H CBMH-90
#16	886.25'	0.001 af	4.00'D x 4.92'H CBMH-100

0.811 af Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	0.250 in/hr Exfiltration over Surface area
#2	Primary	880.39'	24.0" Round Culvert L= 50.0' Ke= 0.500
	-		Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#5	Device 2	886.05'	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
			3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs) -3=Orifice/Grate (Controls 0.00 cfs) -4=Orifice/Grate (Controls 0.00 cfs)

-5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Inflow	Depth = 6.31" for 100-Year event
Inflow =	49.69 cfs @ 12.11 hrs, Volume=	3.921 af
Outflow =	40.35 cfs @_ 12.22 hrs, Volume=	3.921 af, Atten= 19%, Lag= 6.6 min
Discarded =	0.10 cfs @_ 12.22 hrs, Volume=	0.118 af
Primary =	10.81 cfs @_ 12.20 hrs, Volume=	3.215 af
Secondary =	29.39 cfs @_ 12.22 hrs, Volume=	0.588 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 889.50' @ 12.20 hrs Surf.Area= 16,669 sf Storage= 38,576 cf

Plug-Flow detention time= 40.0 min calculated for 3.921 af (100% of inflow) Center-of-Mass det. time= 39.3 min (799.7 - 760.4)

 MSE 24-hr 3
 100-Year Rainfall=7.36"

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 st x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= $\pm 10.00^{\circ} \times 19.63^{\circ}$ st x 2 rows
ur-		05.5	12.50° Header x 19.63 sf x 1 = 245.4 cf Inside
#5 #0	886.25	25 CT	4.00'D X 2.00'H CBMH-30
#0 #7	886.25	29 Cf	4.00'D X 2.29'H CBMH-31
#1 #0	880.25	30 Cl	
#0 #0	000.20 996.25'	40 Cl 57 of	
#9 #10	000.20 996.25'	57 Cl	
#10 #11	886.25'	59 Cl	
#11 #12	886.25'	62 cf	
#12 #13	886 25'	60 cf	$4.00 D \times 4.35 H CBMH-70$
#13 #14	886 25'	66 cf	4.00 D x 4.75 H CBMH-80
#15	886 25'	59 cf	4 00'D x 4 70'H CBMH-90
#16	886.25	62 cf	4.00'D x 4.92'H CBMH-100
#17	888.33'	8,117 cf	Low Road cb (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation S		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.3	3	15	0	0				
888.5	50	345	31	31				
889.0	0	3,000	836	867				
889.5	0	7,000	2,500	3,367				
890.0	0	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	Discarded	880.75'	0.250 in/hr Exfil	tration over S	Surface	area		
#2	Primary	880.39'	12.0" Round C	ulvert L= 50.0)' Ke=	0.500		
			Inlet / Outlet Inve	ert= 880.39' / 8	879.47'	S= 0.018	4 '/'	Cc= 0.900
			n= 0.013, Flow	Area= 0.79 sf				
#3	Device 2	880.89'	24.0" Vert. Orifi	ce/Grate C=	0.600			
			Limited to weir fl	ow at low head	ds			
#4 Secondary		888.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir					
			Head (feet) 0.20	0.40 0.60 0	.80 1.0	00 1.20 1	.40 ´	1.60
			Coef. (English)	2.49 2.56 2.7	0 2.69	2.68 2.69	9 2.6	67 2.64

Discarded OutFlow Max=0.10 cfs @ 12.22 hrs HW=889.50' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.81 cfs @ 12.20 hrs HW=889.50' (Free Discharge) 2=Culvert (Barrel Controls 10.81 cfs @ 13.77 fps) 3=Orifice/Grate (Passes 10.81 cfs of 41.74 cfs potential flow)

Secondary OutFlow Max=26.83 cfs @ 12.22 hrs HW=889.50' (Free Discharge) 4=Broad-Crested Rectangular Weir (Weir Controls 26.83 cfs @ 2.68 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN Des	scription		
*	0.	110	98			
*	0.	030	69			
	0.	140	92 We	ighted Aver	age	
	0.	030	69 21.4	43% Pervio	us Area	
	0.	110	98 78.	57% Imperv	ious Area	
	Ŧ	1	0	\/.l	0	Description
	IC	Lengtr	Slope	Velocity	Capacity	Description
_	(min)	(teet) (ft/ft)	(ft/sec)	(cts)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	0.0	0.0	T.4.1			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 3.58 cfs @ 12.23 hrs, Volume= 0.253 af, Depth= 3.99"

Area (ac) C		CN	Desc	cription			
*	0.	340	98				
*	0.	420	69				
	0.	760	82	Weig	ghted Aver	age	
	0.	420	69	55.2	6% Pervio	us Area	
	0.	340	98	44.7	4% Imper	∕ious Area	
	Tc (min)	Lengtl (feet	h (:)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	13.9	15	6 0.	.0615	0.19		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.3	93	3 0	.1150	5.09		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.6	17:	2 0	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.8	42	1 T	otal			

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	cription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.060 98 85.71% Impervious Area				1% Imperv	vious Area	
	Tc (min)	Length (feet	ו :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	30	.0500	0.10		Sheet Flow,
	0.9	85	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

Area (ac) CN		CN	Desc	cription			
*	* 0.190 98		98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.48	8% Pervio	us Area	
	0.	190	98	65.52	2% Imperv	vious Area	
	Tc (min)	Length (feet)	n S)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
	0.0	407		0040	0.04		Grass: Dense n= 0.240 P2= 2.81"
	0.9 1		0.	0.0310	2.64		Shallow Concentrated Flow, Grassed Waterway, Ky= 15.0 fpc
0.4 1		166	6 0.	0200	6.42	5.04	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
_	14.1	453	B To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90	Weig	ghted Aver	age	
	0.150 69 26.32%			2% Pervio	us Area		
	0.420 98 73.68% Impervious Area			8% Imperv	vious Area		
	Тс	Length	1 3	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.5 115		0.	0.0300 0.13			Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	100	0.	.0150	2.49		Shallow Concentrated Flow,
_							Paved Kv= 20.3 fps

15.2 215 Total

Summary for Subcatchment E.HOU:

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

_	Area (a	ic) Cl	Dese	cription		
*	0.00	00 98	3			
*	0.01	10 69)			
	0.01	10 69) Weig	ghted Aver	age	
	0.01	0.010 69 100.00% Pervious Are				
	Tc L (min)	_ength (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0	(((12,000)	(010)	Direct Entry,

Summary for Subcatchment EXSO:

Runoff = 2.26 cfs @ 12.39 hrs, Volume= 0.197 af, Depth= 2.66"

	Area (ac)	CN	Desc	cription					
*	0.006	98							
*	0.884	69							
	0.890	69	Weig	phted Aver	age				
	0.884 69 99.33% Pervious Area								
	0.006	98	0.67% Impervi		ous Area				
				D					
	IC Len	gth	Slope	Velocity	Capacity	Description			
_	(min) (fe	eet)	(ft/ft)	(ft/sec)	(cfs)				
	26.1 2	240 C	0.0300	0.15		Sheet Flow,			
						Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment HOU:

Runoff = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area ((ac)	CN	Desc	cription		
*	0.0	650	98				
*	0.0	080	69				
	0.	730	95	Weig	hted Aver	age	
	0.0	080	69	10.9	6% Pervio	us Area	
	0.0	650	98	89.04	4% Imperv	vious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

19114-0	overall	ex asbu	uilt cr		MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"
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Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•
1.0	12	0.2500	0.20		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			
	-				
	Sı	immary	for Sub	catchme	nt NW.LEX: Lex. Ave. Entrance Drive
Runoff	=	1.13 cf	s@ 12.0	6 hrs, Volu	ıme= 0.054 af, Depth= 5.41"
			C		
Runoff b	y SCS TH	R-20 metl	hod, UH=S	SCS, Split F	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-	hr 3 100	-Year St.	Paul Rain	fall=5.90"	
Area	(ac) C	N Des	cription		
0.	.010 6	69 50-7	'5% Grass	cover, Fair	, HSG B
0.	.110 9	98 Pave	ed parking	, HSG B	
0.	120 9	96 Weig	ghted Ave	rage	
0.	.010 6	69 8.33	% Perviou	s Area	
0.	.110 9	98 91.6	7% Imper	vious Area	
Т	1	01	Mala alter	0	Description
IC (min)	(feet)				Description
	(1661)	0.0215		(015)	Shoot Flow
0.5	33	0.0215	1.00		Smooth surfaces $n = 0.011$ P2= 2.81"
0.6	27	0.0108	0.78		Sheet Flow.
0.0		0.0100	0.1.0		Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			
			Sum	mary for	Subcatchment ROOF:
Runoff	=	3.44 cf	s@ 12.0	6 hrs, Volu	ume= 0.165 af, Depth= 5.66"
Runoff b MSE 24-	y SCS TF hr 3 100	R-20 metl -Year St.	hod, UH=S Paul Rain	SCS, Split F fall=5.90"	Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area	(ac) C	N Des	cription		
* 0.	.350 9	98 ROC) DF		
0.	.350 9	98 100.	.00% Impe	rvious Area	

Tc Length hin) (feet) Slope Velocity Capacity (ft/ft) (ft/sec) (cfs) Description (min) 1.0

Direct Entry,

Summary for Subcatchment S.DRIVE:

Runoff = 1.59 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac) (CN Des	cription		
*	0.	130	98			
*	0.	070	69			
	0. 0. 0.	200 070 130	88 Wei 69 35.0 98 65.0	ghted Aver 00% Pervio 00% Imperv	age us Area /ious Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.8	19	0.0520	0.12		Sheet Flow,
	0.2	7	0.0200	0.76		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Shooth surfaces $n = 0.011 P2 = 2.81$ Smooth surfaces $n = 0.011 P2 = 2.81$ "
_	0.1	18	0.0295	3.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 4.65"

Area ((ac) (N Des	cription		
0.0	040	69 50-	75% Grass	cover, Fair	; HSG B
0.0	080	98 Wa	ter Surface	, HSG B	
0.1	120	88 We	ghted Aver	age	
0.0	040	69 33.3	33% Pervio	us Area	
0.0	080	98 66.	67% Imperv	vious Area	
-		0		0 "	
IC	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 2.51 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	ription		
*	0.	190	98				
*	0.	140	69				
	0.	330	86	Weig	hted Aver	age	
	0.	140	69	42.42	2% Pervio	us Area	
	0.	190	98	57.58	3% Imperv	vious Area	
	Tc	Length	า 3	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	2.9	11	10.	0150	0.06		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	48	30.	0225	1.17		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.6	59	9 To	otal			

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (a	ac)	CN	Desc	ription		
0.5	540	98	Pave	d parking,	HSG C	
0.0)40	69	50-7	5% Grass	cover, Fair	r, HSG B
0.5	580	96	Weig	hted Aver	age	
0.0)40	69	6.90	% Perviou	s Area	
0.5	540	98	93.10	0% Imperv	vious Area	
Тс	Lengtl	h S	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet	t)	(ft/ft)	(ft/sec)	(cfs)	
7.0						Direct Entry,

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

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	Area	(ac) C	CN Des	cription			
*	0.1	250	96 ROA	ADWAY			_
_	0.	070	69 50-7	'5% Grass	cover, Fair,	, HSG B	
	0.	320	90 Weig	ghted Aver	age		
	0.	320	90 100.	00% Pervi	ous Area		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	2.3	15	0.0500	0.11		Sheet Flow,	-
	1.3	130	0.0307	1.61		Grass: Dense $n= 0.240$ P2= 2.81" Sheet Flow, Smooth surfaces $n= 0.011$ P2= 2.81"	
	0.4	50	0.0125	2.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps	
	4.0	195	Total				

Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN De	escription		
*	0.	420	98			
*	0.	050	69			
	0.	470	95 W	eighted Ave	rage	
	0.	050	69 10	.64% Pervio	ous Area	
	0.	420	98 89	.36% Imper	vious Area	
	Тс	Length	Slop	e Velocity	Capacity	Description
_	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
	2.1	13	0.050	0 0.10		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	1.4	105	0.018	7 1.27		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	Total			
				-	-	

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

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	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weig	phted Aver	age	
	0.	580	72	24.8	9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	ious Area	
					-		
	Тс	Length	า :	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	3 0	.0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	6 0	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	1 0	.0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
_							n= 0.013

14.2 397 Total

Summary for Reach 2R: (new Reach)

Inflow .	Area =	8.360 ac, 64.55% Impervious, Inflow	Depth = 4.50" for 100-Year St. Pau	l event
Inflow	=	26.79 cfs @ 12.31 hrs, Volume=	3.138 af	
Outflov	v =	26.79 cfs @ 12.31 hrs, Volume=	3.138 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	ea =	2.330 ac, 75.11% Impervious, Inflow	v Depth = 4.98" for 100-Year St. Paul even	t
Inflow	=	13.52 cfs @ 12.22 hrs, Volume=	0.966 af	
Outflow	=	13.52 cfs @_ 12.22 hrs, Volume=	0.966 af, Atten= 0%, Lag= 0.0 min	
Primary	=	13.52 cfs @ 12.22 hrs, Volume=	0.966 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge) **1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

 Inflow Area =
 0.730 ac, 89.04% Impervious, Inflow Depth =
 5.33" for 100-Year St. Paul event

 Inflow =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af

 Outflow =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af, Atten= 0%, Lag= 0.0 min

 Primary =
 5.75 cfs @
 12.14 hrs, Volume=
 0.324 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 885.85' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.56 cfs @ 12.14 hrs HW=885.80' (Free Discharge) ←1=Culvert (Barrel Controls 5.56 cfs @ 4.53 fps)

Summary for Pond 61: Stub-61

Inflow A	vrea =	0.580 ac, 93.10% Impervious, Inflow I	Depth = 5.45" for 100-Year St. Paul event
Inflow	=	4.65 cfs @ 12.14 hrs, Volume=	0.264 af
Outflow	- =	4.65 cfs @ 12.14 hrs, Volume=	0.264 af, Atten= 0%, Lag= 0.0 min
Primary	- =	4.65 cfs @ 12.14 hrs, Volume=	0.264 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge) -1=Culvert (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108": (new Pond)

Inflow Are	ea =	1.050 ac, 50.48% Impervious, Inflo	ow Depth = 4.16" for 100-Year St. Paul eve	nt
Inflow	=	5.15 cfs @ 12.23 hrs, Volume=	0.364 af	
Outflow	=	2.10 cfs @ 12.50 hrs, Volume=	0.350 af, Atten= 59%, Lag= 16.7 min	
Primary	=	2.10 cfs $\overline{@}$ 12.50 hrs, Volume=	0.350 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 891.52' @ 12.50 hrs Surf.Area= 0.021 ac Storage= 0.140 af

Plug-Flow detention time= 80.2 min calculated for 0.350 af (96% of inflow) Center-of-Mass det. time= 59.7 min (832.8 - 773.1)

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Volume	Inver	t Avail.Storag	e Storage Description
#1	881.45	5' 0.088 a	af 108.0" Round Pipe Storage Inside #2
			L= 60.0' S= 0.0123 '/'
#2	881.00)' 0.052 a	at 14.00'W x 66.00'L x 10.25'H Prismatoid
		0 140 /	
		0.140 a	ai Totai Available Storage
Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500
		l	Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	890.79'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
Primarv	OutFlow	Max=2.06 cfs @	12.50 hrs HW=891.49' (Free Discharge)
1=Cu	Ivert (Pass	ses 2.06 cfs of 42	2.90 cfs potential flow)
1 -2=	Orifice/Gra	ate (Orifice Cont	rols 1.26 cfs @ 14.47 fps)
<u> </u>	Broad-Cre	sted Rectangul	ar Weir (Weir Controls 0.79 cfs @ 2.26 fps)
		-	
			Summary for Pond 110:
Inflow A	rea =	1 460 ac 85 62	2% Impervious Inflow Denth = 5.23" for 100-Year St Paul event
Inflow	=	9.79 cfs @ 12.02	09 hrs Volume= 0.636 af
Outflow	=	9 79 cfs @ 12.	09 hrs Volume= 0.636 af Atten= 0% Lag= 0.0 min
Primarv	=	9.79 cfs @ 12.	09 hrs. Volume= 0.636 af
Routing	by Stor-Ind	method Time S	Span= 0.00-72.00 hrs. dt= 0.05 hrs

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge) ☐ 1=Culvert (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area	a =	0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul event
Inflow	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af
Outflow	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 889.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices	
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf	
Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge) —1=Culvert (Barrel Controls 7.56 cfs @ 6.16 fps)				

Summary for Pond 130:

Inflow Are	ea =	0.420 ac, 97.62% Impervious,	Inflow Depth = 5.59" for 100-Year St. Paul event
Inflow	=	3.99 cfs @ 12.06 hrs, Volume=	0.196 af
Outflow	=	3.99 cfs @ 12.06 hrs, Volume=	= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary	=	3.99 cfs @ 12.06 hrs, Volume=	= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge) **1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow A	rea =	0.070 ac, 85.71% Impervious, Inflow	Depth = 5.23" for 100-Year St. Paul event
Inflow	=	0.63 cfs @ 12.09 hrs, Volume=	0.031 af
Outflow	=	0.63 cfs @ 12.09 hrs, Volume=	0.031 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.63 cfs @ 12.09 hrs, Volume=	0.031 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

 Inflow Area =
 0.080 ac, 62.50% Impervious, Inflow Depth = 4.53" for 100-Year St. Paul event

 Inflow =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af

 Outflow =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af, Atten= 0%, Lag= 0.0 min

 Primary =
 0.65 cfs @ 12.07 hrs, Volume=
 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Area	a =	.120 ac, 91.67% Impervious, Inflow Depth = 5.41" for 100-Year St. Paul even
Inflow	=	13 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow	=	.13 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary	=	13 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 884.80' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge) —1=Culvert (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond SYS: (new Pond)

MSE 24-hr 3 100-Year St. Paul Rainfall=5.90" Printed 12/9/2020

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	18.50'W x 316.00'L x 6.00'H Field A
			0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	18.50'W x 196.00'L x 6.00'H Field B
			0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	4.00'D x 2.00'H CBMH-30
#6	886.25'	0.001 af	4.00'D x 2.29'H CBMH-31
#7	886.25'	0.001 af	4.00'D x 2.82'H CBMH-40
#8	886.25'	0.001 af	4.00'D x 3.18'H CBMH-41
#9	886.25'	0.001 af	4.00'D x 4.50'H CBMH-50
#10	886.25	0.001 af	4.00'D x 4.70'H CBMH-51
#11	886.25	0.001 af	4.00'D x 4.80'H CBMH-52
#12	886.25'	0.001 af	4.00'D x 4.95'H CBMH-60
#13	886.25	0.001 af	4.00'D x 4.75'H CBMH-70
#14	886.25	0.002 af	4.00'D x 5.26'H CBMH-80
#15	886.25	0.001 af	4.00'D x 4.70'H CBMH-90
#16	886.25	0.001 af	4.00'D x 4.92'H CBMH-100

