STORMWATER REPORT 189-193 ADAMS STREET NEWTON, MASSACHUSETTS



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INTRODUCTION

VTP Associates has performed a stormwater management analysis to evaluate the post-development impacts created by the proposed residential at #189-193 Adams Street in Newton, Massachusetts. The project will include a new residence building with approximately 18 units, a new surface driveway with parking, landscaped areas, and an associated stormwater management system.

VTP Associates analyzed the hydrology for the drainage areas impacted by the proposed work utilizing the Soil Conservation Service's (SCS) Runoff Curve Number (CN) methodology. VTP Associates used the HydroCAD computer modeling system in conjunction with the SCS's methods to determine the peak rate of runoff for the 2, 10, and 100-year storm events.

VTP Associates proposes the use of best management practices (BMPs) as defined by the Massachusetts Department of Environmental Protection (MA DEP) for stormwater management onsite to protect downstream receiving waters from adverse water quality impacts due to stormwater runoff. Mitigating the rate and quality of stormwater runoff from the project site will also help to lessen the environmental impact of the proposed development.

METHODOLOGY

Hydrology and Hydraulics

VTP Associates analyzed the survey base plan and conducted a site visit to determine the existing drainage flow patterns onsite. The existing conditions survey, in conjunction with aerial photography, and site visits were used to determine existing surface coverage areas for the site. VTP Associates determined that a majority of the pre-developed surface cover for the study area is impervious cover. Initial soil research was determined using the Natural Resources Conservation Service (NRCS) soil survey maps for Middlesex County, Massachusetts via Web Soil Survey 1.1. According to the soil survey, the soil on the site consists of the following:

626B: Merrimac – Urban land complex

VTP Associates used a Hydrologic soil group 'A' for its drainage calculations. As per the Mass DEP Stormwater Hydrology Handbook for Conservation Commissions, VTP used a design infiltration rate of 7.0 in/hr for 'A' soils.

For each subcatchment area, VTP Associates determined drainage flow path lengths, surface cover type and slopes for sheet and shallow concentrated flow. The information was used to calculate the time of concentration (Tc) for each subcatchment areas. Where applicable, a minimum Tc of 5 minutes was used; the minimum value for highly developed, small catchment areas. SCS Runoff Curve Numbers were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates for the 2, 10 and 100-year storm events were then determined by inputting the weighted CN, Tc, drainage areas, and drainage system information into the HydroCAD storm water modeling system computer program. The storm events were based on the 24-hour duration storm with a SCS Type III storm distribution curve.

Storm Event

VTP Associates used Massachusetts rainfall data maps from Technical Paper 40, Rainfall Frequency Atlas of the United States and the City of Newton's Requirements for On-Site Drainage to estimate the rainfall depth for the 2, 10 and 100-year storms. The rainfall depths for the 24-hour storm events used are as follows:

Storm Event	24-Hour Rainfall Depth (inches)
2-year	3.1
10-year	4.5
100-year	8.78

HYDROLOGICAL ANALYSIS

Pre-Development Conditions

The existing site consists of a two-half-story wood building, a detached on- story mason garage, a detached one-story wood garage, a two-story wood house, a surface driveway with parking. Approximately 15,730 square feet (81.3%) of the site is impervious cover. The site is bound by residential building to the southwest, northwest and southeast, and Adams Street to the northeast.

VTP Associates compiled the existing drainage areas from an existing conditions survey prepared by VTP Associates. Additionally, VTP Associates conducted site visits to evaluate the existing onsite drainage patterns and watershed divides from the existing conditions survey. At present, stormwater runoffs from the existing study area drain to Adams Street to the northeast (E1), to the northwest (E2) and southwest (E3) abutters. The pre-development drainage areas are shown on "Figure 1: Pre-Development Drainage Areas."

Post Development Conditions

The proposed project includes the construction of a new multi-family residence, consisting 18 units, on ground parking, walkways, landscaped areas, and associated drainage improvements. As a result, approximately 16,093 square feet (83.1%) of the site is impervious. The same overall area was analyzed for the proposed conditions as the pre-development conditions and is shown on "Figure 2: Post-Development Drainage Areas." Similar to pre-development conditions, the stormwater runoff flows in the same direction. The same design points were used as in the pre-development conditions.

The new residence will have approximately 7,180 square feet of impervious, or roof, and the driveway will be approximately 9,129 square feet. The roof runoff areas are separated into two drainage areas and discharge to a respective underground infiltration system. The roof runoff areas (PR1) and (PR2) will be collected by roof leaders and discharge into the onsite 8,000 gal. Tank (TNK) with a verflow into the infiltration system #1 (INF-1)). The driveway runoff (PD1) will be collected by a catch basin and discharge into onsite infiltration system #1 (INF-1). The driveway runoff (PD2) and (PD3) will be collected by two catch basins and discharge into onsite infiltration system #2 (INF-2). The runoff from (AD1) will be collected by an area drain and discharge into onsite infiltration system #2 (INF-2). The runoff from (AD2) and (AD3) will be collected by two area drains and discharge into onsite infiltration system #1 (INF-1). The intent of the proposed stormwater management systems are to infiltrate stormwater runoff of the proposed building and driveway/parking. The infiltration system was designed to control the 100-year storm with the addition of overflow to the infiltration systems and help mitigate proposed peak rates of runoff to less than existing conditions. The drainage areas can be seen on "Figure 2: Post-Development Drainage Areas."

VTP Associates analyzed the pre- and post-development site conditions to determine the peak rates of runoff at the design points. By incorporating the stormwater management features discussed above, the peak rates of runoff in the post-development condition is to be better than pre-development levels. Pre-development peak runoff rates vs. post-development peak runoff rates for the 2, 10, and 100-year storm events are presented in Table 1 below.

Table 1, Pre-development vs. Post-Development Peak Rate of Runoff

Design Point #1 – Adams Street (Northeast)

STORM EVENT	PRE-DEVELOPMENT	POST-DEVELOPMENT	PRE-DEVELOPMENT	POST-DEVELOPMENT
(DESIGN POINT)	PEAK RATE OF	PEAK RATE OF	VOLUME OF	VOLUME OF RUNOFF
	RUNOFF (CFS)	RUNOFF (CFS)	RUNOFF (AF)	(AF)
2-YEAR	0.43	0.00	0.032	0.000
10-YEAR	0.63	0.01	0.048	0.001
100-YEAR	1.25	0.08	0.098	0.005

Design Point #2 – Northwest Abutter

STORM EVENT	PRE-DEVELOPMENT	POST-DEVELOPMENT	PRE-DEVELOPMENT	POST-DEVELOPMENT
(DESIGN POINT)	PEAK RATE OF	PEAK RATE OF	VOLUME OF	VOLUME OF RUNOFF
	RUNOFF (CFS)	RUNOFF (CFS)	RUNOFF (AF)	(AF)
2-YEAR	0.42	0.00	0.029	0.000
10-YEAR	0.77	0.00	0.053	0.000
100-YEAR	1.92	0.00	0.135	0.000

Design Point #3 – Southwest Abutter

STORM EVENT	PRE-DEVELOPMENT	POST-DEVELOPMENT	PRE-DEVELOPMENT	POST-DEVELOPMENT
(DESIGN POINT)	RUNOFF (CFS)	RUNOFF (CFS)	RUNOFF (AF)	(AF)
2-YEAR	0.07	0.00	0.005	0.000
10-YEAR	0.17	0.00	0.012	0.000
100-YEAR	0.57	0.00	0.039	0.000

CONCLUSION

The post-development peak rate of runoff is expected to be less than or equal to pre-development levels for the 2, 10, and 100-year storm events. Although there is increased impervious coverage on the site as a result of the proposed redevelopment, the addition of the underground infiltration systems controls the post-development runoff to pre-development levels or better.

