

COPY

Addendum -1

Stormwater Management Report

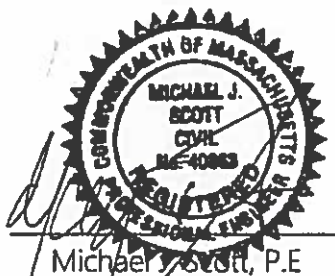
for:

Brigati Village
41 Church Street, 14 & 15 West Street
Grafton, Massachusetts 01519

Project Proponent:

David W. Brossi
15 Juniper Lane
Grafton, MA 01519

Original Report February 2019
Revised: May 2019



Michael J. Scott, P.E.

Taylor Smith, E.I.T.

EXHIBIT 35

WDA
DESIGN
GROUP

RECEIVED

MAY 20 2019

PLANNING BOARD
GRAFTON, MA

TABLE OF CONTENTS	TOC
Purpose	2
Stormwater Management Standards	2
Standard #2 – Peak Rate Attenuation.....	2
Analysis Summary.....	2
EXISTING Hydrology.....	4
Proposed Hydrology	5

PURPOSE

Revised hydrologic calculations have been performed in response to peer review comments as well as feedback from the Conservation Commission as part of Special Permit, Notice of Intent and Site Plan Review applications for the proposed development located at 41 Church Street, 14 and 15 West Street in Grafton, MA. This report addresses drainage, hydrology and stormwater management comments received from Graves Engineering and the Town of Grafton Planning Board as well as comments made during the Conservation Commission hearings. Stormwater calculations reference the original Stormwater Management Report dated February 2019. The calculations were performed to design stormwater collection and attenuation facilities for the site and to demonstrate that the project will meet the standards of the Town of Grafton and the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Regulations.

The revisions made in this report are as follows:

- a) The detention basin near the eastern portion of the site (DB-3) has been modified. At the request of the Conservation Commission, this basin has been redesigned as a gravel wetland to provide Low Impact Development (LID) stormwater measures. The basin will promote increased natural filtration through a series of treatment cells with wetland vegetation and enhance groundwater recharge. The basin has been designed in accordance with the University of New Hampshire Stormwater Center subsurface Gravel Wetland Design Specifications, dated May 2016.
- b) The offsite area to the east of the property has been included as part of this analysis. This area does not affect the hydrology of the project site and is independent of the project site. The analysis of this offsite area is intended for the purpose of mitigating an existing drainage problem at #11 West Street.

STORMWATER MANAGEMENT STANDARDS

STANDARD #2 – PEAK RATE ATTENUATION.

ANALYSIS SUMMARY

To assess the impact of the proposed development on peak runoff rates on down-gradient properties, hydrologic calculations were performed for each of three design storm events at the design points. The calculations estimate net peak discharge rates generated on-site at the design points. The design points are located at the property line near Church Street to the west, the property line near West Street to the north, and the BVW to the east of the proposed development. The design point for the offsite drainage to the east is the existing culvert behind the house at #13 West Street.

Calculations of peak runoff rates for existing and proposed site conditions are summarized in Table I for comparison of peak runoff rates for the design point for the three design storm events. A proposed hydrology plan is provided showing the various sub-watersheds draining to the proposed stormwater management facilities. Stormwater runoff from the overland areas not tributary to the stormwater management facilities will drain by sheet flow or shallow concentrated flow along the existing flow patterns to the design points.

Table I demonstrates that the proposed stormwater management system will be effective in limiting peak rates of runoff from the subject property to approximate pre-development levels.

TABLE I: EXISTING AND PROPOSED PEAK RUNOFF

DRAINAGE AREA	DESIGN STORM EVENT / PEAK RUNOFF (cfs)		
	2-Year	10-Year	100-Year
Existing (DP-1)	2.6	6.6	17.9
Proposed (DP-1)	2.6	6.6	17.5
Existing (DP-2)	1.7	3.6	8.6
Proposed (DP-2)	1.2	3.5	7.3
Existing (DP-3)	2.6	6.6	17.9
Proposed (DP-3)	2.6	5.8	15.6
Existing (DP-4)	4.6	11.4	30.3
Proposed (DP-4)	4.6	11.4	30.3

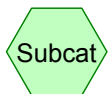
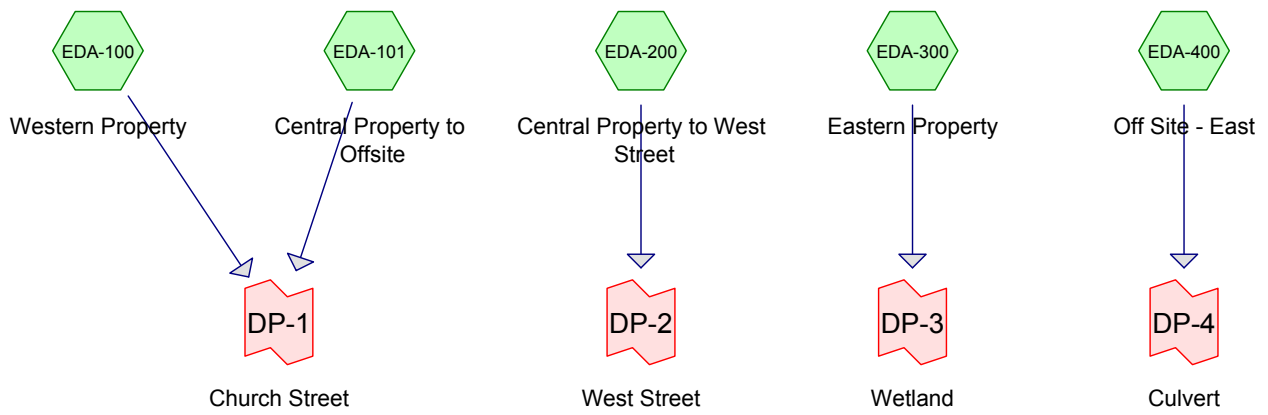
TABLE II: EXISTING AND PROPOSED RUNOFF VOLUMES

DRAINAGE AREA	DESIGN STORM EVENT / VOLUME (cf)		
	2-Year	10-Year	100-Year
Existing (DP-1)	12,068	27,606	73,618
Proposed (DP-1)	18,714	37,770	89,686
Existing (DP-2)	7,777	16,062	39,071
Proposed (DP-2)	5,861	12,073	28,050
Existing (DP-3)	11,528	26,371	70,324
Proposed (DP-3)	20,807	41,312	96,190
Existing (DP-4)	19,248	43,226	113,419
Proposed (DP-4)	19,248	43,226	113,419

TABLE III: MAXIMUM WATER ELEVATION

STORMWATER FACILITY	100-YEAR STORM EVENT WATER ELEVATION	TOP / BERM ELEVATION
DB-1	452.10	453.10
DB-2	454.52	455.50
DB-3	469.36	470.50

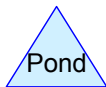
EXISTING HYDROLOGY



Subcat



Reach



Pond



Link

Routing Diagram for Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
73,545	74	>75% Grass cover, Good, HSG C (EDA-200, EDA-400)
332	96	Gravel surface, HSG C (EDA-200)
6,277	98	Paved parking, HSG C (EDA-200)
5,688	98	Roofs, HSG C (EDA-200, EDA-400)
11,510	98	Unconnected pavement, HSG C (EDA-400)
570,283	70	Woods, Good, HSG C (EDA-100, EDA-101, EDA-200, EDA-300, EDA-400)
667,635	71	TOTAL AREA

Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
667,635	HSG C	EDA-100, EDA-101, EDA-200, EDA-300, EDA-400
0	HSG D	
0	Other	
667,635		TOTAL AREA

Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	73,545	0	0	73,545	>75% Grass cover, Good
0	0	332	0	0	332	Gravel surface
0	0	6,277	0	0	6,277	Paved parking
0	0	5,688	0	0	5,688	Roofs
0	0	11,510	0	0	11,510	Unconnected pavement
0	0	570,283	0	0	570,283	Woods, Good
0	0	667,635	0	0	667,635	TOTAL AREA

Sub
Num

Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-100: Western Property Runoff Area=147,019 sf 0.00% Impervious Runoff Depth=0.85"
 Flow Length=614' Tc=14.8 min CN=70 Runoff=2.3 cfs 10,432 cf

Subcatchment EDA-101: Central Property to Runoff Area=23,057 sf 0.00% Impervious Runoff Depth=0.85"
 Flow Length=740' Tc=16.2 min CN=70 Runoff=0.3 cfs 1,636 cf

Subcatchment EDA-200: Central Property Runoff Area=79,093 sf 12.19% Impervious Runoff Depth=1.18"
 Flow Length=540' Tc=18.8 min CN=76 Runoff=1.7 cfs 7,777 cf

Subcatchment EDA-300: Eastern Property Runoff Area=162,466 sf 0.00% Impervious Runoff Depth=0.85"
 Flow Length=445' Tc=13.1 min CN=70 Runoff=2.6 cfs 11,528 cf

Subcatchment EDA-400: Off Site - East Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=0.90"
 Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=4.6 cfs 19,248 cf

Link DP-1: Church Street Inflow=2.6 cfs 12,068 cf
 Primary=2.6 cfs 12,068 cf

Link DP-2: West Street Inflow=1.7 cfs 7,777 cf
 Primary=1.7 cfs 7,777 cf

Link DP-3: Wetland Inflow=2.6 cfs 11,528 cf
 Primary=2.6 cfs 11,528 cf

Link DP-4: Culvert Inflow=4.6 cfs 19,248 cf
 Primary=4.6 cfs 19,248 cf

Total Runoff Area = 667,635 sf Runoff Volume = 50,620 cf Average Runoff Depth = 0.91"
96.48% Pervious = 644,160 sf 3.52% Impervious = 23,475 sf

Existing - Addendum

Prepared by Microsoft

Summary for Subcatchment EDA-100: Western Property

Runoff = 2.3 cfs @ 12.23 hrs, Volume= 10,432 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
147,019	70	Woods, Good, HSG C
147,019		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, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	564	0.1900	2.18		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.8	614	Total			

Summary for Subcatchment EDA-101: Central Property to Offsite

Runoff = 0.3 cfs @ 12.25 hrs, Volume= 1,636 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
23,057	70	Woods, Good, HSG C
23,057		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.9	690	0.1110	1.67		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	740	Total			

Summary for Subcatchment EDA-200: Central Property to West Street

Runoff = 1.7 cfs @ 12.28 hrs, Volume= 7,777 cf, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Existing - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
28,835	70	Woods, Good, HSG C
3,366	98	Roofs, HSG C
332	96	Gravel surface, HSG C
40,283	74	>75% Grass cover, Good, HSG C
6,277	98	Paved parking, HSG C
79,093	76	Weighted Average
69,450		87.81% Pervious Area
9,643		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	50	0.0140	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.8	279	0.0600	1.22		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.8	211	0.0800	4.55		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
18.8	540	Total			

Summary for Subcatchment EDA-300: Eastern Property

Runoff = 2.6 cfs @ 12.21 hrs, Volume= 11,528 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
162,466	70	Woods, Good, HSG C
162,466		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	395	0.0650	1.27		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
13.1	445	Total			

Summary for Subcatchment EDA-400: Off Site - East

Runoff = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Existing - Addendum

Type III 24-hr 2-year-NRCC Rainfall=3.24"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Link DP-1: Church Street