0.811 af Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	0.250 in/hr Exfiltration over Surface area
#2	Primary	880.39'	24.0" Round Culvert L= 50.0' Ke= 0.500
	-		Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#5	Device 2	886.05'	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
			3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs) -3=Orifice/Grate (Controls 0.00 cfs) -4=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Controls 0.00 cls)

-5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Inflow	Depth = 4.91" for 100-Year St. Paul event
Inflow =	39.07 cfs @ 12.11 hrs, Volume=	3.053 af
Outflow =	24.75 cfs @ 12.31 hrs, Volume=	3.053 af, Atten= 37%, Lag= 11.9 min
Discarded =	0.08 cfs @_ 12.31 hrs, Volume=	0.115 af
Primary =	10.60 cfs @_ 12.32 hrs, Volume=	2.771 af
Secondary =	14.07 cfs @_ 12.31 hrs, Volume=	0.167 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 889.15' @ 12.32 hrs Surf.Area= 13,859 sf Storage= 36,564 cf

Plug-Flow detention time= 45.2 min calculated for 3.053 af (100% of inflow) Center-of-Mass det. time= 44.5 min (807.8 - 763.3)

MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	4.00'D x 2.00'H CBMH-30
#6	886.25'	29 cf	4.00'D x 2.29'H CBMH-31
#7	886.25'	35 cf	4.00'D x 2.82'H CBMH-40
#8	886.25'	40 cf	4.00'D x 3.18'H CBMH-41
#9	886.25'	57 cf	4.00'D x 4.50'H CBMH-50
#10	886.25'	59 cf	4.00'D x 4.70'H CBMH-51
#11	886.25'	60 cf	4.00'D x 4.80'H CBMH-52
#12	886.25'	62 cf	4.00'D x 4.95'H CBMH-60
#13	886.25'	60 cf	4.00'D x 4.75'H CBMH-70
#14	886.25	66 cf	4.00 [°] D x 5.26 [°] H CBMH-80
#15	886.25	59 cf	4.00'D x 4.70'H CBMH-90
#16	886.25	62 ct	4.00'D x 4.92'H CBMH-100
#17	888.33'	8,117 cf	Low Road cb (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation S		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.3	3	15	0	0				
888.5	50	345	31	31				
889.0	00	3,000	836	867				
889.5	50	7,000	2,500	3,367				
890.0	0	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	Discarded	880.75'	0.250 in/hr Exfi	Itration over S	Surface	area		
#2	Primary	880.39'	12.0" Round C	ulvert L= 50.0	0' Ke=	0.500		
	-		Inlet / Outlet Inve	ert= 880.39' / 8	379.47'	S= 0.018	4 '/'	Cc= 0.900
			n= 0.013, Flow	Area= 0.79 sf				
#3	Device 2	880.89'	24.0" Vert. Orifi	ice/Grate C=	0.600			
			Limited to weir f	low at low hea	ds			
#4	#4 Secondary 888.50'		10.0' long x 10	.0' breadth Br	oad-Cre	ested Rec	tang:	ular Weir
			Head (feet) 0.20	0 0.40 0.60 0	0.80 1.0	0 1.20 1	.40 1	1.60
			Coef. (English)	2.49 2.56 2.7	70 2.69	2.68 2.69	9 2.6	67 2.64

Discarded OutFlow Max=0.08 cfs @ 12.31 hrs HW=889.11' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=10.57 cfs @ 12.32 hrs HW=889.10' (Free Discharge) 2=Culvert (Barrel Controls 10.57 cfs @ 13.46 fps) -3=Orifice/Grate (Passes 10.57 cfs of 40.63 cfs potential flow)

Secondary OutFlow Max=12.76 cfs @ 12.31 hrs HW=889.11' (Free Discharge) 4=Broad-Crested Rectangular Weir (Weir Controls 12.76 cfs @ 2.10 fps)

Appendix B

HydroCAD Report, Proposed



19114-overall PROP as built cr

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Area Listing (all nodes)

Are	ea CN	Description	
(acres	s)	(subcatchment-numbers)	
5.10	8 98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.CART, E.LP, N.LP, NE.LEX, S.DRIVE,	
		S.LP, SE.LP, SWLEX, W.ALDI, WILD)	
1.62	2 69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.CART, E.LP, S.DRIVE, SE.LP, SWLEX,	
		W.ALDI, WILD)	
0.11	0 85	(WILD)	
0.17	4 69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)	
0.11	0 98	Paved parking, HSG B (NW.LEX)	
0.54	0 98	Paved parking, HSG C (TCF)	
0.25	60 96	ROADWAY (UNIV)	
0.35	i0 98	ROOF (ROOF)	
0.08	3 98	Water Surface, HSG B (SE.LEX)	
0.25 0.35 0.08	50 96 50 98 33 98	ROADWAY (UNIV) ROOF (ROOF) Water Surface, HSG B (SE.LEX)	
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Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	CART	0.00	0.00	85.0	0.0100	0.013	0.0	12.0	0.0
2	CART	0.00	0.00	255.0	0.0100	0.013	0.0	15.0	0.0
3	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
4	E.CART	0.00	0.00	75.0	0.0100	0.013	0.0	12.0	0.0
5	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
6	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
7	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
8	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
9	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
10	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
11	108"	882.45	882.15	20.0	0.0150	0.013	0.0	24.0	0.0
12	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
13	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
14	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
15	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
16	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
17	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
18	PROP	889.00	887.00	50.0	0.0400	0.013	0.0	12.0	0.0
19	SYS	880.39	879.17	55.0	0.0222	0.013	0.0	12.0	0.0

Pipe Listing (all nodes)

Summary for Subcatchment C.DRIVE:

Runoff = 0.43 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
_	0.	140	92 Wei	ghted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	7% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
_						Paved Kv= 20.3 tps
	2 0	00	T - 4 - 1			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 0.59 cfs @ 12.23 hrs, Volume= 0.043 af, Depth= 1.56"

	Area	(ac)	CN	Desc	cription		
*	0.	210	98				
*	0.	120	69				
	0.	330	87	Weig	ghted Aver	age	
	0.	120	69	36.3	6% Pervio	us Area	
	0.	210	98	63.6	4% Imperv	vious Area	
	Tc (min)	Lengt (feet	h :	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	13.7	6	20	.0100	0.08		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.3	8	50	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.8	25	50	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 st Perim= 3.9' r= 0.31'
							n= 0.013
	14.8	40	2 T	otal			

Summary for Subcatchment DOCK:

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

_	Area	(ac)	CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Length (feet	ו ני)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	3 0.	.0500	0.10		Sheet Flow,
	0.9	85	5 0.	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 0.54 cfs @ 12.22 hrs, Volume= 0.038 af, Depth= 1.59"

	Area	(ac)	CN	Desc	cription		
*	0.	190	98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

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Summary for Subcatchment E.ALDI:

Runoff = 1.13 cfs @ 12.23 hrs, Volume= 0.083 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area	(ac) (CN	Desc	ription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90	Weig	hted Aver	age	
	0.	150	69	26.32	2% Pervio	us Area	
	0.	420	98	73.68	3% Imperv	vious Area	
	_					_	
	Tc	Length	S	Slope	Velocity	Capacity	Description
_	(min)	(feet)		(ft/ft)	(ft/sec)	(cfs)	
	14.5	115	0.	0300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	100	0.	0150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps
	45.0	045	-				

15.2 215 Total

Summary for Subcatchment E.CART:

Runoff = 0.45 cfs @ 12.24 hrs, Volume= 0.034 af, Depth= 0.95"

	Area	(ac) (CN Des	cription		
*	0.	130	98			
*	0.	300	69			
	0.	430	78 Wei	ghted Aver	age	
	0.	300	69 69.7	7% Pervio	us Area	
	0.	130	98 30.2	3% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.0	156	0.0600	0.19		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.4	70	0.0400	3.00		Shallow Concentrated Flow,
						Grassed Waterway Kv= 15.0 fps
	0.3	75	0.0100	4.54	3.56	Pipe Channel,
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
						n= 0.013
	14.7	301	Total			

Summary for Subcatchment E.LP:

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area	(ac)	CN	Desc	ription					
*	0.	029	98							
*	0.	022	69							
	0.	051	85	Weig	hted Aver	age				
	0.	022	69	43.14	4% Pervio	us Area				
	0.	029	98	56.8	6% Imperv	vious Area				
	Tc (min)	Lengt (fee	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.0	1	6 0	.0300	0.09		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment N.LP:

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.112 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Desc	ription		
*	0.6	607	98				
*	0.0	000	69				
	0.6	607	98	Weig	hted Aver	age	
	0.6	607	98	100.0	00% Impe	rvious Area	a
	Tc (min)	Lengt	h S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0	(100	•/	(1310)	(1.500)	(010)	Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 1.54"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Тс	Length	n S	Slope	Velo	city	Capacity	Description	

Longai	Ciopo	velocity	Oupdoily	Description
(feet)	(ft/ft)	(ft/sec)	(cfs)	
12	0.2500	0.20		Sheet Flow,
				Grass: Dense n= 0.240 P2= 2.81"
36	0.0240	1.13		Sheet Flow,
				Smooth surfaces n= 0.011 P2= 2.81"
	(feet) 12 36	(feet) (ft/ft) 12 0.2500 36 0.0240	(feet) (ft/ft) (ft/sec) 12 0.2500 0.20 36 0.0240 1.13	(feet) (ft/ft) (ft/sec) (cfs) 12 0.2500 0.20 36 0.0240 1.13

1.5 48 Total

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

0.021 af, Depth= 2.07" Runoff 0.45 cfs @ 12.06 hrs, Volume= =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

Area (ac	c) CI	N Desc	cription					
0.01	0 6	9 50-7	5% Grass	cover, Fair	, HSG B			
0.11	0 9	8 Pave	ed parking,	, HSG B				
0.12	0 9	6 Weig	ghted Aver	age				
0.01	0 6	9 8.33	% Perviou	s Area				
0.11	0 9	8 91.6	7% Imperv	ious Area				
			-					
Tc Le	ength	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	-			
0.5	33	0.0215	1.06		Sheet Flow,			
					Smooth surfaces	n= 0.011	P2= 2.81"	
0.6	27	0.0108	0.78		Sheet Flow,			
					Smooth surfaces	n= 0.011	P2= 2.81"	
1.1	60	Total						

Summary for Subcatchment ROOF:

1.40 cfs @ 12.06 hrs, Volume= Runoff 0.065 af, Depth= 2.22" =

	Area	(ac)	CN	Desc	cription		
*	0.	350	98	ROC)F		
	0.	350	98	100.	00% Impe	rvious Area	a
	Тс	Lengt	h	Slope	Velocity	Capacity	Description
_	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	1.0						Direct Entry,

Summary for Subcatchment S.DRIVE:

Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area	(ac) C	N Des	cription		
*	0.	168	98			
*	0.	206	69			
_	0.374 82		32 Wei	ghted Aver	age	
	0.206 69		<u>.</u> 59 55.0	8% Pervio	us Area	
	0.	168	98 44.9	2% Imperv	∕ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	5.0	35	0.0400	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	F 7	00	Tatal			

5.7 88 Total

Summary for Subcatchment S.LP:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.143 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Desc	cription		
*	0.7	770	98				
*	0.0	000	69				
	0.7	770	98	Weig	phted Aver	age	
	0.7	770	98	100.	00% Impe	rvious Area	
	Tc (min)	Lengt (feet	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.016 af, Depth= 1.81"

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Area	(ac) (CN Des	cription				
0.	024	, HSG B					
0.083 98 Water Surface, HSG B							
0.	107	91 Wei	ghted Aver	age			
0.	024	69 22.4	3% Pervio	us Area			
0.	083	98 77.5	57% Imperv	vious Area			
Тс	Length	Slope	Velocity	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
6.8	43	0.0280	0.11		Sheet Flow,		
					Grass: Dense n= 0.240 P2= 2.81"		
0.4	33	0.0333	1.27		Sheet Flow,		
					Smooth surfaces n= 0.011 P2= 2.81"		
7.2	76	Total					

Summary for Subcatchment SE.LP:

Runoff	=	0.03 cfs @	12.12 hrs,	Volume=	0.001 af, Depth= ().50"
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Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

_	Area	(ac)	CN	Desc	ription					
*	0.	002	98							
*	0.	033	69							
	0.	035	71	Weig	hted Aver	age				
	0.	033	69	94.2	9% Pervio	us Area				
	0.002 98 5.71% Impervious Area			ous Area						
	Tc (min)	Lengtl (feet	h :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.9	2:	2 0	.0300	0.10		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment SWLEX:

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 1.48"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

19114-overall PROP as built cr MSE 24-hr 3 1-Year Rainfall=2.45" Printed 12/9/2020 Prepared by {enter your company name here} HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC Page 11 Capacity Tc Length Slope Velocity Description (feet) (ft/ft) (ft/sec) (cfs) (min) 2.9 0.0150 Sheet Flow, 11 0.06 Grass: Dense n= 0.240 P2= 2.81" 0.7 48 0.0225 1.17 Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81" Total 3.6 59 Summary for Subcatchment TCF: Runoff 1.85 cfs @ 12.14 hrs, Volume= 0.101 af, Depth= 2.10" = Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45" Description Area (ac) CN Paved parking, HSG C 0.540 98 0.040 69 50-75% Grass cover, Fair, HSG B Weighted Average 0.580 96 6.90% Pervious Area 0.040 69 0.540 93.10% Impervious Area 98 Capacity Тс Length Slope Velocity Description (ft/ft) (min) (feet) (ft/sec) (cfs) 7.0 Direct Entry, Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive 0.040 af. Depth= 1.49" Runoff = 0.91 cfs @ 12.10 hrs, Volume= Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45" Area (ac) CN Description

*	0.	250	96 ROA	ADWAY		
	0.	070	69 50-7	'5% Grass	cover, Fair	, HSG B
	0. 0.	320 320	90 Wei 90 100.	ghted Aver .00% Pervi	age ous Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	2.3	15	0.0500	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.81"
	1.3	130	0.0307	1.61		Sheet Flow,
	0.4	50	0.0125	2.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff 1.65 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.03" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.45"

	Area	(ac)	CN	Desc	ription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.64	4% Pervio	us Area	
	0.	420	98	89.36	5% Imperv	vious Area	
	Тс	Length	1 8	Slope	Velocity	Capacity	Description
	(min)	(feet		(ft/ft)	(ft/sec)	(cfs)	
	2.1	13	0.	0500	0.10		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	1.4	105	0 .	0187	1.27		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	To	otal			

Summary for Subcatchment WILD:

Runoff = 4.92 cfs @ 12.22 hrs, Volume= 0.348 af, Depth= 1.79"

	Area	(ac)	CN	Desc	cription		
*	1.	750	98				
*	0.	470	69				
*	0.	110	85				
	2.	330	92	Weid	hted Aver	ade	
	0.	580	72	24.8	, 9% Pervio	us Area	
	1.	750	98	75.1	1% Imperv	vious Area	
	Тс	Length	1 5	Slope	Velocity	Capacity	Description
	(min)	(feet))	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	0 .	0100	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0.	0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	0 .	0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	0.	0055	4.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013
	14.2	397	' To	otal			

Summary for Reach 2R: (new Reach)

Inflow Are	ea =	8.347 ac,	74.17% Impe	rvious, I	nflow Depth =	1.3	1" for 1-Y	ear event
Inflow	=	5.78 cfs @	12.44 hrs, \	Volume=	0.908	af		
Outflow	=	5.78 cfs @	12.44 hrs, \	Volume=	0.908	af, /	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	ea =	2.330 ac, 75.11% Impervious, Inflow	Depth = 1.79" for 1-Year event
Inflow	=	4.92 cfs @ 12.22 hrs, Volume=	0.348 af
Outflow	=	4.92 cfs @_ 12.22 hrs, Volume=	0.348 af, Atten= 0%, Lag= 0.0 min
Primary	=	4.92 cfs @_ 12.22 hrs, Volume=	0.348 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 885.40' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.83 cfs @ 12.22 hrs HW=885.38' (Free Discharge) **1=Culvert** (Barrel Controls 4.83 cfs @ 3.87 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

Summary for Pond 61: Stub-61

Inflow A	Area =	0.580 ac, 93.10% Impervious, Inflow	Depth = 2.10" for 1-Year event	
Inflow	=	1.85 cfs @ 12.14 hrs, Volume=	0.101 af	
Outflow	/ =	1.85 cfs @ 12.14 hrs, Volume=	0.101 af, Atten= 0%, Lag= 0.0	min
Primary	/ =	1.85 cfs @ 12.14 hrs, Volume=	0.101 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 885.07' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900
			Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.14 hrs HW=885.05' (Free Discharge) **1=Culvert** (Barrel Controls 1.79 cfs @ 3.01 fps)

Summary for Pond 108":

Inflow Area	=	2.427 ac, 7	8.57% Imperviou	s, Inflow Depth =	1.09" f	or 1-Year	event
Inflow	=	2.26 cfs @	12.25 hrs, Volur	ne= 0.220) af		
Outflow	=	1.73 cfs @	12.40 hrs, Volur	ne= 0.220) af, Atten	i= 23%, La	ig= 8.8 min
Discarded	=	0.01 cfs @	7.00 hrs, Volur	ne= 0.023	3 af		
Primary	=	1.72 cfs @	12.40 hrs, Volur	ne= 0.197	' af		

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 883.89' @ 12.40 hrs Surf.Area= 0.021 ac Storage= 0.034 af

Plug-Flow detention time= 131.6 min calculated for 0.220 af (100% of inflow) Center-of-Mass det. time= 132.9 min (923.8 - 790.9)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	4.00'D x 4.50'H Vertical Cone/Cylinder x 2
#2	881.00'	0.052 af	14.00'W x 66.00'L x 10.25'H Prismatoid
			0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	108.0" Round Pipe Storage Inside #2
			L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2 #3	Device 1 Device 1	882.50' 889.50'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.5' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
#4	Discarded	881.00'	2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 7.00 hrs HW=881.14' (Free Discharge) **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.72 cfs @ 12.40 hrs HW=883.89' (Free Discharge)

1=Culvert (Passes 1.72 cfs of 8.53 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.72 cfs @ 4.94 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area	=	1.460 ac, 8	5.62% Imperv	vious, Inflow De	pth = 1	.96" for '	1-Year event
Inflow	=	3.82 cfs @	12.09 hrs, V	olume=	0.238 af	:	
Outflow	=	3.82 cfs @	12.09 hrs, V	olume=	0.238 af	, Atten= 0°	%, Lag= 0.0 min
Primary	=	3.82 cfs @	12.09 hrs, V	olume=	0.238 af	1	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 886.16' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.67 cfs @ 12.09 hrs HW=886.13' (Free Discharge) ☐ 1=Culvert (Inlet Controls 3.67 cfs @ 3.43 fps)

Summary for Pond 120:

