PRELIMINARY DRAINAGE REPORT

"The Village at Norfolk"
25 Rockwood Road
in
Norfolk, Massachusetts

May 11, 2017

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PRELIMINARY DRAINAGE REPORT
The Village at Norfolk

Section 1.0: Introduction

This preliminary drainage report has been prepared to accompany comprehensive permit site plans revised as of May 11, 2017. Where no wetlands are present on site or within 200' of locus, and because there are no new stormwater discharges to any wetlands, compliance with DEP Stormwater Management Regulations is not required. This report summarizes preliminary calculations used to size underground leaching beds to infiltrate runoff from the roadways and 32-unit condominium site. Because the majority of site runoff shall be recharged to the underlying soils, there is no increase in offsite runoff conditions based on a comparison of the pre-development and post-development calculations contained herein. Final site design shall include additional details and calculations.

Section 2.0: Existing Conditions

Locus Description. The condominium project is located at 25 Rockwood Road (see Figure A, USGS Locus Map), and is identified by the Town of Norfolk Assessors Office as Assessors map 14 block 49 lot 11. There is an existing home with a long paved driveway on the site that will be razed to construct the project. The project site is 6.56 acres and is located in the town's Business B-1 (Outside Core) zoning district. The site is on the west side of Rockwood Road, bordered by the Norfolk Housing Authority to the North, single family homes to the North, South and East, and the MBTA commuter rail line running along southern property line.

Topography. On-site topography is characterized by slopes, ranging from 2%-13%. Rockwood Road is at a relatively gentle slope in front of the site driveways at an elevation of approximately 197 ft. The highest elevation on site is near the northwest property corner located in the central area of the site at el. 227. The lowest elevation on site is 195 at the east portion of the site. The site has 3 onsite low spots where there is no outlet for runoff (each side of existing driveway near entrance off Rockwood Road and at back portion of site behind the town's apartment buildings) and no wetlands present indicating low water table and permeable soils. The central portion of the site where the existing homestead is drains offsite to the east to a concrete-lined channel on the Gross property, that has a culvert draining under Rockwood Road; this channel appears to be dry. The rear portion of the site slopes offsite to the west and towards an existing infiltration basin on the town property.

Soils. 10 observation holes were excavated to shallow depths (6' to 10' generally) throughout the site to document general soil conditions in April 2016 by Jeff Youngquist (DEP Certified Soil Evaluator) of Outback Engineering. Based on these test pits, 3 monitoring wells were installed to refusal at depths of 23', 17' and 14.5' at MW-1, 2 and 3, respectively, by D'Amore Associates. Additional soil test pits were excavated in April and May 2017 to assess soil and groundwater conditions for both septic and drainage

systems. Refer to Existing Conditions Plan (sheet 2) for exploration locations, and Detail Sheets 9 and 10 for test pit soil logs.

Soils were generally found to be sand and loamy sand with some areas of slightly sandy loam. Groundwater was typically not encountered at higher elevations, but was encountered at MW-DA1 with groundwater at a depth of 14' below grade (or elev. 184.5') on June 20, 2016, and TP-2 which had water weeping into the hole at 6' below grade on April 28, 2016. Per the most recent Natural Resources Conservation Service (NRCS) soil maps, soils onsite consist of Canton Fine sandy loam (map unit 420B; hydrologic soil group B) in the eastern portion of the site area, and Hinckley loamy sand, (map unit 245B; hydrologic soil group A) in the western portion of the site behind the existing house. Refer to Figure B for the Soil Survey Map and Appendix D-2 for NRCS Soil Descriptions.

Section 3.0: Summary of Drainage Calculations

The site was broken down into 5 subcatchments based on existing conditions and topography, and a number of smaller subcatchments based on expected runoff conditions in the developed condition (see Pre- and Post-Development Drainage Maps in Appendix C). Based on the soils explorations described above, drain leaching beds were sized for the 100-year storm using HydroCad software and allowable infiltration rates (Rawl's rates) for the underlying soil at each proposed bed.

Runoff calculations from the drainage areas were then modeled and compared to runoff rates and volumes for the post-developed conditions (see summary Table below). Note: only two subcatchments flow offsite (EDA-3 and EDA-4) while the other 3 are contained onsite. S(see calcs in Appendix B, and refer to site plans for drainage bed locations and typical details).

Final site design shall provide more details and calculations to ensure there are no negative drainage impacts to off-site and down-gradient properties, as well as more information regarding the proposed drainage system features.

There are 3 off-site and 2 on-site design points that were analyzed with a summary of runoff rates as follows.

Comparison of Pre- & Post-Development Runoff Rates

Design Point 1 – Flow to depression @ North of driveway

	Pre development	**Post development**
	Rate & Volume	Rate & Volume
100 Year Storm (6.70") • To Design Point 1	2.20 cfs 0.158 af	0.00* cfs 0.00 af

Design Point 2 – Flow to depression South of driveway

	Pre development	**Post development**
	Rate	Rate
100 Year Storm (6.70") • To Design Point 2	0.87 cfs 0.062 af	0.00* cfs 0.00 af

Design Point 3 – Flow to Corner of N/F Coyne and Gross

	Pre development	**Post development**
	Rate	Rate
100 Year Storm (6.70") • To Design Point 3	7.51 cfs 0.761 af	6.85 cfs 0.406 af

Design Point 4 – Flow to existing town basin

	Pre development	**Post development**
	Rate	Rate
100 Year Storm (6.70") • To Design Point 4	0.064 cfs 0.136 af	0.47 cfs 0.090 af

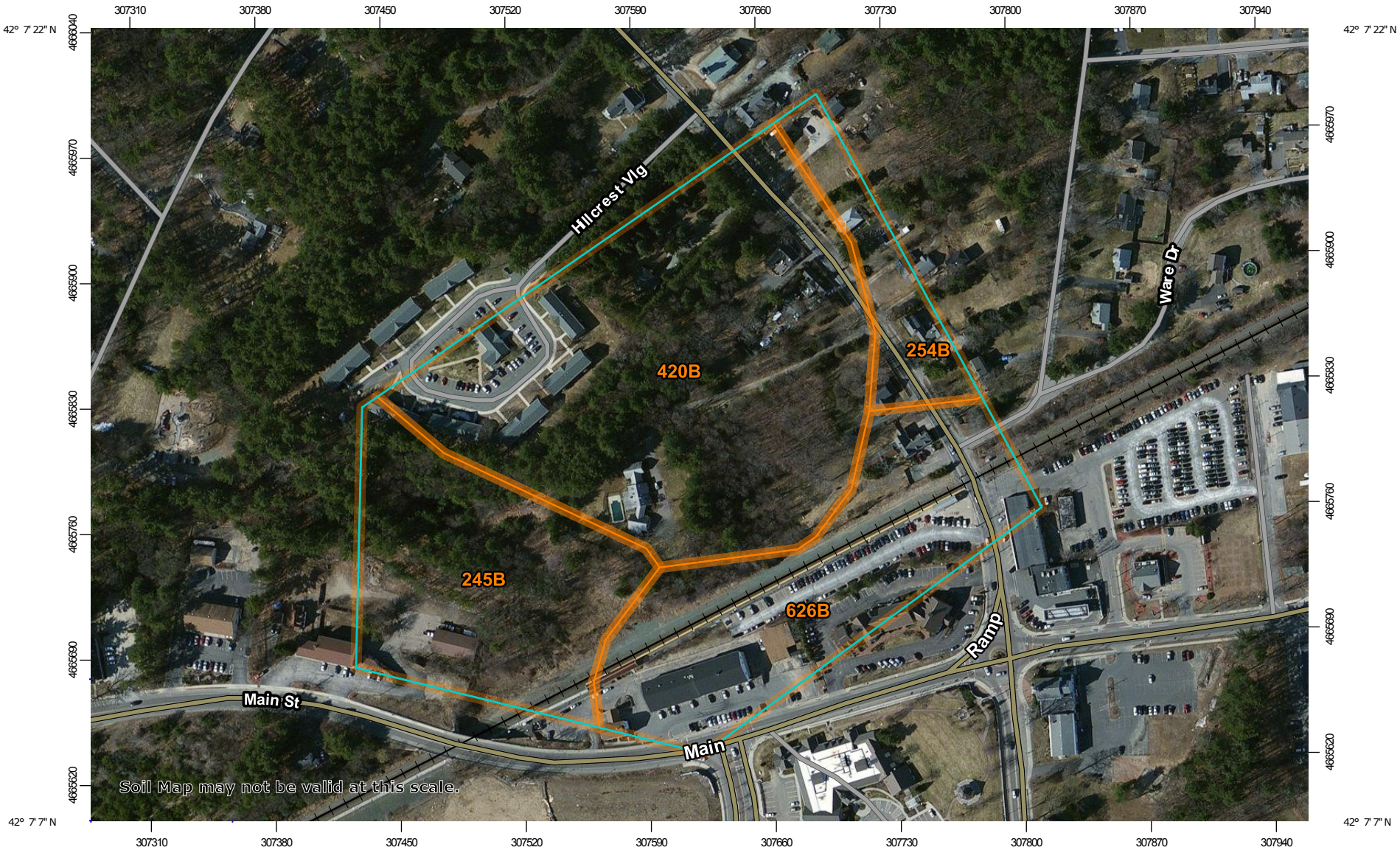
Design Point 5 – Flow to depression at rear of property

	Pre development	**Post development**
	Rate	Rate
100 Year Storm (6.70") • To Design Point 5	0.48 cfs 0.087 af	0.25 cfs 0.038 af

***** All runoff to Design Points 1 and 2 are contained within leaching chamber LC1.

Appendix A
NRCS Soils Map and Descriptions

Soil Map—Norfolk and Suffolk Counties, Massachusetts
(The Village at Norfolk)



Map Scale: 1:3,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 12, Sep 15, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—Apr 8, 2011