Inflow Area = 170,076 sf, 0.00% Impervious, Inflow Depth = 0.85" for 2-year-NRCC event
 Inflow = 2.6 cfs @ 12.23 hrs, Volume= 12,068 cf
 Primary = 2.6 cfs @ 12.23 hrs, Volume= 12,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 79,093 sf, 12.19% Impervious, Inflow Depth = 1.18" for 2-year-NRCC event
 Inflow = 1.7 cfs @ 12.28 hrs, Volume= 7,777 cf
 Primary = 1.7 cfs @ 12.28 hrs, Volume= 7,777 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 162,466 sf, 0.00% Impervious, Inflow Depth = 0.85" for 2-year-NRCC event
 Inflow = 2.6 cfs @ 12.21 hrs, Volume= 11,528 cf
 Primary = 2.6 cfs @ 12.21 hrs, Volume= 11,528 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 0.90" for 2-year-NRCC event
 Inflow = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf
 Primary = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Existing - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-100: Western Property Runoff Area=147,019 sf 0.00% Impervious Runoff Depth=1.95"
 Flow Length=614' Tc=14.8 min CN=70 Runoff=5.7 cfs 23,864 cf

Subcatchment EDA-101: Central Property to Runoff Area=23,057 sf 0.00% Impervious Runoff Depth=1.95"
 Flow Length=740' Tc=16.2 min CN=70 Runoff=0.9 cfs 3,743 cf

Subcatchment EDA-200: Central Property Runoff Area=79,093 sf 12.19% Impervious Runoff Depth=2.44"
 Flow Length=540' Tc=18.8 min CN=76 Runoff=3.6 cfs 16,062 cf

Subcatchment EDA-300: Eastern Property Runoff Area=162,466 sf 0.00% Impervious Runoff Depth=1.95"
 Flow Length=445' Tc=13.1 min CN=70 Runoff=6.6 cfs 26,371 cf

Subcatchment EDA-400: Off Site - East Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=2.03"
 Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=11.4 cfs 43,226 cf

Link DP-1: Church Street Inflow=6.6 cfs 27,606 cf
 Primary=6.6 cfs 27,606 cf

Link DP-2: West Street Inflow=3.6 cfs 16,062 cf
 Primary=3.6 cfs 16,062 cf

Link DP-3: Wetland Inflow=6.6 cfs 26,371 cf
 Primary=6.6 cfs 26,371 cf

Link DP-4: Culvert Inflow=11.4 cfs 43,226 cf
 Primary=11.4 cfs 43,226 cf

Total Runoff Area = 667,635 sf Runoff Volume = 113,265 cf Average Runoff Depth = 2.04"
96.48% Pervious = 644,160 sf 3.52% Impervious = 23,475 sf

Existing - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

Summary for Subcatchment EDA-100: Western Property

Runoff = 5.7 cfs @ 12.21 hrs, Volume= 23,864 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
147,019	70	Woods, Good, HSG C
147,019		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, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	564	0.1900	2.18		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.8	614	Total			

Summary for Subcatchment EDA-101: Central Property to Offsite

Runoff = 0.9 cfs @ 12.24 hrs, Volume= 3,743 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
23,057	70	Woods, Good, HSG C
23,057		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.9	690	0.1110	1.67		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	740	Total			

Summary for Subcatchment EDA-200: Central Property to West Street

Runoff = 3.6 cfs @ 12.26 hrs, Volume= 16,062 cf, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Existing - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
28,835	70	Woods, Good, HSG C
3,366	98	Roofs, HSG C
332	96	Gravel surface, HSG C
40,283	74	>75% Grass cover, Good, HSG C
6,277	98	Paved parking, HSG C
79,093	76	Weighted Average
69,450		87.81% Pervious Area
9,643		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	50	0.0140	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.8	279	0.0600	1.22		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.8	211	0.0800	4.55		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
18.8	540	Total			

Summary for Subcatchment EDA-300: Eastern Property

Runoff = 6.6 cfs @ 12.19 hrs, Volume= 26,371 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
162,466	70	Woods, Good, HSG C
162,466		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	395	0.0650	1.27		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
13.1	445	Total			

Summary for Subcatchment EDA-400: Off Site - East

Runoff = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Existing - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Link DP-1: Church Street

Inflow Area = 170,076 sf, 0.00% Impervious, Inflow Depth = 1.95" for 10-year-NRCC event
 Inflow = 6.6 cfs @ 12.22 hrs, Volume= 27,606 cf
 Primary = 6.6 cfs @ 12.22 hrs, Volume= 27,606 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 79,093 sf, 12.19% Impervious, Inflow Depth = 2.44" for 10-year-NRCC event
 Inflow = 3.6 cfs @ 12.26 hrs, Volume= 16,062 cf
 Primary = 3.6 cfs @ 12.26 hrs, Volume= 16,062 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 162,466 sf, 0.00% Impervious, Inflow Depth = 1.95" for 10-year-NRCC event
 Inflow = 6.6 cfs @ 12.19 hrs, Volume= 26,371 cf
 Primary = 6.6 cfs @ 12.19 hrs, Volume= 26,371 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 2.03" for 10-year-NRCC event
 Inflow = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf
 Primary = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Existing - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-100: Western Property Runoff Area=147,019 sf 0.00% Impervious Runoff Depth=5.19"
Flow Length=614' Tc=14.8 min CN=70 Runoff=15.6 cfs 63,638 cf

Subcatchment EDA-101: Central Property to Runoff Area=23,057 sf 0.00% Impervious Runoff Depth=5.19"
Flow Length=740' Tc=16.2 min CN=70 Runoff=2.4 cfs 9,980 cf

Subcatchment EDA-200: Central Property Runoff Area=79,093 sf 12.19% Impervious Runoff Depth=5.93"
Flow Length=540' Tc=18.8 min CN=76 Runoff=8.6 cfs 39,071 cf

Subcatchment EDA-300: Eastern Property Runoff Area=162,466 sf 0.00% Impervious Runoff Depth=5.19"
Flow Length=445' Tc=13.1 min CN=70 Runoff=17.9 cfs 70,324 cf

Subcatchment EDA-400: Off Site - East Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=5.32"
Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=30.3 cfs 113,419 cf

Link DP-1: Church Street Inflow=17.9 cfs 73,618 cf
Primary=17.9 cfs 73,618 cf

Link DP-2: West Street Inflow=8.6 cfs 39,071 cf
Primary=8.6 cfs 39,071 cf

Link DP-3: Wetland Inflow=17.9 cfs 70,324 cf
Primary=17.9 cfs 70,324 cf

Link DP-4: Culvert Inflow=30.3 cfs 113,419 cf
Primary=30.3 cfs 113,419 cf

Total Runoff Area = 667,635 sf Runoff Volume = 296,432 cf Average Runoff Depth = 5.33"
96.48% Pervious = 644,160 sf 3.52% Impervious = 23,475 sf

Existing - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

Summary for Subcatchment EDA-100: Western Property

Runoff = 15.6 cfs @ 12.21 hrs, Volume= 63,638 cf, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
147,019	70	Woods, Good, HSG C
147,019		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, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	564	0.1900	2.18		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.8	614	Total			

Summary for Subcatchment EDA-101: Central Property to Offsite

Runoff = 2.4 cfs @ 12.22 hrs, Volume= 9,980 cf, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
23,057	70	Woods, Good, HSG C
23,057		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.9	690	0.1110	1.67		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	740	Total			

Summary for Subcatchment EDA-200: Central Property to West Street

Runoff = 8.6 cfs @ 12.26 hrs, Volume= 39,071 cf, Depth= 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Existing - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
28,835	70	Woods, Good, HSG C
3,366	98	Roofs, HSG C
332	96	Gravel surface, HSG C
40,283	74	>75% Grass cover, Good, HSG C
6,277	98	Paved parking, HSG C
79,093	76	Weighted Average
69,450		87.81% Pervious Area
9,643		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	50	0.0140	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.8	279	0.0600	1.22		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.8	211	0.0800	4.55		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
18.8	540	Total			

Summary for Subcatchment EDA-300: Eastern Property

Runoff = 17.9 cfs @ 12.18 hrs, Volume= 70,324 cf, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
162,466	70	Woods, Good, HSG C
162,466		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
5.2	395	0.0650	1.27		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
13.1	445	Total			

Summary for Subcatchment EDA-400: Off Site - East

Runoff = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Existing - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Link DP-1: Church Street

Inflow Area = 170,076 sf, 0.00% Impervious, Inflow Depth = 5.19" for 100-year-NRCC event
 Inflow = 17.9 cfs @ 12.21 hrs, Volume= 73,618 cf
 Primary = 17.9 cfs @ 12.21 hrs, Volume= 73,618 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 79,093 sf, 12.19% Impervious, Inflow Depth = 5.93" for 100-year-NRCC event
 Inflow = 8.6 cfs @ 12.26 hrs, Volume= 39,071 cf
 Primary = 8.6 cfs @ 12.26 hrs, Volume= 39,071 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 162,466 sf, 0.00% Impervious, Inflow Depth = 5.19" for 100-year-NRCC event
 Inflow = 17.9 cfs @ 12.18 hrs, Volume= 70,324 cf
 Primary = 17.9 cfs @ 12.18 hrs, Volume= 70,324 cf, Atten= 0%, Lag= 0.0 min

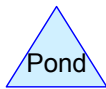
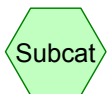
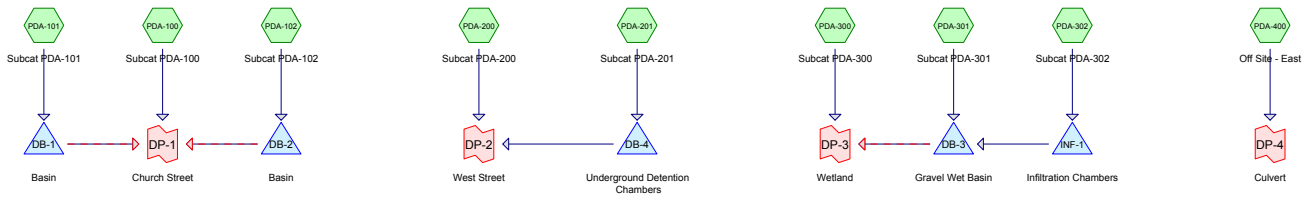
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 5.32" for 100-year-NRCC event
 Inflow = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf
 Primary = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

PROPOSED HYDROLOGY



Routing Diagram for Proposed - Addendum
 Prepared by Microsoft
 HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
208,892	74	>75% Grass cover, Good, HSG C (PDA-100, PDA-101, PDA-102, PDA-200, PDA-201, PDA-300, PDA-301, PDA-302, PDA-400)
14,649	96	Gravel surface, HSG C (PDA-100, PDA-101, PDA-102, PDA-200, PDA-201, PDA-300, PDA-301)
57,415	98	Paved parking, HSG C (PDA-100, PDA-101, PDA-102, PDA-200, PDA-201, PDA-301, PDA-302)
56,188	98	Roofs, HSG C (PDA-101, PDA-102, PDA-200, PDA-201, PDA-300, PDA-301, PDA-302, PDA-400)
11,510	98	Unconnected pavement, HSG C (PDA-400)
318,887	70	Woods, Good, HSG C (PDA-100, PDA-102, PDA-300, PDA-400)
667,541	77	TOTAL AREA

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
667,541	HSG C	PDA-100, PDA-101, PDA-102, PDA-200, PDA-201, PDA-300, PDA-301, PDA-302, PDA-400
0	HSG D	
0	Other	
667,541		TOTAL AREA

Proposed - Addendum

Prepared by Microsoft

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	208,892	0	0	208,892	>75% Grass cover, Good
0	0	14,649	0	0	14,649	Gravel surface
0	0	57,415	0	0	57,415	Paved parking
0	0	56,188	0	0	56,188	Roofs
0	0	11,510	0	0	11,510	Unconnected pavement
0	0	318,887	0	0	318,887	Woods, Good
0	0	667,541	0	0	667,541	TOTAL AREA