ENCLOSURES

NRCS Soil Map Pre-Development Drainage Areas (Figure 1) Post-Development Drainage Areas (Figure 2) Pre & Post Development HydroCAD Calculations

Custom Soil Resource Report Soil Map



	MAP L	EGEND		MAP INFORMATION
Area of Inte	erest (AOI)	30	Spoil Area	The soil surveys that comprise your AOI were mapped at
	Area of Interest (AOI)	۵	Stony Spot	1:25,000.
Soils		m	Very Stony Spot	Warning: Soil Man may not be valid at this scale
	Soil Map Unit Polygons	69	Wet Spot	Warning. Soir Map may not be valid at this scale.
~	Soil Map Unit Lines	N N	Other	Enlargement of maps beyond the scale of mapping can cause
	Soil Map Unit Points	-	Special Line Features	misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of
Special P	Point Features	Water Fea	tures	contrasting soils that could have been shown at a more detailed
అ	Blowout	~	Streams and Canals	scale.
	Borrow Pit	Transporta	ation	Please rely on the bar scale on each map sheet for map
英	Clay Spot	+++	Rails	measurements.
\diamond	Closed Depression	~	Interstate Highways	Source of Man: Natural Resources Conservation Service
X	Gravel Pit	~	US Routes	Web Soil Survey URL:
00	Gravelly Spot	~	Major Roads	Coordinate System: Web Mercator (EPSG:3857)
0	Landfill	~	Local Roads	Maps from the Web Soil Survey are based on the Web Mercator
٨.	Lava Flow	Backgrou	nd	projection, which preserves direction and shape but distorts
<u>مل</u> د	Marsh or swamp	and the second second	Aerial Photography	Albers equal-area conic projection that preserves area, such as the
衆	Mine or Quarry			accurate calculations of distance or area are required.
0	Miscellaneous Water			This product is generated from the USDA-NRCS certified data as
0	Perennial Water			of the version date(s) listed below.
~	Rock Outcrop			Soil Survey Area: Middlesex County Massachusetts
+	Saline Spot			Survey Area Data: Version 17, Oct 6, 2017
• • •	Sandy Spot			Soil man units are labeled (as snace allows) for man scales
-	Severely Eroded Spot			1:50,000 or larger.
~	Sinkhole			Deta(a) equiplimente una shetesrashedi. Aus 10,2011, Aus
~ ~	Slide or Slip			25, 2014 2014 2014 2014 2014 2014 2014 2014
n an	Sodic Spot			
jΨ				I ne orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	0.5	100.0%
Totals for Area of Interest		0.5	100.0%







Summary for Subcatchment AD1: Area Drain-1

Runoff = 0.00 cfs @ 12.42 hrs, Volume= 0.000 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN Description									
* 14	98 Ret. Wall									
48	39 >75% Grass cover, Good, HSG A									
62	52 Weighted Average									
48	77.42% Pervious Area									
14	22.58% Impervious Area									
Tc Length (min) (feet)	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)									
5.0	Direct Entry, Minimum									
	Subcatchment AD1: Area Drain-1									
Hydrograph										
	Runoff									



Summary for Subcatchment AD2: Area Drain-2

Runoff = 0.00 cfs @ 13.78 hrs, Volume= 0.000 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

A	rea (sf)	CN Des	scription						
r	36	98 Ret	. Wall						
	187	39 >75	% Grass	s cover, Go	ood, HS	G A			
	223	49 We	ighted A	verage					
	187	83.8	86% Per	vious Area					
	36	16.1	14% Imp	ervious Ar	ea				
Tc	Length	Slope V	/elocity	Capacity	Descri	ption			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
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Summary for Subcatchment AD3: Area Drain-3

Runoff = 0.00 cfs @ 13.78 hrs, Volume= 0.000 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Aı	rea (sf)	CN	Des	criptio	n								
*		67	98	Ret.	Wall									
		311	39	>75	<u>% Gra</u>	ss cov	ver, Go	od, HS	G A					
		378	49	Wei	ghted	Avera	ige s Aroa							
		67		17.7	'2% In	pervi	ous Ar	ea						
	Tc (min)	Length	Slop	e V	elocity	' Ca	pacity	Desci	ription					
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Summary for Subcatchment E1: Adams Street (Northeast)

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

>75% Grass cover, Good, HSG A					

Subcatchment E1: Adams Street (Northeast)



Summary for Subcatchment E2: Northwest Abutter

Runoff = 0.42 cfs @ 12.08 hrs, Volume= 0.029 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description			
*	1,717	98	Ex. Concret	te Garage F	Roof (Portion)	
*	187	98	Ex. Wood C	arage Roo	of (Portion)	
*	5,671	98	Paved Drive	eway (Portio	on)	
*	107	98	Conc./brick	pads		
*	48	98	Ret. Wall	•		
	3,129	39	>75% Gras	s cover, Go	ood, HSG A	
	10,859	81	Weighted A	verage		
	3,129		28.81% Per	vious Area		
	7,730		71.19% Imp	pervious Are	ea	
Т	c Length	Slop	e Velocity	Capacity	Description	
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)		
5.	0				Direct Entry, Minimum	





Summary for Subcatchment E3: Southwest Abutter

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description						
*	887	98	Ex. House	Roof					
*	63	98	Ex. Wood C	Garage Roc	of (Portion)				
*	621	98	Paved Drive	eway					
*	354	98	Landing/Ste	eps/Walks					
*	63	98	Ret. Wall						
*	34	98	Bulkhead						
	2,135	39	>75% Gras	>75% Grass cover, Good, HSG A					
	4,157	68	68 Weighted Average						
	2,135		51.36% Pei	rvious Area					
	2,022		48.64% Imp	pervious Ar	ea				
Т	c Length	Slop	e Velocity	Capacity	Description				
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)					
5.	0				Direct Entry, Minimum				

Subcatchment E3: Southwest Abutter



Summary for Subcatchment P1: Adams Street (Northeast)

Runoff = 0.00 cfs @ 12.39 hrs, Volume= 0.000 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description				
*	154	98	Walks/Con	c. Pads			
*	59	98	Ret. Wall				
	704	39	>75% Gras	s cover, Go	bod, HSG A		
	917	53	53 Weighted Average				
	704		76.77% Pervious Area				
	213		23.23% Imp	pervious Ar	ea		
- (mi	Tc Length in) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description		
5	5.0				Direct Entry, Minimum		

Subcatchment P1: Adams Street (Northeast)



Summary for Subcatchment PD1: Driveway/Parking-1

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.024 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description					
*	5,232	98	Driveway/P	arking Lot				
*	22	98	Curbing	c				
*	168	98	Ret. Walls					
*	50	98	Walks	Valks				
	1,148	39	>75% Gras	s cover, Go	ood, HSG A			
	6,620	620 88 Weighted Average						
	1,148		17.34% Pe	rvious Area	1			
	5,472		82.66% Imp	pervious Ar	rea			
-	Tc Length	Slop	e Velocity	Capacity	Description			
(mi	n) (feet)	(ft/f	t) (ft/sec)	(cfs)				
5	5.0				Direct Entry, Minimum			