Inflow Area	=	0.890 ac, 9	93.26% Impe	ervious,	Inflow Depth =	2.10"	for 1-Y	ear event
Inflow	=	3.19 cfs @	12.08 hrs,	Volume=	- 0.156	6 af		
Outflow	=	3.19 cfs @	12.08 hrs,	Volume=	= 0.156	af, Att	en= 0%,	Lag= 0.0 min
Primary	=	3.19 cfs @	12.08 hrs,	Volume=	= 0.156	5 af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 886.93' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.01 cfs @ 12.08 hrs HW=886.88' (Free Discharge) **1=Culvert** (Barrel Controls 3.01 cfs @ 3.98 fps)

Summary for Pond 130:

Inflow Are	a =	0.420 ac, 9	7.62% Imperviou	s, Inflow Depth =	2.18" for	1-Year event
Inflow	=	1.62 cfs @	12.06 hrs, Volur	me= 0.07	6 af	
Outflow	=	1.62 cfs @	12.06 hrs, Volur	me= 0.07	6 af, Atten= 0	%, Lag= 0.0 min
Primary	=	1.62 cfs @	12.06 hrs, Volur	me= 0.07	6 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.47' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500
	-		Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.06 hrs HW=887.45' (Free Discharge) ←1=Culvert (Barrel Controls 1.54 cfs @ 3.88 fps)

Summary for Pond 140:

Inflow Area	ı =	0.070 ac, 8	35.71% Impe	ervious,	Inflow Dep	th = 1.	96" for	1-Year event	
Inflow	=	0.24 cfs @	12.09 hrs,	Volume	= 0).011 af			
Outflow	=	0.24 cfs @	12.09 hrs,	Volume	= 0).011 af,	Atten= 0	%, Lag= 0.0 mir	n
Primary	=	0.24 cfs @	12.09 hrs,	Volume	= 0).011 af		-	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.42' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.09 hrs HW=887.42' (Free Discharge) -1=Culvert (Barrel Controls 0.23 cfs @ 1.70 fps)

Summary for Pond CB31:

Inflow Area	a =	0.080 ac, 6	2.50% Impe	ervious,	Inflow De	pth =	1.54"	for 1-Y	'ear event	
Inflow	=	0.22 cfs @	12.07 hrs,	Volume	=	0.010	af			
Outflow	=	0.22 cfs @	12.07 hrs,	Volume	=	0.010	af, Att	en= 0%,	Lag= 0.0	min
Primary	=	0.22 cfs @	12.07 hrs,	Volume	=	0.010	af		-	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.47' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500
			Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.07 hrs HW=884.46' (Free Discharge) ←1=Culvert (Barrel Controls 0.21 cfs @ 2.24 fps)

Summary for Pond CB41:

Inflow Are	ea =	0.120 ac, 91.67% Impervious,	Inflow Depth = 2.07	for 1-Year event
Inflow	=	0.45 cfs @ 12.06 hrs, Volume	= 0.021 af	
Outflow	=	0.45 cfs @ 12.06 hrs, Volume	e 0.021 af, A	tten= 0%, Lag= 0.0 min
Primary	=	0.45 cfs @ 12.06 hrs, Volume	= 0.021 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.55' @ 12.06 hrs

 MSE 24-hr 3
 1-Year Rainfall=2.45"

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Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.06 hrs HW=884.54' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.43 cfs @ 2.60 fps)

Summary for Pond PROP: (new Pond)

Inflow Area	a =	1.377 ac,10	0.00% Imp	ervious, l	nflow Depth =	2.22"	for 1-Ye	ar event	
Inflow	=	4.66 cfs @	12.14 hrs,	Volume=	0.255	af			
Outflow	=	0.86 cfs @	12.46 hrs,	Volume=	0.255	af, Atte	en= 81%,	Lag= 19.0	min
Discarded	=	0.05 cfs @	9.15 hrs,	Volume=	0.150	af		-	
Primary	=	0.82 cfs @	12.46 hrs,	Volume=	0.105	af			

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 890.10' @ 12.46 hrs Surf.Area= 0.057 ac Storage= 0.137 af

Plug-Flow detention time= 508.6 min calculated for 0.255 af (100% of inflow) Center-of-Mass det. time= 509.2 min (1,266.6 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	45.00'W x 55.00'L x 9.00'H Field A
			0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	CMP Round 96 x 8 Inside #1
			Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf
			Overall Size= 96.0"W x 96.0"H x 20.00'L
			Row Length Adjustment= -5.00' x 50.27 sf x 4 rows
			41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	4.00'D x 5.00'H Vertical Cone/Cylinder x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2 #3 #4	Device 1 Discarded Device 1	889.10' 886.50' 894.40'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.800 in/hr Exfiltration over Surface area 4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 9.15 hrs HW=886.65' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.82 cfs @ 12.46 hrs HW=890.10' (Free Discharge) 1=Culvert (Passes 0.82 cfs of 2.92 cfs potential flow) 2=Orifice/Grate (Orifice Controls 0.82 cfs @ 4.16 fps) 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac, 74.57% Impervious, Inflov	w Depth = 1.56" for 1-Year event
Inflow =	13.01 cfs @ 12.12 hrs, Volume=	1.071 af
Outflow =	5.81 cfs @ 12.45 hrs, Volume=	1.071 af, Atten= 55%, Lag= 19.9 min
Discarded =	0.05 cfs @ 7.15 hrs, Volume=	0.170 af
Primary =	5.75 cfs @ 12.45 hrs, Volume=	0.901 af
Secondary =	0.00 cfs $\overline{@}$ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 883.45' @ 12.45 hrs Surf.Area= 9,472 sf Storage= 15,329 cf

Plug-Flow detention time= 144.1 min calculated for 1.071 af (100% of inflow) Center-of-Mass det. time= 143.5 min (917.9 - 774.4)

MSE 24-hr 3 1-Year Rainfall=2.45" Printed 12/9/2020 LLC Page 19

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= $60.0^{\circ}W \times 60.0^{\circ}H => 19.63 \text{ sf } \times 20.00^{\circ}L = 392.7 \text{ cf}$
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00° x 19.63 st x 2 rows
		05.5	12.50' Header X 19.63 st X 1 = 245.4 ct Inside
#5	886.25	25 CT	4.00'D X 2.00'H CBMH-30
#0 #7	886.25	29 Cf	4.00'D X 2.29'H CBMH-31
#1 #0	880.20 886.25	30 Cl	
#0 #0	000.20	40 Cl 57 of	
#9 #10	000.25 996 25'	57 Cl	
#10	886.25'	59 Cl	
#11 #12	886 25'	62 cf	
#12 #13	886 25'	60 cf	$4.00 \text{ D} \times 4.35 \text{ H} \text{ CBMH-70}$
#10 #14	886 25'	66 cf	4.00 D x 5.26'H CBMH-80
#15	886 25'	59 cf	4 00'D x 4 70'H CBMH-90
#16	886.25	62 cf	4.00'D x 4.92'H CBMH-100
#17	888.33'	8,117 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation S (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)					
888.33		15	0	0					
888.50		345	31	31					
889.0	00	3,000	836	867					
889.	50	7,000	2,500	3,367					
890.0	00	12,000	4,750	8,117					
Device	Routing	Invert	Outlet Devices						
#1	Discarded	880.75'	0.250 in/hr Exf	iltration over	Surface area				
#2	Primary	880.39'	12.0" Round Culvert L= 55.0' Ke= 0.500						
			Inlet / Outlet Inv	/ert= 880.39' /	879.17' S= 0.0222 '/' Cc= 0.900				
			n= 0.013, Flow	n= 0.013, Flow Area= 0.79 sf					
#3	Device 2	881.60'	7.0" Vert. Orifi	ce/Grate C=	0.600 Limited to weir flow at low heads				
#4	Device 2	881.60'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600				
			Limited to weir	flow at low hea	ads				
#5 Device 2		885.60'	7.0' long x 1.0 Head (feet) 0.2 2.50 3.00	breadth Bro 20 0.40 0.60	ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00				

19114-overall PROP as built cr	MSE 24-hr 3	1-Year Rain	nfall=2.45"
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Coef. (English) 2.69 2.72 2.7 3.30 3.31 3.32	25 2.85 2.98 3.	08 3.20 3.28	3 3.31

#6 Secondary 888.50' **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

Discarded OutFlow Max=0.05 cfs @ 7.15 hrs HW=880.86' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=5.75 cfs @ 12.45 hrs HW=883.45' (Free Discharge) 2=Culvert (Passes 5.75 cfs of 6.05 cfs potential flow) -3=Orifice/Grate (Orifice Controls 1.61 cfs @ 6.02 fps) -4=Orifice/Grate (Orifice Controls 4.14 cfs @ 5.93 fps) -5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge) G=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) C	N Des	cription		
*	* 0.110 98		98			
*	0.	030 6	59			
	0.140		92 Weig	2 Weighted Avera		
	0.	030 6	69 21.4	3% Pervio	us Area	
	0.	110 9	98 78.5	7% Imperv	/ious Area	
	_					
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	<u> </u>	00	Tatal			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 1.15 cfs @ 12.23 hrs, Volume= 0.083 af, Depth= 3.02"

_	Area (ac)		CN	Desc	cription		
*	0.	210	98				
*	0.	120	69				
	0.	330	87	Weig	Weighted Average		
	0.	120	69	36.3	6% Pervio	us Area	
	0.	210	98	63.6	4% Imperv	ious Area/	
	Tc (min)	Lengtl (feet	h :	Slope	Velocity (ft/sec)	Capacity	Description
_	13.7	6	. <u>,</u> 20	0100	0.08	(010)	Sheet Flow
	10.7	0.	_ 0	.0100	0.00		Grass: Dense n= 0.240 P2= 2.81"
	0.3	8	50	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.8	25	50	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	14.8	402	2 T	otal			

Summary for Subcatchment DOCK:

0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59" Runoff =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription		
*	0.	060	98				
*	0.	010	69				
	0.	070	94	Weig	hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.	060	98	85.7	1% Imperv	vious Area	
	Tc (min)	Lengtł (feet	ר :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	30	.0500	0.10		Sheet Flow,
	0.9	85	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

	Area (ac)		CN	Desc	cription		
*	0.190 9		98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) (CN De	scription		
*	0.	420	98			
*	0.	150	69			
	0.	570	90 We	ighted Ave	rage	
	0.	150	69 26.	32% Pervio	ous Area	
	0.	420	98 73.	68% Imperv	vious Area	
	Tc (min)	Length (feet)	Slope (ft/ft	velocity (ft/sec)	Capacity (cfs)	Description
	14.5	115	0.0300	0.13		Sheet Flow,
	0.7	100	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	450	045	Tatal			

15.2 215 Total

Summary for Subcatchment E.CART:

Runoff = 1.10 cfs @ 12.24 hrs, Volume= 0.078 af, Depth= 2.17"

_	Area (ac)		CN	Desc	cription		
*	0.130 9		98				
*	0.	300	69				
	0.430		78	Weig	phted Aver	age	
	0.	300	69	69.7	7% Pervio	us Area	
	0.	130	98 3	30.2	3% Imperv	vious Area	
	Tc (min)	Length (feet	n Slo) (f	ope ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
-	14.0	156	5 0.06	600	0.19		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.4	70	0.04	400	3.00		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.3	75	5 0.0	100	4.54	3.56	Pipe Channel,
							12.0 Round Area= 0.8 St Perim= 3.1° r= 0.25°
_	447	20/	Tat				11- 0.015
	14.7	30	101	ai			

Summary for Subcatchment E.LP:

0.26 cfs @ 12.09 hrs, Volume= Runoff = 0.012 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription					
*	0.	029	98							
*	0.	022	69							
	0.	051	85	Weig	ghted Aver	age				
	0.	022	69	43.1	4% Pervio	us Area				
	0.	029	98	56.8	6% Imperv	vious Area				
	Tc (min)	Lengt (feet	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.0	1	6 0	.0300	0.09		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment N.LP:

Runoff 3.56 cfs @ 12.14 hrs, Volume= 0.200 af, Depth= 3.95" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area ((ac)	CN	Desc	ription		
*	0.0	607	98				
*	0.0	000	69				
	0.6	607	98	Weig	hted Aver	age	
	0.6	607	98	100.0	00% Impe	vious Area	а
	Тс	Lengt	h :	Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99" Runoff =

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Prepared by {enter your company name here} HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC Page 25 0.5 36 0.0240 1.13 Smooth surfaces n= 0.011 P2= 2.81" 1.5 48 Total Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive Runoff 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Depth= 3.74" = Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19" Area (ac) CN Description 50-75% Grass cover, Fair, HSG B 0.010 69 0.110 98 Paved parking, HSG B Weighted Average 0.120 96 8.33% Pervious Area 0.010 69

0.110 91.67% Impervious Area 98

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff 2.43 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 3.95" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription		
*	0.	350	98	ROC)F		
	0.	350	98	100.	00% Impe	rvious Area	a
	Тс	Lengt	h S	Slope	Velocity	Capacity	Description
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	1.0						Direct Entry,

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					-
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
05	36	0 0240	1 13		Sheet Flow

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020

Summary for Subcatchment S.DRIVE:

Runoff = 1.52 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac) (CN Des	cription		
*	0.	168	98			
*	0.	206	69			
_	0.	374	82 Wei	ghted Aver	age	
	0.	206	69 55.0	8% Pervio	us Area	
	0.168 98		98 44.9	2% Imperv	ious Area/	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min) (feet)		(ft/ft)	(ft/sec)	(cfs)	
	5.0	35	0.0400	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2		0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4		0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1		0.0295	3.49		Shallow Concentrated Flow,
_						Paved Kv= 20.3 fps
	E 7	0.0	Tatal			

5.7 88 Total

Summary for Subcatchment S.LP:

Runoff = 4.51 cfs @ 12.14 hrs, Volume= 0.254 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription		
*	0.	770	98				
*	0.	000	69				
	0.	770	98	Weig	phted Aver	age	
	0.	770	98	100.	00% Impe	rvious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 3.38"

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MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC Page 27

Area	a (ac)	CN	Desc	cription		
	0.024 69 50-75% Grass cover, Fair,			5% Grass	cover, Fair	, HSG B
0.083 98 Water Surface, HSG B					HSG B	
	0.107	91	l Weig	phted Aver	age	
	0.024	69	22.4	3% Pervio	us Area	
	0.083	98	3 77.5	7% Imperv	vious Area	
Тс	: Leng	th	Slope	Velocity	Capacity	Description
(min) (fee	et)	(ft/ft)	(ft/sec)	(cfs)	
6.8	} ∠	13	0.0280	0.11		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
0.4	1 3	33	0.0333	1.27		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
72	> 7	76	Total			

Summary for Subcatchment SE.LP:

	Runoff	=	0.10 cfs @	12.11 hrs,	Volume=	0.004 af,	Depth=	1.54"
--	--------	---	------------	------------	---------	-----------	--------	-------

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

	Area	(ac)	CN	Desc	cription					
*	0.	002	98							
*	0.	033	69							
	0.	035	71	Weig	hted Aver	age				
	0.	033	69	94.29	9% Pervio	us Area				
	0.	002	98	5.71	% Impervi	ous Area				
	Tc (min)	Lengt (fee	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.9	2	2 0	0.0300	0.10		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment SWLEX:

1.63 cfs @ 12.10 hrs, Volume= Runoff = 0.078 af, Depth= 2.92"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

19114-overall PROP as built cr MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 Prepared by {enter your company name here} HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC Page 28 Velocity Capacity Tc Length Slope Description (feet) (ft/ft) (ft/sec) (cfs) (min) 2.9 0.0150 0.06 Sheet Flow, 11 Grass: Dense n= 0.240 P2= 2.81" 0.7 48 0.0225 1.17 Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81" Total 3.6 59

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Descriptio	n	
0.540	98	Paved par	king, HSG C	
0.040	69	50-75% G	rass cover, Fai	ir, HSG B
0.580	96	Weighted	Average	
0.040	69	6.90% Pei	vious Area	
0.540	98	93.10% In	npervious Area	
Tc Lenç (min) (fe	gth S et)	Slope Velo (ft/ft) (ft/s	city Capacity sec) (cfs)	Description
7.0				Direct Entry,

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

Area (ac)		(ac)	CN [Desc	ription		
*	* 0.250		96 F	ROA	DWAY		
_	0.	070	69 5	50-75	5% Grass	cover, Fair,	HSG B
	0.	320	90 V	Neig	hted Aver	age	
	0.	320	90 1	100.0	0% Pervi	ous Area	
	Tc (min)	Length (feet)	Slo	pe /ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.3	15	0.05	500	0.11		Sheet Flow,
	1.3	130	0.03	807	1.61		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	0.4	50	0.01	25	2.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	4.0	195	Tota	al			

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Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.19"

_	Area	(ac)	CN	Desc	ription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.64	4% Pervio	us Area	
	0.	420	98	89.30	6% Imperv	vious Area	
	Tc (min)	Length (feet)	n S)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	30.	.0500	0.10		Sheet Flow,
	1.4	105	50.	.0187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	3 To	otal			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

	Area	(ac) (CN D	escriptio	n		
*	1.	750	98				
*	0.	470	69				
*	0.	.110	85				
	2.	.330	92 W	eiahted	Aver	ade	
	0.	580	72 24	1.89% Pe	ervio	us Area	
	1.	750	98 75	5.11% In	nperv	ious Area	
					-		
	Тс	Length	Slop	e Velo	city	Capacity	Description
	(min)	(feet)	(ft/	ft) (ft/s	sec)	(cfs)	
	13.0	58	0.010	0 0	0.07		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0.010	0 4	.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.4	126	0.010)0 5	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	0.2	54	0.005	5 4	.41	7.79	Pipe Channel,
							18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
							n= 0.013
	14.2	397	Total				

Summary for Reach 2R: (new Reach)

 Inflow Area =
 8.347 ac, 74.17% Impervious, Inflow Depth = 2.84" for 10-Year event

 Inflow =
 8.26 cfs @ 12.53 hrs, Volume=
 1.978 af

 Outflow =
 8.26 cfs @ 12.53 hrs, Volume=
 1.978 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	a =	2.330 ac, 7	75.11% Impervi	ous, Inflow D	epth = 3.37	" for 10-	Year event
Inflow	=	9.18 cfs @	12.22 hrs, Vo	lume=	0.654 af		
Outflow	=	9.18 cfs @	12.22 hrs, Vo	lume=	0.654 af, A	Atten= 0%,	Lag= 0.0 min
Primary	=	9.18 cfs @	12.22 hrs, Vo	lume=	0.654 af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge) **1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) ☐ 1=Culvert (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow Are	ea =	0.580 ac, 93.10% Impervious, Inflo	w Depth = 3.78" for 10-Year event	
Inflow	=	3.26 cfs @ 12.14 hrs, Volume=	0.183 af	
Outflow	=	3.26 cfs @ 12.14 hrs, Volume=	0.183 af, Atten= 0%, Lag= 0.0 m	in
Primary	=	3.26 cfs $\overline{@}$ 12.14 hrs, Volume=	0.183 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900
			Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge) **1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108":