Sub
Num

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-100: Subcat PDA-100	Runoff Area=83,108 sf 0.00% Impervious Runoff Depth=0.95" Flow Length=420' Tc=9.2 min CN=72 Runoff=1.7 cfs 6,611 cf
Subcatchment PDA-101: Subcat PDA-101	Runoff Area=56,037 sf 44.91% Impervious Runoff Depth=1.87" Flow Length=420' Tc=6.1 min CN=86 Runoff=2.8 cfs 8,732 cf
Subcatchment PDA-102: Subcat PDA-102	Runoff Area=37,593 sf 25.75% Impervious Runoff Depth=1.50" Flow Length=363' Tc=7.6 min CN=81 Runoff=1.4 cfs 4,701 cf
Subcatchment PDA-200: Subcat PDA-200	Runoff Area=28,172 sf 31.17% Impervious Runoff Depth=1.57" Tc=6.0 min CN=82 Runoff=1.2 cfs 3,687 cf
Subcatchment PDA-201: Subcat PDA-201	Runoff Area=22,776 sf 52.14% Impervious Runoff Depth=2.12" Tc=6.0 min CN=89 Runoff=1.3 cfs 4,020 cf
Subcatchment PDA-300: Subcat PDA-300	Runoff Area=91,425 sf 4.89% Impervious Runoff Depth=1.01" Tc=6.0 min CN=73 Runoff=2.3 cfs 7,683 cf
Subcatchment PDA-301: Subcat PDA-301	Runoff Area=75,396 sf 51.45% Impervious Runoff Depth=1.95" Tc=6.0 min CN=87 Runoff=3.9 cfs 12,254 cf
Subcatchment PDA-302: Subcat PDA-302	Runoff Area=17,034 sf 73.53% Impervious Runoff Depth=2.39" Tc=6.0 min CN=92 Runoff=1.0 cfs 3,391 cf
Subcatchment PDA-400: Off Site - East	Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=0.90" Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=4.6 cfs 19,248 cf
Pond DB-1: Basin	Peak Elev=449.36' Storage=2,728 cf Inflow=2.8 cfs 8,732 cf Discarded=0.0 cfs 413 cf Primary=0.7 cfs 8,319 cf Secondary=0.0 cfs 0 cf Outflow=0.7 cfs 8,732 cf
Pond DB-2: Basin	Peak Elev=453.87' Storage=1,713 cf Inflow=1.4 cfs 4,701 cf Discarded=0.0 cfs 918 cf Primary=0.4 cfs 3,783 cf Secondary=0.0 cfs 0 cf Outflow=0.4 cfs 4,701 cf
Pond DB-3: Gravel Wet Basin	Peak Elev=466.84' Storage=7,672 cf Inflow=4.9 cfs 15,014 cf Discarded=0.0 cfs 106 cf Primary=0.5 cfs 13,124 cf Secondary=0.0 cfs 0 cf Outflow=0.5 cfs 13,230 cf
Pond DB-4: Underground Detention	Peak Elev=453.20' Storage=2,076 cf Inflow=1.3 cfs 4,020 cf Outflow=0.4 cfs 2,174 cf
Pond INF-1: Infiltration Chambers	Peak Elev=476.29' Storage=657 cf Inflow=1.0 cfs 3,391 cf Outflow=1.1 cfs 2,760 cf
Link DP-1: Church Street	Inflow=2.6 cfs 18,714 cf Primary=2.6 cfs 18,714 cf
Link DP-2: West Street	Inflow=1.2 cfs 5,861 cf Primary=1.2 cfs 5,861 cf

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Link DP-3: Wetland

Inflow=2.6 cfs 20,807 cf
Primary=2.6 cfs 20,807 cf

Link DP-4: Culvert

Inflow=4.6 cfs 19,248 cf
Primary=4.6 cfs 19,248 cf

Total Runoff Area = 667,541 sf Runoff Volume = 70,326 cf Average Runoff Depth = 1.26"
81.26% Pervious = 542,428 sf 18.74% Impervious = 125,113 sf

Proposed - Addendum

Prepared by Microsoft

Summary for Subcatchment PDA-100: Subcat PDA-100

Runoff = 1.7 cfs @ 12.15 hrs, Volume= 6,611 cf, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
28,053	74	>75% Grass cover, Good, HSG C
25	74	>75% Grass cover, Good, HSG C
168	96	Gravel surface, HSG C
291	96	Gravel surface, HSG C
949	96	Gravel surface, HSG C
0	98	Paved parking, HSG C
45,248	70	Woods, Good, HSG C
8,374	70	Woods, Good, HSG C
83,108	72	Weighted Average
83,108		100.00% Pervious Area
0		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	370	0.1700	2.89		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	420	Total			

Summary for Subcatchment PDA-101: Subcat PDA-101

Runoff = 2.8 cfs @ 12.09 hrs, Volume= 8,732 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
509	74	>75% Grass cover, Good, HSG C
339	74	>75% Grass cover, Good, HSG C
343	74	>75% Grass cover, Good, HSG C
131	74	>75% Grass cover, Good, HSG C
15,978	74	>75% Grass cover, Good, HSG C
330	74	>75% Grass cover, Good, HSG C
418	74	>75% Grass cover, Good, HSG C
4,509	74	>75% Grass cover, Good, HSG C
4,661	74	>75% Grass cover, Good, HSG C
2,982	96	Gravel surface, HSG C
671	96	Gravel surface, HSG C
11,823	98	Paved parking, HSG C
3,678	98	Roofs, HSG C
3,698	98	Roofs, HSG C
3,491	98	Roofs, HSG C
1,158	98	Roofs, HSG C
1,318	98	Roofs, HSG C
56,037	86	Weighted Average
30,871		55.09% Pervious Area
25,166		44.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.5	140	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	230	0.0600	11.11	8.73	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.1	420	Total			

Summary for Subcatchment PDA-102: Subcat PDA-102

Runoff = 1.4 cfs @ 12.11 hrs, Volume= 4,701 cf, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
1,859	74	>75% Grass cover, Good, HSG C
17,909	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
3,181	74	>75% Grass cover, Good, HSG C
1,565	96	Gravel surface, HSG C
5,321	98	Paved parking, HSG C
1,569	98	Roofs, HSG C
23	98	Roofs, HSG C
2,055	98	Roofs, HSG C
711	98	Roofs, HSG C
3,401	70	Woods, Good, HSG C
37,593	81	Weighted Average
27,915		74.25% Pervious Area
9,679		25.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	113	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.6	363	Total			

Summary for Subcatchment PDA-200: Subcat PDA-200

Runoff = 1.2 cfs @ 12.09 hrs, Volume= 3,687 cf, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
369	74	>75% Grass cover, Good, HSG C
7,894	74	>75% Grass cover, Good, HSG C
10,980	74	>75% Grass cover, Good, HSG C
148	96	Gravel surface, HSG C
3,791	98	Paved parking, HSG C
533	98	Roofs, HSG C
4,457	98	Roofs, HSG C
28,172	82	Weighted Average
19,391		68.83% Pervious Area
8,781		31.17% Impervious Area

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

Proposed - Addendum

Prepared by Microsoft

Summary for Subcatchment PDA-201: Subcat PDA-201

Runoff = 1.3 cfs @ 12.09 hrs, Volume= 4,020 cf, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Description
44	74	>75% Grass cover, Good, HSG C
332	74	>75% Grass cover, Good, HSG C
1,433	74	>75% Grass cover, Good, HSG C
2,488	74	>75% Grass cover, Good, HSG C
337	74	>75% Grass cover, Good, HSG C
1	74	>75% Grass cover, Good, HSG C
706	74	>75% Grass cover, Good, HSG C
2,669	74	>75% Grass cover, Good, HSG C
2,170	96	Gravel surface, HSG C
719	96	Gravel surface, HSG C
45	98	Paved parking, HSG C
7,676	98	Paved parking, HSG C
134	98	Paved parking, HSG C
1,080	98	Roofs, HSG C
182	98	Roofs, HSG C
2,758	98	Roofs, HSG C
22,776	89	Weighted Average
10,900		47.86% Pervious Area
11,876		52.14% Impervious Area

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

Summary for Subcatchment PDA-300: Subcat PDA-300

Runoff = 2.3 cfs @ 12.10 hrs, Volume= 7,683 cf, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
32,702	74	>75% Grass cover, Good, HSG C
38	74	>75% Grass cover, Good, HSG C
352	96	Gravel surface, HSG C
908	96	Gravel surface, HSG C
532	98	Roofs, HSG C
20	98	Roofs, HSG C
1,141	98	Roofs, HSG C
2,598	98	Roofs, HSG C
175	98	Roofs, HSG C
52,959	70	Woods, Good, HSG C
91,425	73	Weighted Average
86,958		95.11% Pervious Area
4,467		4.89% Impervious Area

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

Summary for Subcatchment PDA-301: Subcat PDA-301

Runoff = 3.9 cfs @ 12.09 hrs, Volume= 12,254 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
7,797	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
374	74	>75% Grass cover, Good, HSG C
3,114	74	>75% Grass cover, Good, HSG C
51	74	>75% Grass cover, Good, HSG C
412	74	>75% Grass cover, Good, HSG C
36	74	>75% Grass cover, Good, HSG C
491	74	>75% Grass cover, Good, HSG C
383	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
3,631	74	>75% Grass cover, Good, HSG C
2,788	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
376	74	>75% Grass cover, Good, HSG C
512	74	>75% Grass cover, Good, HSG C
11,499	74	>75% Grass cover, Good, HSG C
3,726	96	Gravel surface, HSG C
11,265	98	Paved parking, HSG C
1,740	98	Paved parking, HSG C
8,269	98	Paved parking, HSG C
1,114	98	Roofs, HSG C
911	98	Roofs, HSG C
5,335	98	Roofs, HSG C
2,187	98	Roofs, HSG C
2,129	98	Roofs, HSG C
1,461	98	Roofs, HSG C
4,376	98	Roofs, HSG C
75,396	87	Weighted Average
36,608		48.55% Pervious Area
38,788		51.45% Impervious Area

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

Summary for Subcatchment PDA-302: Subcat PDA-302

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 3,391 cf, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year-NRCC Rainfall=3.24"

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
3,798	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
7,350	98	Paved parking, HSG C
1,825	98	Roofs, HSG C
3,350	98	Roofs, HSG C
17,034	92	Weighted Average
4,508		26.47% Pervious Area
12,525		73.53% Impervious Area

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

Summary for Subcatchment PDA-400: Off Site - East

Runoff = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year-NRCC Rainfall=3.24"

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Pond DB-1: Basin

Inflow Area = 56,037 sf, 44.91% Impervious, Inflow Depth = 1.87" for 2-year-NRCC event
 Inflow = 2.8 cfs @ 12.09 hrs, Volume= 8,732 cf
 Outflow = 0.7 cfs @ 12.50 hrs, Volume= 8,732 cf, Atten= 76%, Lag= 24.4 min
 Discarded = 0.0 cfs @ 12.50 hrs, Volume= 413 cf
 Primary = 0.7 cfs @ 12.50 hrs, Volume= 8,319 cf
 Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 2-year-NRCC Rainfall=3.24"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 449.36' @ 12.50 hrs Surf.Area= 1,801 sf Storage= 2,728 cf

Plug-Flow detention time= 73.4 min calculated for 8,728 cf (100% of inflow)

Center-of-Mass det. time= 74.6 min (896.6 - 822.1)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	14,092 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.00	130	0	0
448.00	820	950	950
450.00	2,266	3,086	4,036
452.00	3,720	5,986	10,022
453.00	4,420	4,070	14,092