Subcatchment PD1: Driveway/Parking-1



Summary for Subcatchment PD2: Driveway/Parking-2

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description					
*	3,066	98	Driveway/P	arking Lot				
*	82	98	Curbing					
*	417	98	Walks	Walks				
	1,098	39	>75% Gras	75% Grass cover, Good, HSG A				
	4,663	4,663 84 Weighted Average						
	1,098		23.55% Pe	rvious Area	1			
	3,565		76.45% Im	pervious Ar	rea li			
Т	c Length	Slop	e Velocity	Capacity	Description			
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)				
5.	.0				Direct Entry, Minimum			

Subcatchment PD2: Driveway/Parking-2



Summary for Subcatchment PD3: Driveway/Parking-3

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"

		(11/11) (II/Sec)	(015)	Direct Entry Minimum			
(mir	(foot)	010p /ft/ft	(ft/soc)	Capacity (cfc)	Description			
т	o Longth	Slop	o Volocity	Capacity	Description			
	852		80.30% Imp	pervious Ar	ea			
	209		19.70% Pei	vious Area				
	1,061	061 86 Weighted Average						
	209	39	>75% Gras	s cover, Go	bod, HSG A			
*	21	98	Curbing	Curbing				
*	831	98	Driveway					
	Area (sf)	CN	Description					

Subcatchment PD3: Driveway/Parking-3



Summary for Subcatchment PR1: Roof-1

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.013 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"



Summary for Subcatchment PR2: Roof-2

Runoff = 0.34 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 2-Year Rainfall=3.10"



Summary for Pond CB1: Catch Basin-1

Inflow Area	l =	0.152 ac, 8	2.66% Impe	rvious, Inflow D	epth = 1.91"	for 2-Year event
Inflow	=	0.35 cfs @	12.07 hrs, \	Volume=	0.024 af	
Outflow	=	0.35 cfs @	12.07 hrs, \	Volume=	0.024 af, At	ten= 0%, Lag= 0.0 min
Primary	=	0.35 cfs @	12.07 hrs, Y	Volume=	0.024 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.00' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0" Round 8"CCP L= 13.7' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0328 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.35 cfs @ 12.07 hrs HW=47.00' TW=42.08' (Dynamic Tailwater) **1=8''CCP** (Inlet Controls 0.35 cfs @ 2.32 fps)



Pond CB1: Catch Basin-1

Summary for Pond CB2: Catch Basin-2

Inflow Area	=	0.107 ac, 7	6.45% Imper	vious, Inflow De	epth = 1.60"	for 2-Year event
Inflow	=	0.21 cfs @	12.08 hrs, V	/olume=	0.014 af	
Outflow	=	0.21 cfs @	12.08 hrs, V	/olume=	0.014 af, Atte	en= 0%, Lag= 0.0 min
Primary	=	0.21 cfs @	12.08 hrs, V	/olume=	0.014 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 46.92' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0" Round 8"CCP L= 22.5' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0200 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.21 cfs @ 12.08 hrs HW=46.92' TW=42.27' (Dynamic Tailwater) 1=8"CCP (Inlet Controls 0.21 cfs @ 2.01 fps)

Hydrograph 46.92 46.91 Elevation Inflow 46.9 Primary 0.23 Inflow Area=0.107 ac 46.89 0.21 cfs 0.22 46.88 0.21 cfs 0.21 Peak Elev=46.92' 46.87 0.2 46.86 0.19 46.85 8.0" 0.18 46.84 Elevation (feet) 0.17 **Round Culvert** 46.83 0.16 46.82 0.15 46.81 n=0.009 0.14 (cfs) 46.8 0.13 46.79 L=22.5' 0.12 46.78 Flow 0.11 46.77 S=0.0200 '/' 0.1 46.76 0.09 46.75 0.08 46.74 0.07 46.73 0.06 46.72 0.05 46.71 0.04 -46.7 0.03 0.02 0.01 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Pond CB2: Catch Basin-2

Summary for Pond CB3: Catch Basin-3

Inflow Area	=	0.024 ac, 8	0.30% Impe	ervious, In	flow Depth =	1.75"	for 2-Y	ear event
Inflow	=	0.05 cfs @	12.07 hrs,	Volume=	0.004	af		
Outflow	=	0.05 cfs @	12.07 hrs,	Volume=	0.004	af, Atte	en= 0%,	Lag= 0.0 min
Primary	=	0.05 cfs @	12.07 hrs,	Volume=	0.004	af		

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.61' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	8.0" Round 8"CCP L= 125.8' Ke= 0.200 Inlet / Outlet Invert= 47.50' / 46.25' S= 0.0099 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.05 cfs @ 12.07 hrs HW=47.61' TW=42.26' (Dynamic Tailwater) 1=8"CCP (Inlet Controls 0.05 cfs @ 1.40 fps)



Pond CB3: Catch Basin-3

Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area =	0.331 ac, 88.57% Impervious	, Inflow Depth = 1.68" for 2-Year event
Inflow =	0.78 cfs @ 12.10 hrs, Volum	e= 0.046 af
Outflow =	0.21 cfs @ 12.07 hrs, Volum	e= 0.046 af, Atten= 74%, Lag= 0.0 min
Discarded =	0.21 cfs @ 12.07 hrs, Volum	e= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 42.75' @ 12.47 hrs Surf.Area= 0.029 ac Storage= 0.008 af

Plug-Flow detention time= 7.9 min calculated for 0.046 af (100% of inflow) Center-of-Mass det. time= 7.9 min (849.7 - 841.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	42.00'	0.026 af	26.50'W x 48.00'L x 5.25'H Field A
			0.153 af Overall - 0.079 af Embedded = 0.075 af x 35.0% Voids
#2A	43.00'	0.059 af	Concrete Galley 4x4x4.25 x 55 Inside #1
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
			5 Rows of 11 Chambers
		0.085 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices	
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'
Discard	ed OutFlow	Max=0.21 cfs	s @ 12.07 hrs HW=42.07' (Free Discharge)	

1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

11 Chambers/Row x 4.00' Long = 44.00' Row Length +24.0" End Stone x 2 = 48.00' Base Length 5 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 26.50' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

55 Chambers x 46.4 cf = 2,550.9 cf Chamber Storage 55 Chambers x 62.3 cf = 3,428.2 cf Displacement

6,678.0 cf Field - 3,428.2 cf Chambers = 3,249.8 cf Stone x 35.0% Voids = 1,137.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,688.4 cf = 0.085 afOverall Storage Efficiency = 55.2%Overall System Size = $48.00' \times 26.50' \times 5.25'$

55 Chambers 247.3 cy Field 120.4 cy Stone







Pond INF-1: Inf. System #1 Galleys

Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area =	0.133 ac,	76.58% Impervious,	Inflow Depth = 1.6	1" for 2-Year event
Inflow =	0.26 cfs @	12.08 hrs, Volume	e= 0.018 af	
Outflow =	0.08 cfs @	2 12.00 hrs, Volume	e= 0.018 af,	Atten= 68%, Lag= 0.0 min
Discarded =	0.08 cfs @	2 12.00 hrs, Volume	e 0.018 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 42.65' @ 12.39 hrs Surf.Area= 0.012 ac Storage= 0.003 af