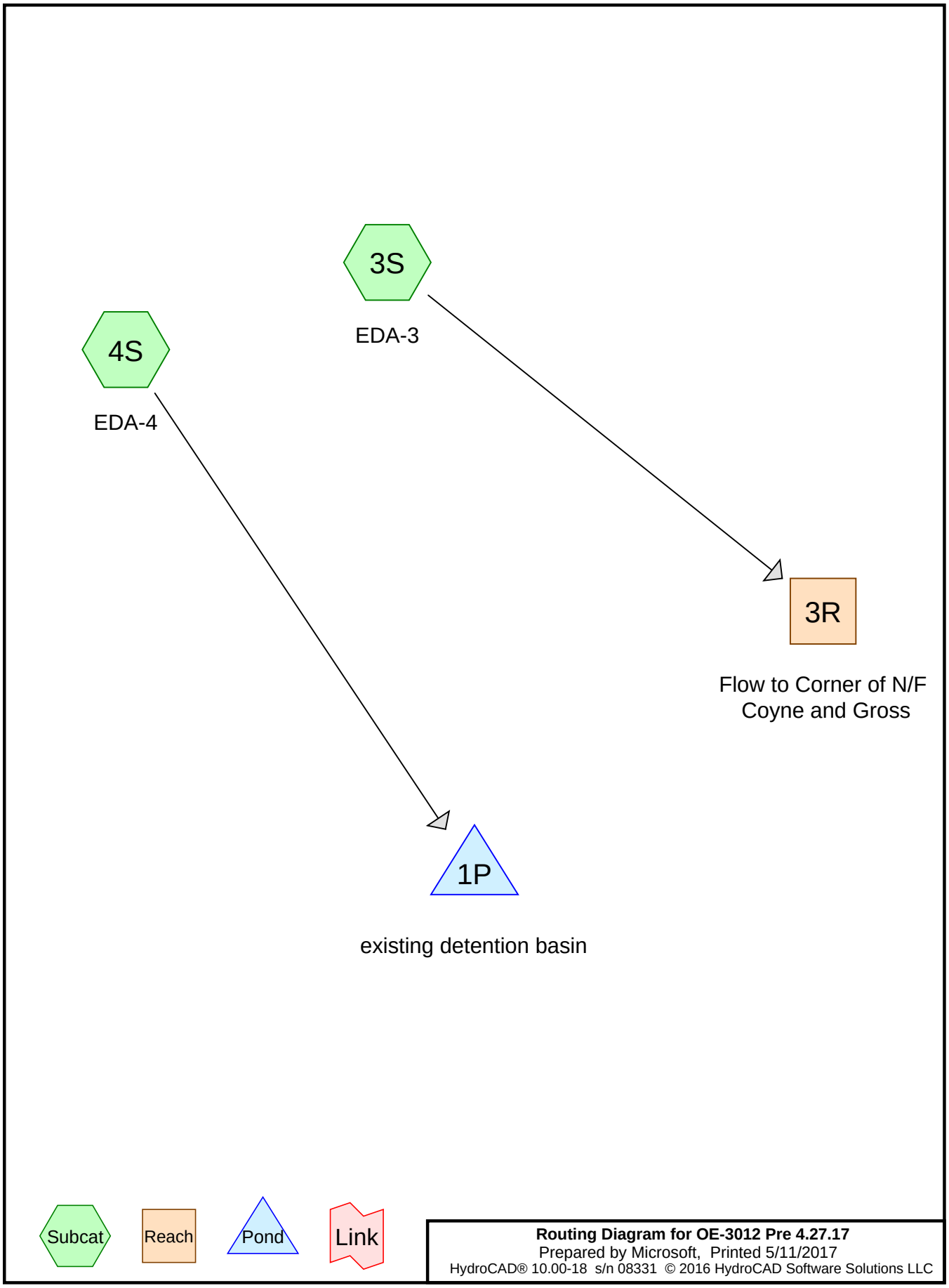
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Norfolk and Suffolk Counties, Massachusetts (MA616)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
245B	Hinckley loamy sand, 3 to 8 percent slopes	4.6	21.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	1.5	6.9%
420B	Canton fine sandy loam, 3 to 8 percent slopes	10.0	46.6%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	5.3	24.7%
Totals for Area of Interest		**21.3**	**100.0%**

Appendix B

PRE & POST-DEVELOPMENT HYDROLOGY CALCULATIONS



Routing Diagram for OE-3012 Pre 4.27.17
Prepared by Microsoft, Printed 5/11/2017
HydroCAD® 10.00-18 s/n 08331 © 2016 HydroCAD Software Solutions LLC

Summary for Subcatchment 3S: EDA-3

Runoff = 0.58 cfs @ 12.43 hrs, Volume= 0.111 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Description
*	6,046	98	ex. drive
*	6,246	98	ex roof
	100,347	55	Woods, Good, HSG B
	54,767	61	>75% Grass cover, Good, HSG B
	5,879	39	>75% Grass cover, Good, HSG A
	14,644	30	Woods, Good, HSG A
	187,929	57	Weighted Average
	175,637		93.46% Pervious Area
	12,292		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0280	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	621	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
15.3	671	Total			

Summary for Subcatchment 4S: EDA-4

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Description
*	96,780	40	weighted curve number per TR-55
	96,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	410	0.0280	2.69		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
13.0	460	Total			

Summary for Reach 3R: Flow to Corner of N/F Coyne and Gross

Inflow Area = 4.314 ac, 6.54% Impervious, Inflow Depth = 0.31" for 2 yr event
Inflow = 0.58 cfs @ 12.43 hrs, Volume= 0.111 af
Outflow = 0.58 cfs @ 12.43 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: existing detention basin

Inflow Area = 2.222 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 1.5 min
Discarded = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 208.00' @ 24.02 hrs Surf.Area= 1,882 sf Storage= 0 cf

Plug-Flow detention time= 2.9 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (1,331.3 - 1,328.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf
#2	Discarded	208.00'	**12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.53 cfs @ 24.02 hrs HW=208.00' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment 3S: EDA-3

Runoff = 2.78 cfs @ 12.25 hrs, Volume= 0.332 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Description
*	6,046	98	ex. drive
*	6,246	98	ex roof
	100,347	55	Woods, Good, HSG B
	54,767	61	>75% Grass cover, Good, HSG B
	5,879	39	>75% Grass cover, Good, HSG A
	14,644	30	Woods, Good, HSG A
	187,929	57	Weighted Average
	175,637		93.46% Pervious Area
	12,292		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0280	0.08		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	621	0.0200	2.28		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
15.3	671	Total			

Summary for Subcatchment 4S: EDA-4

Runoff = 0.05 cfs @ 13.74 hrs, Volume= 0.030 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Description
*	96,780	40	weighted curve number per TR-55
	96,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	410	0.0280	2.69		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
13.0	460	Total			

Summary for Reach 3R: Flow to Corner of N/F Coyne and Gross

Inflow Area = 4.314 ac, 6.54% Impervious, Inflow Depth = 0.92" for 10 yr event
Inflow = 2.78 cfs @ 12.25 hrs, Volume= 0.332 af
Outflow = 2.78 cfs @ 12.25 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: existing detention basin

Inflow Area = 2.222 ac, 0.00% Impervious, Inflow Depth = 0.16" for 10 yr event
Inflow = 0.05 cfs @ 13.74 hrs, Volume= 0.030 af
Outflow = 0.05 cfs @ 13.80 hrs, Volume= 0.030 af, Atten= 0%, Lag= 3.6 min
Discarded = 0.05 cfs @ 13.80 hrs, Volume= 0.030 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 208.00' @ 13.80 hrs Surf.Area= 1,898 sf Storage= 8 cf

Plug-Flow detention time= 2.9 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (1,031.0 - 1,028.1)

Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf
#2	Discarded	208.00'	**12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.53 cfs @ 13.80 hrs HW=208.00' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment "4S": EDA-4 with areas

Runoff = 0.08 cfs @ 12.93 hrs, Volume= 0.047 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

Area (sf)	CN	Description
72,430	30	Woods, Good, HSG A
2,307	61	>75% Grass cover, Good, HSG B
3,828	39	>75% Grass cover, Good, HSG A
4,303	55	Woods, Good, HSG B
13,912	32	Woods/grass comb., Good, HSG A
96,780	32	Weighted Average
96,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	410	0.0280	2.69		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
13.0	460	Total			

Summary for Subcatchment 1S: EDA-1

Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	3,119	98	ex driveway
	20,298	61	>75% Grass cover, Good, HSG B
	7,374	55	Woods, Good, HSG B
	30,791	63	Weighted Average
	27,672		89.87% Pervious Area
	3,119		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0900	0.27		**Sheet Flow, AB**
					Grass: Short n= 0.150 P2= 3.20"
0.6	164	0.0900	4.83		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
1.7	290	0.0200	2.87		**Shallow Concentrated Flow, cd**
					Paved Kv= 20.3 fps
0.3	50	0.0400	3.22		**Shallow Concentrated Flow, de**
					Unpaved Kv= 16.1 fps
5.7	554	Total			

Summary for Subcatchment 2S: EDA-2

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	1,600	98	ex driveway
	8,887	61	>75% Grass cover, Good, HSG B
	10,487	67	Weighted Average
	8,887		84.74% Pervious Area
	1,600		15.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0900	0.27		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.20"
0.6	164	0.0900	4.83		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
1.7	290	0.0200	2.87		**Shallow Concentrated Flow, cd** Paved Kv= 20.3 fps
0.3	50	0.0400	3.22		**Shallow Concentrated Flow, de** Unpaved Kv= 16.1 fps
5.7	554	Total			

Summary for Subcatchment 3S: EDA-3

Runoff = 7.51 cfs @ 12.22 hrs, Volume= 0.761 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	6,046	98	ex. drive
*	6,246	98	ex roof
	100,347	55	Woods, Good, HSG B
	54,767	61	>75% Grass cover, Good, HSG B
	5,879	39	>75% Grass cover, Good, HSG A
	14,644	30	Woods, Good, HSG A
	187,929	57	Weighted Average
	175,637		93.46% Pervious Area
	12,292		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0280	0.08		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.20"
4.5	621	0.0200	2.28		**Shallow Concentrated Flow, BC**
					Unpaved Kv= 16.1 fps
15.3	671	Total			