Device	Routing	Invert	Outlet Devices
#1	Primary	444.00'	18.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 444.00' / 439.50' S= 0.0818 ' / Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Device 1	446.75'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	451.50'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	451.95'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	452.00'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	446.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.50 hrs HW=449.36' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.7 cfs @ 12.50 hrs HW=449.36' (Free Discharge)
 ↳ **1=Culvert** (Passes 0.7 cfs of 18.3 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.7 cfs @ 7.52 fps)
 ↳ **3=Orifice/Grate** (Controls 0.0 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=446.00' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond DB-2: Basin

Inflow Area =	37,593 sf, 25.75% Impervious, Inflow Depth = 1.50" for 2-year-NRCC event
Inflow =	1.4 cfs @ 12.11 hrs, Volume= 4,701 cf
Outflow =	0.4 cfs @ 12.52 hrs, Volume= 4,701 cf, Atten= 72%, Lag= 24.1 min
Discarded =	0.0 cfs @ 12.52 hrs, Volume= 918 cf
Primary =	0.4 cfs @ 12.52 hrs, Volume= 3,783 cf
Secondary =	0.0 cfs @ 0.00 hrs, Volume= 0 cf

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 453.87' @ 12.52 hrs Surf.Area= 1,360 sf Storage= 1,713 cf

Plug-Flow detention time= 269.7 min calculated for 4,701 cf (100% of inflow)
 Center-of-Mass det. time= 269.2 min (1,109.6 - 840.4)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	3,603 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	476	0	0
454.00	1,424	1,900	1,900
455.00	1,982	1,703	3,603

Device	Routing	Invert	Outlet Devices
#1	Primary	449.90'	18.0" Round Culvert L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.90' / 449.74' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	452.85'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	453.95'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600
#4	Device 1	454.40'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	454.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	452.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.52 hrs HW=453.86' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.4 cfs @ 12.52 hrs HW=453.86' (Free Discharge)
 ↳ **1=Culvert** (Passes 0.4 cfs of 15.3 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.4 cfs @ 4.43 fps)
 ↳ **3=Orifice/Grate** (Controls 0.0 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond DB-3: Gravel Wet Basin

Inflow Area =	92,430 sf, 55.52% Impervious, Inflow Depth = 1.95" for 2-year-NRCC event
Inflow =	4.9 cfs @ 12.09 hrs, Volume= 15,014 cf
Outflow =	0.5 cfs @ 12.96 hrs, Volume= 13,230 cf, Atten= 90%, Lag= 52.1 min
Discarded =	0.0 cfs @ 12.96 hrs, Volume= 106 cf
Primary =	0.5 cfs @ 12.96 hrs, Volume= 13,124 cf
Secondary =	0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 466.84' @ 12.96 hrs Surf.Area= 5,156 sf Storage= 7,672 cf

Plug-Flow detention time= 228.5 min calculated for 13,230 cf (88% of inflow)
 Center-of-Mass det. time= 173.0 min (995.0 - 822.0)

Volume	Invert	Avail.Storage	Storage Description
#1	463.70'	32,768 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
463.70	0	0	0
464.00	867	130	130
465.00	1,385	1,126	1,256
466.00	3,884	2,635	3,891
468.00	6,925	10,809	14,700
470.00	11,143	18,068	32,768

Device	Routing	Invert	Outlet Devices
#1	Primary	464.00'	18.0" Round Culvert L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 462.50' S= 0.0288 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	465.30'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	467.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	468.00'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	469.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	469.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#7	Discarded	466.00'	0.270 in/hr Exfiltration over Surface area above 466.00' Excluded Surface area = 3,884 sf

Discarded OutFlow Max=0.0 cfs @ 12.96 hrs HW=466.84' (Free Discharge)
 ↳7=Exfiltration (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.5 cfs @ 12.96 hrs HW=466.84' (Free Discharge)
 ↳1=Culvert (Passes 0.5 cfs of 12.3 cfs potential flow)
 ↳2=Orifice/Grate (Orifice Controls 0.5 cfs @ 5.64 fps)
 ↳3=Orifice/Grate (Controls 0.0 cfs)
 ↳4=Orifice/Grate (Controls 0.0 cfs)
 ↳5=Orifice/Grate (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=463.70' (Free Discharge)
 ↳6=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Proposed - Addendum

Prepared by Microsoft

Summary for Pond DB-4: Underground Detention Chambers

Inflow Area = 22,776 sf, 52.14% Impervious, Inflow Depth = 2.12" for 2-year-NRCC event
 Inflow = 1.3 cfs @ 12.09 hrs, Volume= 4,020 cf
 Outflow = 0.4 cfs @ 12.45 hrs, Volume= 2,174 cf, Atten= 72%, Lag= 21.8 min
 Primary = 0.4 cfs @ 12.45 hrs, Volume= 2,174 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 453.20' @ 12.45 hrs Surf.Area= 1,389 sf Storage= 2,076 cf

Plug-Flow detention time= 233.9 min calculated for 2,173 cf (54% of inflow)
 Center-of-Mass det. time= 124.6 min (935.2 - 810.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	450.90'	1,338 cf	16.75'W x 82.94'L x 3.50'H Field A 4,862 cf Overall - 1,516 cf Embedded = 3,346 cf x 40.0% Voids
#2A	451.40'	1,516 cf	ADS_StormTech SC-740 +Cap x 33 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 33 Chambers in 3 Rows
#3	454.39'	564 cf	83.00'W x 17.00'L x 1.00'H Prismatic 1,411 cf Overall x 40.0% Voids
		3,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	450.56'	10.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.56' / 450.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.55 sf
#2	Device 1	452.94'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600

Primary OutFlow Max=0.4 cfs @ 12.45 hrs HW=453.20' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.4 cfs of 3.9 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.4 cfs @ 1.73 fps)

Summary for Pond INF-1: Infiltration Chambers

Inflow Area = 17,034 sf, 73.53% Impervious, Inflow Depth = 2.39" for 2-year-NRCC event
 Inflow = 1.0 cfs @ 12.09 hrs, Volume= 3,391 cf
 Outflow = 1.1 cfs @ 12.10 hrs, Volume= 2,760 cf, Atten= 0%, Lag= 0.4 min
 Primary = 1.1 cfs @ 12.10 hrs, Volume= 2,760 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 476.29' @ 12.10 hrs Surf.Area= 447 sf Storage= 657 cf

Plug-Flow detention time= 113.5 min calculated for 2,760 cf (81% of inflow)
 Center-of-Mass det. time= 41.0 min (838.3 - 797.3)

Proposed - Addendum

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Volume	Invert	Avail.Storage	Storage Description
#1	474.50'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#2	475.00'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
#3	472.00'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#4	472.50'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		846 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	476.10'	4.0' long x 1.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 6.0' Crest Height

Primary OutFlow Max=1.0 cfs @ 12.10 hrs HW=476.28' (Free Discharge)
 ↑1=Sharp-Crested Rectangular Weir (Weir Controls 1.0 cfs @ 1.41 fps)

Summary for Link DP-1: Church Street

Inflow Area = 176,738 sf, 19.72% Impervious, Inflow Depth = 1.27" for 2-year-NRCC event
 Inflow = 2.6 cfs @ 12.16 hrs, Volume= 18,714 cf
 Primary = 2.6 cfs @ 12.16 hrs, Volume= 18,714 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 50,948 sf, 40.54% Impervious, Inflow Depth = 1.38" for 2-year-NRCC event
 Inflow = 1.2 cfs @ 12.09 hrs, Volume= 5,861 cf
 Primary = 1.2 cfs @ 12.09 hrs, Volume= 5,861 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 183,854 sf, 30.34% Impervious, Inflow Depth = 1.36" for 2-year-NRCC event
 Inflow = 2.6 cfs @ 12.10 hrs, Volume= 20,807 cf
 Primary = 2.6 cfs @ 12.10 hrs, Volume= 20,807 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 2-year-NRCC Rainfall=3.24"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 19

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 0.90" for 2-year-NRCC event
Inflow = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf
Primary = 4.6 cfs @ 12.18 hrs, Volume= 19,248 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum*Type III 24-hr 10-year-NRCC Rainfall=4.88"*

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 20

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-100: Subcat PDA-100 Runoff Area=83,108 sf 0.00% Impervious Runoff Depth=2.11"
 Flow Length=420' Tc=9.2 min CN=72 Runoff=4.1 cfs 14,584 cf

Subcatchment PDA-101: Subcat PDA-101 Runoff Area=56,037 sf 44.91% Impervious Runoff Depth=3.36"
 Flow Length=420' Tc=6.1 min CN=86 Runoff=4.9 cfs 15,668 cf

Subcatchment PDA-102: Subcat PDA-102 Runoff Area=37,593 sf 25.75% Impervious Runoff Depth=2.88"
 Flow Length=363' Tc=7.6 min CN=81 Runoff=2.7 cfs 9,021 cf

Subcatchment PDA-200: Subcat PDA-200 Runoff Area=28,172 sf 31.17% Impervious Runoff Depth=2.97"
 Tc=6.0 min CN=82 Runoff=2.2 cfs 6,977 cf

Subcatchment PDA-201: Subcat PDA-201 Runoff Area=22,776 sf 52.14% Impervious Runoff Depth=3.66"
 Tc=6.0 min CN=89 Runoff=2.1 cfs 6,941 cf

Subcatchment PDA-300: Subcat PDA-300 Runoff Area=91,425 sf 4.89% Impervious Runoff Depth=2.19"
 Tc=6.0 min CN=73 Runoff=5.2 cfs 16,660 cf

Subcatchment PDA-301: Subcat PDA-301 Runoff Area=75,396 sf 51.45% Impervious Runoff Depth=3.45"
 Tc=6.0 min CN=87 Runoff=6.7 cfs 21,704 cf

Subcatchment PDA-302: Subcat PDA-302 Runoff Area=17,034 sf 73.53% Impervious Runoff Depth=3.97"
 Tc=6.0 min CN=92 Runoff=1.7 cfs 5,638 cf

Subcatchment PDA-400: Off Site - East Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=2.03"
 Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=11.4 cfs 43,226 cf

Pond DB-1: Basin Peak Elev=450.63' Storage=5,598 cf Inflow=4.9 cfs 15,668 cf
 Discarded=0.0 cfs 532 cf Primary=0.8 cfs 15,136 cf Secondary=0.0 cfs 0 cf Outflow=0.8 cfs 15,668 cf

Pond DB-2: Basin Peak Elev=454.33' Storage=2,397 cf Inflow=2.7 cfs 9,021 cf
 Discarded=0.0 cfs 971 cf Primary=2.0 cfs 8,050 cf Secondary=0.0 cfs 0 cf Outflow=2.0 cfs 9,021 cf

Pond DB-3: Gravel Wet Basin Peak Elev=467.77' Storage=13,177 cf Inflow=8.4 cfs 26,712 cf
 Discarded=0.0 cfs 276 cf Primary=1.3 cfs 24,652 cf Secondary=0.0 cfs 0 cf Outflow=1.3 cfs 24,928 cf

Pond DB-4: Underground Detention Peak Elev=453.80' Storage=2,519 cf Inflow=2.1 cfs 6,941 cf
 Outflow=1.5 cfs 5,096 cf

Pond INF-1: Infiltration Chambers Peak Elev=476.36' Storage=667 cf Inflow=1.7 cfs 5,638 cf
 Outflow=1.7 cfs 5,008 cf

Link DP-1: Church Street Inflow=6.6 cfs 37,770 cf
 Primary=6.6 cfs 37,770 cf

Link DP-2: West Street Inflow=3.5 cfs 12,073 cf
 Primary=3.5 cfs 12,073 cf

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Link DP-3: Wetland

Inflow=5.8 cfs 41,312 cf
Primary=5.8 cfs 41,312 cf

Link DP-4: Culvert

Inflow=11.4 cfs 43,226 cf
Primary=11.4 cfs 43,226 cf

Total Runoff Area = 667,541 sf Runoff Volume = 140,420 cf Average Runoff Depth = 2.52"
81.26% Pervious = 542,428 sf 18.74% Impervious = 125,113 sf