Plug-Flow detention time= 6.6 min calculated for 0.018 af (100% of inflow) Center-of-Mass det. time= 6.6 min (835.4 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	42.00'	0.013 af	13.00'W x 40.00'L x 5.25'H Field A
			0.063 af Overall - 0.026 af Embedded = 0.037 af x 35.0% Voids
#2A	43.00'	0.019 af	Concrete Galley 4x4x4.25 x 18 Inside #1
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
			2 Rows of 9 Chambers
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices	
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'
Discard	ed OutFlow	Max=0.08 cfs	s @ 12.00 hrs HW=42.06' (Free Discharge)	

1=Exfiltration (Exfiltration Controls 0.08 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

9 Chambers/Row x 4.00' Long = 36.00' Row Length +24.0" End Stone x 2 = 40.00' Base Length 2 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 13.00' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

18 Chambers x 46.4 cf = 834.9 cf Chamber Storage 18 Chambers x 62.3 cf = 1,122.0 cf Displacement

2,730.0 cf Field - 1,122.0 cf Chambers = 1,608.0 cf Stone x 35.0% Voids = 562.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,397.7 cf = 0.032 afOverall Storage Efficiency = 51.2%Overall System Size = $40.00' \times 13.00' \times 5.25'$

18 Chambers 101.1 cy Field 59.6 cy Stone







Pond INF-2: Inf. System #2 Galleys

Summary for Pond TNK: 8000gal. TANK

Inflow Area	l =	0.165 ac,10	0.00% Impe	rvious,	Inflow Depth	= 2.87'	' for 2-Ye	ar event
Inflow	=	0.51 cfs @	12.07 hrs, \	Volume=	= 0.0	39 af		
Outflow	=	0.46 cfs @	12.11 hrs, \	Volume=	= 0.02	22 af, A	tten= 11%,	Lag= 2.4 min
Primary	=	0.46 cfs @	12.11 hrs, \	Volume=	= 0.0	22 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.10' @ 12.11 hrs Surf.Area= 0.003 ac Storage= 0.018 af

Plug-Flow detention time= 228.0 min calculated for 0.022 af (56% of inflow) Center-of-Mass det. time= 113.8 min (869.9 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1	40.17'	0.028 af	7.00'W x 16.50'L x 10.66'H Prismatoid
Device	Routing	Invert Ou	tlet Devices
#1	Primary	46.75' 8.0 Inle n=	" Round 8"CPP L= 10.8' Ke= 0.200 et / Outlet Invert= 46.75' / 46.25' S= 0.0463 '/' Cc= 0.900 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.46 cfs @ 12.11 hrs HW=47.10' TW=42.23' (Dynamic Tailwater) **1=8''CPP** (Inlet Controls 0.46 cfs @ 2.50 fps)

Pond TNK: 8000gal. TANK



Summary for Subcatchment AD1: Area Drain-1

Runoff = 0.00 cfs @ 12.11 hrs, Volume= 0.000 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN [Description		
*	14	98 F	Ret. Wall		
	48	39 >	>75% Gras	s cover, Go	bod, HSG A
	62	52 \	Neighted A	verage	
	48		77.42% Pei	rvious Area	l
	14	2	22.58% Imp	pervious Ar	ea
	Tc Length	Slope	Velocity	Capacity	Description
(r	nin) (feet)	(ft/ft)	(ft/sec)	(cfs)	
	5.0				Direct Entry, Minimum
			Su	bcatchme	ent AD1: Area Drain-1
				Hydro	ograph
	0.001			0.00 cfs	
	0.001				Type III 24-hr
	0.001				10-Year Rainfall=4.50"
	0.001				Runoff Area=62 sf
	0.000	 + -	 		Bunoff Volume-0.000 st
()	0.000				
v (cf	0.000				Runoff Deptn=0.59
Ц Ц	0.000				Tc=5.0 min
	0.000				CN=52
	0.000				
	0.000				
	0				
		+ - 			

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

0.000-

Summary for Subcatchment AD2: Area Drain-2

Runoff = 0.00 cfs @ 12.13 hrs, Volume= 0.000 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description				
*	36	98	Ret. Wall				
	187	39	>75% Gras	s cover, Go	ood, HSG A		
	223	49	Weighted A	verage			
	187		83.86% Per	rvious Area			
	36		16.14% imp	Dervious Ar	ea		
	Tc Length (min) (feet)	Slop (ft/fl	e Velocity (ft/sec)	Capacity (cfs)	Description		
	5.0			· · · · ·	Direct Entry,	Minimum	
			Su	bcatchme	nt ΔD2· Δre	oa Drain-2	
			Cu	Hydro			
	0.001						Runoff
	0.001					Type III 24-hr	
	0.001					Year Bainfall=4.50"	
	0.001					Runoff Area-223 ef	
	0.001						
	0.001		·		Runo	off volume=0.000 af	
	(ct) 0.001					Runoff Depth=0.46"	
	OLOO1					Tc=5.0 min	
	0.000					CN=49	
	0.000	 					
	0.000						

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

0.001 0.001 0.000 0.000 0.000 0.000 0.000

Summary for Subcatchment AD3: Area Drain-3

Runoff = 0.00 cfs @ 12.13 hrs, Volume= 0.000 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description						
*	67	98	Ret. Wall						
	311	39 :	>75% Gras	s cover, Go	ood, HSG A				
	378	49	Neighted A	verage					
	311	ł	32.28% Per	rvious Area					
	67		17.72% Imp	pervious Ar	ea				
(n	Tc Length nin) (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	5.0				Direct Entry,	Minimum			
	Subcatchment AD3: Area Drain-3								
	0.002		+ - + -						Runoff
					i i iii !		<u> Tvne II</u>	24-hr	
	0.002								
	0.002	+ -	++-			Year R	aintall	=4.50	
		; ; ; ;- ·	;; ;; - ; - ; -		<u> </u> <u> </u> - <u>+</u> - <u>+</u> <u> </u> <u> </u> - <u>+</u> - <u>+</u> - <u>-</u>	Runoff	Area=	378 sf	
	0.002	+ -			Bunc	ff Volu	imo-0	000 af	
((i i i- : ! L _ L .	iiii - - J! L _ L _ L		; ; ; I-1;U1 ;I U				
(cfs	0.001		+ - + -		+ - +	Runoff	Depth	=0.46''	
No	0.001					· +	Tc=5	0 min	
ш	0.001								
	0.001							∪N=49	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Summary for Subcatchment E1: Adams Street (Northeast)

Runoff = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description					
*	581	98	Ex. Concret	Ex. Concrete Garage Roof (Portion)				
*	2,760	98	Ex. Bldg. R	Ex. Bldg. Roof				
*	1,976	98	Paved Drive	eway (Porti	ion)			
*	571	98	Walks	Walks				
*	71	98	Conc. pads					
*	22	98	Ret. Wall					
	115	39	>75% Gras	>75% Grass cover, Good, HSG A				
	6,096	97	7 Weighted Average					
	115		1.89% Perv	ious Area				
	5,981		98.11% Imp	pervious Are	ea			
Т	c Length	Slop	e Velocity	Capacity	Description			
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)				
5.	0				Direct Entry, Minimum			

Subcatchment E1: Adams Street (Northeast)