Inflow Area	a =	2.427 ac, 7	8.57% Imp	ervious, Inflow [Depth = 2	2.60" for	10-Ye	ear event
Inflow	=	4.78 cfs @	12.24 hrs,	Volume=	0.525 at	f		
Outflow	=	3.15 cfs @	12.45 hrs,	Volume=	0.525 at	f, Atten=	34%, I	Lag= 12.6 min
Discarded	=	0.01 cfs @	5.05 hrs,	Volume=	0.024 at	f		
Primary	=	3.15 cfs @	12.45 hrs,	Volume=	0.501 at	f		

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 886.34' @ 12.45 hrs Surf.Area= 0.021 ac Storage= 0.072 af

Plug-Flow detention time= 64.6 min calculated for 0.525 af (100% of inflow) Center-of-Mass det. time= 65.9 min (864.3 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	4.00'D x 4.50'H Vertical Cone/Cylinder x 2
#2	881.00'	0.052 af	14.00'W x 66.00'L x 10.25'H Prismatoid
			0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	108.0" Round Pipe Storage Inside #2
			L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 5.05 hrs HW=881.14' (Free Discharge) **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=3.14 cfs @ 12.45 hrs HW=886.33' (Free Discharge)

1=Culvert (Passes 3.14 cfs of 25.69 cfs potential flow)

2=Orifice/Grate (Orifice Controls 3.14 cfs @ 9.01 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 110:

 Inflow Area =
 1.460 ac, 85.62% Impervious, Inflow Depth = 3.59" for 10-Year event

 Inflow =
 6.81 cfs @ 12.09 hrs, Volume=
 0.436 af

 Outflow =
 6.81 cfs @ 12.09 hrs, Volume=
 0.436 af, Atten= 0%, Lag= 0.0 min

 Primary =
 6.81 cfs @ 12.09 hrs, Volume=
 0.436 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.56 cfs @ 12.09 hrs HW=886.97' (Free Discharge) -1=Culvert (Inlet Controls 6.56 cfs @ 5.35 fps)

Summary for Pond 120:

Inflow Area	=	0.890 ac, 9	3.26% Impe	ervious, Ir	nflow Depth =	3.78	" for 10-`	Year event
Inflow	=	5.62 cfs @	12.08 hrs,	Volume=	0.280) af		
Outflow	=	5.62 cfs @	12.08 hrs,	Volume=	0.280) af, A	tten= 0%,	Lag= 0.0 min
Primary	=	5.62 cfs @	12.08 hrs,	Volume=	0.280) af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge) **1=Culvert** (Barrel Controls 5.16 cfs @ 4.21 fps)

Summary for Pond 130:

Inflow Area	a =	0.420 ac, 9	7.62% Impervious,	Inflow Depth =	3.89" for 10-	Year event
Inflow	=	2.81 cfs @	12.06 hrs, Volume	= 0.136 a	af	
Outflow	=	2.81 cfs @	12.06 hrs, Volume	= 0.136 a	af, Atten= 0%,	Lag= 0.0 min
Primary	=	2.81 cfs @	12.06 hrs, Volume	= 0.136 a	af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500
			Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge) ←1=Culvert (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Area	a =	0.070 ac,	85.71% Impe	ervious,	Inflow Depth	= 3.5	59" for 10-	Year event
Inflow	=	0.44 cfs @	12.09 hrs,	Volume	= 0.0	21 af		
Outflow	=	0.44 cfs @	12.09 hrs,	Volume	= 0.0	21 af,	Atten= 0%,	Lag= 0.0 min
Primary	=	0.44 cfs @	12.09 hrs,	Volume	= 0.0	21 af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge) -1=Culvert (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

Inflow Area	ı =	0.080 ac, 6	2.50% Impe	rvious,	Inflow Dep	oth =	2.99"	for 10-	Year even	t
Inflow	=	0.43 cfs @	12.07 hrs, 1	Volume=	= (0.020	af			
Outflow	=	0.43 cfs @	12.07 hrs, '	Volume	= (0.020	af, Att	en= 0%,	Lag= 0.0	min
Primary	=	0.43 cfs @	12.07 hrs, '	Volume=	= (0.020	af		-	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500
			Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge) ←1=Culvert (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Ar	ea =	0.120 ac, 91.67% Impervious,	Inflow Depth = 3.74	for 10-Year event
Inflow	=	0.79 cfs @ 12.06 hrs, Volume=	0.037 af	
Outflow	=	0.79 cfs @ 12.06 hrs, Volume=	= 0.037 af, A	tten= 0%, Lag= 0.0 min
Primary	=	0.79 cfs @ 12.06 hrs, Volume=	= 0.037 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.69' @ 12.06 hrs

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 С

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Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond PROP: (new Pond)

Inflow Area	a =	1.377 ac,10	0.00% Imp	ervious, Infle	ow Depth =	3.95"	for 10-Y	ear event
Inflow	=	8.06 cfs @	12.14 hrs,	Volume=	0.454	af		
Outflow	=	1.64 cfs @	12.42 hrs,	Volume=	0.454	af, Atte	en= 80%,	Lag= 17.2 min
Discarded	=	0.05 cfs @	6.15 hrs,	Volume=	0.164	af		-
Primary	=	1.60 cfs @	12.42 hrs,	Volume=	0.290	af		

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 892.21' @ 12.42 hrs Surf.Area= 0.057 ac Storage= 0.236 af

Plug-Flow detention time= 339.0 min calculated for 0.454 af (100% of inflow) Center-of-Mass det. time= 339.6 min (1,088.2 - 748.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	45.00'W x 55.00'L x 9.00'H Field A
			0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	CMP Round 96 x 8 Inside #1
			Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf
			Overall Size= 96.0"W x 96.0"H x 20.00'L
			Row Length Adjustment= -5.00' x 50.27 sf x 4 rows
			41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	4.00'D x 5.00'H Vertical Cone/Cylinder x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2 #3 #4	Device 1 Discarded Device 1	889.10' 886.50' 894.40'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.800 in/hr Exfiltration over Surface area 4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

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Discarded OutFlow Max=0.05 cfs @ 6.15 hrs HW=886.65' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.60 cfs @ 12.42 hrs HW=892.20' (Free Discharge) 1=Culvert (Passes 1.60 cfs of 6.22 cfs potential flow) 2=Orifice/Grate (Orifice Controls 1.60 cfs @ 8.13 fps) 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac, 74.57% Impervious, Inflo	w Depth = 3.11" for 10-Year event
Inflow =	24.71 cfs @ 12.12 hrs, Volume=	2.142 af
Outflow =	8.27 cfs @_ 12.55 hrs, Volume=	2.142 af, Atten= 67%, Lag= 26.2 min
Discarded =	0.05 cfs @ 5.05 hrs, Volume=	0.180 af
Primary =	8.22 cfs @ 12.55 hrs, Volume=	1.961 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 885.66' @ 12.55 hrs Surf.Area= 9,472 sf Storage= 29,768 cf

Plug-Flow detention time= 101.4 min calculated for 2.142 af (100% of inflow) Center-of-Mass det. time= 100.8 min (873.8 - 773.0)

MSE 24-hr 3 10-Year Rainfall=4.19" Printed 12/9/2020 s LLC Page 36

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
		·	35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 st x 2 rows
	000 051	o	12.50' Header x 19.63 st x 1 = 245.4 cf Inside
#5	886.25	25 cf	4.00 ^o D x 2.00 ^o H CBMH-30
#6	886.25	29 cf	4.00'D x 2.29'H CBMH-31
#1	886.25	35 CT	4.00'D x 2.82'H CBMH-40
#8 #0	886.25	40 Cf	4.00 [°] D X 3.18 [°] H CBMH-41
#9 #10	880.20 886.25	57 Cl 50 of	
#10 #11	000.20	59 Cl	
#11 #10	000.20	60 Cl	
#12 #12	000.20 996 25'	02 CI 60 cf	
#13 #17	886.25'	00 CI 66 cf	
#14	886.25'	50 cf	
#15	886 25'	62 cf	
#10	888.33'	8 117 cf	Custom Stage Data (Prismatic) isted below (Recalc)
	000.00		

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
888.33		15	0	0			
888.50		345	31	31			
889.0	00	3,000	836	867			
889.5	50	7,000	2,500	2,500 3,367			
890.00		12,000	4,750	8,117			
Device Routing Invert		Outlet Devices					
#1	Discardeo	880.75'	0.250 in/hr Exfiltration over Surface area				
#2 Primary 880.39'		12.0" Round Culvert L= 55.0' Ke= 0.500					
			Inlet / Outlet Inv	/ert= 880.39' /	879.17' S= 0.0222 '/' Cc= 0.900		
			n= 0.013, Flow	/ Area= 0.79 st	f		
#3	Device 2	881.60'	7.0" Vert. Orifi	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads			
#4	Device 2	881.60'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600				
Limited to		Limited to weir	mited to weir flow at low heads				
#5 Device 2 885.60' 7.0' long x 1.0' breadth Broad-Crested Red Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 2.50 3.00			ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00				

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 #6 Secondary 888.50' 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 Discarded OutFlow Max=0.05 cfs @ 5.05 hrs HW=880.86' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.05 cfs) Primary OutFlow Max=8.22 cfs @ 12.55 hrs HW=885.65' (Free Discharge)

-2=Culvert (Barrel Controls 8.22 cfs @ 10.46 fps)

3=Orifice/Grate (Passes < 2.50 cfs potential flow)

-4=Orifice/Grate (Passes < 6.48 cfs potential flow)

-5=Broad-Crested Rectangular Weir (Passes < 0.24 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge) G=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN Des	cription		
*	0.	110	98			
*	0.	030	69			
_	0.	140	92 Wei	ghted Aver	age	
	0.	030	69 21.4	3% Pervio	us Area	
	0.	110	98 78.5	7% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.0	13	0.0200	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	0.0200	0.71		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0170	0.97		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	0.0195	2.83		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	<u> </u>	00	Tatal			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 2.26 cfs @ 12.23 hrs, Volume= 0.163 af, Depth= 5.92"

	Area	(ac)	CN	Desc	cription		
*	0.	210	98				
*	0.	120	69				
	0.	330	87	Weig	ghted Aver	age	
	0.	120	69	36.3	6% Pervio	us Area	
	0.	210	98	63.6	4% Imperv	ious Area/	
	_					. .	
	Tc	Lengt	h :	Slope	Velocity	Capacity	Description
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	13.7	6	20	.0100	0.08		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.3	8	50	.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
	0.8	25	50	.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
							n= 0.013
	14.8	40	2 T	otal			
Summary for Subcatchment DOCK:

0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65" Runoff =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

_	Area	(ac)	CN	Desc	ription		
*	0.	060	98				
*	0.	010	69				
	0.070 94 Weighted Average				hted Aver	age	
	0.010 69 14.29% Pervious Area			9% Pervio	us Area		
	0.060 98 85.71% Impervious Area			1% Imperv	vious Area		
	Tc (min)	Length (feet	ו ני)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	3 0.	.0500	0.10		Sheet Flow,
	0.9	85	5 0.	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

	Area (ac)		CN	Desc	cription		
*	0.190 98						
*	0.	0.100 69					
	0.	290	88	Weighted Average			
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	150) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	137	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	166	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1' r= 0.25'
_							n= 0.013
	14.1	453	3 To	otal			

Summary for Subcatchment E.ALDI:

4.01 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 6.25" Runoff =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN De	scription		
*	0.	420	98			
*	0.	150	69			
	0.570 90 Weighted Average				rage	
0.150 69 26.32% Pervious Area					ous Area	
	0.420 98 73.68% Impervious Area				vious Area	
	Tc (min)	Length (feet)	Slope (ft/ft	velocity (ft/sec)	Capacity (cfs)	Description
	14.5	115	0.0300	0.13		Sheet Flow,
	0.7	100	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	45 0	045	Tatal			

15.2 215 Total

Summary for Subcatchment E.CART:

Runoff = 2.50 cfs @ 12.23 hrs, Volume= 0.172 af, Depth= 4.81"

	Area (ac)		CN Des	cription		
*	0.130 98		98			
*	0.	300	69			
	0.	430	78 Wei	ghted Aver	age	
	0.	300	69 69.7	77% Pervio	us Area	
	0.	130	98 30.2	23% Imperv	vious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.0	156	0.0600	0.19		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.4	70	0.0400	3.00		Shallow Concentrated Flow,
						Grassed Waterway Kv= 15.0 fps
	0.3	75	0.0100	4.54	3.56	Pipe Channel,
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
						n= 0.013
	14.7	301	Total			

Summary for Subcatchment E.LP:

0.52 cfs @ 12.09 hrs, Volume= Runoff = 0.024 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	cription					
*	0.	029	98							
*	0.	022	69							
	0.	051	85	Weig	ghted Aver	age				
	0.022 69 43.14% Pervious Area									
	0.	029	98	56.8	6% Imperv	vious Area				
	То	Longt	•	Slana	Volocity	Conosity	Description			
	IC (maine)	Lengu	1	Siope		Capacity	Description			
	(min)	(leet)	(11/11)	(it/sec)	(CIS)				
	3.0	10	60	.0300	0.09		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment N.LP:

Runoff 6.28 cfs @ 12.14 hrs, Volume= 0.360 af, Depth= 7.12" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Desc	ription		
*	0.6	607	98				
*	0.0	000	69				
	0.6	607	98	Weig	hted Aver	age	
	0.607 98		98	100.00% Impervious Area			a
	Tc (min)	Lengt	h S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0	(100	•/	(1310)	(1.500)	(010)	Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88" Runoff =

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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Тс	Length	Slope	Velocity	Capacity	Description	
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·	

	4000)		(1001)	(111111)
Sheet Flow,	0.20	0.2500	12	1.0
Grass: Dense n= 0.240 P2= 2.81"				
Sheet Flow,	1.13	0.0240	36	0.5
Smooth surfaces n= 0.011 P2= 2.81"				

1.5 48 Total

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Desc	ription		
0.010	69	50-7	5% Grass	cover, Fair	, HSG B
0.110	98	Pave	d parking,	HSG B	
0.120	96	Weig	hted Aver	age	
0.010	69	8.33	% Perviou	s Area	
0.110	98	91.67	7% Imperv	vious Area	
Tc Lend	ath 3	Slope	Velocitv	Capacity	Description
(min) (fe	et)	(ft/ft)	(ft/sec)	(cfs)	
0.5	33 0	.0215	1.06		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
0.6	27 0	.0108	0.78		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
1.1	60 T	otal			

Summary for Subcatchment ROOF:

Runoff = 4.29 cfs @ 12.06 hrs, Volume= 0.208 af, Depth= 7.12"

	Area	(ac)	CN	Desc	cription		
*	0.	350	98	ROC)F		
	0.	350	98	100.	00% Impe	rvious Area	a
	Тс	Leng	h	Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	·
	1.0						Direct Entry,

Summary for Subcatchment S.DRIVE:

Runoff = 3.20 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac) (CN Des	cription		
*	0.	168	98			
*	0.	206	69			
	0.374 82		82 Wei	ghted Aver	age	
	0.	206	69 55.0	8% Pervio	us Area	
	0.	168	98 44.9	2% Imperv	ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	5.0	35	0.0400	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	E 7	00	Tatal			

5.7 88 Total

Summary for Subcatchment S.LP:

Runoff = 7.96 cfs @ 12.14 hrs, Volume= 0.457 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	cription		
*	0.	770	98				
*	0.	000	69				
	0.	770	98	Weig	phted Aver	age	
	0.	770	98	100.	00% Impe	rvious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.01 cfs @ 12.14 hrs, Volume= 0.057 af, Depth= 6.38"

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MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 ns LLC Page 44

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Area	(ac) (CN Des	cription		
0.	024	69 50-7	75% Grass	cover, Fair	, HSG B
0.	083	98 Wat	er Surface	, HSG B	
0.	107	91 Wei	ghted Aver	age	
0.	024	69 22.4	3% Pervio	us Area	
0.	083	98 77.5	57% Imperv	vious Area	
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.8	43	0.0280	0.11		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SE.LP:

Runoff	=	0.27 cfs @	12.10 hrs, Volume	= 0.012 af, Depth= 4.00"
			- ,	

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac) (CN	Desc	ription					
*	0.0	002	98							
*	0.0)33	69							
	0.0)35	71	Weig	hted Aver	age				
	0.0)33	69	94.2	9% Pervio	us Area				
	0.0	002	98	5.71	% Impervi	ous Area				
	_									
	ŢĊ	Length		Slope	Velocity	Capacity	Description			
	(min)	(feet)		(ft/ft)	(ft/sec)	(cfs)				
	3.9	22	0	.0300	0.10		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment SWLEX:

Runoff = 3.23 cfs @ 12.10 hrs, Volume= 0.156 af, Depth= 5.78"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

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To (min)	c Length	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9) 11	0.0150	0.06	(/	Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.7	′ 48	0.0225	1.17		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
2.0		Tatal			

3.6 59 Total

Summary for Subcatchment TCF:

Runoff 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89" =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

Area ((ac)	CN	Desc	ription		
0.	540	98	Pave	d parking,	HSG C	
0.	040	69	50-7	5% Grass	cover, Fair	r, HSG B
0.	580	96	Weig	hted Aver	age	
0.0	0.040 69 6.90% Pervious Area					
0.540 98 93.10% Impervious Area					rious Area	
Tc (min)	Leng (fee	th S t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0						Direct Entry,

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18" Runoff =

	Area	(ac)	CN	Desc	ription		
*	0.	250	96	ROA	DWAY		
_	0.	070	69	50-7	5% Grass	cover, Fair,	, HSG B
	0.	320	90	Weig	hted Aver	age	
	0.	320	90	100.0	00% Pervi	ous Area	
	Tc (min)	Length (feet)	n S)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.3	15	5 0.0	0500	0.11		Sheet Flow,
	1.3	130	0.0	0307	1.61		Grass: Dense $n=0.240$ P2= 2.81" Sheet Flow, Smooth surfaces $n=0.011$ P2= 2.81"
_	0.4	50	0.0	0125	2.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	4.0	195	5 To	otal			

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year Rainfall=7.36"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.6	, 4% Pervio	us Area	
	0.	420	98	89.3	6% Imperv	vious Area	
	Tc (min)	Lengt (feet	h :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	1	3 0	.0500	0.10		Sheet Flow,
	1.4	10	50	.0187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	11	8 T	otal			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