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

Summary for Subcatchment PDA-100: Subcat PDA-100

Runoff = 4.1 cfs @ 12.14 hrs, Volume= 14,584 cf, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
28,053	74	>75% Grass cover, Good, HSG C
25	74	>75% Grass cover, Good, HSG C
168	96	Gravel surface, HSG C
291	96	Gravel surface, HSG C
949	96	Gravel surface, HSG C
0	98	Paved parking, HSG C
45,248	70	Woods, Good, HSG C
8,374	70	Woods, Good, HSG C
83,108	72	Weighted Average
83,108		100.00% Pervious Area
0		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	370	0.1700	2.89		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	420	Total			

Summary for Subcatchment PDA-101: Subcat PDA-101

Runoff = 4.9 cfs @ 12.09 hrs, Volume= 15,668 cf, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
509	74	>75% Grass cover, Good, HSG C
339	74	>75% Grass cover, Good, HSG C
343	74	>75% Grass cover, Good, HSG C
131	74	>75% Grass cover, Good, HSG C
15,978	74	>75% Grass cover, Good, HSG C
330	74	>75% Grass cover, Good, HSG C
418	74	>75% Grass cover, Good, HSG C
4,509	74	>75% Grass cover, Good, HSG C
4,661	74	>75% Grass cover, Good, HSG C
2,982	96	Gravel surface, HSG C
671	96	Gravel surface, HSG C
11,823	98	Paved parking, HSG C
3,678	98	Roofs, HSG C
3,698	98	Roofs, HSG C
3,491	98	Roofs, HSG C
1,158	98	Roofs, HSG C
1,318	98	Roofs, HSG C
56,037	86	Weighted Average
30,871		55.09% Pervious Area
25,166		44.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.5	140	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	230	0.0600	11.11	8.73	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.1	420	Total			

Summary for Subcatchment PDA-102: Subcat PDA-102

Runoff = 2.7 cfs @ 12.11 hrs, Volume= 9,021 cf, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
1,859	74	>75% Grass cover, Good, HSG C
17,909	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
3,181	74	>75% Grass cover, Good, HSG C
1,565	96	Gravel surface, HSG C
5,321	98	Paved parking, HSG C
1,569	98	Roofs, HSG C
23	98	Roofs, HSG C
2,055	98	Roofs, HSG C
711	98	Roofs, HSG C
3,401	70	Woods, Good, HSG C
37,593	81	Weighted Average
27,915		74.25% Pervious Area
9,679		25.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	113	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.6	363	Total			

Summary for Subcatchment PDA-200: Subcat PDA-200

Runoff = 2.2 cfs @ 12.09 hrs, Volume= 6,977 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
369	74	>75% Grass cover, Good, HSG C
7,894	74	>75% Grass cover, Good, HSG C
10,980	74	>75% Grass cover, Good, HSG C
148	96	Gravel surface, HSG C
3,791	98	Paved parking, HSG C
533	98	Roofs, HSG C
4,457	98	Roofs, HSG C
28,172	82	Weighted Average
19,391		68.83% Pervious Area
8,781		31.17% Impervious Area

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

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

Summary for Subcatchment PDA-201: Subcat PDA-201

Runoff = 2.1 cfs @ 12.09 hrs, Volume= 6,941 cf, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Description
44	74	>75% Grass cover, Good, HSG C
332	74	>75% Grass cover, Good, HSG C
1,433	74	>75% Grass cover, Good, HSG C
2,488	74	>75% Grass cover, Good, HSG C
337	74	>75% Grass cover, Good, HSG C
1	74	>75% Grass cover, Good, HSG C
706	74	>75% Grass cover, Good, HSG C
2,669	74	>75% Grass cover, Good, HSG C
2,170	96	Gravel surface, HSG C
719	96	Gravel surface, HSG C
45	98	Paved parking, HSG C
7,676	98	Paved parking, HSG C
134	98	Paved parking, HSG C
1,080	98	Roofs, HSG C
182	98	Roofs, HSG C
2,758	98	Roofs, HSG C
22,776	89	Weighted Average
10,900		47.86% Pervious Area
11,876		52.14% Impervious Area

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

Summary for Subcatchment PDA-300: Subcat PDA-300

Runoff = 5.2 cfs @ 12.10 hrs, Volume= 16,660 cf, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
32,702	74	>75% Grass cover, Good, HSG C
38	74	>75% Grass cover, Good, HSG C
352	96	Gravel surface, HSG C
908	96	Gravel surface, HSG C
532	98	Roofs, HSG C
20	98	Roofs, HSG C
1,141	98	Roofs, HSG C
2,598	98	Roofs, HSG C
175	98	Roofs, HSG C
52,959	70	Woods, Good, HSG C
91,425	73	Weighted Average
86,958		95.11% Pervious Area
4,467		4.89% Impervious Area

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

Summary for Subcatchment PDA-301: Subcat PDA-301

Runoff = 6.7 cfs @ 12.09 hrs, Volume= 21,704 cf, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-year-NRCC Rainfall=4.88"

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
7,797	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
374	74	>75% Grass cover, Good, HSG C
3,114	74	>75% Grass cover, Good, HSG C
51	74	>75% Grass cover, Good, HSG C
412	74	>75% Grass cover, Good, HSG C
36	74	>75% Grass cover, Good, HSG C
491	74	>75% Grass cover, Good, HSG C
383	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
3,631	74	>75% Grass cover, Good, HSG C
2,788	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
376	74	>75% Grass cover, Good, HSG C
512	74	>75% Grass cover, Good, HSG C
11,499	74	>75% Grass cover, Good, HSG C
3,726	96	Gravel surface, HSG C
11,265	98	Paved parking, HSG C
1,740	98	Paved parking, HSG C
8,269	98	Paved parking, HSG C
1,114	98	Roofs, HSG C
911	98	Roofs, HSG C
5,335	98	Roofs, HSG C
2,187	98	Roofs, HSG C
2,129	98	Roofs, HSG C
1,461	98	Roofs, HSG C
4,376	98	Roofs, HSG C
75,396	87	Weighted Average
36,608		48.55% Pervious Area
38,788		51.45% Impervious Area

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

Summary for Subcatchment PDA-302: Subcat PDA-302

Runoff = 1.7 cfs @ 12.09 hrs, Volume= 5,638 cf, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-year-NRCC Rainfall=4.88"

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
3,798	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
7,350	98	Paved parking, HSG C
1,825	98	Roofs, HSG C
3,350	98	Roofs, HSG C
17,034	92	Weighted Average
4,508		26.47% Pervious Area
12,525		73.53% Impervious Area

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

Summary for Subcatchment PDA-400: Off Site - East

Runoff = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year-NRCC Rainfall=4.88"

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Pond DB-1: Basin

Inflow Area = 56,037 sf, 44.91% Impervious, Inflow Depth = 3.36" for 10-year-NRCC event
 Inflow = 4.9 cfs @ 12.09 hrs, Volume= 15,668 cf
 Outflow = 0.8 cfs @ 12.57 hrs, Volume= 15,668 cf, Atten= 83%, Lag= 28.8 min
 Discarded = 0.0 cfs @ 12.57 hrs, Volume= 532 cf
 Primary = 0.8 cfs @ 12.57 hrs, Volume= 15,136 cf
 Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 450.63' @ 12.57 hrs Surf.Area= 2,721 sf Storage= 5,598 cf

Plug-Flow detention time= 81.4 min calculated for 15,668 cf (100% of inflow)

Center-of-Mass det. time= 80.9 min (886.3 - 805.5)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	14,092 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.00	130	0	0
448.00	820	950	950
450.00	2,266	3,086	4,036
452.00	3,720	5,986	10,022
453.00	4,420	4,070	14,092

Device	Routing	Invert	Outlet Devices
#1	Primary	444.00'	18.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 444.00' / 439.50' S= 0.0818 ' / Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Device 1	446.75'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	451.50'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	451.95'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	452.00'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	446.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.57 hrs HW=450.62' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.8 cfs @ 12.57 hrs HW=450.62' (Free Discharge)
 ↳ **1=Culvert** (Passes 0.8 cfs of 20.6 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.8 cfs @ 9.27 fps)
 ↳ **3=Orifice/Grate** (Controls 0.0 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=446.00' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond DB-2: Basin

Inflow Area =	37,593 sf, 25.75% Impervious, Inflow Depth = 2.88" for 10-year-NRCC event
Inflow =	2.7 cfs @ 12.11 hrs, Volume= 9,021 cf
Outflow =	2.0 cfs @ 12.21 hrs, Volume= 9,021 cf, Atten= 26%, Lag= 6.0 min
Discarded =	0.0 cfs @ 12.21 hrs, Volume= 971 cf
Primary =	2.0 cfs @ 12.21 hrs, Volume= 8,050 cf
Secondary =	0.0 cfs @ 0.00 hrs, Volume= 0 cf

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 454.33' @ 12.21 hrs Surf.Area= 1,607 sf Storage= 2,397 cf

Plug-Flow detention time= 157.9 min calculated for 9,016 cf (100% of inflow)
 Center-of-Mass det. time= 159.1 min (980.7 - 821.6)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	3,603 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	476	0	0
454.00	1,424	1,900	1,900
455.00	1,982	1,703	3,603

Device	Routing	Invert	Outlet Devices
#1	Primary	449.90'	18.0" Round Culvert L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.90' / 449.74' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	452.85'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	453.95'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600
#4	Device 1	454.40'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	454.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	452.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.21 hrs HW=454.32' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=2.0 cfs @ 12.21 hrs HW=454.32' (Free Discharge)
 ↳ **1=Culvert** (Passes 2.0 cfs of 16.3 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.5 cfs @ 5.50 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 1.5 cfs @ 2.08 fps)
 ↳ **4=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond DB-3: Gravel Wet Basin

Inflow Area =	92,430 sf, 55.52% Impervious, Inflow Depth = 3.47" for 10-year-NRCC event
Inflow =	8.4 cfs @ 12.09 hrs, Volume= 26,712 cf
Outflow =	1.3 cfs @ 12.58 hrs, Volume= 24,928 cf, Atten= 84%, Lag= 29.6 min
Discarded =	0.0 cfs @ 12.58 hrs, Volume= 276 cf
Primary =	1.3 cfs @ 12.58 hrs, Volume= 24,652 cf
Secondary =	0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 467.77' @ 12.58 hrs Surf.Area= 6,582 sf Storage= 13,177 cf

Plug-Flow detention time= 207.5 min calculated for 24,915 cf (93% of inflow)

Center-of-Mass det. time= 173.0 min (977.7 - 804.7)

Volume	Invert	Avail.Storage	Storage Description
#1	463.70'	32,768 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
463.70	0	0	0
464.00	867	130	130
465.00	1,385	1,126	1,256
466.00	3,884	2,635	3,891
468.00	6,925	10,809	14,700
470.00	11,143	18,068	32,768

Device	Routing	Invert	Outlet Devices
#1	Primary	464.00'	18.0" Round Culvert L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 462.50' S= 0.0288 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	465.30'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	467.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	468.00'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	469.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	469.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#7	Discarded	466.00'	0.270 in/hr Exfiltration over Surface area above 466.00' Excluded Surface area = 3,884 sf

Discarded OutFlow Max=0.0 cfs @ 12.58 hrs HW=467.77' (Free Discharge)

↳ **7=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=1.3 cfs @ 12.58 hrs HW=467.77' (Free Discharge)