Summary for Subcatchment E2: Northwest Abutter

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 0.053 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf) CN	D	escription				
*	1,717	7 98	E	x. Concret	te Garage F	Roof (Portion)		
*	187	7 98	E	x. Wood C	arage Roo	of (Portion)		
*	5,67	1 98	Р	aved Drive	eway (Portio	on)		
*	107	7 98	С	onc./brick	pads			
*	48	3 98	R	let. Wall				
	3,129	9 39	>	>75% Grass cover, Good, HSG A				
	10,859	9 81	81 Weighted Average					
	3,129	9	2	8.81% Per	vious Area			
	7,730)	7	1.19% Imp	pervious Are	ea		
٦	Fc Leng	th Slo	pe	Velocity	Capacity	Description		
(mi	n) (fee	et) (f	t/ft)	(ft/sec)	(cfs)			
5	.0					Direct Entry, M	Minimum	





Summary for Subcatchment E3: Southwest Abutter

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description					
*	887	98	Ex. House	Ex. House Roof				
*	63	98	Ex. Wood G	Garage Roo	of (Portion)			
*	621	98	Paved Drive	eway				
*	354	98	Landing/Ste	eps/Walks				
*	63	98	Ret. Wall					
*	34	98	Bulkhead	Bulkhead				
	2,135	39	>75% Gras	s cover, Go	bod, HSG A			
	4,157	68	Weighted A	verage				
	2,135		51.36% Per	vious Area	L			
	2,022		48.64% Imp	pervious Are	ea			
٦	Fc Length	Slop	e Velocity	Capacity	Description			
(mi	n) (feet)	(ft/1	t) (ft/sec)	(cfs)				
5	.0				Direct Entry, Minimum			

Subcatchment E3: Southwest Abutter



Summary for Subcatchment P1: Adams Street (Northeast)

Runoff = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description		
*	154	98	Walks/Con	c. Pads	
*	59	98	Ret. Wall		
	704	39	>75% Gras	s cover, Go	ood, HSG A
	917	53	Weighted A	verage	
	704		76.77% Pe	rvious Area	1
	213		23.23% Imp	pervious Ar	rea
To (min)	c Length) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description
5.0)				Direct Entry, Minimum

Subcatchment P1: Adams Street (Northeast)





Summary for Subcatchment PD1: Driveway/Parking-1

Runoff = 0.58 cfs @ 12.07 hrs, Volume= 0.040 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description				
5,232	98	Driveway/P	arking Lot			
22	98	Curbing	•			
168	98	Ret. Walls				
50	98	Walks				
1,148	39	>75% Gras	s cover, Go	ood, HSG A		
6,620	88	Weighted A	Weighted Average			
1,148		17.34% Pe	rvious Area	a		
5,472		82.66% Imp	pervious Ar	rea		
Tc Lengtł	n Slop	e Velocity	Capacity	Description		
n) (feet) (ft/f	t) (ft/sec)	(cfs)			
5.0				Direct Entry, Minimum		
	Area (sf) 5,232 22 168 50 1,148 6,620 1,148 5,472 Fc Length n) (feet .0	Area (sf) CN 5,232 98 22 98 168 98 50 98 1,148 39 6,620 88 1,148 5,472 Tc Length Slop n) (feet) (ft/f	Area (sf) CN Description 5,232 98 Driveway/P 22 98 Curbing 168 98 Ret. Walls 50 98 Walks 1,148 39 >75% Gras 6,620 88 Weighted A 1,148 17.34% Per 5,472 82.66% Imp Tc Length Slope Velocity n) (feet) (ft/ft) (ft/sec)	Area (sf)CNDescription $5,232$ 98Driveway/Parking Lot 22 98Curbing 168 98Ret. Walls 50 98Walks $1,148$ 39 75% Grass cover, G $6,620$ 88Weighted Average $1,148$ 17.34% Pervious Area $5,472$ 82.66% Impervious ATcLengthSlopeVelocityCapacityn)(feet)(ft/ft).0		

Subcatchment PD1: Driveway/Parking-1



Summary for Subcatchment PD2: Driveway/Parking-2

Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description				
*	3,066	98	Driveway/P	arking Lot			
*	82	98	Curbing	c			
*	417	98	Walks				
	1,098	39	>75% Gras	•75% Grass cover, Good, HSG A			
	4,663	84	Weighted Average				
	1,098		23.55% Pervious Area				
	3,565		76.45% Imp	pervious Ar	rea		
Т	c Length	Slop	e Velocity	Capacity	Description		
(mii	n) (feet)	(ft/f	i) (ft/sec)	(cfs)			
5	.0				Direct Entry, Minimum		

Subcatchment PD2: Driveway/Parking-2



Summary for Subcatchment PD3: Driveway/Parking-3

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description		
*	831	98	Driveway		
*	21	98	Curbing		
	209	39	>75% Gras	s cover, Go	bod, HSG A
	1,061	86	Weighted A	verage	
	209		19.70% Pei	vious Area	
	852		80.30% Imp	pervious Ar	ea
۲ miı)	c Length n) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description
5	.0				Direct Entry, Minimum

Subcatchment PD3: Driveway/Parking-3



Summary for Subcatchment PR1: Roof-1

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"



Summary for Subcatchment PR2: Roof-2

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 10-Year Rainfall=4.50"



Summary for Pond CB1: Catch Basin-1

Inflow Area	=	0.152 ac, 8	32.66% Imperv	vious, Inflow D	epth = 3.20	" for 10-`	Year event
Inflow	=	0.58 cfs @	12.07 hrs, Vo	olume=	0.040 af		
Outflow	=	0.58 cfs @	12.07 hrs, Vo	olume=	0.040 af, A	tten= 0%,	Lag= 0.0 min
Primary	=	0.58 cfs @	12.07 hrs, Vo	olume=	0.040 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.10' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0'' Round 8''CCP L= 13.7' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0328 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.58 cfs @ 12.07 hrs HW=47.10' TW=43.04' (Dynamic Tailwater) **1=8''CCP** (Inlet Controls 0.58 cfs @ 2.68 fps)



Pond CB1: Catch Basin-1

Summary for Pond CB2: Catch Basin-2

Inflow Area	l =	0.107 ac, 7	6.45% Imper	vious, Inflow I	Depth = 2	2.82" for ⁻	10-Year event
Inflow	=	0.37 cfs @	12.07 hrs, V	'olume=	0.025 a	f	
Outflow	=	0.37 cfs @	12.07 hrs, V	'olume=	0.025 a	f, Atten= 0°	%, Lag= 0.0 min
Primary	=	0.37 cfs @	12.07 hrs, V	'olume=	0.025 a	f	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.00' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0" Round 8"CCP L= 22.5' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0200 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.36 cfs @ 12.07 hrs HW=47.00' TW=42.83' (Dynamic Tailwater) 1=8"CCP (Inlet Controls 0.36 cfs @ 2.35 fps)



Pond CB2: Catch Basin-2

Summary for Pond CB3: Catch Basin-3

Inflow Area	=	0.024 ac, 8	0.30% Imper	rvious, Inflow	Depth = 3	3.00" for	10-Year event
Inflow	=	0.09 cfs @	12.07 hrs, \	Volume=	0.006 a	af	
Outflow	=	0.09 cfs @	12.07 hrs, \	Volume=	0.006 a	af, Atten=	0%, Lag= 0.0 min
Primary	=	0.09 cfs @	12.07 hrs, \	Volume=	0.006 a	af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.64' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	8.0" Round 8"CCP L= 125.8' Ke= 0.200 Inlet / Outlet Invert= 47.50' / 46.25' S= 0.0099 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.09 cfs @ 12.07 hrs HW=47.64' TW=42.82' (Dynamic Tailwater) 1=8"CCP (Inlet Controls 0.09 cfs @ 1.61 fps)