	Area	(ac) (CN Des	cription		
*	1.	750	98			
*	0.	470	69			
*	0.	110	85			
	2.	330	92 Wei	ahted Aver	ade	
	0.	580	72 24.8	9% Pervio	us Area	
	1.	750	98 75.1	1% Imperv	/ious Area	
				·		
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	13.0	58	0.0100	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0.0100	4.54	3.56	Pipe Channel,
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
						n= 0.013
	0.4	126	0.0100	5.26	6.46	Pipe Channel,
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
						n= 0.013
	0.2	54	0.0055	4.41	7.79	Pipe Channel,
						18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
_						n= 0.013
	14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow A	Area	=	8.347 ac, 7	4.17% Imp	ervious,	Inflow Depth =	5.8	30" for 100)-Year event	1
Inflow	:	=	39.64 cfs @	12.27 hrs,	Volume	= 4.036	af			
Outflow	/ :	=	39.64 cfs @	12.27 hrs,	Volume	= 4.036	af,	Atten= 0%,	Lag= 0.0 m	in

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Are	ea =	2.330 ac, 75.11% Impervious, Inflo	Dw Depth = 6.38"	for 100-Year event
Inflow	=	17.27 cfs @ 12.22 hrs, Volume=	1.238 af	
Outflow	=	17.27 cfs @ 12.22 hrs, Volume=	1.238 af, Att	en= 0%, Lag= 0.0 min
Primary	=	17.27 cfs @_ 12.22 hrs, Volume=	1.238 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge) **1=Culvert** (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

Summary for Pond 61: Stub-61

Inflow A	rea =	0.580 ac, 93.10% Impervious, Inflo	w Depth = 6.89"	for 100-Year event
Inflow	=	5.85 cfs @ 12.14 hrs, Volume=	0.333 af	
Outflow	=	5.85 cfs @ 12.14 hrs, Volume=	0.333 af, Atte	n= 0%, Lag= 0.0 min
Primary	=	5.85 cfs @ 12.14 hrs, Volume=	0.333 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900
			Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge) **1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108":

Inflow Area	=	2.427 ac, 7	8.57% Impervious,	Inflow Depth =	5.56" for	100-Year event
Inflow	=	15.23 cfs @	12.24 hrs, Volume	= 1.124 :	af	
Outflow	=	11.83 cfs @	12.26 hrs, Volume	= 1.109 :	af, Atten=	22%, Lag= 1.5 min
Discarded	=	0.01 cfs @	12.25 hrs, Volume	= 0.024 ;	af	
Primary	=	11.82 cfs @	12.26 hrs, Volume	= 1.084 :	af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 892.59' @ 12.27 hrs Surf.Area= 0.022 ac Storage= 0.141 af

Plug-Flow detention time= 48.5 min calculated for 1.109 af (99% of inflow) Center-of-Mass det. time= 40.4 min (838.0 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	4.00'D x 4.50'H Vertical Cone/Cylinder x 2
#2	881.00'	0.052 af	14.00'W x 66.00'L x 10.25'H Prismatoid
			0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	108.0" Round Pipe Storage Inside #2
			L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2 #3	Device 1 Device 1	882.50' 889.50'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.5' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=892.30' (Free Discharge) **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=10.84 cfs @ 12.26 hrs HW=892.14' (Free Discharge)

-**1=Culvert** (Passes 10.84 cfs of 44.60 cfs potential flow)

2=Orifice/Grate (Orifice Controls 5.13 cfs @ 14.69 fps)

-3=Broad-Crested Rectangular Weir (Weir Controls 5.71 cfs @ 4.32 fps)

Summary for Pond 110:

 Inflow Area =
 1.460 ac, 85.62% Impervious, Inflow Depth = 6.64" for 100-Year event

 Inflow =
 12.36 cfs @ 12.09 hrs, Volume=
 0.808 af

 Outflow =
 12.36 cfs @ 12.09 hrs, Volume=
 0.808 af, Atten= 0%, Lag= 0.0 min

 Primary =
 12.36 cfs @ 12.09 hrs, Volume=
 0.808 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 890.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=11.93 cfs @ 12.09 hrs HW=890.40' (Free Discharge) **1=Culvert** (Barrel Controls 11.93 cfs @ 9.72 fps)

Summary for Pond 120:

Inflow Area	a =	0.890 ac, 9	3.26% Impe	ervious,	Inflow Dept	:h = 6	.90" for	100-	Year eve	ent
Inflow	=	10.09 cfs @	12.08 hrs,	Volume	= 0.	.512 af				
Outflow	=	10.09 cfs @	12.08 hrs,	Volume	= 0.	.512 af	, Atten= ()%, L	_ag= 0.0	min
Primary	=	10.09 cfs @	12.08 hrs,	Volume	= 0.	.512 af				

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.51 cfs @ 12.08 hrs HW=890.63' (Free Discharge) —1=Culvert (Barrel Controls 9.51 cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Area	ı =	0.420 ac, 9	7.62% Impe	ervious,	Inflow Depth =	7.04	" for 100	-Year event
Inflow	=	4.99 cfs @	12.06 hrs,	Volume	= 0.240	5 af		
Outflow	=	4.99 cfs @	12.06 hrs,	Volume	= 0.240	5 af, A	Atten= 0%,	Lag= 0.0 min
Primary	=	4.99 cfs @	12.06 hrs,	Volume	= 0.240	5 af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500
			Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge) **1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area	ı =	0.070 ac,	85.71% Impe	ervious,	Inflow Depth	= 6.6	5" for 100	-Year event
Inflow	=	0.80 cfs @	12.09 hrs,	Volume	= 0.03	39 af		
Outflow	=	0.80 cfs @	12.09 hrs,	Volume	= 0.03	39 af, <i>1</i>	Atten= 0%,	Lag= 0.0 min
Primary	=	0.80 cfs @	12.09 hrs,	Volume	= 0.03	39 af		-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge) ☐ 1=Culvert (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area	=	0.080 ac, 6	62.50% Impe	ervious,	Inflow Dep	th = 5	5.88" fo	or 100	-Year eve	ent
Inflow	=	0.85 cfs @	12.07 hrs,	Volume	= 0).039 a	f			
Outflow	=	0.85 cfs @	12.07 hrs,	Volume	= 0).039 a	f, Atten	= 0%,	Lag= 0.0	min
Primary	=	0.85 cfs @	12.07 hrs,	Volume	= 0).039 a	f			

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500
			Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge) ←1=Culvert (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Ar	rea =	0.120 ac, 91.67% Impervious, I	nflow Depth = 6.84"	for 100-Year event
Inflow	=	1.43 cfs @ 12.06 hrs, Volume=	0.068 af	
Outflow	=	1.43 cfs @ 12.06 hrs, Volume=	0.068 af, At	tten= 0%, Lag= 0.0 min
Primary	=	1.43 cfs @ 12.06 hrs, Volume=	0.068 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.90' @ 12.06 hrs

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MSE 24-hr 3 100-Year Rainfall=7.36" Printed 12/9/2020 С Page 51

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Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge) ☐ 1=Culvert (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond PROP: (new Pond)

Inflow Area	a =	1.377 ac,10	0.00% Impervious,	Inflow Depth = $7.$	12" for 100-Year event
Inflow	=	14.24 cfs @	12.14 hrs, Volume	= 0.817 af	
Outflow	=	8.53 cfs @	12.24 hrs, Volume	= 0.817 af,	Atten= 40%, Lag= 6.2 min
Discarded	=	0.05 cfs @	4.05 hrs, Volume	= 0.172 af	-
Primary	=	8.48 cfs @	12.24 hrs, Volume	= 0.645 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 895.11' @ 12.24 hrs Surf.Area= 0.057 ac Storage= 0.349 af

Plug-Flow detention time= 229.9 min calculated for 0.817 af (100% of inflow) Center-of-Mass det. time= 230.7 min (972.1 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	45.00'W x 55.00'L x 9.00'H Field A
			0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	CMP Round 96 x 8 Inside #1
			Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf
			Overall Size= 96.0"W x 96.0"H x 20.00'L
			Row Length Adjustment= -5.00' x 50.27 sf x 4 rows
			41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	4.00'D x 5.00'H Vertical Cone/Cylinder x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2 #3 #4	Device 1 Discarded Device 1	889.10' 886.50' 894.40'	 6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.800 in/hr Exfiltration over Surface area 4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

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Discarded OutFlow Max=0.05 cfs @ 4.05 hrs HW=886.65' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=8.57 cfs @ 12.24 hrs HW=895.08' (Free Discharge) 1=Culvert (Passes 8.57 cfs of 8.94 cfs potential flow) 2=Orifice/Grate (Orifice Controls 2.26 cfs @ 11.53 fps) 4=Broad-Crested Rectangular Weir (Weir Controls 6.30 cfs @ 2.31 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac, 7	4.57% Impervious,	Inflow Depth = 6.4	09" for 100-Year event
Inflow =	46.14 cfs @	12.11 hrs, Volume	= 4.189 af	
Outflow =	39.54 cfs @	12.27 hrs, Volume	= 4.189 af,	Atten= 14%, Lag= 9.1 min
Discarded =	0.10 cfs @	12.27 hrs, Volume	= 0.189 af	
Primary =	10.74 cfs @	12.27 hrs, Volume	= 3.284 af	
Secondary =	28.70 cfs @	12.27 hrs, Volume	= 0.716 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 889.55' @ 12.27 hrs Surf.Area= 17,081 sf Storage= 38,879 cf

Plug-Flow detention time= 68.4 min calculated for 4.187 af (100% of inflow) Center-of-Mass det. time= 69.2 min (838.7 - 769.5)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 st x 2 rows
		05 6	12.50° Header x 19.63 st x 1 = 245.4 cf Inside
#5	886.25	25 cf	4.00 ^o D x 2.00 ^o H CBMH-30
#6 //3	886.25	29 Cf	4.00°D x 2.29°H CBMH-31
#1 #0	886.25	35 CT	4.00'D X 2.82'H CBMH-40
#8 #0	880.25	40 Cf	
#9 #10	000.20	57 Cl 50 cf	
#10 #11	000.20	59 CI	
#11 #10	000.20	00 Cl	
#12 #13	000.20 886.25'	02 CI 60 cf	
#13 #14	886.25'	00 Cl 66 cf	
#14	886 25'	50 cf	
#16	886 25'	62 cf	4 00'D x 4 92'H CBMH-100
#17	888 33'	8 117 cf	Custom Stage Data (Prismatic) isted below (Recalc)
		e , e ,	

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
888.33		15	0	0				
888.50		345	31	31				
889.0	00	3,000	836	867				
889.5	50	7,000	2,500	3,367				
890.0	00	12,000	4,750	8,117				
Device	Routing	Invert	Outlet Devices					
#1	#1 Discarded 880.75' 0.250 in/hr Exfiltration over Surface area							
#2	Primary	880.39'	12.0" Round Culvert L= 55.0' Ke= 0.500					
			Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900					
			n= 0.013, Flow	= 0.013, Flow Area= 0.79 sf				
#3	Device 2	881.60'	7.0" Vert. Orifi	ce/Grate C=	0.600 Limited to weir flow at low heads			
#4	Device 2	881.60'	8.0" Vert. Orifi	ce/Grate X 2.0	00 C= 0.600			
			Limited to weir	flow at low hea	ads			
#5 Device 2 885.60'			7.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00					

Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 #6 Secondary 888.50' 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

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Discarded OutFlow Max=0.10 cfs @ 12.27 hrs HW=889.54' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.74 cfs @ 12.27 hrs HW=889.54' (Free Discharge) -2=Culvert (Barrel Controls 10.74 cfs @ 13.67 fps) **3=Orifice/Grate** (Passes < 3.56 cfs potential flow) -4=Orifice/Grate (Passes < 9.27 cfs potential flow) -5=Broad-Crested Rectangular Weir (Passes < 181.62 cfs potential flow)

Secondary OutFlow Max=28.37 cfs @ 12.27 hrs HW=889.54' (Free Discharge) G=Broad-Crested Rectangular Weir (Weir Controls 28.37 cfs @ 2.73 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	ription		
*	0.	.110	98				
*	0.	.030	69				
	0.140 9		92	2 Weighted Average			
	0.	.030	69	21.4	3% Pervio	us Area	
	0.	.110	98	78.57	7% Imperv	vious Area	
	Tc (min)	Length (feet	n SI	lope ′ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	3.0	13	3 0.0	200	0.07		Sheet Flow.
							Grass: Dense n= 0.240 P2= 2.81"
	0.1	5	5 0.0	200	0.71		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.6	34	0.0	170	0.97		Sheet Flow,
							Smooth surfaces n= 0.011 P2= 2.81"
	0.2	36	6.0	195	2.83		Shallow Concentrated Flow,
_							Paved Kv= 20.3 fps
	~ ~	~ ~ ~	т.4	41			

3.9 88 Total

Summary for Subcatchment CART:

Runoff = 1.74 cfs @ 12.23 hrs, Volume= 0.125 af, Depth= 4.56"

Area (ac) C		CN	Desc	cription			
*	0.	210	98				
*	0.	0.120 69					
	0.	330	87	Weig	ghted Aver	age	
	0.	120	69	36.3	6% Pervio	us Area	
	0.	210	98	63.6	34% Impervious Area		
	Tc (min)	Lengt (feet	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	13.7	6	2 0	0.0100	0.08		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.3	8	50	0.0100	4.54	3.56	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
	0.8	25	50	0.0100	5.26	6.46	Pipe Channel,
							15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
_							n= 0.013
	14.8	40	2 T	otal			

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	cription		
*	0.	060	98				
*	0.	010	69				
	0.070 94 Weighted Average				hted Aver	age	
	0.	010	69	14.2	9% Pervio	us Area	
	0.060 98 85.71% Impervious Area				1% Imperv	vious Area	
	Tc (min)	Length (feet	ו :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	13	30	.0500	0.10		Sheet Flow,
	0.9	85	50	.0400	1.65		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.0	98	3 T	otal			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

Area (ac)		CN	Desc	cription			
*	0.190 98		98				
*	0.	100	69				
	0.	290	88	Weig	hted Aver	age	
	0.	100	69	34.4	8% Pervio	us Area	
	0.	190	98	65.5	2% Imperv	vious Area	
	Tc (min)	Lengtl (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.8	15) 0.	0700	0.20		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.9	13	70.	0310	2.64		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
	0.4	16	6 0.	0200	6.42	5.04	Pipe Channel,
							12.0" Round Area= 0.8 st Perim= 3.1" r= 0.25'
_							1= 0.013
	14.1	45	3 To	otal			

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Summary for Subcatchment E.ALDI:

3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87" Runoff =

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN [Desc	cription		
*	0.	420	98				
*	0.	150	69				
	0.	570	90 \	Weig	hted Aver	age	
	0.	150	69 2	26.32% Pervious Area			
	0.420 98 73.68% Impervious Area				8% Imperv	vious Area	
	То	Longth	SIC	200	Volocity	Capacity	Description
	(min)	(feet)) (fl	t/ft)	(ft/sec)	(cfs)	Description
	14.5	115	0.03	300	0.13		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.81"
	0.7	100	0.01	150	2.49		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps
	15.2	215	Tota	al			

215 Total

Summary for Subcatchment E.CART:

Runoff = 1.84 cfs @ 12.23 hrs, Volume= 0.127 af, Depth= 3.55"

25'

Summary for Subcatchment E.LP:

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

_	Area	(ac)	CN	Desc	ription					
*	0.	029	98							
*	0.	022	69							
	0.051 85 Weighted Average									
	0.022 69			43.14	4% Pervio	us Area				
	0.029		98	56.8	6% Imperv	vious Area				
	Tc (min)	Lengt (fee	h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.0	1	6 0	.0300	0.09		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment N.LP:

Runoff = 5.02 cfs @ 12.14 hrs, Volume= 0.286 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Desc	ription		
*	0.6	607	98				
*	0.0	000	69				
	0.6	607	98	Weig	hted Aver	age	
	0.6	607	98	100.0	00% Imper	rvious Area	a
	Tc (min)	Lengtł (feet	n 8)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

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1.5 48 Total

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)) CN	N Desc	cription					
0.010 69 50-75% Grass cover, Fair, HSG B								
0.110) 98	B Pave	ed parking,	, HSG B				
0.120) 96	6 Weig	ghted Aver	age				
0.010) 69	9 8.33	% Perviou	s Ārea				
0.110) 98	3 91.6	7% Imperv	vious Area				
Tc Le (min) (ength feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
0.5	33	0.0215	1.06		Sheet Flow,			
					Smooth surfaces	n= 0.011	P2= 2.81"	
0.6	27	0.0108	0.78		Sheet Flow,			
					Smooth surfaces	n= 0.011	P2= 2.81"	
1.1	60	Total						

Summary for Subcatchment ROOF:

Runoff = 3.44 cfs @ 12.06 hrs, Volume= 0.165 af, Depth= 5.66"

	Area	(ac)	CN	Desc	cription		
*	0.	350	98	ROC)F		
	0.	350	98	100.	00% Impe	rvious Area	3
	Тс	Lengt	h	Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	1.0						Direct Entry,

Summary for Subcatchment S.DRIVE:

Runoff = 2.41 cfs @ 12.13 hrs, Volume= 0.124 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac) C	N Des	cription		
*	0.	168	98			
*	0.	206	69			
_	0.374		82 Wei	ghted Aver	age	
	0.	206	69 55.0	8% Pervio	us Area	
	0.	168	98 44.9	2% Imperv	/ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	5.0	35	0.0400	0.12		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.2	7	0.0200	0.76		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.4	28	0.0370	1.28		Sheet Flow,
						Smooth surfaces n= 0.011 P2= 2.81"
	0.1	18	0.0295	3.49		Shallow Concentrated Flow,
						Paved Kv= 20.3 fps
	- -	00	T . 4 . 1			

5.7 88 Total

Summary for Subcatchment S.LP:

Runoff = 6.37 cfs @ 12.14 hrs, Volume= 0.363 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	cription		
*	0.	770	98				
*	0.	000	69				
	0.	770	98	Weig	phted Aver	age	
	0.	770	98	100.	00% Impe	rvious Area	
	Tc (min)	Lengt (fee	:h t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	7.0						Direct Entry,

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.79 cfs @ 12.14 hrs, Volume= 0.044 af, Depth= 4.98"

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Area ((ac) (CN Des	Description						
0.0	024	69 50-7	5% Grass	cover, Fair	, HSG B				
0.0									
0.1	107	91 Wei	ghted Aver	age					
0.0	024	69 22.4	3% Pervio	us Area					
0.083 98 77.57% Impervious Area				∕ious Area					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
6.8	43	0.0280	0.11		Sheet Flow,				
0.4	33	0.0333	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"				
7.2	76	Total							

Summary for Subcatchment SE.LP:

Runoff =	0.19 cfs @	12.10 hrs,	Volume=	0.008 af, Depth= 2.81"
----------	------------	------------	---------	------------------------

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area ((ac)	CN	Desc	ription					
*	0.0	002	98							
*	0.0	033	69							
	0.0	035	71	Weig	hted Aver	age				
	0.033 69 94.29% Pervious Area									
	0.002 98 5.71% Impervious Area									
	Tc (min)	Lengt (feet	h :)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	3.9	2	2 0	.0300	0.10		Sheet Flow, Grass: Dense	n= 0.240	P2= 2.81"	