Summary for Subcatchment 4S: EDA-4

Runoff = 0.79 cfs @ 12.35 hrs, Volume= 0.136 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	96,780	40	weighted curve number per TR-55
	96,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	410	0.0280	2.69		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
13.0	460	Total			

Summary for Subcatchment 5S: EDA-5

Runoff = 0.48 cfs @ 12.38 hrs, Volume= 0.087 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

Area (sf)	CN	Description
2,652	98	Roofs, HSG B
8,128	61	>75% Grass cover, Good, HSG B
13,177	39	>75% Grass cover, Good, HSG A
42,101	30	Woods, Good, HSG A
2,800	55	Woods, Good, HSG B
68,858	39	Weighted Average
66,206		96.15% Pervious Area
2,652		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	392	0.0270	2.65		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
13.0	442	Total			

Summary for Reach 1R: Flow to Depression left of Drive @ Rockwood

Inflow Area = 0.707 ac, 10.13% Impervious, Inflow Depth = 2.68" for 100 yr event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.158 af
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Flow to Depression right of Drive @ Rockwood

Inflow Area = 0.241 ac, 15.26% Impervious, Inflow Depth = 3.07" for 100 yr event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.062 af
Outflow = 0.87 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Flow to Corner of N/F Coyne and Gross

Inflow Area = 4.314 ac, 6.54% Impervious, Inflow Depth = 2.12" for 100 yr event
Inflow = 7.51 cfs @ 12.22 hrs, Volume= 0.761 af
Outflow = 7.51 cfs @ 12.22 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 5R: Flow to depression @ stone wall in rear

Inflow Area = 1.581 ac, 3.85% Impervious, Inflow Depth = 0.66" for 100 yr event
Inflow = 0.48 cfs @ 12.38 hrs, Volume= 0.087 af
Outflow = 0.48 cfs @ 12.38 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: existing detention basin

Inflow Area = 2.222 ac, 0.00% Impervious, Inflow Depth = 0.73" for 100 yr event
Inflow = 0.79 cfs @ 12.35 hrs, Volume= 0.136 af
Outflow = 0.64 cfs @ 12.54 hrs, Volume= 0.136 af, Atten= 18%, Lag= 11.2 min
Discarded = 0.64 cfs @ 12.54 hrs, Volume= 0.136 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 208.12' @ 12.54 hrs Surf.Area= 2,308 sf Storage= 242 cf

Plug-Flow detention time= 3.3 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (940.9 - 937.6)

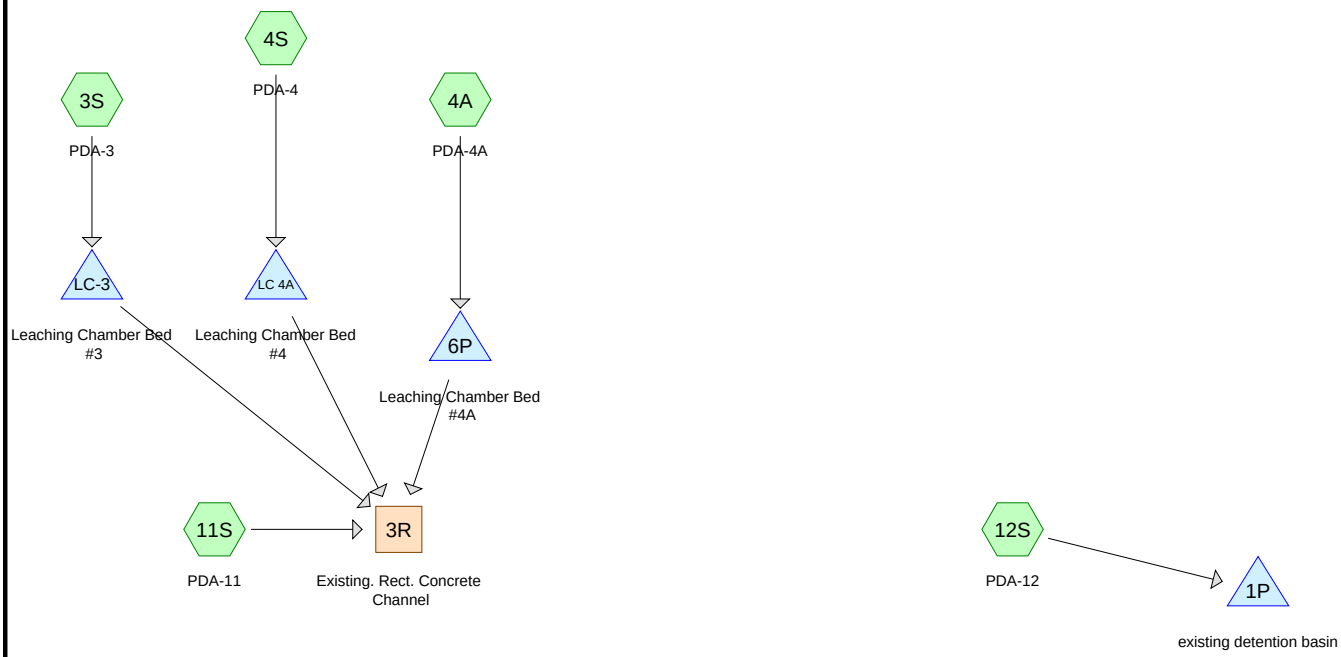
Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

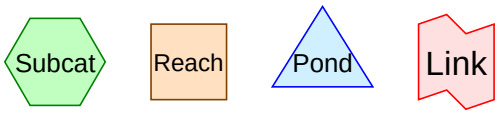
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf
#2	Discarded	208.00'	**12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.64 cfs @ 12.54 hrs HW=208.12' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.64 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)





Routing Diagram for OE-3012 Post Prelim 2.20.17
Prepared by Microsoft, Printed 5/11/2017
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Summary for Subcatchment 3S: PDA-3

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Description
*	5,062	98	Roofs/Pavement, HSG B
	4,320	61	>75% Grass cover, Good, HSG B
*	2,668	98	Roofs, HSG B
	12,050	85	Weighted Average
	4,320		35.85% Pervious Area
	7,730		64.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 4A: PDA-4A

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Description
	1,591	61	>75% Grass cover, Good, HSG B
	1,412	98	Roofs, HSG B
*	8,769	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	589	39	>75% Grass cover, Good, HSG A
	12,361	90	Weighted Average
	2,180		17.64% Pervious Area
	10,181		82.36% Impervious Area
	8,769		86.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, a**

Summary for Subcatchment 4S: PDA-4

Runoff = 1.46 cfs @ 12.10 hrs, Volume= 0.107 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Description
	22,163	61	>75% Grass cover, Good, HSG B
	5,355	98	Roofs, HSG B
*	15,394	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	942	39	>75% Grass cover, Good, HSG A
	43,854	78	Weighted Average
	23,105		52.69% Pervious Area
	20,749		47.31% Impervious Area
	15,394		74.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	26	0.0580	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.1	5	0.0500	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.8	19	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.0	10	0.0440	3.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	11	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	110	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	7	0.0290	3.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	104	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	59	0.0310	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0350	3.01		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	87	0.0450	4.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	455	Total			

Summary for Subcatchment 11S: PDA-11

Runoff = 0.14 cfs @ 12.35 hrs, Volume= 0.026 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Adj	Description
	6,262	39		>75% Grass cover, Good, HSG A
	9,078	61		>75% Grass cover, Good, HSG B
	611	30		Woods, Good, HSG A
	22,072	55		Woods, Good, HSG B
	2,245	98		Roofs, HSG B
*	3,334	98		Unconnected roofs, HSG B (sidewalks,road,deck,patio)
	43,602	59	57	Weighted Average, UI Adjusted
	38,023			87.20% Pervious Area
	5,579			12.80% Impervious Area
	3,334			59.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0870	0.12		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	530	0.0330	2.92		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
9.9	580	Total			

Summary for Subcatchment 12S: PDA-12

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.20"

	Area (sf)	CN	Adj	Description
	31,415	39		>75% Grass cover, Good, HSG A
	2,676	98		Roofs, HSG A
	12,529	30		Woods, Good, HSG A
*	4,009	98		Unconnected roofs, HSG A (deck,patio)
	13,912	32		Woods/grass comb., Good, HSG A
	64,541	42	40	Weighted Average, UI Adjusted
	57,856			89.64% Pervious Area
	6,685			10.36% Impervious Area
	4,009			59.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	50	0.0156	0.06		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
6.6	320	0.0025	0.81		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
20.2	370	Total			

Summary for Reach 3R: Existing. Rect. Concrete Channel

Inflow Area = 2.568 ac, 39.55% Impervious, Inflow Depth = 0.18" for 2 yr event
Inflow = 0.51 cfs @ 12.40 hrs, Volume= 0.039 af
Outflow = 0.51 cfs @ 12.43 hrs, Volume= 0.039 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.67 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 2.9 min

Peak Storage= 28 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 17.02 cfs

2.00' x 1.00' deep channel, n= 0.011 Concrete pipe, straight & clean
Length= 145.0' Slope= 0.0100 '/'
Inlet Invert= 193.98', Outlet Invert= 192.53'

Summary for Pond 1P: existing detention basin

Inflow Area = 1.482 ac, 10.36% Impervious, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Atten= 0%, Lag= 2.5 min
Discarded = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 208.00' @ 24.04 hrs Surf.Area= 1,882 sf Storage= 0 cf

Plug-Flow detention time= 2.9 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (1,337.9 - 1,335.1)

Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900
n= 0.030 Corrugated metal, Flow Area= 4.91 sf

#2	Discarded	208.00'	**12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.53 cfs @ 24.04 hrs HW=208.00' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 6P: Leaching Chamber Bed #4A