Pond CB3: Catch Basin-3

Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area =	0.331 ac, 88.57% Impervious, In	flow Depth = 2.98" for 10-Year event
Inflow =	1.32 cfs @ 12.08 hrs, Volume=	0.082 af
Outflow =	0.21 cfs @ 11.82 hrs, Volume=	0.082 af, Atten= 84%, Lag= 0.0 min
Discarded =	0.21 cfs @ 11.82 hrs, Volume=	0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 43.81' @ 12.56 hrs Surf.Area= 0.029 ac Storage= 0.026 af

Plug-Flow detention time= 36.7 min calculated for 0.082 af (100% of inflow) Center-of-Mass det. time= 36.7 min (855.6 - 818.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	42.00'	0.026 af	26.50'W x 48.00'L x 5.25'H Field A
			0.153 af Overall - 0.079 af Embedded = 0.075 af x 35.0% Voids
#2A	43.00'	0.059 af	Concrete Galley 4x4x4.25 x 55 Inside #1
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
			5 Rows of 11 Chambers
		0.085 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices	
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'
Discard	ed OutFlow	Max=0.21 cfs	s@11.82 hrs HW=42.06' (Free Discharge)	

1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

11 Chambers/Row x 4.00' Long = 44.00' Row Length +24.0" End Stone x 2 = 48.00' Base Length 5 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 26.50' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

55 Chambers x 46.4 cf = 2,550.9 cf Chamber Storage 55 Chambers x 62.3 cf = 3,428.2 cf Displacement

6,678.0 cf Field - 3,428.2 cf Chambers = 3,249.8 cf Stone x 35.0% Voids = 1,137.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,688.4 cf = 0.085 afOverall Storage Efficiency = 55.2%Overall System Size = $48.00' \times 26.50' \times 5.25'$

55 Chambers 247.3 cy Field 120.4 cy Stone







Pond INF-1: Inf. System #1 Galleys

Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area =	=	0.133 ac, 7	76.58% Impe	ervious,	Inflow Depth =	2.83	" for 10-Y	ear event
Inflow =		0.45 cfs @	12.07 hrs,	Volume	= 0.031	af		
Outflow =		0.08 cfs @	11.82 hrs,	Volume	= 0.031	af, A	tten= 81%,	Lag= 0.0 min
Discarded =		0.08 cfs @	11.82 hrs,	Volume	= 0.031	af		

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 43.54' @ 12.52 hrs Surf.Area= 0.012 ac Storage= 0.008 af

Plug-Flow detention time= 23.9 min calculated for 0.031 af (100% of inflow) Center-of-Mass det. time= 23.9 min (836.8 - 812.9)

Volume	Invert	Avail.Storage	Storage Description	
#1A	42.00'	0.013 af	13.00'W x 40.00'L x 5.25'H Field A	
			0.063 af Overall - 0.026 af Embedded = 0.037 af x 35.0% Voids	
#2A	43.00'	0.019 af	Concrete Galley 4x4x4.25 x 18 Inside #1	
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf	
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf	
			2 Rows of 9 Chambers	
		0.032 af	Total Available Storage	

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices	
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'
Discard	ed OutFlow	Max=0.08 cfs	s @ 11.82 hrs HW=42.06' (Free Discharge)	

1=Exfiltration (Exfiltration Controls 0.08 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

9 Chambers/Row x 4.00' Long = 36.00' Row Length +24.0" End Stone x 2 = 40.00' Base Length 2 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 13.00' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

18 Chambers x 46.4 cf = 834.9 cf Chamber Storage 18 Chambers x 62.3 cf = 1,122.0 cf Displacement

2,730.0 cf Field - 1,122.0 cf Chambers = 1,608.0 cf Stone x 35.0% Voids = 562.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,397.7 cf = 0.032 afOverall Storage Efficiency = 51.2%Overall System Size = $40.00' \times 13.00' \times 5.25'$

18 Chambers 101.1 cy Field 59.6 cy Stone







Pond INF-2: Inf. System #2 Galleys

Summary for Pond TNK: 8000gal. TANK

Inflow Area	=	0.165 ac,10	0.00% Impe	rvious, I	nflow Dep	th =	4.26"	for	10-Ye	ear eve	ent
Inflow	=	0.75 cfs @	12.07 hrs,	Volume=	: 0	.059	af				
Outflow	=	0.74 cfs @	12.08 hrs,	Volume=	: 0	.041	af, At	ten= 1	%, L	.ag= 0.1	7 min
Primary	=	0.74 cfs @	12.08 hrs,	Volume=	. 0	.041	af				

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.21' @ 12.08 hrs Surf.Area= 0.003 ac Storage= 0.019 af

Plug-Flow detention time= 180.7 min calculated for 0.041 af (70% of inflow) Center-of-Mass det. time= 86.3 min (835.2 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1	40.17'	0.028 af	7.00'W x 16.50'L x 10.66'H Prismatoid
Device	Routing	Invert Ou	tlet Devices
#1	Primary	46.75' 8.0 Inle n=	" Round 8"CPP L= 10.8' Ke= 0.200 et / Outlet Invert= 46.75' / 46.25' S= 0.0463 '/' Cc= 0.900 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.74 cfs @ 12.08 hrs HW=47.21' TW=43.09' (Dynamic Tailwater) **1=8''CPP** (Inlet Controls 0.74 cfs @ 2.88 fps)

Pond TNK: 8000gal. TANK



Summary for Subcatchment AD1: Area Drain-1

Runoff = 0.00 cfs @ 12.08 hrs, Volume= 0.000 af, Depth= 2.97"

0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description				
*	14	98	Ret. Wall				
	48	39 :	>75% Gras	s cover, Go	ood, HSG A		
	62	52	Weighted A	verage			
	48		77.42% Per	vious Area			
	14	2	22.58% imp	pervious Ar	ea		
(Tc Length (min) (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	5.0				Direct Entry,	Minimum	
			Sul	bcatchme	ent AD1: Area	a Drain-1	
				Hydro	graph		
	0.005					↓····· ↓···· ↓···· ↓···· ↓···· ↓···· ↓ ↓ ↓···· ↓···· ↓···· ↓···· ↓ ↓···· ↓···· ↓···· ↓···· ↓···· ↓ ↓···· ↓···· ↓···· ↓···· ↓···· ↓ ↓···· ↓···· ↓···· ↓···· ↓····	Runoff
	0.005			0.00 cfs		Type III 24-hr	_
	0.004	+ -	+-+-+-		100-Y	ear (Newton) Rainfall=8.78"	-
		$-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$	$-\frac{1}{1}-\frac{1}{1}-\frac{1}{1}-\frac{1}{1}-\frac{1}{1}-\frac{1}{1}$		$-\frac{1}{1}$		-
						Runoff Volume=0.000 af	_
	0.003					Runoff Depth=2.97"	
	(j 0.003				$-\frac{1}{1}$	CN=52	-
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Summary for Subcatchment AD2: Area Drain-2

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description		
*	36	98	Ret. Wall		
	187	39	>75% Gras	s cover, Go	bod, HSG A
	223	49	Weighted A	verage	
	187		83.86% Per	vious Area	L
	36		16.14% lmp	pervious Are	ea
				. .	
Ţ	c Length	Slop	e Velocity	Capacity	Description
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)	
5.	0				Direct Entry, Minimum
			_		