↳ **1=Culvert** (Passes 1.3 cfs of 14.8 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.6 cfs @ 7.31 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.7 cfs @ 3.49 fps)
 ↳ **4=Orifice/Grate** (Controls 0.0 cfs)
 ↳ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=463.70' (Free Discharge)

↳ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

Summary for Pond DB-4: Underground Detention Chambers

Inflow Area = 22,776 sf, 52.14% Impervious, Inflow Depth = 3.66" for 10-year-NRCC event
 Inflow = 2.1 cfs @ 12.09 hrs, Volume= 6,941 cf
 Outflow = 1.5 cfs @ 12.18 hrs, Volume= 5,096 cf, Atten= 31%, Lag= 5.2 min
 Primary = 1.5 cfs @ 12.18 hrs, Volume= 5,096 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 453.80' @ 12.18 hrs Surf.Area= 1,389 sf Storage= 2,519 cf

Plug-Flow detention time= 158.8 min calculated for 5,096 cf (73% of inflow)
 Center-of-Mass det. time= 70.9 min (866.1 - 795.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	450.90'	1,338 cf	16.75'W x 82.94'L x 3.50'H Field A 4,862 cf Overall - 1,516 cf Embedded = 3,346 cf x 40.0% Voids
#2A	451.40'	1,516 cf	ADS_StormTech SC-740 +Cap x 33 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 33 Chambers in 3 Rows
#3	454.39'	564 cf	83.00'W x 17.00'L x 1.00'H Prismatic 1,411 cf Overall x 40.0% Voids
		3,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	450.56'	10.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.56' / 450.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.55 sf
#2	Device 1	452.94'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600

Primary OutFlow Max=1.5 cfs @ 12.18 hrs HW=453.79' (Free Discharge)

- ↑1=Culvert (Passes 1.5 cfs of 4.4 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 1.5 cfs @ 3.73 fps)

Summary for Pond INF-1: Infiltration Chambers

Inflow Area = 17,034 sf, 73.53% Impervious, Inflow Depth = 3.97" for 10-year-NRCC event
 Inflow = 1.7 cfs @ 12.09 hrs, Volume= 5,638 cf
 Outflow = 1.7 cfs @ 12.09 hrs, Volume= 5,008 cf, Atten= 0%, Lag= 0.3 min
 Primary = 1.7 cfs @ 12.09 hrs, Volume= 5,008 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 476.36' @ 12.09 hrs Surf.Area= 447 sf Storage= 667 cf

Plug-Flow detention time= 85.0 min calculated for 5,005 cf (89% of inflow)
 Center-of-Mass det. time= 32.6 min (816.1 - 783.5)

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Volume	Invert	Avail.Storage	Storage Description
#1	474.50'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#2	475.00'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
#3	472.00'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#4	472.50'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		846 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	476.10'	4.0' long x 1.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 6.0' Crest Height

Primary OutFlow Max=1.7 cfs @ 12.09 hrs HW=476.35' (Free Discharge)

↑1=Sharp-Crested Rectangular Weir (Weir Controls 1.7 cfs @ 1.66 fps)

Summary for Link DP-1: Church Street

Inflow Area = 176,738 sf, 19.72% Impervious, Inflow Depth = 2.56" for 10-year-NRCC event
 Inflow = 6.6 cfs @ 12.17 hrs, Volume= 37,770 cf
 Primary = 6.6 cfs @ 12.17 hrs, Volume= 37,770 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 50,948 sf, 40.54% Impervious, Inflow Depth = 2.84" for 10-year-NRCC event
 Inflow = 3.5 cfs @ 12.11 hrs, Volume= 12,073 cf
 Primary = 3.5 cfs @ 12.11 hrs, Volume= 12,073 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 183,854 sf, 30.34% Impervious, Inflow Depth = 2.70" for 10-year-NRCC event
 Inflow = 5.8 cfs @ 12.10 hrs, Volume= 41,312 cf
 Primary = 5.8 cfs @ 12.10 hrs, Volume= 41,312 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 10-year-NRCC Rainfall=4.88"

Prepared by Microsoft

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 2.03" for 10-year-NRCC event
Inflow = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf
Primary = 11.4 cfs @ 12.17 hrs, Volume= 43,226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum*Type III 24-hr 100-year-NRCC Rainfall=8.84"*

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Page 35

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-100: Subcat PDA-100 Runoff Area=83,108 sf 0.00% Impervious Runoff Depth=5.44"
 Flow Length=420' Tc=9.2 min CN=72 Runoff=10.7 cfs 37,667 cf

Subcatchment PDA-101: Subcat PDA-101 Runoff Area=56,037 sf 44.91% Impervious Runoff Depth=7.15"
 Flow Length=420' Tc=6.1 min CN=86 Runoff=10.0 cfs 33,378 cf

Subcatchment PDA-102: Subcat PDA-102 Runoff Area=37,593 sf 25.75% Impervious Runoff Depth=6.54"
 Flow Length=363' Tc=7.6 min CN=81 Runoff=6.0 cfs 20,484 cf

Subcatchment PDA-200: Subcat PDA-200 Runoff Area=28,172 sf 31.17% Impervious Runoff Depth=6.66"
 Tc=6.0 min CN=82 Runoff=4.8 cfs 15,637 cf

Subcatchment PDA-201: Subcat PDA-201 Runoff Area=22,776 sf 52.14% Impervious Runoff Depth=7.51"
 Tc=6.0 min CN=89 Runoff=4.2 cfs 14,258 cf

Subcatchment PDA-300: Subcat PDA-300 Runoff Area=91,425 sf 4.89% Impervious Runoff Depth=5.56"
 Tc=6.0 min CN=73 Runoff=13.3 cfs 42,368 cf

Subcatchment PDA-301: Subcat PDA-301 Runoff Area=75,396 sf 51.45% Impervious Runoff Depth=7.27"
 Tc=6.0 min CN=87 Runoff=13.7 cfs 45,674 cf

Subcatchment PDA-302: Subcat PDA-302 Runoff Area=17,034 sf 73.53% Impervious Runoff Depth=7.88"
 Tc=6.0 min CN=92 Runoff=3.2 cfs 11,180 cf

Subcatchment PDA-400: Off Site - East Runoff Area=256,000 sf 5.40% Impervious Runoff Depth=5.32"
 Flow Length=737' Tc=11.5 min UI Adjusted CN=71 Runoff=30.3 cfs 113,419 cf

Pond DB-1: Basin Peak Elev=452.10' Storage=10,384 cf Inflow=10.0 cfs 33,378 cf
 Discarded=0.0 cfs 779 cf Primary=4.5 cfs 32,075 cf Secondary=0.8 cfs 524 cf Outflow=5.3 cfs 33,378 cf

Pond DB-2: Basin Peak Elev=454.52' Storage=2,722 cf Inflow=6.0 cfs 20,484 cf
 Discarded=0.0 cfs 1,065 cf Primary=5.9 cfs 19,395 cf Secondary=0.1 cfs 25 cf Outflow=6.0 cfs 20,484 cf

Pond DB-3: Gravel Wet Basin Peak Elev=469.36' Storage=26,057 cf Inflow=16.9 cfs 56,222 cf
 Discarded=0.0 cfs 616 cf Primary=3.2 cfs 53,822 cf Secondary=0.0 cfs 0 cf Outflow=3.2 cfs 54,438 cf

Pond DB-4: Underground Detention Peak Elev=455.37' Storage=3,406 cf Inflow=4.2 cfs 14,258 cf
 Outflow=2.8 cfs 12,413 cf

Pond INF-1: Infiltration Chambers Peak Elev=476.50' Storage=686 cf Inflow=3.2 cfs 11,180 cf
 Outflow=3.2 cfs 10,549 cf

Link DP-1: Church Street Inflow=17.5 cfs 89,686 cf
 Primary=17.5 cfs 89,686 cf

Link DP-2: West Street Inflow=7.3 cfs 28,050 cf
 Primary=7.3 cfs 28,050 cf

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Link DP-3: Wetland

Inflow=15.6 cfs 96,190 cf
Primary=15.6 cfs 96,190 cf

Link DP-4: Culvert

Inflow=30.3 cfs 113,419 cf
Primary=30.3 cfs 113,419 cf

Total Runoff Area = 667,541 sf Runoff Volume = 334,065 cf Average Runoff Depth = 6.01"
81.26% Pervious = 542,428 sf 18.74% Impervious = 125,113 sf

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

Summary for Subcatchment PDA-100: Subcat PDA-100

Runoff = 10.7 cfs @ 12.13 hrs, Volume= 37,667 cf, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
28,053	74	>75% Grass cover, Good, HSG C
25	74	>75% Grass cover, Good, HSG C
168	96	Gravel surface, HSG C
291	96	Gravel surface, HSG C
949	96	Gravel surface, HSG C
0	98	Paved parking, HSG C
45,248	70	Woods, Good, HSG C
8,374	70	Woods, Good, HSG C
83,108	72	Weighted Average
83,108		100.00% Pervious Area
0		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
2.1	370	0.1700	2.89		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	420	Total			

Summary for Subcatchment PDA-101: Subcat PDA-101

Runoff = 10.0 cfs @ 12.09 hrs, Volume= 33,378 cf, Depth= 7.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
509	74	>75% Grass cover, Good, HSG C
339	74	>75% Grass cover, Good, HSG C
343	74	>75% Grass cover, Good, HSG C
131	74	>75% Grass cover, Good, HSG C
15,978	74	>75% Grass cover, Good, HSG C
330	74	>75% Grass cover, Good, HSG C
418	74	>75% Grass cover, Good, HSG C
4,509	74	>75% Grass cover, Good, HSG C
4,661	74	>75% Grass cover, Good, HSG C
2,982	96	Gravel surface, HSG C
671	96	Gravel surface, HSG C
11,823	98	Paved parking, HSG C
3,678	98	Roofs, HSG C
3,698	98	Roofs, HSG C
3,491	98	Roofs, HSG C
1,158	98	Roofs, HSG C
1,318	98	Roofs, HSG C
56,037	86	Weighted Average
30,871		55.09% Pervious Area
25,166		44.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.5	140	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	230	0.0600	11.11	8.73	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.1	420	Total			

Summary for Subcatchment PDA-102: Subcat PDA-102

Runoff = 6.0 cfs @ 12.11 hrs, Volume= 20,484 cf, Depth= 6.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
1,859	74	>75% Grass cover, Good, HSG C
17,909	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
3,181	74	>75% Grass cover, Good, HSG C
1,565	96	Gravel surface, HSG C
5,321	98	Paved parking, HSG C
1,569	98	Roofs, HSG C
23	98	Roofs, HSG C
2,055	98	Roofs, HSG C
711	98	Roofs, HSG C
3,401	70	Woods, Good, HSG C
37,593	81	Weighted Average
27,915		74.25% Pervious Area
9,679		25.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	113	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.6	363	Total			

Summary for Subcatchment PDA-200: Subcat PDA-200

Runoff = 4.8 cfs @ 12.09 hrs, Volume= 15,637 cf, Depth= 6.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
369	74	>75% Grass cover, Good, HSG C
7,894	74	>75% Grass cover, Good, HSG C
10,980	74	>75% Grass cover, Good, HSG C
148	96	Gravel surface, HSG C
3,791	98	Paved parking, HSG C
533	98	Roofs, HSG C
4,457	98	Roofs, HSG C
28,172	82	Weighted Average
19,391		68.83% Pervious Area
8,781		31.17% Impervious Area