Inflow Area =	0.284 ac, 82.36% Impervious, Inflow Depth = 2.17" for 2 yr event				
Inflow =	0.71 cfs @	12.09 hrs,	Volume=	0.051 af	
Outflow =	0.12 cfs @	11.72 hrs,	Volume=	0.051 af,	Atten= 83%, Lag= 0.0 min
Discarded =	0.12 cfs @	11.72 hrs,	Volume=	0.051 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 197.99' @ 12.55 hrs Surf.Area= 0.015 ac Storage= 0.014 af

Plug-Flow detention time= 29.9 min calculated for 0.051 af (100% of inflow)
Center-of-Mass det. time= 29.9 min (836.8 - 806.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	196.50'	0.014 af	**12.17'W x 53.50'L x 3.54'H Field A** 0.053 af Overall - 0.017 af Embedded = 0.036 af x 40.0% Voids
#2A	197.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**6.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.60' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.12 cfs @ 11.72 hrs HW=196.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.50' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond LC 4A: Leaching Chamber Bed #4

Inflow Area = 1.007 ac, 47.31% Impervious, Inflow Depth = 1.27" for 2 yr event
Inflow = 1.46 cfs @ 12.10 hrs, Volume= 0.107 af
Outflow = 0.54 cfs @ 12.41 hrs, Volume= 0.107 af, Atten= 63%, Lag= 18.9 min
Discarded = 0.16 cfs @ 11.71 hrs, Volume= 0.094 af
Primary = 0.37 cfs @ 12.41 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 201.24' @ 12.41 hrs Surf.Area= 0.019 ac Storage= 0.029 af

Plug-Flow detention time= 49.8 min calculated for 0.107 af (100% of inflow)
Center-of-Mass det. time= 49.8 min (899.2 - 849.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	199.00'	0.023 af	**16.00'W x 52.50'L x 4.29'H Field A** 0.083 af Overall - 0.026 af Embedded = 0.057 af x 40.0% Voids
#2A	199.75'	0.026 af	**Cultec R-330XLHD** x 21 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	199.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	200.90'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 200.90' / 199.70' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.16 cfs @ 11.71 hrs HW=199.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.37 cfs @ 12.41 hrs HW=201.24' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.37 cfs @ 1.57 fps)

Summary for Pond LC-3: Leaching Chamber Bed #3

Inflow Area = 0.277 ac, 64.15% Impervious, Inflow Depth = 1.76" for 2 yr event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.18 cfs @ 11.90 hrs, Volume= 0.041 af, Atten= 69%, Lag= 0.0 min
Discarded = 0.18 cfs @ 11.90 hrs, Volume= 0.041 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 198.17' @ 12.43 hrs Surf.Area= 0.021 ac Storage= 0.007 af

Plug-Flow detention time= 8.5 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 8.5 min (834.6 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	197.50'	0.016 af	**12.25'W x 75.50'L x 2.54'H Field A** 0.054 af Overall - 0.013 af Embedded = 0.041 af x 40.0% Voids
#2A	198.00'	0.013 af	**Cultec R-150XLHD** x 21 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 3 rows
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**4.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.40' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.18 cfs @ 11.90 hrs HW=197.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=197.50' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment 3S: PDA-3

Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Description
*	5,062	98	Roofs/Pavement, HSG B
	4,320	61	>75% Grass cover, Good, HSG B
*	2,668	98	Roofs, HSG B
	12,050	85	Weighted Average
	4,320		35.85% Pervious Area
	7,730		64.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 4A: PDA-4A

Runoff = 1.14 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Description
	1,591	61	>75% Grass cover, Good, HSG B
	1,412	98	Roofs, HSG B
*	8,769	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	589	39	>75% Grass cover, Good, HSG A
	12,361	90	Weighted Average
	2,180		17.64% Pervious Area
	10,181		82.36% Impervious Area
	8,769		86.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, a**

Summary for Subcatchment 4S: PDA-4

Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.203 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Description
	22,163	61	>75% Grass cover, Good, HSG B
	5,355	98	Roofs, HSG B
*	15,394	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	942	39	>75% Grass cover, Good, HSG A
	43,854	78	Weighted Average
	23,105		52.69% Pervious Area
	20,749		47.31% Impervious Area
	15,394		74.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	26	0.0580	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.1	5	0.0500	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.8	19	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.0	10	0.0440	3.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	11	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	110	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	7	0.0290	3.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	104	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	59	0.0310	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0350	3.01		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	87	0.0450	4.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	455	Total			

Summary for Subcatchment 11S: PDA-11

Runoff = 0.76 cfs @ 12.16 hrs, Volume= 0.077 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Adj	Description
	6,262	39		>75% Grass cover, Good, HSG A
	9,078	61		>75% Grass cover, Good, HSG B
	611	30		Woods, Good, HSG A
	22,072	55		Woods, Good, HSG B
	2,245	98		Roofs, HSG B
*	3,334	98		Unconnected roofs, HSG B (sidewalks,road,deck,patio)
	43,602	59	57	Weighted Average, UI Adjusted
	38,023			87.20% Pervious Area
	5,579			12.80% Impervious Area
	3,334			59.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0870	0.12		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	530	0.0330	2.92		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
9.9	580	Total			

Summary for Subcatchment 12S: PDA-12

Runoff = 0.03 cfs @ 13.85 hrs, Volume= 0.020 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.65"

	Area (sf)	CN	Adj	Description
	31,415	39		>75% Grass cover, Good, HSG A
	2,676	98		Roofs, HSG A
	12,529	30		Woods, Good, HSG A
*	4,009	98		Unconnected roofs, HSG A (deck,patio)
	13,912	32		Woods/grass comb., Good, HSG A
	64,541	42	40	Weighted Average, UI Adjusted
	57,856			89.64% Pervious Area
	6,685			10.36% Impervious Area
	4,009			59.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	50	0.0156	0.06		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
6.6	320	0.0025	0.81		**Shallow Concentrated Flow, bc**
					Unpaved Kv= 16.1 fps
20.2	370	Total			

Summary for Reach 3R: Existing. Rect. Concrete Channel

Inflow Area = 2.568 ac, 39.55% Impervious, Inflow Depth = 0.72" for 10 yr event
Inflow = 2.78 cfs @ 12.16 hrs, Volume= 0.155 af
Outflow = 2.77 cfs @ 12.17 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.92 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 1.9 min

Peak Storage= 82 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 17.02 cfs

2.00' x 1.00' deep channel, n= 0.011 Concrete pipe, straight & clean
Length= 145.0' Slope= 0.0100 '/'
Inlet Invert= 193.98', Outlet Invert= 192.53'

Summary for Pond 1P: existing detention basin

Inflow Area = 1.482 ac, 10.36% Impervious, Inflow Depth = 0.16" for 10 yr event
Inflow = 0.03 cfs @ 13.85 hrs, Volume= 0.020 af
Outflow = 0.03 cfs @ 13.90 hrs, Volume= 0.020 af, Atten= 0%, Lag= 3.1 min
Discarded = 0.03 cfs @ 13.90 hrs, Volume= 0.020 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 208.00' @ 13.90 hrs Surf.Area= 1,892 sf Storage= 6 cf

Plug-Flow detention time= 2.9 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (1,037.7 - 1,034.8)

Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900
n= 0.030 Corrugated metal, Flow Area= 4.91 sf

#2 Discarded 208.00' **12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.53 cfs @ 13.90 hrs HW=208.00' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 6P: Leaching Chamber Bed #4A

Inflow Area = 0.284 ac, 82.36% Impervious, Inflow Depth = 3.54" for 10 yr event
Inflow = 1.14 cfs @ 12.09 hrs, Volume= 0.084 af
Outflow = 0.31 cfs @ 12.44 hrs, Volume= 0.084 af, Atten= 73%, Lag= 21.3 min
Discarded = 0.12 cfs @ 11.60 hrs, Volume= 0.078 af
Primary = 0.19 cfs @ 12.44 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 199.10' @ 12.44 hrs Surf.Area= 0.015 ac Storage= 0.025 af

Plug-Flow detention time= 54.0 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 54.0 min (847.2 - 793.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	196.50'	0.014 af	**12.17'W x 53.50'L x 3.54'H Field A** 0.053 af Overall - 0.017 af Embedded = 0.036 af x 40.0% Voids
#2A	197.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**6.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.60' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.12 cfs @ 11.60 hrs HW=196.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.19 cfs @ 12.44 hrs HW=199.10' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.19 cfs @ 1.48 fps)

Summary for Pond LC 4A: Leaching Chamber Bed #4

Inflow Area = 1.007 ac, 47.31% Impervious, Inflow Depth = 2.42" for 10 yr event
Inflow = 2.83 cfs @ 12.09 hrs, Volume= 0.203 af
Outflow = 2.19 cfs @ 12.16 hrs, Volume= 0.203 af, Atten= 23%, Lag= 4.1 min
Discarded = 0.16 cfs @ 11.37 hrs, Volume= 0.131 af
Primary = 2.03 cfs @ 12.16 hrs, Volume= 0.071 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 201.85' @ 12.16 hrs Surf.Area= 0.019 ac Storage= 0.037 af

Plug-Flow detention time= 41.9 min calculated for 0.203 af (100% of inflow)
Center-of-Mass det. time= 41.9 min (872.5 - 830.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	199.00'	0.023 af	**16.00'W x 52.50'L x 4.29'H Field A** 0.083 af Overall - 0.026 af Embedded = 0.057 af x 40.0% Voids
#2A	199.75'	0.026 af	**Cultec R-330XLHD** x 21 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
		0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	199.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	200.90'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 200.90' / 199.70' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.16 cfs @ 11.37 hrs HW=199.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=2.03 cfs @ 12.16 hrs HW=201.85' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.03 cfs @ 2.62 fps)

Summary for Pond LC-3: Leaching Chamber Bed #3

Inflow Area = 0.277 ac, 64.15% Impervious, Inflow Depth = 3.05" for 10 yr event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.21 cfs @ 12.51 hrs, Volume= 0.070 af, Atten= 78%, Lag= 25.2 min
Discarded = 0.18 cfs @ 11.72 hrs, Volume= 0.069 af
Primary = 0.04 cfs @ 12.51 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 198.95' @ 12.51 hrs Surf.Area= 0.021 ac Storage= 0.018 af