Summary for Subcatchment SWLEX:

Runoff = 2.48 cfs @ 12.10 hrs, Volume= 0.119 af, Depth= 4.43"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		Sheet Flow,
					Smooth surfaces n= 0.011 P2= 2.81"
2.6	50	Tatal			

3.6 59 Total

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

CN	Description				
98	Paved parking, HSG C				
0.040 69 50-75% Grass cover, Fair, HSG B					
96	Weighted Average				
69	6.90% Pervious Area				
98	93.10% Impervious Area				
th S t)	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)				
	Direct Entry,				
	CN 98 69 96 69 98 :h \$ t)				

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

	Area	(ac)	CN	Desc	ription		
*	0.	250	96	ROA	DWAY		
_	0.	070	69	50-7	5% Grass	cover, Fair,	HSG B
	0.	320	90	Weig	hted Aver	age	
	0.	320	90	100.0	00% Pervi	ous Area	
	Tc (min)	Length (feet	n S)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.3	15	5 0.0	0500	0.11		Sheet Flow,
	1.3	130) 0.0	0307	1.61		Grass: Dense $n=0.240$ P2= 2.81" Sheet Flow, Smooth surfaces $n=0.011$ P2= 2.81"
	0.4	50) 0.0	0125	2.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
	4.0	195	5 To	otal			

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Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area	(ac)	CN	Desc	cription		
*	0.	420	98				
*	0.	050	69				
	0.	470	95	Weig	hted Aver	age	
	0.	050	69	10.6	, 4% Pervio	us Area	
	0.	420	98	89.3	6% Imperv	vious Area	
	Tc (min)	Lengtl (feet	ר ()	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	2.1	1:	30	.0500	0.10		Sheet Flow,
	1.4	10	50	.0187	1.27		Grass: Dense n= 0.240 P2= 2.81" Sheet Flow, Smooth surfaces n= 0.011 P2= 2.81"
	3.5	118	3 T	otal			

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

	Area	(ac) C	N Des	cription		
*	1.	750	98			
*	0.	470	69			
*	0.	110	85			
	2.	330	92 Weig	ghted Aver	age	
	0.	580	72 24.8	9% Pervio	uš Area	
	1.	750	98 75.1	1% Imperv	ious Area/	
	Tc	l enath	Slone	Velocity	Canacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
	13.0	58	0.0100	0.07		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.81"
	0.6	159	0.0100	4.54	3.56	Pipe Channel,
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
						n= 0.013
	0.4	126	0.0100	5.26	6.46	Pipe Channel,
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
						n= 0.013
	0.2	54	0.0055	4.41	7.79	Pipe Channel,
						18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
_						n= 0.013
	14.2	397	Total			

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Summary for Reach 2R: (new Reach)

 Inflow Area =
 8.347 ac, 74.17% Impervious, Inflow Depth =
 4.43" for 100-Year St. Paul event

 Inflow =
 25.23 cfs @
 12.31 hrs, Volume=
 3.085 af

 Outflow =
 25.23 cfs @
 12.31 hrs, Volume=
 3.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Ar	ea =	2.330 ac, 75.11% Impervious, Inflo	ow Depth = 4.98"	for 100-Year St. Paul event
Inflow	=	13.52 cfs @ 12.22 hrs, Volume=	0.966 af	
Outflow	=	13.52 cfs @_ 12.22 hrs, Volume=	0.966 af, Atter	n= 0%, Lag= 0.0 min
Primary	=	13.52 cfs @ 12.22 hrs, Volume=	0.966 af	-

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	18.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge) **1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	15.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge) ☐ 1=Culvert (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow	Area =	0.580 ac, 93.10% Impervious, Inflow	v Depth = 5.45" for 100-Year St. Paul event
Inflow	=	4.65 cfs @ 12.14 hrs, Volume=	0.264 af
Outflov	w =	4.65 cfs @_ 12.14 hrs, Volume=	0.264 af, Atten= 0%, Lag= 0.0 min
Primar	ry =	4.65 cfs @ 12.14 hrs, Volume=	0.264 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	12.0" Round Culvert L= 22.0' Ke= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge) **1=Culvert** (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108":

Inflow Area	=	2.427 ac, 7	78.57% Impe	ervious,	Inflow Depth =	4.18" for	- 100-Y	ear St. Paul e	vent
Inflow	=	7.13 cfs @	12.23 hrs,	Volume=	= 0.844	af			
Outflow	=	4.30 cfs @	12.48 hrs,	Volume	= 0.844	af, Atten=	40%, L	_ag= 14.8 min	
Discarded	=	0.01 cfs @	4.05 hrs,	Volume=	= 0.024	af		-	
Primary	=	4.29 cfs @	12.48 hrs,	Volume	= 0.820	af			

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 889.36' @ 12.48 hrs Surf.Area= 0.021 ac Storage= 0.118 af

Plug-Flow detention time= 46.9 min calculated for 0.844 af (100% of inflow) Center-of-Mass det. time= 48.1 min (851.3 - 803.2)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	4.00'D x 4.50'H Vertical Cone/Cylinder x 2
#2	881.00'	0.052 af	14.00'W x 66.00'L x 10.25'H Prismatoid
			0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	108.0" Round Pipe Storage Inside #2
			L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	24.0" Round Culvert L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	0.5' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 4.05 hrs HW=881.14' (Free Discharge) **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=4.29 cfs @ 12.48 hrs HW=889.34' (Free Discharge)

1=Culvert (Passes 4.29 cfs of 36.71 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 4.29 cfs @ 12.28 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 110:

 Inflow Area =
 1.460 ac, 85.62% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event

 Inflow =
 9.79 cfs @ 12.09 hrs, Volume=
 0.636 af

 Outflow =
 9.79 cfs @ 12.09 hrs, Volume=
 0.636 af, Atten= 0%, Lag= 0.0 min

 Primary =
 9.79 cfs @ 12.09 hrs, Volume=
 0.636 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	15.0" Round Culvert L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge) ☐ 1=Culvert (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area	=	0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul event
Inflow	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af
Outflow	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary	=	3.03 cfs @ 12.08 hrs, Volume= 0.405 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 889.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	15.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge) **1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)

Summary for Pond 130:

Inflow Are	a =	0.420 ac, 97.62% Impervious, Inflow Depth = 5.59" for 100-Year St. Paul ev	/ent
Inflow	=	3.99 cfs @ 12.06 hrs, Volume= 0.196 af	
Outflow	=	3.99 cfs @ 12.06 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min	
Primary	=	3.99 cfs @ 12.06 hrs, Volume= 0.196 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	12.0" Round Culvert L= 68.0' Ke= 0.500
			Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge) **1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow Area	a =	0.070 ac, 85.71% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow	=	0.63 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow	=).63 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary	=).63 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	12.0" Round Culvert L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge) **1=Culvert** (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

Inflow Area	a =	0.080 ac, 0	62.50% Impe	ervious,	Inflow	Depth =	4.53"	for	100-Year	St. Paul	event
Inflow	=	0.65 cfs @	12.07 hrs,	Volume	=	0.030	af				
Outflow	=	0.65 cfs @	12.07 hrs,	Volume	=	0.030	af, At	ten= 0	%, Lag=	0.0 min	
Primary	=	0.65 cfs @	12.07 hrs,	Volume	=	0.030	af		-		

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	12.0" Round Culvert L= 23.0' Ke= 0.500
			Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge) ←1=Culvert (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Are	ea =	0.120 ac, 91.67% Impervious, Infl	ow Depth = 5.41" for 100-Year St. Paul event
Inflow	=	1.13 cfs @ 12.06 hrs, Volume=	0.054 af
Outflow	=	1.13 cfs $\overline{@}$ 12.06 hrs, Volume=	0.054 af, Atten= 0%, Lag= 0.0 min
Primary	=	1.13 cfs @ 12.06 hrs, Volume=	0.054 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 884.80' @ 12.06 hrs

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Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	12.0" Round Culvert L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge) ☐ 1=Culvert (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond PROP: (new Pond)

Inflow Area	a =	1.377 ac,10	0.00% Impervious, Ir	nflow Depth = 5.66	" for 100-Y	/ear St. Paul event
Inflow	=	11.40 cfs @	12.14 hrs, Volume=	0.650 af		
Outflow	=	2.32 cfs @	12.43 hrs, Volume=	0.650 af, A	Atten= 80%, 1	Lag= 17.3 min
Discarded	=	0.05 cfs @	4.80 hrs, Volume=	0.169 af		-
Primary	=	2.27 cfs @	12.43 hrs, Volume=	0.480 af		

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 894.45' @ 12.43 hrs Surf.Area= 0.057 ac Storage= 0.330 af

Plug-Flow detention time= 273.2 min calculated for 0.650 af (100% of inflow) Center-of-Mass det. time= 272.9 min (1,016.9 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	45.00'W x 55.00'L x 9.00'H Field A
			0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	CMP Round 96 x 8 Inside #1
			Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf
			Overall Size= 96.0"W x 96.0"H x 20.00'L
			Row Length Adjustment= -5.00' x 50.27 sf x 4 rows
			41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	4.00'D x 5.00'H Vertical Cone/Cylinder x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2 #3 #4	Device 1 Discarded Device 1	889.10' 886.50' 894.40'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 0.800 in/hr Exfiltration over Surface area 4.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 4.80 hrs HW=886.65' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=2.26 cfs @ 12.43 hrs HW=894.45' (Free Discharge) 1=Culvert (Passes 2.26 cfs of 8.41 cfs potential flow) 2=Orifice/Grate (Orifice Controls 2.14 cfs @ 10.87 fps) 4=Broad-Crested Rectangular Weir (Weir Controls 0.12 cfs @ 0.60 fps)

Summary for Pond SYS: (new Pond)

Inflow Area	=	8.261 ac, 7	4.57% Impervi	ious, Inflow [Depth = 4	.71" for	100-Year \$	St. Paul event
Inflow	=	36.27 cfs @	12.11 hrs, Vo	olume=	3.244 af			
Outflow	=	25.18 cfs @	12.31 hrs, Vo	olume=	3.244 af	, Atten= 3	1%, Lag=	11.5 min
Discarded	=	0.08 cfs @	12.31 hrs, Vo	olume=	0.186 af			
Primary	=	10.52 cfs @	12.31 hrs, Vo	olume=	2.816 af			
Secondary	=	14.58 cfs @	12.31 hrs, Vo	olume=	0.242 af			

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs Peak Elev= 889.16' @ 12.31 hrs Surf.Area= 13,927 sf Storage= 36,601 cf

Plug-Flow detention time= 82.5 min calculated for 3.244 af (100% of inflow) Center-of-Mass det. time= 81.8 min (854.3 - 772.5)

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Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	18.50'W x 316.00'L x 6.00'H Field A
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	CMP Round 60 x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	18.50'W x 196.00'L x 6.00'H Field B
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	CMP Round 60 x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	4.00'D x 2.00'H CBMH-30
#6	886.25'	29 cf	4.00'D x 2.29'H CBMH-31
#7	886.25'	35 cf	4.00'D x 2.82'H CBMH-40
#8	886.25'	40 cf	4.00'D x 3.18'H CBMH-41
#9	886.25'	57 cf	4.00'D x 4.50'H CBMH-50
#10	886.25'	59 cf	4.00'D x 4.70'H CBMH-51
#11	886.25'	60 cf	4.00'D x 4.80'H CBMH-52
#12	886.25'	62 cf	4.00'D x 4.95'H CBMH-60
#13	886.25'	60 cf	4.00'D x 4.75'H CBMH-70
#14	886.25'	66 cf	4.00'D x 5.26'H CBMH-80
#15	886.25'	59 cf	4.00'D x 4.70'H CBMH-90
#16	886.25'	62 cf	4.00'D x 4.92'H CBMH-100
	888.33'	8,117 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

43,451 cf Total Available Storage

Storage Group A created with Chamber Wizard Storage Group B created with Chamber Wizard

Elevation S (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
888.33		15	0	0	
888.50		345	31	31	
889.00		3,000	836	867	
889.50		7,000	2,500	3,367	
890.00		12,000	4,750	8,117	
	_				
Device	Routing	Invert	Outlet Devices		
#1	Discarded	880.75'	0.250 in/hr Exfiltration over Surface area		
#2	Primary	880.39'	12.0" Round Culvert L= 55.0' Ke= 0.500		
			Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900		
			n= 0.013, Flow Area= 0.79 sf		
#3	Device 2	881.60'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads		
#4	Device 2	881.60'	8.0" Vert. Orifice/Grate X 2.00 C= 0.600		
			Limited to weir	flow at low hea	ads
#5	Device 2	885.60'	7.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00		

19114-overall PROP as built crMSE 24-hr 3100-Year St. Paul Rainfall=5.90"Prepared by {enter your company name here}Printed 12/9/2020HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLCPage 71

 #6
 Secondary
 888.50'
 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.32

 #6
 Secondary
 888.50'
 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

 Discarded OutFlow Max=0.08 cfs @ 12.31 hrs
 HW=889.15' (Free Discharge)

 -1=Exfiltration (Exfiltration Controls 0.08 cfs)
 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=10.52 cfs @ 12.31 hrs HW=889.15' (Free Discharge) 2=Culvert (Barrel Controls 10.52 cfs @ 13.39 fps) -3=Orifice/Grate (Passes < 3.47 cfs potential flow) -4=Orifice/Grate (Passes < 9.03 cfs potential flow) -5=Broad-Crested Rectangular Weir (Passes < 155.53 cfs potential flow)

Secondary OutFlow Max=14.18 cfs @ 12.31 hrs HW=889.15' (Free Discharge) G=Broad-Crested Rectangular Weir (Weir Controls 14.18 cfs @ 2.18 fps)

Figures A

Existing Drainage Map Proposed Drainage Map







PROFESSIONAL SIGNATURE

QUALITY CONTROL



St. Paul, MN

OWNER NAME

OWNER ADDRE

LOUCKS

PLANNING CIML ENGINEERING LAND SURVEYING LANDSCAPE ARCHITECTURE ENVIRONMENTAL 7200 Heniock Lane, Suite 300 Maple Grove, MV 5536 753.424.5505 www.loucksinc.com



LEXINGTON APARTMENTS

St. Paul, MN

OWNER NAM

VNER ADDRESS



PLANNING CIVIL ENGINEERING LAND SURVEYING LANDSCAPE ARCHITECTURE ENVIRONMENTAL 7200 Hemlock Lane, Suite 300 Maple Grove, MM 5369 763.424.505 www.loucksinc.com





PROPOSED HYDROLOGY AREAS


Figure B

Geotechnical Report

Geotechnical Evaluation Report

Proposed Mixed-Use Building Southwest of North Lexington Parkway and University Avenue West St. Paul, Minnesota

Prepared for

Alatus, LLC

Professional Certification:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Whank O

Mark L. Jenkins, PE Senior Engineer License Number: 41770 October 1, 2019



Project B1907294

Braun Intertec Corporation





Braun Intertec Corporation 11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952.995.2000 Fax: 952.995.2020 Web: braunintertec.com

October 1, 2019

Project B1907294

Ms. Carla Dunham Alatus, LLC 800 Nicollet Mall, Suite 2850 Minneapolis, MN 55402

Re: Geotechnical Evaluation Proposed Mixed-Use Building Southwest of North Lexington Parkway and University Avenue West St. Paul, Minnesota

Dear Ms. Dunham:

We are pleased to present this Geotechnical Evaluation Report for the proposed Mixed-Used Building to be located southwest of North Lexington parkway and University Avenue West in St. Paul, Minnesota.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Dan Martin at 952.995.2227 (dmartin@braunintertec.com), Mark Jenkins at 651.487.7010 (mjenkins@braunintertec.com), or Ray Huber (rhuber@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

2 lande

Mark L. Jenkins, PE Senior Engineer

Daniel E. Martin Principal – Senior Project Manager

Ray A. Huber, PE Vice President – Principal Engineer

AA/EOE

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Appendix

Soil Boring Location Sketch Log of Boring Sheets ST-1 through ST-6 Laboratory Test Results Summary Descriptive Terminology of Soil



A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the proposed design and construction of the Mixed-Use Building, located southwest of University Avenue and Lexington Parkway in St. Paul, Minnesota. The project will include the construction of a building with below-grade parking, one level of commercial use and five levels of residential use. Tables 1 and 2 provide project details.

Aspect	Description
Below-grade levels	One (Provided)
Above-grade levels	Six (Provided)
Lowest level floor elevation	881.5 (Provided)
Grade level floor elevation	890 (Provided)
Column loads (kips)	650 (Assumed)
Wall loads (kips/foot)	15 (Assumed)
Cuts or fills for buildings	Cuts of 9 1/2 to 14 1/2 feet to establish basement subgrade elevation; mostly 9 1/2 to 11 feet (Provided)
Tolerable building settlement	1 inch (Assumed)
Comments	Below-grade parking below building, with commercial space on first level (pre-cast concrete walls and precast plank flooring likely) and residential space to be wood-framed

Table 1. Building Description



Table 2. Site Aspects and Grading Description

Aspect	Description
Pavement type(s)	Concrete (below grade) and bituminous (exterior)
Assumed pavement loads	Medium-duty: 150,000 ESALs*
Grade changes	Exterior cuts and fills of less than 5 feet

*Equivalent 18,000-lb single axle loads based on 20-year design.

The figure below shows an illustration of the proposed site layout.



Figure 1. Site Layout

Figure provided by ESG dated June 12, 2019.

A.2. Site Conditions and History

Currently, the site exists as an open parcel with sparse grass.

Current grades range from 889 to 895 1/2 at the boring locations (mostly 889 to 892 1/2). Generally, the site is relatively level, sloping from the northeast to the southwest.



Historically, the site has been impacted by previous development. Previous buildings that were constructed on this site have been demolished and the site is currently graded relatively level.



Photograph 1. Aerial Photograph of the Site in 2018

Photograph provided by Google Earth™.

A.3. Purpose

The purpose of our geotechnical evaluation was to characterize the subsurface geologic conditions at the selected exploration locations and evaluate their impact on the design and construction of building foundations, grade-bearing slabs, below-grade walls, pavements and utilities. Estimated infiltration rates are provided per Minnesota Stormwater Manual guidelines.



A.4. Background Information and Reference Documents

We reviewed the following information:

- Lower and upper level plans prepared by ESG dated June 20, 2019.
- Site survey and topographic plan prepared by Alliant Engineering dated February 26, 2019.
- Previous geotechnical report for this site prepared by Braun Intertec dated April 27, 2001.

In addition to the provided sources, we have used several publicly available sources of information.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB102873 to Ms. Carla Dunham, dated June 27, 2019, and authorized shortly thereafter. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. We selected and staked the new exploration locations in locations that supplement existing boring data. We acquired the surface elevations and locations with GPS technology using the State of Minnesota's permanent GPS base station network. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.
- Performing 6 standard penetration test (SPT) borings, denoted as ST-1 to ST-6, to nominal depths of 31 feet below grade across the site.
- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.