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

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

Summary for Subcatchment PDA-201: Subcat PDA-201

Runoff = 4.2 cfs @ 12.09 hrs, Volume= 14,258 cf, Depth= 7.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Description
44	74	>75% Grass cover, Good, HSG C
332	74	>75% Grass cover, Good, HSG C
1,433	74	>75% Grass cover, Good, HSG C
2,488	74	>75% Grass cover, Good, HSG C
337	74	>75% Grass cover, Good, HSG C
1	74	>75% Grass cover, Good, HSG C
706	74	>75% Grass cover, Good, HSG C
2,669	74	>75% Grass cover, Good, HSG C
2,170	96	Gravel surface, HSG C
719	96	Gravel surface, HSG C
45	98	Paved parking, HSG C
7,676	98	Paved parking, HSG C
134	98	Paved parking, HSG C
1,080	98	Roofs, HSG C
182	98	Roofs, HSG C
2,758	98	Roofs, HSG C
22,776	89	Weighted Average
10,900		47.86% Pervious Area
11,876		52.14% Impervious Area

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

Summary for Subcatchment PDA-300: Subcat PDA-300

Runoff = 13.3 cfs @ 12.09 hrs, Volume= 42,368 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
32,702	74	>75% Grass cover, Good, HSG C
38	74	>75% Grass cover, Good, HSG C
352	96	Gravel surface, HSG C
908	96	Gravel surface, HSG C
532	98	Roofs, HSG C
20	98	Roofs, HSG C
1,141	98	Roofs, HSG C
2,598	98	Roofs, HSG C
175	98	Roofs, HSG C
52,959	70	Woods, Good, HSG C
91,425	73	Weighted Average
86,958		95.11% Pervious Area
4,467		4.89% Impervious Area

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

Summary for Subcatchment PDA-301: Subcat PDA-301

Runoff = 13.7 cfs @ 12.09 hrs, Volume= 45,674 cf, Depth= 7.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-year-NRCC Rainfall=8.84"

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
7,797	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
374	74	>75% Grass cover, Good, HSG C
3,114	74	>75% Grass cover, Good, HSG C
51	74	>75% Grass cover, Good, HSG C
412	74	>75% Grass cover, Good, HSG C
36	74	>75% Grass cover, Good, HSG C
491	74	>75% Grass cover, Good, HSG C
383	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
3,631	74	>75% Grass cover, Good, HSG C
2,788	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
376	74	>75% Grass cover, Good, HSG C
512	74	>75% Grass cover, Good, HSG C
11,499	74	>75% Grass cover, Good, HSG C
3,726	96	Gravel surface, HSG C
11,265	98	Paved parking, HSG C
1,740	98	Paved parking, HSG C
8,269	98	Paved parking, HSG C
1,114	98	Roofs, HSG C
911	98	Roofs, HSG C
5,335	98	Roofs, HSG C
2,187	98	Roofs, HSG C
2,129	98	Roofs, HSG C
1,461	98	Roofs, HSG C
4,376	98	Roofs, HSG C
75,396	87	Weighted Average
36,608		48.55% Pervious Area
38,788		51.45% Impervious Area

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

Summary for Subcatchment PDA-302: Subcat PDA-302

Runoff = 3.2 cfs @ 12.09 hrs, Volume= 11,180 cf, Depth= 7.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-year-NRCC Rainfall=8.84"

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Area (sf)	CN	Description
3,798	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
355	74	>75% Grass cover, Good, HSG C
7,350	98	Paved parking, HSG C
1,825	98	Roofs, HSG C
3,350	98	Roofs, HSG C
17,034	92	Weighted Average
4,508		26.47% Pervious Area
12,525		73.53% Impervious Area

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

Summary for Subcatchment PDA-400: Off Site - East

Runoff = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year-NRCC Rainfall=8.84"

Area (sf)	CN	Adj	Description
208,906	70		Woods, Good, HSG C
11,510	98		Unconnected pavement, HSG C
2,322	98		Roofs, HSG C
33,262	74		>75% Grass cover, Good, HSG C
256,000	72	71	Weighted Average, UI Adjusted
242,168			94.60% Pervious Area
13,832			5.40% Impervious Area
11,510			83.21% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
7.2	687	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.5	737	Total			

Summary for Pond DB-1: Basin

Inflow Area = 56,037 sf, 44.91% Impervious, Inflow Depth = 7.15" for 100-year-NRCC event
 Inflow = 10.0 cfs @ 12.09 hrs, Volume= 33,378 cf
 Outflow = 5.3 cfs @ 12.26 hrs, Volume= 33,378 cf, Atten= 47%, Lag= 10.0 min
 Discarded = 0.0 cfs @ 12.26 hrs, Volume= 779 cf
 Primary = 4.5 cfs @ 12.26 hrs, Volume= 32,075 cf
 Secondary = 0.8 cfs @ 12.26 hrs, Volume= 524 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 452.10' @ 12.26 hrs Surf.Area= 3,788 sf Storage= 10,384 cf

Plug-Flow detention time= 88.3 min calculated for 33,378 cf (100% of inflow)

Center-of-Mass det. time= 87.8 min (872.4 - 784.6)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	14,092 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.00	130	0	0
448.00	820	950	950
450.00	2,266	3,086	4,036
452.00	3,720	5,986	10,022
453.00	4,420	4,070	14,092

Device	Routing	Invert	Outlet Devices
#1	Primary	444.00'	18.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 444.00' / 439.50' S= 0.0818 ' / Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Device 1	446.75'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	451.50'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	451.95'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	452.00'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	446.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.26 hrs HW=452.09' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=4.3 cfs @ 12.26 hrs HW=452.09' (Free Discharge)
 ↳ **1=Culvert** (Passes 4.3 cfs of 23.1 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 1.0 cfs @ 10.96 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.6 cfs @ 2.82 fps)
 ↳ **4=Orifice/Grate** (Weir Controls 2.8 cfs @ 1.24 fps)

Secondary OutFlow Max=0.8 cfs @ 12.26 hrs HW=452.09' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Weir Controls 0.8 cfs @ 0.82 fps)

Summary for Pond DB-2: Basin

Inflow Area =	37,593 sf, 25.75% Impervious, Inflow Depth = 6.54" for 100-year-NRCC event
Inflow =	6.0 cfs @ 12.11 hrs, Volume= 20,484 cf
Outflow =	6.0 cfs @ 12.12 hrs, Volume= 20,484 cf, Atten= 1%, Lag= 0.8 min
Discarded =	0.0 cfs @ 12.12 hrs, Volume= 1,065 cf
Primary =	5.9 cfs @ 12.12 hrs, Volume= 19,395 cf
Secondary =	0.1 cfs @ 12.12 hrs, Volume= 25 cf

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 454.52' @ 12.12 hrs Surf.Area= 1,716 sf Storage= 2,722 cf

Plug-Flow detention time= 86.7 min calculated for 20,484 cf (100% of inflow)
 Center-of-Mass det. time= 86.3 min (884.6 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	3,603 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	476	0	0
454.00	1,424	1,900	1,900
455.00	1,982	1,703	3,603

Device	Routing	Invert	Outlet Devices
#1	Primary	449.90'	18.0" Round Culvert L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.90' / 449.74' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	452.85'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	453.95'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600
#4	Device 1	454.40'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	454.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	452.00'	0.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.0 cfs @ 12.12 hrs HW=454.52' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=5.7 cfs @ 12.12 hrs HW=454.52' (Free Discharge)
 ↳ **1=Culvert** (Passes 5.7 cfs of 16.7 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.5 cfs @ 5.90 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 3.1 cfs @ 2.57 fps)
 ↳ **4=Orifice/Grate** (Weir Controls 2.1 cfs @ 1.12 fps)

Secondary OutFlow Max=0.1 cfs @ 12.12 hrs HW=454.52' (Free Discharge)
 ↳ **5=Broad-Crested Rectangular Weir** (Weir Controls 0.1 cfs @ 0.36 fps)

Summary for Pond DB-3: Gravel Wet Basin

Inflow Area =	92,430 sf, 55.52% Impervious, Inflow Depth = 7.30" for 100-year-NRCC event
Inflow =	16.9 cfs @ 12.09 hrs, Volume= 56,222 cf
Outflow =	3.2 cfs @ 12.53 hrs, Volume= 54,438 cf, Atten= 81%, Lag= 26.4 min
Discarded =	0.0 cfs @ 12.53 hrs, Volume= 616 cf
Primary =	3.2 cfs @ 12.53 hrs, Volume= 53,822 cf
Secondary =	0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Peak Elev= 469.36' @ 12.53 hrs Surf.Area= 9,791 sf Storage= 26,057 cf

Plug-Flow detention time= 171.6 min calculated for 54,410 cf (97% of inflow)

Center-of-Mass det. time= 153.3 min (936.6 - 783.3)

Volume	Invert	Avail.Storage	Storage Description
#1	463.70'	32,768 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
463.70	0	0	0
464.00	867	130	130
465.00	1,385	1,126	1,256
466.00	3,884	2,635	3,891
468.00	6,925	10,809	14,700
470.00	11,143	18,068	32,768

Device	Routing	Invert	Outlet Devices
#1	Primary	464.00'	18.0" Round Culvert L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 462.50' S= 0.0288 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	465.30'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	467.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	468.00'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	469.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	469.50'	10.0' long x 16.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#7	Discarded	466.00'	0.270 in/hr Exfiltration over Surface area above 466.00' Excluded Surface area = 3,884 sf

Discarded OutFlow Max=0.0 cfs @ 12.53 hrs HW=469.36' (Free Discharge)

↳ **7=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=3.2 cfs @ 12.53 hrs HW=469.36' (Free Discharge)

↳ **1=Culvert** (Passes 3.2 cfs of 18.3 cfs potential flow)

↳ **2=Orifice/Grate** (Orifice Controls 0.8 cfs @ 9.50 fps)

↳ **3=Orifice/Grate** (Orifice Controls 1.4 cfs @ 6.99 fps)

↳ **4=Orifice/Grate** (Orifice Controls 1.0 cfs @ 5.07 fps)

↳ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=463.70' (Free Discharge)

↳ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Summary for Pond DB-4: Underground Detention Chambers

Inflow Area = 22,776 sf, 52.14% Impervious, Inflow Depth = 7.51" for 100-year-NRCC event
 Inflow = 4.2 cfs @ 12.09 hrs, Volume= 14,258 cf
 Outflow = 2.8 cfs @ 12.18 hrs, Volume= 12,413 cf, Atten= 34%, Lag= 5.7 min
 Primary = 2.8 cfs @ 12.18 hrs, Volume= 12,413 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 455.37' @ 12.18 hrs Surf.Area= 2,800 sf Storage= 3,406 cf

Plug-Flow detention time= 108.0 min calculated for 12,406 cf (87% of inflow)
 Center-of-Mass det. time= 50.3 min (826.4 - 776.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	450.90'	1,338 cf	16.75'W x 82.94'L x 3.50'H Field A 4,862 cf Overall - 1,516 cf Embedded = 3,346 cf x 40.0% Voids
#2A	451.40'	1,516 cf	ADS_StormTech SC-740 +Cap x 33 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 33 Chambers in 3 Rows
#3	454.39'	564 cf	83.00'W x 17.00'L x 1.00'H Prismatic 1,411 cf Overall x 40.0% Voids
		3,419 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	450.56'	10.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.56' / 450.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.55 sf
#2	Device 1	452.94'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600

Primary OutFlow Max=2.8 cfs @ 12.18 hrs HW=455.35' (Free Discharge)

- ↑1=Culvert (Passes 2.8 cfs of 5.5 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 2.8 cfs @ 7.07 fps)

Summary for Pond INF-1: Infiltration Chambers

Inflow Area = 17,034 sf, 73.53% Impervious, Inflow Depth = 7.88" for 100-year-NRCC event
 Inflow = 3.2 cfs @ 12.09 hrs, Volume= 11,180 cf
 Outflow = 3.2 cfs @ 12.09 hrs, Volume= 10,549 cf, Atten= 0%, Lag= 0.2 min
 Primary = 3.2 cfs @ 12.09 hrs, Volume= 10,549 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 476.50' @ 12.09 hrs Surf.Area= 447 sf Storage= 686 cf