Plug-Flow detention time= 26.1 min calculated for 0.070 af (100% of inflow)
Center-of-Mass det. time= 26.1 min (836.5 - 810.4)

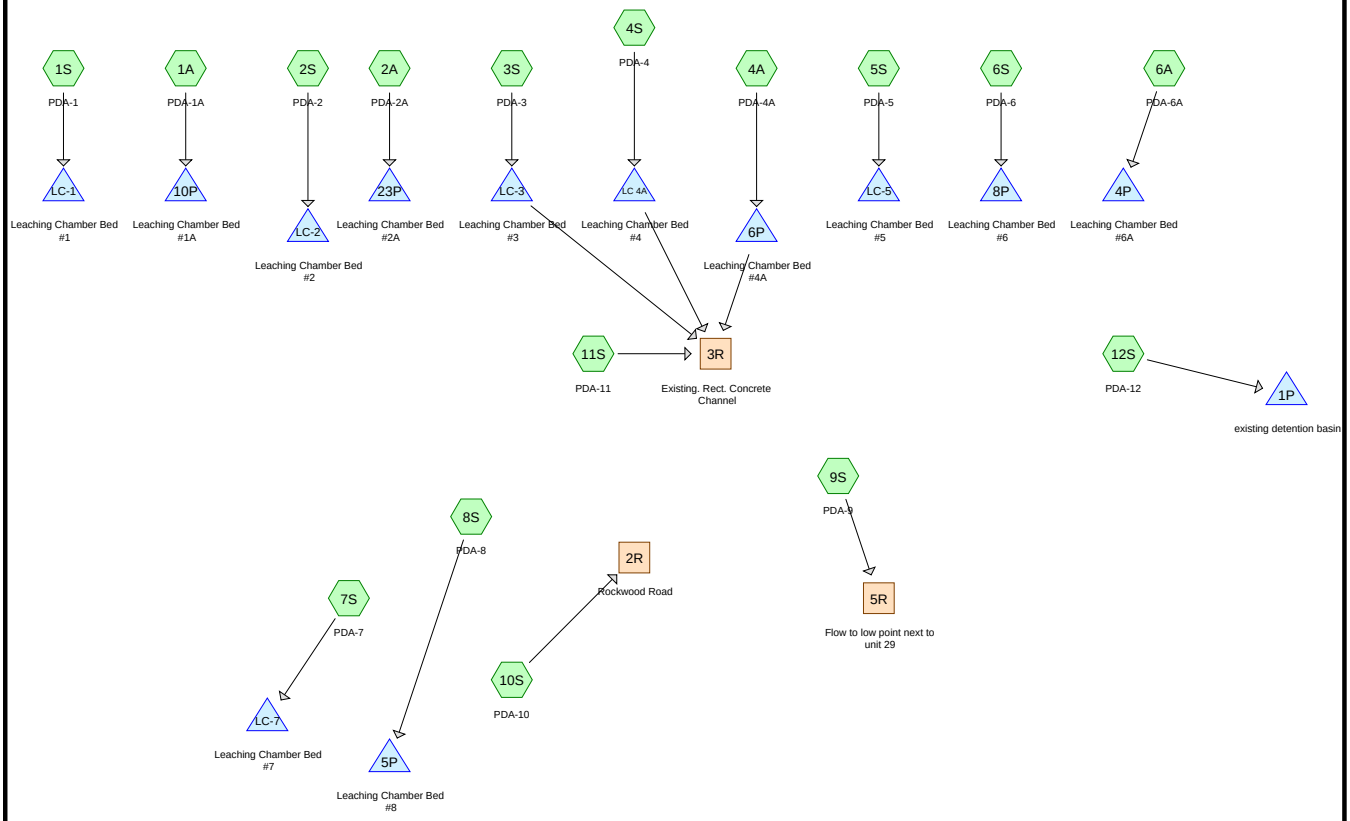
Volume	Invert	Avail.Storage	Storage Description
#1A	197.50'	0.016 af	**12.25'W x 75.50'L x 2.54'H Field A** 0.054 af Overall - 0.013 af Embedded = 0.041 af x 40.0% Voids
#2A	198.00'	0.013 af	**Cultec R-150XLHD** x 21 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 3 rows
		0.030 af	Total Available Storage

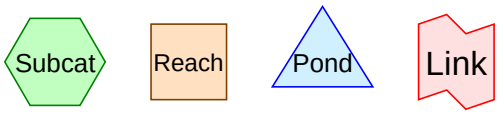
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**4.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.40' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.18 cfs @ 11.72 hrs HW=197.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.04 cfs @ 12.51 hrs HW=198.95' (Free Discharge)
└─**2=Culvert** (Inlet Controls 0.04 cfs @ 1.02 fps)





Routing Diagram for OE-3012 Post Prelim 2.20.17
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Summary for Subcatchment 1A: PDA-1A

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.095 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	3,930	98	Pavement/sidewalks, HSG A
	1,330	98	Roofs, HSG A
	6,913	61	>75% Grass cover, Good, HSG B
	12,173	77	Weighted Average
	6,913		56.79% Pervious Area
	5,260		43.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, ab**

Summary for Subcatchment 1S: PDA-1

Runoff = 1.51 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	6,250	98	Pavement/sidewalks, HSG A
	1,345	98	Roofs, HSG A
	3,793	61	>75% Grass cover, Good, HSG B
	11,388	86	Weighted Average
	3,793		33.31% Pervious Area
	7,595		66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0300	0.17		**Sheet Flow, ab**
					Grass: Short n= 0.150 P2= 3.20"
1.2	200	0.0200	2.87		**Shallow Concentrated Flow, bc**
					Paved Kv= 20.3 fps
6.0	250	Total			

Summary for Subcatchment 2A: PDA-2A

Runoff = 1.23 cfs @ 12.12 hrs, Volume= 0.096 af, Depth= 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	5,218	98	Roads/swalks, HSG B
	1,281	61	>75% Grass cover, Good, HSG B
	828	98	Roofs, HSG B
	3,972	58	Woods/grass comb., Good, HSG B
	11,299	80	Weighted Average
	5,253		46.49% Pervious Area
	6,046		53.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow, ab**
					Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	305	0.0400	4.06		**Shallow Concentrated Flow, bc**
					Paved Kv= 20.3 fps
8.4	355	Total			

Summary for Subcatchment 2S: PDA-2

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 0.180 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	6,148	98	Roads/swalks, HSG B
	9,507	61	>75% Grass cover, Good, HSG B
	5,172	98	Roofs, HSG B
	20,827	81	Weighted Average
	9,507		45.65% Pervious Area
	11,320		54.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, ab**

Summary for Subcatchment 3S: PDA-3

Runoff = 1.57 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	5,062	98	Roofs/Pavement, HSG B
	4,320	61	>75% Grass cover, Good, HSG B
*	2,668	98	Roofs, HSG B
	12,050	85	Weighted Average
	4,320		35.85% Pervious Area
	7,730		64.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 4A: PDA-4A

Runoff = 1.74 cfs @ 12.08 hrs, Volume= 0.131 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	1,591	61	>75% Grass cover, Good, HSG B
	1,412	98	Roofs, HSG B
*	8,769	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	589	39	>75% Grass cover, Good, HSG A
	12,361	90	Weighted Average
	2,180		17.64% Pervious Area
	10,181		82.36% Impervious Area
	8,769		86.13% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, a**

Summary for Subcatchment 4S: PDA-4

Runoff = 4.91 cfs @ 12.09 hrs, Volume= 0.353 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	22,163	61	>75% Grass cover, Good, HSG B
	5,355	98	Roofs, HSG B
*	15,394	98	Unconnected pavement, HSG B (sidewalks,road,deck,patio)
	942	39	>75% Grass cover, Good, HSG A
	43,854	78	Weighted Average
	23,105		52.69% Pervious Area
	20,749		47.31% Impervious Area
	15,394		74.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	26	0.0580	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.1	5	0.0500	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.8	19	0.0500	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.0	10	0.0440	3.38		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	11	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	110	0.0310	2.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	7	0.0290	3.46		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	104	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	59	0.0310	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0350	3.01		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	87	0.0450	4.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.2	455	Total			

Summary for Subcatchment 5S: PDA-5

Runoff = 3.53 cfs @ 12.09 hrs, Volume= 0.253 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	16,076	61	>75% Grass cover, Good, HSG B
	4,326	98	Roofs, HSG B
	182	98	Roofs, HSG A
*	136	98	Unconnected roofs, HSG A (sidewalks,road,deck,patio)
*	9,905	98	Unconnected roofs, HSG B (sidewalks,road,deck,patio)
	30,625	79	Weighted Average
	16,076		52.49% Pervious Area
	14,549		47.51% Impervious Area
	10,041		69.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 6A: PDA-6A

Runoff = 1.28 cfs @ 12.09 hrs, Volume= 0.094 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	5,260	98	roads/swalks
	650	98	Unconnected roofs, HSG B
*	1,607	98	patios
	1,561	39	>75% Grass cover, Good, HSG A
	570	61	>75% Grass cover, Good, HSG B
	9,648	86	Weighted Average
	2,131		22.09% Pervious Area
	7,517		77.91% Impervious Area
	650		8.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 6S: PDA-6

Runoff = 1.87 cfs @ 12.09 hrs, Volume= 0.133 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
*	5,500	98	Roads HSG B
	1,677	98	Unconnected roofs, HSG B
*	2,400	98	Patios
	3,716	61	>75% Grass cover, Good, HSG B
	3,730	39	>75% Grass cover, Good, HSG A
	17,023	77	Weighted Average
	7,446		43.74% Pervious Area
	9,577		56.26% Impervious Area
	1,677		17.51% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: PDA-7

Runoff = 4.36 cfs @ 12.09 hrs, Volume= 0.321 af, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	5,880	39	>75% Grass cover, Good, HSG A
	6,011	98	Roofs, HSG A
*	20,476	98	Unconnected roofs, HSG A (sidewalks,road,deck,patio)
	32,367	87	Weighted Average
	5,880		18.17% Pervious Area
	26,487		81.83% Impervious Area
	20,476		77.31% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 8S: PDA-8