- Perform engineering analysis including bearing capacity, settlement and pavement design.
- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation and the design of foundations, floor slabs, exterior slabs, utilities, stormwater improvements and pavements.

Our authorized scope of services for the project also included a Phase II Environmental Site Assessment, which will be submitted separately.

B. Results

B.1. Geologic Overview

The native soils on this site consist of glacial outwash sands (poorly graded sand and poorly graded sand with silt). Existing fill associated with previous developments covers the site in variable thicknesses.

We based the geologic origins used in this report on the soil types, in-situ and laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Previous Geotechnical Information

We performed 23 borings within, or in close proximity to, this site in 2001. Those historic borings were performed at the locations shown on our Boring Location Sketch in the Appendix.

We could not obtain permission to include those historic boring logs with this report. The data obtained from those historic borings are summarized below in Table 4.

The previous borings were very similar to our current borings, but did encounter isolated layers of lean clay and a few encountered buried topsoil beneath the fill. We accounted for the removal of those materials in Table 4.



B.3. Boring Results

Table 3 provides a summary of the soil boring results, in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheet in the Appendix includes definitions of abbreviations used in Table 3.

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Topsoil fill	SM	NA	 Typically fine-grained Dark brown to black Trace roots Thicknesses at boring locations varied from 4 to 8 inches (mostly 4 inches) Moisture condition generally moist
Fill	SM, SC, SP-SM and CL layers in historic borings	3 to 22 BPF	 Penetration resistance of 3 to 16 BPF Moisture condition generally moist Thicknesses at boring locations varied from 4 to 18 feet (mostly 10 to 11 1/2 feet) Portions with concrete fragments Buried topsoil below fill in a few historic borings (accounted for in Table 4)
Glacial Outwash	SP, SP-SM	4 to 22 BPF	 General penetration resistances of 6 to 11 BPF Moisture condition generally moist May contain cobbles and boulders

Table 3. Subsurface Profile Summary*

*Abbreviations defined in the attached Descriptive Terminology sheet. BPF = blows-per-foot

For simplicity in this report, we define existing fill to mean existing, uncontrolled or undocumented fill.

B.4. Groundwater

We did not observe groundwater while advancing our borings. Based on the historical borings that extended to depths of up to 50 feet, groundwater appeared to be down 45 feet at the time of that exploration. Due to the layered nature of the existing fill, perched groundwater may exist within granular layers of the fill seasonally and periodically. Project planning should anticipate seasonal and annual fluctuations of groundwater.



B.5. Laboratory Test Results

The boring logs show the results of laboratory testing we performed, next to the tested sample depth. A summary table of laboratory test results is included in the Appendix.

The moisture content of the fill was approximately 13 percent, indicating that the materials were likely near their probable optimum moisture contents. The moisture content of the glacial outwash sands ranged from approximately 4 to 6 percent, indicating they were dry of their optimal moisture content.

Our mechanical analyses indicated that the fill contained 32 percent silt and clay by weight (visually ranging from about 15 to 35 percent, with isolated layers of cleaner sand and sandy lean clay based on the historical borings).

C. Recommendations

C.1. Site Grading and Subgrade Preparation

C.1.a. Building Subgrade Excavations

We recommend removing topsoil fill and existing fill from below building slabs, foundations and their oversize areas. Excavations to establish basement subgrade elevation (assumed to be at about elevation 880.5) will sometimes penetrate the existing fill. Table 4 shows the anticipated excavation depths and bottom elevations for each of the recent and historic borings, and the anticipated depth below basement slab subgrade elevation. We also recommend having a geotechnical engineer, or an engineering technician working under the direction of a geotechnical engineer (geotechnical representative), evaluate the suitability of exposed subgrade soils to support the proposed structure. Note that surface grades at the historic borings that were drilling in 2001 may have changed.



Location	Approximate Surface Elevation (feet)	Anticipated Excavation Depth (feet)	Anticipated Bottom Elevation (feet)	Anticipated Depth Below Floor Subgrade (880.5) (feet)
ST-1	889.9	11 1/2	878 1/2	2
ST-2	889.0	10	879	1 1/2
ST-3	889.0	11 1/2	877 1/2	3
ST-4	890.4	18	872 1/2	8
ST-5	895.4	4	891	
ST-6	892.6	10	882 1/2	
HB-1	891.0	14	877	3 1/2
HB-2	890.0	9	881	
HB-3	890.0	6	884	
HB-4	889.0	6	883	
HB-5	891.0	6	885	
HB-6	890.0	9	881	
HB-7	889.0	8	881	
HB-8	889.0	11	878	2 1/2
HB-9	897.0	4	893	
HB-10	896.0	5	891	
HB-11	897.0	3	894	
HB-12	894.0	6	888	
HB-13	893.0	8	885	
HB-14	891.0	7	884	
HB-15	897.0	4	893	

Table 4. Building Excavation Depths



Location	Approximate Surface Elevation (feet)	Anticipated Excavation Depth (feet)	Anticipated Bottom Elevation (feet)	Anticipated Depth Below Floor Subgrade (880.5) (feet)
HB-16	897.0	2	895	
HB-17	897.0	3	894	
HB-18	900.0	2	898	
HB-19	894.7	4	890 1/2	
HB-20	890.0	11	879	1 1/2
HB-21	889.0	1	888	
HB-22	898.0	1	897	
HB-23	892.0	4	888	

Excavation depths will vary between the borings. Portions of the excavations may also extend deeper than indicated by the borings. A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

Prior to the placement of engineered fill or footings, we recommend surface compacting the exposed soils in the bottoms of the excavations with a minimum of 4 passes by a large (minimum diameter of 3 1/2 feet), vibratory smooth-drum compactor, to a minimum of 100 percent of the standard Proctor. The final pass is recommended to be performed in the static mode.

C.1.b. Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or lower gradient. See Figure 2 for an illustration of excavation oversizing.







C.1.c. Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist primarily of existing fill (mostly silty sand and clayey sand). These soils are typically considered Type C Soil under OSHA (Occupational Safety and Health Administration) guidelines. OSHA guidelines indicate unsupported excavations in Type C soils should have a gradient no steeper than 1 1/2H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches." This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.



C.1.d. Excavation Support

In the event there is insufficient room to slope excavations, or if the excavations are exposed to surcharges and need to be shored, we recommend designing the shoring based on the parameters presented below in Table 5. The parameters shown have not been reduced by safety factors.

Saturated unit weights are recommended to account for the potential buildup of hydrostatic pressure behind undrained support structures within the low permeability fill.

Geologic Material	Wet Unit Weight (ɣ, pcf)	Friction Angle (Ø, deg)	Cohesion (C, psf)	K _A	Ko	Kp
Existing fill upper 2 to 18 feet (mostly 6 to 11 feet)	125	30	0	0.33	0.50	3.0
Outwash SP and SP-SM	120	34	0	0.28	0.44	3.5

Table 5. Parameters for Shoring Design

C.1.e. Excavation Dewatering

We recommend removing perched groundwater from the excavations. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as the existing fill. Based on groundwater levels observed in 2001 (at a depth of about 45 feet), we do not expect hydrostatic groundwater will be encountered by the excavations that are anticipated for this project.

C.1.f. Exterior Pavement and Slab Subgrade Preparation

We recommend the following steps for exterior pavement and exterior slab subgrade preparation, understanding the site will have exterior grade changes of 5 feet or less. Note that project planning may need to require additional subcuts to limit frost heave.

- 1. Strip unsuitable soils consisting of topsoil, organic soils, vegetation, existing structures and pavements from the area, within 3 feet of the surface of the proposed pavement grade.
- 2. Have a geotechnical representative observe the excavated subgrade to evaluate if additional subgrade improvements are necessary.



- 3. Slope subgrade soils to areas of sand or drain tile to allow the removal of accumulating water.
- 4. Scarify, moisture condition and surface compact the subgrade with at least 4 passes of a large vibratory roller with a minimum drum diameter of 3 1/2 feet. Surface compact to at least 100 percent of standard Proctor density.
- 5. Place pavement engineered fill to grade and compact in accordance with Section C.1.h to bottom of pavement and exterior slab section. See Section C.5 for additional considerations related to frost heave.
- 6. Proofroll the pavement or exterior slab subgrade as described in Section C.1.g.

To improve long-term pavement performance, we recommend incorporating 18 inches of engineered fill (sand with less than 12 percent by weight passing the #200 sieve) in paved areas, in addition to the recommendations above, as a sand subbase. Section C.7 provides recommended pavement design sections with and without the sand subbase. Note, we recommend sloping subgrade soils to promote drainage and removal of accumulated water.

C.1.g. Exterior Pavement Subgrade Proofroll

After preparing the subgrade as described above and prior to the placement of the aggregate base, we recommend proofrolling the exterior subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proofroll. Areas that fail the proofroll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proofroll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, and/or geotextiles. We recommend performing a second proofroll after the aggregate base material is in place, and prior to placing bituminous or concrete pavement.

C.1.h. Engineered Fill Materials and Compaction

Table 6 below contains our recommendations for engineered fill materials.



Locations To Be Used	Engineered Fill Classification	Possible Soil Type Descriptions	Gradation	Additional Requirements
Below foundationsBelow interior slabs	Structural fill	SP, SP-SM	100% passing 2-inch sieve < 12% passing #200 sieve	< 2% Organic Content (OC)
 Drainage layer Non-frost- susceptible 	 Free-draining Non-frost- susceptible fill 	GP, GW, SP, SW	100% passing 1-inch sieve < 50% passing #40 sieve < 5% passing #200 sieve	< 2% OC
Behind below-grade walls, beyond drainage layer	Retained fill	SP, SW, SP-SM, SW-SM, SM	100% passing 3-inch sieve < 20% passing #200 sieve	< 2% OC Plasticity Index (PI) < 4%
Pavements	Pavement fill	SP, SP-SM, SM, SC	100% passing 3-inch sieve	< 2% OC PI < 15%
Below landscaped surfaces, where subsidence is not a concern	Non-structural fill		100% passing 6-inch sieve	< 10% OC

Table 6. Engineered Fill Materials*

* Engineered fill materials should satisfy the approved Response Action Plan (RAP), or applicable environmental requirements.

* More select soils comprised of coarse sands with < 5% passing #200 sieve may be needed to accommodate work occurring in periods of wet or freezing weather.

We recommend spreading engineered fill in loose lifts of approximately 10 inches thick (for silty and clayey sands a maximum thickness of 8 inches is recommended). We recommend compacting engineered fill in accordance with the criteria presented below in Table 7. The project documents should specify relative compaction of engineered fill, based on the structure located above the engineered fill, and vertical proximity to that structure.



	Relative Compaction, percent	Moisture Content Variance from Optimum, percentage points		
Reference	(ASTM D698 – Standard Proctor)	< 12% Passing #200 Sieve (typically SP, SP-SM)	> 12% Passing #200 Sieve (typically CL, SC, ML, SM)	
Below foundations and oversizing zones	100	±3	-1 to +3	
Below interior slabs	100	±3	-1 to +3	
Within 3 feet of pavement subgrade	100	±3	-2 to +1	
More than 3 feet below pavement subgrade	95	±3	±3	
Below landscaped surfaces	90	±5	±5	
Adjacent to below-grade wall	95*	±3	-1 to +3	

Table 7. Compaction Recommendations Summary

*Increase compaction requirement to meet compaction required for structure supported by this engineered fill.

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

We recommend performing density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

C.1.i. Special Inspections of Soils

We recommend including the site grading and placement of engineered fill within the building pad under the requirements of Special Inspections, as provided in Chapter 17 of the International Building Code, which is part of the Minnesota State Building Code. Special Inspection requires observation of soil conditions below engineered fill or footings, evaluations to determine if excavations extend to the anticipated soils, and if engineered fill materials meet requirements for type of engineered fill and compaction condition of engineered fill. A licensed geotechnical engineer should direct the Special Inspections of site grading and engineered fill placement. The purpose of these Special Inspections is to evaluate whether the work is in accordance with the approved Geotechnical Report for the project. Special Inspections should include evaluation of the subgrade, observing preparation of the subgrade (surface compaction or dewatering, excavation oversizing, placement procedures and materials used for engineered fill, etc.) and compaction testing of the engineered fill.



C.2. Spread Footings

Table 8 below contains our recommended parameters for foundation design.

Item	Description
Maximum net allowable bearing pressure (psf)	6,000
Minimum factor of safety for bearing capacity failure	3.0
Minimum width (inches)	24 (wall) 48 (column)
Minimum embedment below final exterior grade for heated structures (inches)	42
Minimum embedment below final exterior grade for unheated structures or for footings not protected from freezing temperatures during construction (inches)	60
Total estimated settlement (inches)	1
Differential settlement	Typically about 1/2 of total settlement*

Table 8. Recommended Spread Footing Design Parameters

* Actual differential settlement amounts will depend on final loads and foundation layout. We can evaluate differential settlement based on final foundation plans and loadings.

C.3. Below-Grade Walls

We recommend designing the walls based on silty sand backfill having an equivalent fluid pressure of 62 pounds per cubic foot (pcf) for at-rest earth pressure. Designs should also consider the slope of any fill and dead or live loads, including equipment and materials, placed within a horizontal distance behind the walls that is equal to the height of the walls. Our recommended values also assume the wall design provides drainage to prevent water from accumulating behind the walls. The construction documents should clearly identify the material properties of the soil the contractor should use for wall fill.

The project documents should indicate if walls need bracing prior to filling and allowable unbalanced fill heights.



C.3.a. Drainage Control

We recommend installing drain tile to remove water behind the below-grade walls, at the location shown in Figure 3. The below-grade wall drainage system should also incorporate free-draining, engineered fill or a drainage board placed against the wall and connected to the drain tile.

Even with the use of free-draining, engineered fill, we recommend general waterproofing of below-grade walls that surround occupied or potentially occupied areas because of the potential cost impacts related to seepage after construction is complete.



Figure 3. Generalized Illustration of Wall Engineered Fill

The materials listed in the sketch should meet the definitions in Section C.1.h. Low-permeability material is capable of directing water away from the wall, like clay, topsoil or pavement. The project documents should indicate if the contractor should brace the walls prior to filling and allowable unbalanced fill heights.



As shown in Figure 3, we recommend Zone 2 consist of retained, engineered fill, and this material will control lateral pressures on the wall. However, we are also providing design parameters for using other engineered fill material. If final design uses non-sand material for engineered fill, project planning should account for the following items:

- Other engineered fill material may result in higher lateral pressure on the wall.
- Other engineered fill material may be more difficult to compact.
- Post-construction consolidation of other engineered fill material may result in settlementrelated damage to the structures or slabs supported on the engineered fill. Post-construction settlement of other engineered fill material may also cause drainage towards the structure. The magnitude of consolidation could be up to about 3 percent of the wall fill thickness.

C.3.b. Configuring and Resisting Lateral Loads

Below-grade wall design can use active earth pressure conditions, if the walls can rotate slightly. If the wall design cannot tolerate rotation, then design should use at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required for walls supporting sand. Rotation up to 0.02 times the wall height is required when wall supports clay.

Table 9 presents our recommended lateral coefficients and equivalent fluid pressures for wall design of active, at-rest and passive earth pressure conditions. The table also provides recommended wet unit weights and internal friction angles. Designs should also consider the slope of any engineered fill and dead or live loads placed behind the walls within a horizontal distance that is equal to the height of the walls. Our recommended values assume the wall design provides drainage so water cannot accumulate behind the walls. The construction documents should clearly identify what soils the contractor should use for engineered fill of walls. For areas that will support settlement-sensitive structures, we recommend the wall backfill consist of sand with less than 12 percent by weight particles passing the #200 sieve.



Retained Soil	Wet Unit Weight, (pcf)	Friction Angle, degrees	Active Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)	At-Rest Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)	Passive Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)
On-Site SM Fill	125	30	42	62	375
SP and SP-SM	120	34	34	53	424

Table 9. Recommended Below-Grade Wall Design Parameters – Drained Conditions

* Based on Rankine model for soils in a region behind the wall extending at least 2 horizontal feet beyond the bottom outer edges of the wall footings and then rising up and away from the wall at an angle no steeper than 60 degrees from horizontal.

Sliding resistance between the bottom of the footing and the soil can also resist lateral pressures. We recommend assuming a sliding coefficient equal to 0.4 between the concrete and soil.

The values presented in this section are un-factored.

C.4. Interior Slabs/Pavements

C.4.a. Subgrade Modulus

The anticipated floor subgrade is poorly graded sand and poorly graded sand with silt. We recommend using a modulus of subgrade reaction, k, of 200 pounds per square inch per inch of deflection (pci) to design the slabs. If the slab design requires placing 6 inches of compacted crushed aggregate base immediately below the slab, the slab design may increase the k-value by 50 pci. We recommend that the aggregate base materials be free of bituminous. In addition to improving the modulus of subgrade reaction, an aggregate base facilitates construction activities and is less weather sensitive.

C.4.b. Moisture Vapor Protection

Excess transmission of water vapor could cause floor dampness, certain types of floor bonding agents to separate, or mold to form under floor coverings. If project planning includes using floor coverings or coatings, we recommend placing a vapor retarder or vapor barrier immediately beneath the slab. We also recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.



C.5. Frost Protection

C.5.a. General

The on-site silty soil fill will underlie all or some of the exterior slabs and pavements. We consider those materials to be moderately to highly frost susceptible. Soils of this type can retain moisture and heave upon freezing. In general, this characteristic is not an issue unless these soils become saturated, due to surface runoff or infiltration, or are excessively wet in situ. Once frozen, unfavorable amounts of general and isolated heaving of the soils and the surface structures supported on them could develop. This type of heaving could affect design drainage patterns and the performance of exterior slabs and pavements, as well as any isolated exterior footings and piers.

Note that general runoff and infiltration from precipitation are not the only sources of water that can saturate subgrade soils and contribute to frost heave. Roof drainage and irrigation of landscaped areas in close proximity to exterior slabs, pavements, and isolated footings and piers, contribute as well.

C.5.b. Frost Heave Mitigation

To address most of the heave related issues, we recommend setting general site grades and grades for exterior surface features to direct surface drainage away from buildings, across large paved areas and away from walkways. Such grading will limit the potential for saturation of the subgrade and subsequent heaving. General grades should also have enough "slope" to tolerate potential larger areas of heave, which may not fully settle after thawing.

Even small amounts of frost-related differential movement at walkway joints or cracks can create tripping hazards. Project planning can explore several subgrade improvement options to address this condition.

One of the more conservative subgrade improvement options to mitigate potential heave is removing any frost-susceptible soils present below the exterior slab areas down to a minimum depth of 4 feet below subgrade elevations. We recommend filling the resulting excavation with non-frost-susceptible fill. We also recommend sloping the bottom of the excavation toward one or more collection points to remove any water entering the engineered fill. This approach will not be effective in controlling frost heave without removing the water.