Subcatchment AD2: Area Drain-2



Summary for Subcatchment AD3: Area Drain-3

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	A	rea (sf)	CN	Description						
*		67	98	Ret. Wall						
		311	39	>75% Gras	s cover, Go	bod, HSG A				
		378	49	Weighted Average						
		311		82.28% Per	vious Area					
		67		17.72% Imp	17.72% Impervious Area					
	Тс	Length	Slop	e Velocity	Capacity	Description				
()	min)	(feet)	(ft/f	t) (ft/sec)	(cfs)					
	5.0					Direct Entry, Minimum				

Subcatchment AD3: Area Drain-3



Summary for Subcatchment E1: Adams Street (Northeast)

Runoff = 1.25 cfs @ 12.07 hrs, Volume= 0.098 af, Depth= 8.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

5.	0		· · · · ·		Direct Entry, Minimum	
(mir	n) (feet)	(ft/f	t) (ft/sec)	(cfs)	-	
Т	c Length	Slop	e Velocity	Capacity	Description	
	5,981		98.11% Imp	pervious Are	ea	
	115		1.89% Perv	rious Area		
	6,096	97	Weighted A	verage		
	115	39	>75% Gras	s cover, Go	ood, HSG A	
*	22	98	Ret. Wall			
*	71	98	Conc. pads			
*	571	98	Walks			
*	1,976	98	Paved Drive	eway (Portio	on)	
*	2,760	98	Ex. Bldg. R	oof		
*	581	98	Ex. Concret	te Garage F	Roof (Portion)	
	Area (sf)	CN	Description			

Subcatchment E1: Adams Street (Northeast)



Summary for Subcatchment E2: Northwest Abutter

Runoff = 1.92 cfs @ 12.07 hrs, Volume= 0.135 af, Depth= 6.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf) CN	Descriptior	1		
*	1,71	7 98	Ex. Concre	te Garage F	Roof (Portion)	
*	18	7 98	Ex. Wood	Garage Řoo	f (Portion)	
*	5,67	1 98	Paved Driv	eway (Porti	on)	
*	10	7 98	Conc./brick	pads		
*	48	8 98	Ret. Wall	•		
	3,129	9 39	>75% Gras	s cover, Go	ood, HSG A	
	10,859	9 81	Weighted A	Average		
	3,129	9	28.81% Pe	rvious Area		
	7,730	C	71.19% lm	pervious Are	ea	
Г	lc Leng	th Slo	pe Velocity	Capacity	Description	
(mii	n) (fee	et) (ft	/ft) (ft/sec)	(cfs)		
5	.0				Direct Entry, Minimum	





Summary for Subcatchment E3: Southwest Abutter

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description			
*	887	98	Ex. House I	Roof		
*	63	98	Ex. Wood C	arage Roo	of (Portion)	
*	621	98	Paved Drive	eway		
*	354	98	Landing/Ste	eps/Walks		
*	63	98	Ret. Wall			
*	34	98	Bulkhead			
	2,135	39	>75% Gras	s cover, Go	ood, HSG A	
	4,157	68	Weighted A	verage		
	2,135		51.36% Per	vious Area		
	2,022		48.64% Imp	pervious Are	ea	
Т	c Length	Slop	e Velocity	Capacity	Description	
(mir	ı) (feet)	(ft/f	t) (ft/sec)	(cfs)		
5.	0				Direct Entry, Minimum	

Subcatchment E3: Southwest Abutter



Summary for Subcatchment P1: Adams Street (Northeast)

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 0.005 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description						
*	154	98	Walks/Con	c. Pads					
*	59	98	Ret. Wall						
	704	39	>75% Gras	75% Grass cover, Good, HSG A					
	917	53							
	704		76.77% Pe	vious Area	1				
	213		23.23% Imp	pervious Ar	rea				
To (min	c Length) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description				
5.0)				Direct Entry, Minimum				

Subcatchment P1: Adams Street (Northeast)



Summary for Subcatchment PD1: Driveway/Parking-1

Runoff = 1.27 cfs @ 12.07 hrs, Volume= 0.093 af, Depth= 7.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description		
*	5,232	98	Driveway/P	arking Lot	
*	22	98	Curbing	C	
*	168	98	Ret. Walls		
*	50	98	Walks		
	1,148	39	>75% Gras	s cover, Go	ood, HSG A
	6,620	88	Weighted A	verage	
	1,148		17.34% Pe	rvious Area	1
	5,472		82.66% Im	pervious Are	rea l
_	.	01		o ''	
<i>,</i> .	Ic Length	Slop	e Velocity	Capacity	Description
(mi	n) (feet)	(ft/f	t) (ft/sec)	(CfS)	
5	.0				Direct Entry, Minimum

Subcatchment PD1: Driveway/Parking-1



Summary for Subcatchment PD2: Driveway/Parking-2

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.061 af, Depth= 6.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

*	3 066	98	Driveway/Parking Lot						
*	82	98	Curbing						
*	417	98	Walks	Walks					
	1,098	39	>75% Grass cover, Good, HSG A						
	4,663	84	Weighted A	verage					
	1,098		23.55% Pervious Area						
	3,565		76.45% Imp	pervious Ar	rea				
-	Tc Length	Slope	e Velocity	Canacity	Description				
(mi	in) (feet)	(ft/ft) (ft/sec)	(cfs)	Decemption				
5	5.0				Direct Entry, Minimum				

Subcatchment PD2: Driveway/Parking-2



Summary for Subcatchment PD3: Driveway/Parking-3

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 0.014 af, Depth= 7.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description		
*	831	98	Driveway		
*	21	98	Curbing		
	209	39	>75% Gras	s cover, Go	bod, HSG A
	1,061 209 852	86	Weighted A 19.70% Pei 80.30% Imp	verage vious Area pervious Are	ea
To (min)	c Length) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description
5.0)				Direct Entry, Minimum

Subcatchment PD3: Driveway/Parking-3



Summary for Subcatchment PR1: Roof-1

Runoff = 0.49 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"



Summary for Subcatchment PR2: Roof-2

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 0.078 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Type III 24-hr 100-Year (Newton) Rainfall=8.78"



Summary for Pond CB1: Catch Basin-1

Inflow	Area =	0.152 ac, 82.66% Impervious, Inflow	Depth = 7.33" for 100-Year (Newton) even	۱t
Inflow	=	1.27 cfs @ 12.07 hrs, Volume=	0.093 af	
Outflow	N =	1.27 cfs @ 12.07 hrs, Volume=	0.093 af, Atten= 0%, Lag= 0.0 min	
Primar	у =	1.27 cfs @ 12.07 hrs, Volume=	0.093 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.40' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0" Round 8"CCP L= 13.7' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0328 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.27 cfs @ 12.07 hrs HW=47.40' TW=44.32' (Dynamic Tailwater) **1=8''CCP** (Inlet Controls 1.27 cfs @ 3.65 fps)



Pond CB1: Catch Basin-1

Summary for Pond CB2: Catch Basin-2

Inflow Area	a =	0.107 ac, 7	6.45% Impervious	, Inflow Depth =	6.85" fo	r 100-Year (Newton) event
Inflow	=	0.86 cfs @	12.07 hrs, Volum	e= 0.061	af	
Outflow	=	0.86 cfs @	12.07 hrs, Volum	e= 0.061	af, Atten=	0%, Lag= 0.0 min
Primary	=	0.86 cfs @	12.07 hrs, Volum	e= 0.061	af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.20' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	8.0'' Round 8''CCP L= 22.5' Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.25' S= 0.0200 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.86 cfs @ 12.07 hrs HW=47.20' TW=44.26' (Dynamic Tailwater) **1=8''CCP** (Inlet Controls 0.86 cfs @ 3.02 fps)