Runoff = 2.03 cfs @ 12.09 hrs, Volume= 0.145 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	10,748	61	>75% Grass cover, Good, HSG B
	5,274	39	>75% Grass cover, Good, HSG A
*	1,826	98	Roofs, HSG B (offsite)
*	81	98	Roofs, HSG B
	2,940	98	Roofs, HSG A
*	420	98	Unconnected roofs, HSG B (deck,patio)
*	2,665	98	Unconnected roofs, HSG A (deck,patio)
	23,954	68	Weighted Average
	16,022		66.89% Pervious Area
	7,932		33.11% Impervious Area
	3,085		38.89% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 9S: PDA-9

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 0.038 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	10,307	39	>75% Grass cover, Good, HSG A
	2,027	98	Roofs, HSG A
*	101	98	Roofs, HSG B (offsite)
*	627	98	Roofs, HSG A (offsite)
	13,912	30	Woods, Good, HSG A
	26,974	40	Weighted Average
	24,219		89.79% Pervious Area
	2,755		10.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0480	0.21		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.8	210	0.0140	1.90		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
5.8	260	Total			

Summary for Subcatchment 10S: PDA-10

Runoff = 2.45 cfs @ 12.08 hrs, Volume= 0.169 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Description
	12,865	61	>75% Grass cover, Good, HSG B
	3,623	98	Roofs, HSG B
*	5,649	98	Unconnected roofs, HSG B (sidewalk,deck,patio)
	22,137	76	Weighted Average
	12,865		58.12% Pervious Area
	9,272		41.88% Impervious Area
	5,649		60.93% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow, ab** Grass: Short n= 0.150 P2= 3.20"
1.5	277	0.0380	3.14		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
5.1	327	Total			

Summary for Subcatchment 11S: PDA-11

Runoff = 2.04 cfs @ 12.15 hrs, Volume= 0.177 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Adj	Description
	6,262	39		>75% Grass cover, Good, HSG A
	9,078	61		>75% Grass cover, Good, HSG B
	611	30		Woods, Good, HSG A
	22,072	55		Woods, Good, HSG B
	2,245	98		Roofs, HSG B
*	3,334	98		Unconnected roofs, HSG B (sidewalks,road,deck,patio)
	43,602	59	57	Weighted Average, UI Adjusted
	38,023			87.20% Pervious Area
	5,579			12.80% Impervious Area
	3,334			59.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0870	0.12		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	530	0.0330	2.92		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
9.9	580	Total			

Summary for Subcatchment 12S: PDA-12

Runoff = 0.48 cfs @ 12.46 hrs, Volume= 0.090 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.70"

	Area (sf)	CN	Adj	Description
	31,415	39		>75% Grass cover, Good, HSG A
	2,676	98		Roofs, HSG A
	12,529	30		Woods, Good, HSG A
*	4,009	98		Unconnected roofs, HSG A (deck,patio)
	13,912	32		Woods/grass comb., Good, HSG A
	64,541	42	40	Weighted Average, UI Adjusted
	57,856			89.64% Pervious Area
	6,685			10.36% Impervious Area
	4,009			59.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	50	0.0156	0.06		**Sheet Flow, ab** Woods: Light underbrush n= 0.400 P2= 3.20"
6.6	320	0.0025	0.81		**Shallow Concentrated Flow, bc** Unpaved Kv= 16.1 fps
20.2	370	Total			

Summary for Reach 2R: Rockwood Road

Inflow Area = 0.508 ac, 41.88% Impervious, Inflow Depth = 3.99" for 100 yr event
Inflow = 2.45 cfs @ 12.08 hrs, Volume= 0.169 af
Outflow = 2.45 cfs @ 12.08 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Existing. Rect. Concrete Channel

Inflow Area = 2.568 ac, 39.55% Impervious, Inflow Depth = 1.90" for 100 yr event
Inflow = 6.86 cfs @ 12.16 hrs, Volume= 0.406 af
Outflow = 6.85 cfs @ 12.17 hrs, Volume= 0.406 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.60 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 1.5 min

Peak Storage= 151 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.00' Flow Area= 2.0 sf, Capacity= 17.02 cfs

2.00' x 1.00' deep channel, n= 0.011 Concrete pipe, straight & clean
Length= 145.0' Slope= 0.0100 '/'
Inlet Invert= 193.98', Outlet Invert= 192.53'

Summary for Reach 5R: Flow to low point next to unit 29

Inflow Area = 0.619 ac, 10.21% Impervious, Inflow Depth = 0.73" for 100 yr event
Inflow = 0.25 cfs @ 12.14 hrs, Volume= 0.038 af
Outflow = 0.25 cfs @ 12.14 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: existing detention basin

Inflow Area = 1.482 ac, 10.36% Impervious, Inflow Depth = 0.73" for 100 yr event
Inflow = 0.48 cfs @ 12.46 hrs, Volume= 0.090 af
Outflow = 0.47 cfs @ 12.52 hrs, Volume= 0.090 af, Atten= 1%, Lag= 3.5 min
Discarded = 0.47 cfs @ 12.52 hrs, Volume= 0.090 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 208.04' @ 12.52 hrs Surf.Area= 2,028 sf Storage= 80 cf

Plug-Flow detention time= 2.9 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (947.1 - 944.2)

Volume	Invert	Avail.Storage	Storage Description
#1	208.00'	42,696 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.00	1,882	211.0	0	0	1,882
209.00	7,002	471.0	4,171	4,171	15,997
213.00	12,526	578.0	38,524	42,696	25,172

Device	Routing	Invert	Outlet Devices
#1	Primary	208.42'	**30.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.42' / 207.92' S= 0.0100 '/' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf
#2	Discarded	208.00'	**12.060 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.57 cfs @ 12.52 hrs HW=208.04' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.57 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 4P: Leaching Chamber Bed #6A

Inflow Area = 0.221 ac, 77.91% Impervious, Inflow Depth = 5.08" for 100 yr event
Inflow = 1.28 cfs @ 12.09 hrs, Volume= 0.094 af
Outflow = 0.14 cfs @ 11.59 hrs, Volume= 0.094 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.14 cfs @ 11.59 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 220.84' @ 12.81 hrs Surf.Area= 0.016 ac Storage= 0.032 af

Plug-Flow detention time= 74.1 min calculated for 0.094 af (100% of inflow)
Center-of-Mass det. time= 74.1 min (867.9 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	217.50'	0.016 af	**13.17'W x 54.50'L x 3.54'H Field A** 0.058 af Overall - 0.017 af Embedded = 0.041 af x 40.0% Voids
#2A	218.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		0.034 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	217.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.14 cfs @ 11.59 hrs HW=217.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Summary for Pond 5P: Leaching Chamber Bed #8

Inflow Area = 0.550 ac, 33.11% Impervious, Inflow Depth = 3.17" for 100 yr event
Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.145 af
Outflow = 0.19 cfs @ 11.65 hrs, Volume= 0.145 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.19 cfs @ 11.65 hrs, Volume= 0.145 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 215.77' @ 13.17 hrs Surf.Area= 0.023 ac Storage= 0.055 af

Plug-Flow detention time= 111.3 min calculated for 0.145 af (100% of inflow)
Center-of-Mass det. time= 111.3 min (948.7 - 837.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	211.50'	0.030 af	**37.33'W x 26.50'L x 4.54'H Field A** 0.103 af Overall - 0.027 af Embedded = 0.076 af x 40.0% Voids
#2A	212.50'	0.027 af	**Cultec R-330XLHD** x 21 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 7 rows
		0.057 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.19 cfs @ 11.65 hrs HW=211.55' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Summary for Pond 6P: Leaching Chamber Bed #4A

Inflow Area = 0.284 ac, 82.36% Impervious, Inflow Depth = 5.53" for 100 yr event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.131 af
Outflow = 0.86 cfs @ 12.23 hrs, Volume= 0.131 af, Atten= 51%, Lag= 8.8 min
Discarded = 0.12 cfs @ 11.19 hrs, Volume= 0.101 af
Primary = 0.73 cfs @ 12.23 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 200.02' @ 12.23 hrs Surf.Area= 0.015 ac Storage= 0.031 af

Plug-Flow detention time= 47.8 min calculated for 0.131 af (100% of inflow)
Center-of-Mass det. time= 47.7 min (829.0 - 781.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	196.50'	0.014 af	**12.17'W x 53.50'L x 3.54'H Field A** 0.053 af Overall - 0.017 af Embedded = 0.036 af x 40.0% Voids
#2A	197.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		0.032 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**6.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.60' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.12 cfs @ 11.19 hrs HW=196.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.73 cfs @ 12.23 hrs HW=200.02' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.73 cfs @ 3.74 fps)

Summary for Pond 8P: Leaching Chamber Bed #6

Inflow Area = 0.391 ac, 56.26% Impervious, Inflow Depth = 4.10" for 100 yr event
Inflow = 1.87 cfs @ 12.09 hrs, Volume= 0.133 af
Outflow = 0.21 cfs @ 11.64 hrs, Volume= 0.133 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.21 cfs @ 11.64 hrs, Volume= 0.133 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 213.07' @ 12.86 hrs Surf.Area= 0.025 ac Storage= 0.047 af

Plug-Flow detention time= 75.0 min calculated for 0.133 af (100% of inflow)
Center-of-Mass det. time= 75.0 min (891.9 - 816.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	210.00'	0.021 af	**16.08'W x 67.33'L x 3.21'H Field A** 0.080 af Overall - 0.027 af Embedded = 0.053 af x 40.0% Voids
#2A	210.50'	0.027 af	**Cultec R-280HD** x 27 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 3 rows
		0.048 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.21 cfs @ 11.64 hrs HW=210.03' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Summary for Pond 10P: Leaching Chamber Bed #1A