An important geometric aspect of the excavation and replacement approach described above is sloping the banks of the excavations to create a more gradual transition between the unexcavated soils considered frost susceptible and the engineered fill in the excavated area, which is not frost susceptible. The slope allows attenuation of differential movement that may occur along the excavation boundary. We recommend slopes that are 3H:1V, or flatter, along transitions between frost-susceptible and nonfrost-susceptible soils.

Figure 4 shows an illustration summarizing some of the recommendations.



Figure 4. Frost Protection Geometry Illustration

Another option is to limit frost heave in critical areas, such as doorways and entrances, via frost-depth footings or localized excavations with sloped transitions between frost-susceptible and non-frost-susceptible soils, as described above.

Over the life of slabs and pavements, cracks will develop and joints will open up, which will expose the subgrade and allow water to enter from the surface and either saturate or perch atop the subgrade soils. This water intrusion increases the potential for frost heave or moisture-related distress near the crack or joint. Therefore, we recommend implementing a detailed maintenance program to seal and/or fill any cracks and joints. The maintenance program should give special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.



C.6. Pavements and Exterior Slabs

C.6.a. Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar silty and clayey sand soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of 25. Note the contractor may need to perform limited removal of unsuitable or less suitable soils to achieve this value. Table 10 provides recommended pavement sections, based on the soils support and traffic loads.

We based the concrete pavement designs on a modulus of subgrade reaction (k) of 125 pci (exterior).

Use	Medium Duty – No Sand Subbase	Medium Duty – With Sand Subbase	Light Duty Walkways	Medium Duty
Minimum asphalt thickness (inches)	4	4		
Minimum concrete thickness (inches)			4	6
Minimum aggregate base thickness (inches)	12	8	6	6
Minimum granular subbase	NA	18	NA	NA

Table 10. Recommended Bituminous Pavement Sections

C.6.b. Concrete Pavements

We assumed the concrete pavement section in Table 10 will have edge support. We recommend placing an aggregate base below the pavement to provide a suitable subgrade for concrete placement, reduce faulting and help dissipate loads. Appropriate mix designs, panel sizing, jointing, doweling and edge reinforcement are critical to performance of rigid pavements. We recommend you contact your civil engineer to determine the final design or consult with us for guidance on these items.

C.6.c. Bituminous Pavement Materials

Appropriate mix designs are critical to the performance of flexible pavements. We can provide recommendations for pavement material selection during final pavement design.



C.6.d. Subgrade Drainage

We recommend installing perforated drainpipes throughout pavement areas at low points, around catch basins, and behind curb in landscaped areas. We also recommend installing drainpipes along pavement and exterior slab edges where exterior grades promote drainage toward those edge areas. The contractor should place drainpipes in small trenches, extended at least 8 inches below the granular subbase layer, or below the aggregate base material where no subbase is present.

C.6.e. Performance and Maintenance

We based the above pavement designs on a 20-year performance life for bituminous and a 35-year life for concrete. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

It is common to place the non-wear course of bituminous and then delay placement of wear course. For this situation, we recommend evaluating if the reduced pavement section will have sufficient structure to support construction traffic.

Many conditions affect the overall performance of the exterior slabs and pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. With regard to bituminous pavements in particular, it is common to have thermal cracking develop within the first few years of placement, and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade.

C.7. Utilities

C.7.a. Subgrade Stabilization

Earthwork activities associated with utility installations located inside the building area should adhere to the recommendations in Section C.1.

For exterior utilities, we anticipate the soils at typical invert elevations will generally be suitable for utility support. However, if construction encounters unfavorable conditions such as soft fill, soft clay, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.



C.7.b. Corrosion Potential

Based on our experience, the fill soils encountered by the borings are moderately corrosive to metallic conduits, but only marginally corrosive to concrete. We recommend specifying non-corrosive materials or providing corrosion protection, unless project planning chooses to perform additional tests to demonstrate the soils are not corrosive.

For interior utilities that will be installed within sandy soils, we consider those soils non- to slightly corrosive to metallic conduits. If utilities extend through exterior fill soils, we recommend bedding the utilities in sandy soil free of any clay lumps or constructing the utilities with non-corrosive materials.

C.8. Stormwater

We estimated infiltration rates for some of the soils we encountered in our soil borings, as listed in Table 11. These infiltration rates represent the long-term infiltration capacity of a practice and not the capacity of the soils in their natural state. Field testing, such as with a double-ring infiltrometer (ASTM D3385), may justify the use of higher infiltration rates. However, we recommend adjusting field test rates by the appropriate correction factor, as provided for in the Minnesota Stormwater Manual or as allowed by the local watershed. We recommend consulting the Minnesota Stormwater Manual for stormwater design.

Soil Type	Infiltration Rate * (inches/hour)
Sands with less than 12% fines, poorly graded or well graded sands	0.8
On-site fill with silty and clayey sand layers	0.06

Table 11. Estimated	Design	Infiltration	Rates	Based o	on Soil	Classification
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* From Minnesota Stormwater Manual. Rates may differ at individual sites.

Fine-grained soils (silts and clays), topsoil or organic matter that mixes into or washes onto the soil will lower the permeability. The contractor should maintain and protect infiltration areas during construction. Furthermore, organic matter and silt washed into the system after construction can fill the soil pores and reduce permeability over time. Proper maintenance is important for long-term performance of infiltration systems.



This geotechnical evaluation does not constitute a review of site suitability for stormwater infiltration or evaluate the potential impacts, if any, from infiltration of large amounts of stormwater.

C.9. Equipment Support

The recommendations included in the report may not be applicable to equipment used for the construction and maintenance of this project. We recommend evaluating subgrade conditions in areas of shoring, scaffolding, cranes, pumps, lifts and other construction equipment prior to mobilization to determine if the exposed materials are suitable for equipment support, or require some form of subgrade improvement. We also recommend project planning consider the effect that loads applied by such equipment may have on structures they bear on or surcharge – including pavements, buried utilities, below-grade walls, etc. We can assist you in this evaluation.

D. Procedures

D.1. Penetration Test Borings

We drilled the penetration test borings with an all-terrain mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance to ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

We sealed penetration test boreholes meeting the Minnesota Department of Health (MDH) Environmental Borehole criteria with an MDH-approved grout. We will forward sealing records for those boreholes to the Minnesota Department of Health Well Management Section.

D.2. Exploration Logs

D.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.



We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

D.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

D.3. Material Classification and Testing

D.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

D.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM procedures.

D.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then sealed the boreholes, as noted on the boring logs, preventing further groundwater level observations.



E. Qualifications

E.1. Variations in Subsurface Conditions

E.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

E.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

E.2. Continuity of Professional Responsibility

E.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.



E.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

E.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

E.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.



Appendix







11001 Hampshire Avenue S Minneapolis, MN 55438 952.995.2000 braunintertec.com



Drawing Information

	Project No: B1907294
	Drawing No: B1907294
Drawn By:	BJB
Date Drawn:	7/15/19
Checked By:	MJ
ast Modified:	9/17/19

Project Information

Proposed Lexington Mixed Use Building

SW of North Lexington Parkway and University Avenue

Saint Paul, Minnesota

Investigation Locations

STANDARD PENETRATION TEST BORING

ENVIRONMENTAL SOIL BORING

 ENVIRONMENTAL SOIL BORING WITH GROUNDWATER SAMPLE

SOIL VAPOR PROBE

PREVIOUSLY COMPLETED
 GEOTECHNICAL SOIL BORING





LOG OF BORING

The Science You Build On.					S	ee Descriptive	Termino	ology sheet	for explanation	of abbreviations
Project Number B1907294			BORING: ST-1							
Geotechnical Evaluation Proposed Lexington Mixed Use Building 411-417 Lexington Parkway North			LOCATION: See attached sketch							
St. Paul, Minne	esota	,				NORTHING			EASTING:	
DRILLER: N	1. Takada	LOGGED BY:	I	M. Jenkin	s	START DATE:		09/11/19	END DATE:	09/11/19
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LOG OF BORING

The Science You Build On.		ee Descriptive Terminology sheet for explanation of abbreviations				
Project Number B1907294			BORING: ST-2			
Geotechnical Evaluation			LOCATION: See attached sketch			
411-417 Lexingto	on Mixed Use Bui Parkway North	lding				
St. Paul, Minnesota	a		NORTHING:		EASTING:	
DRILLER: M. Takad	da LOGGED BY:	M. Jenkins	START DATE:	09/11/19	END DATE: 09/11/19	
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B1907294	Boring immediatel	y grouted			ST-2 page 1 of 1	


The Science You Build On.				Ş	See Descriptive	Termino	ology sheet	for explanation	of abbreviations
Project Numb	er B190729	4	BORING:			ST-3			
Geotechnical	Evaluation				LOCATION:	See atta	ached sket	ch	
Proposed Lex	ington Mix gton Parkw	ed Use Bui /ay North	ilding						
St. Paul, Minn	esota				NORTHING	:		EASTING:	
DRILLER:	M. Takada LOGGED BY: M. Jenkins				START DAT	E:	09/11/19	END DATE:	09/11/19
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B1907294	Borii	ng immediate	ly grouted Braun li	ntertec Corporation				ST	-3 page 1 of 1



Project Number B1907294BOFGeotechnical EvaluationLOCProposed Lexington Mixed Use Building411-417 Lexington Parkway NorthSt. Paul, MinnesotaNOF	RING: CATION: See attached s RTHING: ART DATE: 09/11/ REACING:	ST-4 ketch EASTING:
Geotechnical EvaluationLocProposed Lexington Mixed Use Building411-417 Lexington Parkway NorthSt. Paul, MinnesotaNOF	CATION: See attached s RTHING: ART DATE: 09/11/	EASTING:
411-417 Lexington Parkway North St. Paul, Minnesota	RTHING: ART DATE: 09/11/	EASTING:
St. Paul, Minnesota	RTHING: ART DATE: 09/11/	EASTING:
	ART DATE: 09/11/	
DRILLER: M. Takada LOGGED BY: M. Jenkins STA	REACING	19 END DATE: 09/11/19
SURFACE ELEVATION: 890.4 ft RIG: 7507 METHOD: 3 1/4" HSA SUR	NI AOINO.	WEATHER: Rain
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The Science You Build On.	See Descriptive Terminology she	et for explanation of abbreviations		
Project Number B1907294	BORING: ST-5			
Geotechnical Evaluation	LOCATION: See attached sk	etch		
Proposed Lexington Mixed Use Building 411-417 Lexington Parkway North				
St. Paul, Minnesota	NORTHING:	EASTING:		
DRILLER: M. Takada LOGGED BY: M. Jenkins	START DATE: 09/11/1	9 END DATE: 09/11/19		
SURFACE 895.4 ft RIG: 7507 METHOD: 3 1/4" HSA	SURFACING:	WEATHER: Rain		
Elev./ Depth ft t (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Blows (N-Value) Recovery	Tests or Remarks		
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- - - - - 864.4 - 30 - - 31.0 END OF BORING -	12-7-11 (18) 3"	Water not observed while drilling.		
B1907294 DOILING IMMEdiately grouted		ST-5 page 1 of 1		



The Science You Bu	ee Descriptive	Termino	ology sheet	for explanation	of abbreviations					
Project N	umber	[•] B190729	94		BORING:			ST-6		
Geotechn	nical Ev	valuation		1.I [.] .		LOCATION:	See att	ached sket	ch	
Proposed 411-417 L	l Lexin .exingt	igton Mix ton Parkw	ed Use Bui /ay North	lding						
St. Paul, I	Minnes	sota				NORTHING	:		EASTING:	
DRILLER:	M.	Takada	LOGGED BY:	M.	Jenkins	START DAT	E:	09/11/19	END DATE:	09/11/19
SURFACE ELEVATION:	892.6 f	t RIG: 7	507	METHOD:	3 1/4" HSA	SURFACING	G:		WEATHER:	Rain
Elev./ Depth at ft A	Level	De (Soil-ASTM D	escription of Ma 2488 or 2487; 1110-1-2908	aterials Rock-USACE 3)	Sample M3	Blows (N-Value) Recovery	q _₽ tsf	MC %	Tests or	Remarks
892.3 0.3		SILTY SAND moist (TOPS)	(SM), fine-grair OIL FILL)	ned Sand, bla	ck,					
 		grained Sand	, trace Gravel,	dark brown, m	noist 📈	6-5-4				
					$-\Delta$	(9) 3"				
 -						5				
					5-	2-2-6 (8)				
-						4"				
-					\neg	2-2-1				
-					$\neg \Delta$	(3) 7"				
882.6						4-3-4				
_ 10.0	ļ	POORLY GR	ADED SAND (S	SP), fine to		(7)				
-		moist, loose t	o medium dens	e (GLACIAL		5				
-	(OUTWASH)				6-4-4 (8)				
-						4"				
-					15	5-7-6				
-						(13) 3"				
-						0				
-										
-										
-					20	6-7-7				
- 						(14) 4"				
<u> </u>										
E-					_					
					25-	7-11-11 (22)				
						4"				
						6614				
861.6					30 - X	(17)				
31.0			END OF BOF	RING		3"			Water not obs	erved while
		Bori	na immediated	v arouted						0
в190/294		Dom		ັງອີງິິິ≌Bratun In	tertec Corporation				ST	-ь page 1 of 1



11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Geotechnical Testing Various ASTM

Client:

Alatus, LLC 800 Nicollet Mall, Suite 2850 Minneapolis, MN 55402

Project:

B1907294 Proposed Lexington Mixed Use Building 411-417 Lexington Parkway North St. Paul, MN

Sample Information												
Metafield	ID:	270856	270856									
Complete	d Date:	09/21/20	1/2019 Prepared By: Streier, Jim									
	Laboratory Results Summary											
Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
ST-1	41	1.0	12.8					3				
ST-1	46	12.5	5.6	7								
ST-3	36	12.5	3.9	3.7								
ST-4	25	10.0	13.2	32								
ST-5	3	5.0	3.9	2.4								
						Ger	neral					



Criteria for Assigning Group Symbols and						Soil Classification	
	Group N	Group Symbol	Group Name ^B				
ç	Gravels	Clean Gr	avels	$C_u \ge 4$ and $1 \le C_c \le 3^D$	GW	Well-graded gravel ^E	
ed o	(More than 50% of	(Less than 5	% fines ^c)	$C_u < 4$ and/or $(C_c < 1 \text{ or } C_c > 3)^D$	GP	Poorly graded gravel ^E	
d Soi etain ve)	retained on No. 4	Gravels wit	th Fines	Fines classify as ML or MH	GM	Silty gravel ^{E F G}	
aineo)% re) siev	sieve)	(More than 12% fines ^C)		Fines Classify as CL or CH	GC	Clayey gravel ^{EFG}	
e-gra in 50	Sands	Clean Sands		$C_u \ge 6$ and $1 \le C_c \le 3^D$	SW	Well-graded sand ¹	
bars e tha No	(50% or more coarse	(Less than 5	% fines ^H)	$C_u < 6$ and/or $(C_c < 1 \text{ or } C_c > 3)^D$	SP	Poorly graded sand	
ັ້ຣູ fraction passes No. 4		Sands with Fines		Fines classify as ML or MH	SM	Silty sand ^{FGI}	
)	Sieve)		2% fines ^H)	Fines classify as CL or CH	SC	Clayey sand ^{FGI}	
		Inorganic	PI > 7 and	plots on or above "A" line	CL	Lean clay ^{KLM}	
the	Silts and Clays	morganic	PI < 4 or plots below "A" line ^J		ML	Silt ^{KLM}	
ned Soil: e passes) sieve)	50)	Organic	ic Liquid Limit – oven dried Liquid Limit – not dried <0.75		OL	Organic clay KLMN Organic silt KLMO	
grai mor 200		Inorganic	PI plots o	n or above "A" line	СН	Fat clay ^{KLM}	
Fine- % or No	Silts and Clays	morganic	PI plots b	elow "A" line	МН	Elastic silt ^{KLM}	
(50	more)	Organic	Liquid Lim	nit – oven dried nit – not dried <0.75	ОН	Organic clay KLMP Organic silt KLMQ	
Hig	hly Organic Soils	Primarily org	anic matter	, dark in color, and organic odor	PT	Peat	

A. Based on the material passing the 3-inch (75-mm) sieve.

If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, Β. or both" to group name.

- C. Gravels with 5 to 12% fines require dual symbols:
 - GW-GM well-graded gravel with silt

GW-GC well-graded gravel with clay

GP-GM poorly graded gravel with silt

GP-GC poorly graded gravel with clay

 $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ D. $C_u = D_{60} / D_{10}$

- E. If soil contains ≥ 15% sand, add "with sand" to group name.
- If fines classify as CL-ML, use dual symbol GC-GM or SC-SM. F.
- If fines are organic, add "with organic fines" to group name. G
- Sands with 5 to 12% fines require dual symbols: Η.
 - SW-SM well-graded sand with silt
 - SW-SC well-graded sand with clay
 - SP-SM poorly graded sand with silt
 - poorly graded sand with clay SP-SC
- I. If soil contains \geq 15% gravel, add "with gravel" to group name.
- If Atterberg limits plot in hatched area, soil is CL-ML, silty clay. J.
- If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is Κ. predominant.
- 1 If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
- M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
- N. $PI \ge 4$ and plots on or above "A" line.
- O. PI < 4 or plots below "A" line.
- PI plots on or above "A" line. Ρ.
- Q. PI plots below "A" line.



Wet density, pcf

% Passing #200 sieve

WD

P200

Descriptive	Terminol	logy of	Soil
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Based on Standards ASTM D2487/2488 (Unified Soil Classification System)

Particle Size Identification			
Boulders over 12"			
Cobbles 3" to 12"			
Gravel			
Coarse			
Fine No. 4 to 3/4" (4.75 mm to 19.00 mm)			
Sand			
Coarse No. 10 to No. 4 (2.00 mm to 4.75 mm)			
Medium No. 40 to No. 10 (0.425 mm to 2.00 mm)			
Fine No. 200 to No. 40 (0.075 mm to 0.425 mm)			
Silt No. 200 (0.075 mm) to .005 mm			
Clay < .005 mm			
Relative Proportions ^{L, M}			

	Inclusion Thickness	60
with	≥ 15%	
little	6 to 14%	
trace	0 to 5%	

	menusion mickiess
lens	0 to 1/8"
seam	1/8" to 1"
laver	over 1"

Apparent Relative Density of Cohesionless Soils

Very loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 BPF
Dense	31 to 50 BPF
Very dense	over 50 BPF

Consistency of	Blows	Approximate Unconfined
Cohesive Soils	Per Foot	Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF.	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch. Moist: Damp but no visible water.

Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling ($\underline{\bigtriangledown}$), at the end of drilling ($\underline{\checkmark}$), or at some time after drilling (🔽).

	Laboratory Tests
oc	Organic content. %

q, мс

- Pocket penetrometer strength, tsf
 - Moisture content, %
- qυ Unconfined compression test, tsf

- PL Plastic limit Ы
 - Plasticity index