Pond CB2: Catch Basin-2

Summary for Pond CB3: Catch Basin-3

Inflow Area =	=	0.024 ac, 8	80.30% Impervious,	Inflow Depth =	7.09" f	or 100-Yea	ar (Newton) event
Inflow =	-	0.20 cfs @	12.07 hrs, Volume	= 0.014	af		
Outflow =	:	0.20 cfs @	12.07 hrs, Volume	= 0.014	af, Atten	= 0%, Lag=	= 0.0 min
Primary =		0.20 cfs @	12.07 hrs, Volume	= 0.014	af		

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.72' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	8.0" Round 8"CCP L= 125.8' Ke= 0.200 Inlet / Outlet Invert= 47.50' / 46.25' S= 0.0099 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.20 cfs @ 12.07 hrs HW=47.72' TW=44.25' (Dynamic Tailwater) 1=8"CCP (Inlet Controls 0.20 cfs @ 1.99 fps)

Hydrograph 47.71 Elevation -47.7 Inflow 47.69 Primary Inflow Area=0.024 ac 0.22 0.20 47.68 0.21 0.20 cfs 47.67 Peak Elev=47.72' 0.2 47.66 0.19 47.65 8.0" 0.18-47.64 0.17 47.64 47.63 47.62 47.61 47.6 47.6 47.59 **Elevation** 0.16 Round Culvert 0.15 0.14 n=0.009 0.13 (s) 0.13 0.12 L=125.8 47.58 0.11 Flow 47.57 0.1 S=0.0099 '/ 47.56 0.09 0.08 47.55 -47.54 0.07 47.53 0.06 0.05 47.52 0.04 47.51 0.03 47.5 0.02 0.01 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Pond CB3: Catch Basin-3

Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area =	0.331 ac, 88.57% Impervious, Inflov	w Depth = 7.10" for 100-Year (Newton) event
Inflow =	2.73 cfs @ 12.08 hrs, Volume=	0.196 af
Outflow =	0.21 cfs @ 11.38 hrs, Volume=	0.196 af, Atten= 92%, Lag= 0.0 min
Discarded =	0.21 cfs @ 11.38 hrs, Volume=	0.196 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 46.57' @ 13.11 hrs Surf.Area= 0.029 ac Storage= 0.079 af

Plug-Flow detention time= 134.9 min calculated for 0.196 af (100% of inflow) Center-of-Mass det. time= 134.9 min (925.8 - 790.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	42.00'	0.026 af	26.50'W x 48.00'L x 5.25'H Field A
			0.153 af Overall - 0.079 af Embedded = 0.075 af x 35.0% Voids
#2A	43.00'	0.059 af	Concrete Galley 4x4x4.25 x 55 Inside #1
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
			5 Rows of 11 Chambers
		0.085 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices			
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'		
Discarded OutFlow Max=0.21 cfs @ 11.38 hrs HW=42.06' (Free Discharge)						

1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

11 Chambers/Row x 4.00' Long = 44.00' Row Length +24.0" End Stone x 2 = 48.00' Base Length 5 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 26.50' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

55 Chambers x 46.4 cf = 2,550.9 cf Chamber Storage 55 Chambers x 62.3 cf = 3,428.2 cf Displacement

6,678.0 cf Field - 3,428.2 cf Chambers = 3,249.8 cf Stone x 35.0% Voids = 1,137.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,688.4 cf = 0.085 afOverall Storage Efficiency = 55.2%Overall System Size = $48.00' \times 26.50' \times 5.25'$

55 Chambers 247.3 cy Field 120.4 cy Stone







Pond INF-1: Inf. System #1 Galleys
Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area =	0.133 ac, 76.58% Impervious, Inflow D	Depth = 6.85" for 100-Year (Newton) event
Inflow =	1.06 cfs @ 12.07 hrs, Volume=	0.076 af
Outflow =	0.08 cfs @ 11.52 hrs, Volume=	0.076 af, Atten= 92%, Lag= 0.0 min
Discarded =	0.08 cfs @ 11.52 hrs, Volume=	0.076 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 46.46' @ 13.05 hrs Surf.Area= 0.012 ac Storage= 0.029 af

Plug-Flow detention time= 117.0 min calculated for 0.076 af (100% of inflow) Center-of-Mass det. time= 116.9 min (905.2 - 788.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	42.00'	0.013 af	13.00'W x 40.00'L x 5.25'H Field A
			0.063 af Overall - 0.026 af Embedded = 0.037 af x 35.0% Voids
#2A	43.00'	0.019 af	Concrete Galley 4x4x4.25 x 18 Inside #1
			Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
			Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
			2 Rows of 9 Chambers
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices	
#1	Discarded	42.00'	7.000 in/hr Exfiltration over Surface area	Phase-In= 0.01'
Discard	ed OutFlow	Max=0.08 cfs	s@11.52 hrs HW=42.05' (Free Discharge)	

1=Exfiltration (Exfiltration Controls 0.08 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent) Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

9 Chambers/Row x 4.00' Long = 36.00' Row Length +24.0" End Stone x 2 = 40.00' Base Length 2 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 13.00' Base Width 12.0" Base + 51.0" Chamber Height = 5.25' Field Height

18 Chambers x 46.4 cf = 834.9 cf Chamber Storage 18 Chambers x 62.3 cf = 1,122.0 cf Displacement

2,730.0 cf Field - 1,122.0 cf Chambers = 1,608.0 cf Stone x 35.0% Voids = 562.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,397.7 cf = 0.032 afOverall Storage Efficiency = 51.2%Overall System Size = $40.00' \times 13.00' \times 5.25'$

18 Chambers 101.1 cy Field 59.6 cy Stone







Pond INF-2: Inf. System #2 Galleys

Summary for Pond TNK: 8000gal. TANK

Inflow A	Area =	0.165 ac,1	00.00% Impervious	, Inflow Depth =	8.54" for 1	00-Year (Newton) event
Inflow	=	1.47 cfs @	12.07 hrs, Volum	ie= 0.117 a	af	
Outflow		1.43 cfs @	12.09 hrs, Volum	ie= 0.100 a	af, Atten= 3%	6, Lag= 1.1 min
Primary	/ =	1.43 cfs @	12.09 hrs, Volum	ie= 0.100 a	af	

Routing by Dyn-Stor-Ind method, Time Span= 0.50-30.00 hrs, dt= 0.010 hrs Peak Elev= 47.55' @ 12.09 hrs Surf.Area= 0.003 ac Storage= 0.020 af

Plug-Flow detention time= 126.8 min calculated for 0.100 af (85% of inflow) Center-of-Mass det. time= 61.2 min (800.4 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1	40.17'	0.028 af	7.00'W x 16.50'L x 10.66'H Prismatoid
Device	Routing	Invert Ou	tlet Devices
#1	Primary	46.75' 8.0 Inle n=	" Round 8"CPP L= 10.8' Ke= 0.200 et / Outlet Invert= 46.75' / 46.25' S= 0.0463 '/' Cc= 0.900 0.009 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.43 cfs @ 12.09 hrs HW=47.55' TW=44.50' (Dynamic Tailwater) **1=8"CPP** (Inlet Controls 1.43 cfs @ 4.09 fps)

Pond TNK: 8000gal. TANK