Inflow Area = 0.279 ac, 43.21% Impervious, Inflow Depth = 4.10" for 100 yr event
Inflow = 1.34 cfs @ 12.09 hrs, Volume= 0.095 af
Outflow = 0.04 cfs @ 10.65 hrs, Volume= 0.074 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.04 cfs @ 10.65 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 198.04' @ 16.05 hrs Surf.Area= 0.018 ac Storage= 0.056 af

Plug-Flow detention time= 448.8 min calculated for 0.074 af (77% of inflow)
Center-of-Mass det. time= 366.4 min (1,183.4 - 816.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	192.50'	0.032 af	**19.50'W x 40.03'L x 6.00'H Field A** 0.108 af Overall - 0.027 af Embedded = 0.081 af x 40.0% Voids
#2A	193.50'	0.027 af	**Cultec R-902HD** x 18 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 2 Rows of 9 Chambers Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		0.059 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	192.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 10.65 hrs HW=192.56' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond 23P: Leaching Chamber Bed #2A

Inflow Area = 0.259 ac, 53.51% Impervious, Inflow Depth = 4.42" for 100 yr event
Inflow = 1.23 cfs @ 12.12 hrs, Volume= 0.096 af
Outflow = 0.02 cfs @ 9.55 hrs, Volume= 0.038 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.02 cfs @ 9.55 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 198.23' @ 19.87 hrs Surf.Area= 0.021 ac Storage= 0.069 af

Plug-Flow detention time= 463.1 min calculated for 0.038 af (40% of inflow)
Center-of-Mass det. time= 341.1 min (1,153.0 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	192.50'	0.036 af	**17.75'W x 51.03'L x 6.00'H Field A** 0.125 af Overall - 0.036 af Embedded = 0.089 af x 40.0% Voids
#2A	193.50'	0.036 af	**Cultec R-902HD** x 24 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 2 Rows of 12 Chambers Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		0.071 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	192.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 9.55 hrs HW=192.56' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Summary for Pond LC 4A: Leaching Chamber Bed #4

Inflow Area = 1.007 ac, 47.31% Impervious, Inflow Depth = 4.20" for 100 yr event
Inflow = 4.91 cfs @ 12.09 hrs, Volume= 0.353 af
Outflow = 4.15 cfs @ 12.14 hrs, Volume= 0.353 af, Atten= 16%, Lag= 3.1 min
Discarded = 0.16 cfs @ 10.51 hrs, Volume= 0.172 af
Primary = 3.99 cfs @ 12.14 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.18' @ 12.14 hrs Surf.Area= 0.019 ac Storage= 0.048 af

Plug-Flow detention time= 34.7 min calculated for 0.353 af (100% of inflow)
Center-of-Mass det. time= 34.7 min (849.5 - 814.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	199.00'	0.023 af	**16.00'W x 52.50'L x 4.29'H Field A** 0.083 af Overall - 0.026 af Embedded = 0.057 af x 40.0% Voids
#2A	199.75'	0.026 af	**Cultec R-330XLHD** x 21 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

		Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
	0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	199.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	200.90'	**12.0" Round Culvert**
			L= 60.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 200.90' / 199.70' S= 0.0200 '/' Cc= 0.900
			n= 0.011 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.16 cfs @ 10.51 hrs HW=199.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=3.98 cfs @ 12.14 hrs HW=203.18' (Free Discharge)
└**2=Culvert** (Inlet Controls 3.98 cfs @ 5.07 fps)

Summary for Pond LC-1: Leaching Chamber Bed #1

Inflow Area =	0.261 ac, 66.69% Impervious, Inflow Depth = 5.08" for 100 yr event			
Inflow =	1.51 cfs @	12.09 hrs, Volume=	0.111 af	
Outflow =	0.08 cfs @	10.89 hrs, Volume=	0.111 af, Atten= 95%, Lag= 0.0 min	
Discarded =	0.08 cfs @	10.89 hrs, Volume=	0.111 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 195.12' @ 14.21 hrs Surf.Area= 0.033 ac Storage= 0.052 af

Plug-Flow detention time= 257.2 min calculated for 0.111 af (100% of inflow)
Center-of-Mass det. time= 257.1 min (1,050.9 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	192.00'	0.035 af	**13.25'W x 107.25'L x 3.29'H Field A**
			0.107 af Overall - 0.019 af Embedded = 0.089 af x 40.0% Voids
#2A	192.75'	0.019 af	**Cultec R-150XLHD** x 30 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 3 rows
		0.054 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	192.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 10.89 hrs HW=192.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond LC-2: Leaching Chamber Bed #2

Inflow Area = 0.478 ac, 54.35% Impervious, Inflow Depth = 4.53" for 100 yr event
Inflow = 2.51 cfs @ 12.09 hrs, Volume= 0.180 af
Outflow = 0.04 cfs @ 9.49 hrs, Volume= 0.075 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.04 cfs @ 9.49 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 200.96' @ 19.31 hrs Surf.Area= 0.041 ac Storage= 0.129 af

Plug-Flow detention time= 462.5 min calculated for 0.075 af (42% of inflow)
Center-of-Mass det. time= 342.1 min (1,149.3 - 807.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	194.50'	0.092 af	**15.17'W x 117.50'L x 6.54'H Field A** 0.268 af Overall - 0.039 af Embedded = 0.229 af x 40.0% Voids
#2A	196.50'	0.039 af	**Cultec R-330XLHD** x 32 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		0.130 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 9.49 hrs HW=194.57' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond LC-3: Leaching Chamber Bed #3

Inflow Area = 0.277 ac, 64.15% Impervious, Inflow Depth = 4.97" for 100 yr event
Inflow = 1.57 cfs @ 12.09 hrs, Volume= 0.114 af
Outflow = 0.51 cfs @ 12.39 hrs, Volume= 0.114 af, Atten= 68%, Lag= 18.1 min
Discarded = 0.18 cfs @ 11.61 hrs, Volume= 0.095 af
Primary = 0.33 cfs @ 12.39 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 199.97' @ 12.39 hrs Surf.Area= 0.021 ac Storage= 0.029 af

Plug-Flow detention time= 27.9 min calculated for 0.114 af (100% of inflow)
Center-of-Mass det. time= 27.9 min (824.5 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	197.50'	0.016 af	**12.25'W x 75.50'L x 2.54'H Field A** 0.054 af Overall - 0.013 af Embedded = 0.041 af x 40.0% Voids
#2A	198.00'	0.013 af	**Cultec R-150XLHD** x 21 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 3 rows

0.030 af Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.50'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	198.80'	**4.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 198.80' / 198.40' S= 0.0200 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.18 cfs @ 11.61 hrs HW=197.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.33 cfs @ 12.39 hrs HW=199.97' (Free Discharge)
└─**2=Culvert** (Inlet Controls 0.33 cfs @ 3.80 fps)

Summary for Pond LC-5: Leaching Chamber Bed #5

Inflow Area =	0.703 ac,	47.51% Impervious,	Inflow Depth =	4.31"	for 100 yr event
Inflow =	3.53 cfs @	12.09 hrs,	Volume=	0.253 af	
Outflow =	0.08 cfs @	10.06 hrs,	Volume=	0.140 af,	Atten= 98%, Lag= 0.0 min
Discarded =	0.08 cfs @	10.06 hrs,	Volume=	0.140 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 213.50' @ 17.53 hrs Surf.Area= 0.078 ac Storage= 0.166 af

Plug-Flow detention time= 461.5 min calculated for 0.140 af (56% of inflow)
Center-of-Mass det. time= 352.6 min (1,164.8 - 812.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	210.00'	0.073 af	**34.50'W x 98.50'L x 3.54'H Field A** 0.276 af Overall - 0.095 af Embedded = 0.181 af x 40.0% Voids
#2A	210.50'	0.095 af	**Cultec R-330XLHD** x 78 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		0.167 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 10.06 hrs HW=210.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond LC-7: Leaching Chamber Bed #7

Inflow Area = 0.743 ac, 81.83% Impervious, Inflow Depth = 5.19" for 100 yr event
Inflow = 4.36 cfs @ 12.09 hrs, Volume= 0.321 af
Outflow = 0.47 cfs @ 11.59 hrs, Volume= 0.321 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.47 cfs @ 11.59 hrs, Volume= 0.321 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 215.33' @ 12.79 hrs Surf.Area= 0.057 ac Storage= 0.110 af

Plug-Flow detention time= 71.9 min calculated for 0.321 af (100% of inflow)
Center-of-Mass det. time= 71.9 min (862.8 - 790.8)