Plug-Flow detention time= 55.0 min calculated for 10,543 cf (94% of inflow)
 Center-of-Mass det. time= 23.4 min (789.9 - 766.5)

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Volume	Invert	Avail.Storage	Storage Description
#1	474.50'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#2	475.00'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
#3	472.00'	239 cf	12.50'W x 17.86'L x 3.50'H Prismaoid 781 cf Overall - 184 cf Embedded = 598 cf x 40.0% Voids
#4	472.50'	184 cf	ADS_StormTech SC-740 +Cap x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		846 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	476.10'	4.0' long x 1.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) 6.0' Crest Height

Primary OutFlow Max=3.2 cfs @ 12.09 hrs HW=476.49' (Free Discharge)

↑1=Sharp-Crested Rectangular Weir (Weir Controls 3.2 cfs @ 2.06 fps)

Summary for Link DP-1: Church Street

Inflow Area = 176,738 sf, 19.72% Impervious, Inflow Depth = 6.09" for 100-year-NRCC event
 Inflow = 17.5 cfs @ 12.17 hrs, Volume= 89,686 cf
 Primary = 17.5 cfs @ 12.17 hrs, Volume= 89,686 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Street

Inflow Area = 50,948 sf, 40.54% Impervious, Inflow Depth = 6.61" for 100-year-NRCC event
 Inflow = 7.3 cfs @ 12.10 hrs, Volume= 28,050 cf
 Primary = 7.3 cfs @ 12.10 hrs, Volume= 28,050 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Wetland

Inflow Area = 183,854 sf, 30.34% Impervious, Inflow Depth = 6.28" for 100-year-NRCC event
 Inflow = 15.6 cfs @ 12.10 hrs, Volume= 96,190 cf
 Primary = 15.6 cfs @ 12.10 hrs, Volume= 96,190 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Proposed - Addendum

Type III 24-hr 100-year-NRCC Rainfall=8.84"

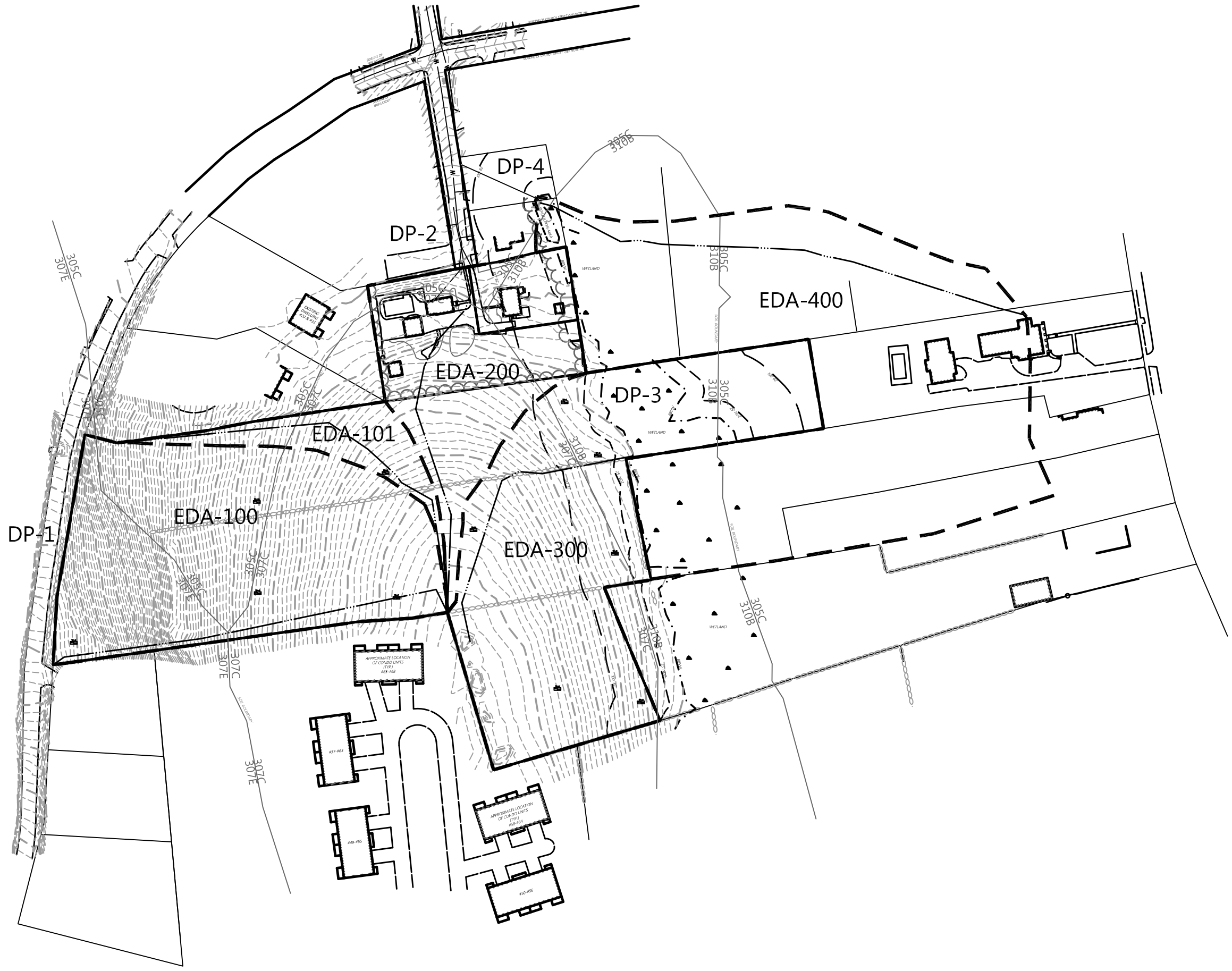
Prepared by Microsoft

HydroCAD® 10.00-24 s/n 01522 © 2018 HydroCAD Software Solutions LLC

Summary for Link DP-4: Culvert

Inflow Area = 256,000 sf, 5.40% Impervious, Inflow Depth = 5.32" for 100-year-NRCC event
Inflow = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf
Primary = 30.3 cfs @ 12.16 hrs, Volume= 113,419 cf, Atten= 0%, Lag= 0.0 min

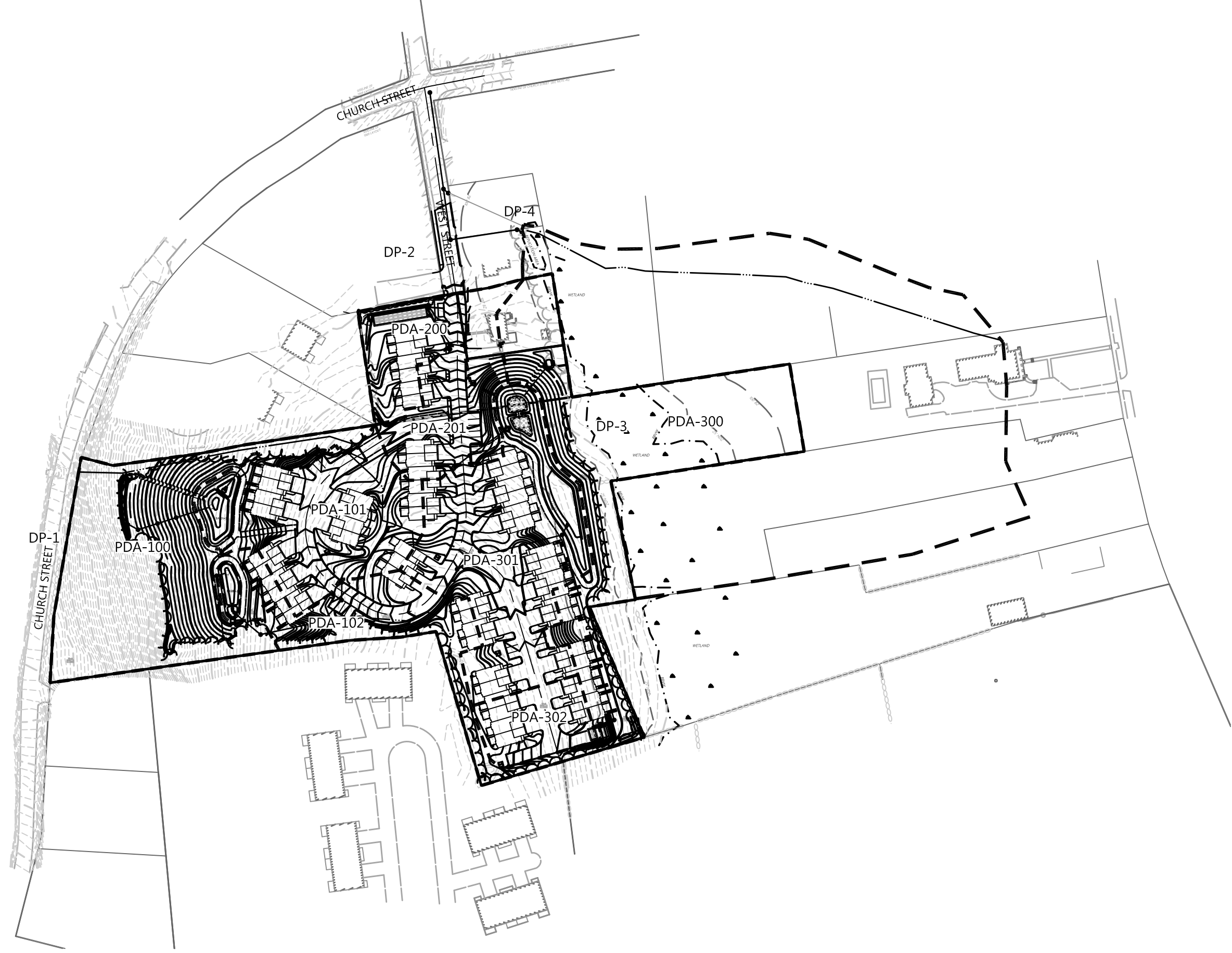
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs



<p>PREPARED BY:</p>	<p>EXISTING HYDROLOGY</p>
	<p>41 Church Street and 14 & 15 West Street Grafton, MA</p>
<p>OWNER:</p>	<p>DAVID W. BROSSI 15 Juniper Lane Grafton, MA</p>
<p>PREPARED FOR:</p>	<p>DAVID W. BROSSI 15 Juniper Lane Grafton, MA</p>
<p>DATE:</p>	<p>02/06/19</p>
<p>DRAWN BY:</p>	<p>TBS</p>
<p>JOB NO.:</p>	<p>1046.00</p>
<p>FILE NO.:</p>	<p>1046.350</p>
<p>REV. DATE:</p>	<p>05/15/19</p>



31 EAST MAIN STREET WESTBOROUGH, MA | 508.366.6552
7 CENTRAL STREET PROVIDENCE, RI | 401.274.1360
WDA-DG.COM



PREPARED BY:

TITLE: PROPOSED HYDROLOGY
41 Church Street and 14 & 15 West Street
Grafton, MA

OWNER: DAVID W. BROSSI
15 Juniper Lane
Grafton, MA

PREPARED FOR: DAVID W. BROSSI
15 Juniper Lane
Grafton, MA

DATE: 02/06/19 JOB NO: 1046.00 REV DATE: 05/15/19
DRAWN BY: TBS FILE NO: 1046.350



31 EAST MAIN STREET WESTBOROUGH, MA | 508.366.6552
7 CENTRAL STREET PROVIDENCE, RI | 401.274.1360
WDA-DG.COM