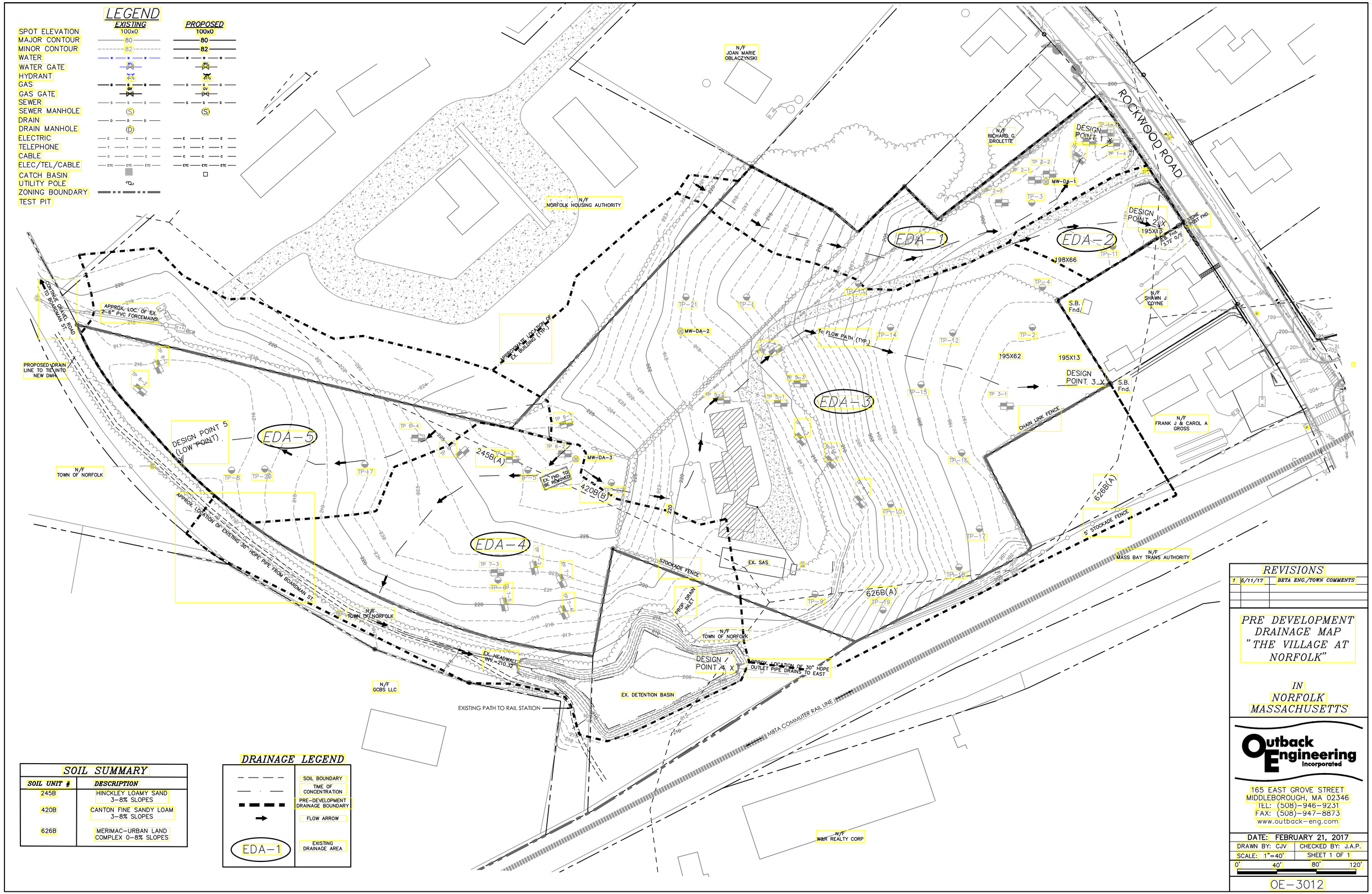
Volume	Invert	Avail.Storage	Storage Description
#1A	211.50'	0.077 af	**43.50'W x 57.00'L x 4.04'H Field A** 0.230 af Overall - 0.038 af Embedded = 0.192 af x 40.0% Voids
#2A	213.00'	0.038 af	**Cultec R-150XLHD** x 60 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 12 rows
		0.115 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.47 cfs @ 11.59 hrs HW=211.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.47 cfs)

Appendix C
PRE- & POST-DEVELOPMENT MAPS


LEGEND
EXISTING
PROPOSED
SPOT ELEVATION
MAJOR CONTOUR
MINOR CONTOUR
WATER
WATER GATE
HYDRANT
GAS
GAS GATE
SEWER
SEWER MANHOLE
DRAIN
DRAIN MANHOLE
ELECTRIC
TELEPHONE
CABLE
ELEC/TEL/CABLE
CATCH BASIN
UTILITY POLE
ZONING BOUNDARY
TEST PIT
N/F JOAN MARIE OBLACZYNSKI
N/F NORFOLK HOUSING AUTHORITY
N/F RICHARD G DROLETTE
ROCKWOOD ROAD
DESIGN POINT 1
DESIGN POINT 2
DESIGN POINT 3
DESIGN POINT 4
DESIGN POINT 5 (LOW POINT)
EDA-1
EDA-2
EDA-3
EDA-4
EDA-5
MW-DA-1
MW-DA-2
MW-DA-3
FLOW PATH (TYP)
S.B. Fnd.
N/F SHAWN J COYNE
N/F FRANK J & CAROL A GROSS
CHAIN LINK FENCE
5' STOCKADE FENCE
N/F MASS BAY TRANS AUTHORITY
EX. SAS
STOCKADE FENCE
PROP. DRAIN INLET
N/F TOWN OF NORFOLK
EX. DETENTION BASIN
APPROX. LOCATION OF 30" HDPE OUTLET PIPE DRAINS TO EAST
EXISTING PATH TO RAIL STATION
MBTA COMMUTER RAIL LINE
N/F W&R REALTY CORP
N/F GCBS LLC
EX. HEADWALL INV=210.32
APPROX. LOCATION OF EXISTING 30" HDPE PIPE FROM BOARDMAN ST.
CONTINUE BRAKEL ROAD TO BOARDMAN ST.
APPROX. LOC. OF EX. 2-6" PVC FORCEMAINS
PROPOSED DRAIN LINE TO TIE INTO NEW DMH
APPROXIMATE LOCATION OF EX. BUILDING (TYP.)
EX. FND. TO BE REMOVED
N/F TOWN OF NORFOLK
245B(A)
420B(B)
626B(A)
198X66
195X62
195X13
195X10
TP-1
TP-2
TP-3
TP-4
TP-5-1
TP-5-2
TP-5-3
TP-6-1
TP-6-2
TP-6-3
TP-6-4
TP-7-1
TP-7-2
TP-7-3
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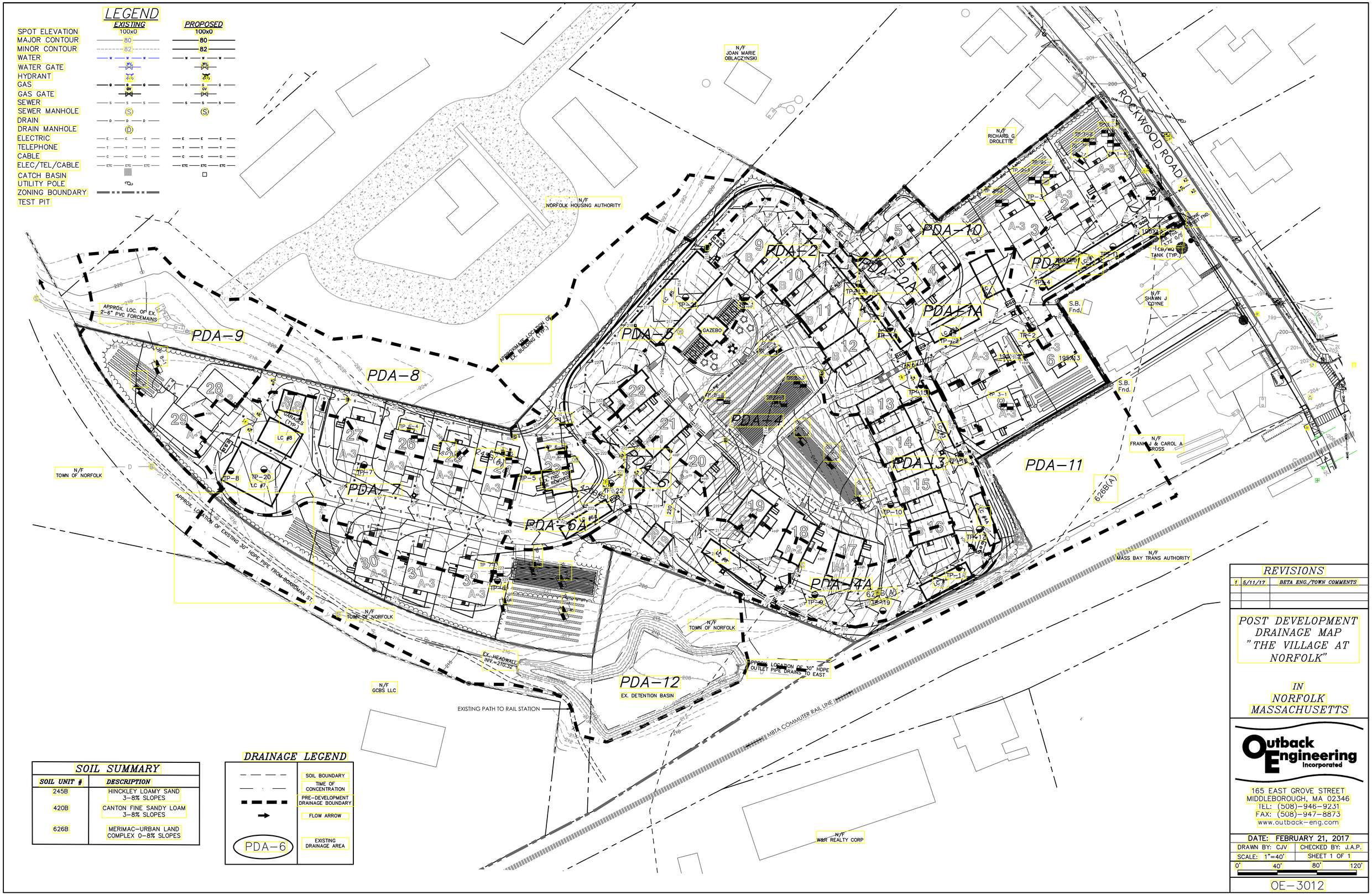
TP-47



SOIL SUMMARY

SOIL UNIT #	DESCRIPTION
245B	HINCKLEY LOAMY SAND 3-8% SLOPES
420B	CANTON FINE SANDY LOAM 3-8% SLOPES
626B	MERIMAC-URBAN LAND COMPLEX 0-8% SLOPES

DRAINAGE LEGEND

	SOIL BOUNDARY
	TIME OF CONCENTRATION
	PRE-DEVELOPMENT DRAINAGE BOUNDARY
	FLOW ARROW
PDA-6	EXISTING DRAINAGE AREA

REVISIONS

1	5/11/17	BETA ENG./TOWN COMMENTS

POST DEVELOPMENT DRAINAGE MAP "THE VILLAGE AT NORFOLK"

IN NORFOLK MASSACHUSETTS

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FAX: (508)-947-8873
www.outback-eng.com

DATE: FEBRUARY 21, 2017
DRAWN BY: CJV | CHECKED BY: J.A.P.
SCALE: 1"=40' | SHEET 1 OF 1
0' 40' 80' 120'

OE-3012