APPLICATION FOR
STORMWATER MANAGEMENT
LAND DISTURBANCE PERMIT APPLICATION

DRAINAGE DESIGN & CALCULATIONS

for

Islington Village

WESTWOOD, MASSACHUSETTS

PREPARED FOR:
Giorgio Petruzziello
Supreme Development, Inc.
21 Eastbrook Road
Dedham, MA 02026

Date: December 12, 2017

Prepared by
GCG ASSOCIATES, INC.
84 Main Street, Wilmington, MA 01887

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Land Disturbance Permit Application

To Stormwater Authority:

The undersigned wishes to submit a Land Disturbance Permit Application as defined in the Zoning By-Laws of the Town of Westwood Section 350 and requests a review and determination by the Stormwater Authority of said Land Disturbance Plan.

The Land Disturbance Plan involves property where owner's title to the land is derived under deed from Islington Village, see attached., dated_____, and recorded in the Norfolk County Registry of Deeds, Book _____, Page_____, or Land Court Certificate of Title No. ___, Registered in _____ District, Book _____, Page

Give a brief summary of the nature of the project.

Proposed redevelopment at Islington Village, north intersection of Washington Street with School and East Streets. Redevelopment includes CVS, Public Library, Mixed-use building with retail and 2-bdrm condos, relocated daycare.

The property (building) is described as being located at Islington Village, see attached.; it is currently used as _____and the changes proposed to be made are _____.

The project is located on the parcel shown on Assessors Map 23, Parcel 161, 162, 163, 165, 187, 188, 189, 190.

Applicant's Signature _____ Owner's Signature(s) _____

Applicant's Name (print) Giorgio Petruzziello Owner's Names(s) Giorgio Petruzziello

Applicant's Address 21 - Eastbrook Rd Dedham, MA Owner's Address 21 - Eastbrook Rd Dedham, MA

Date Received by Town Clerk: _____

Signature _____

Please note: 1) An applicant for a Land Disturbance Plan Review must file with the Stormwater Authority a completed Land Disturbance Permit Package (see Land Disturbance Permit Application Checklist) 2) The applicant shall also file a copy of the Land Disturbance Plan and the application with the Town Clerk. The date of receipt by the Town Clerk shall be the official filing date.

Land Disturbance Permit Application Checklist

The Stormwater Authority shall make a determination as to the completeness of the application and adequacy of the materials submitted. No review shall take place until the application has been found to be complete. The Land Disturbance Permit Application package shall include:

(1) [X] A completed Application Form with original signatures of all owners;

(2) [X] A certified list of abutters within 300 feet of the property;

(3) [X] Payment of the application and review fees; and,

(4) [X] One (1) copy each of the Application Form and the list of abutters filed with the Town Clerk.

[X] Stormwater Management Plan (3 copies) shall at a minimum include:

(1) [X] Name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected;

(2) [X] Narrative describing project

(3) [x] Plan(s)

(4) [X] Calculations to show compliance with regulations

(5) [X] Soil mapping and test data

(6) [X] Completed MassDEP Checklist for Stormwater Report

[X] Erosion and Sedimentation Control Plan (3 copies) shall at a minimum include:

(1) [X] Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan;

(2) [X] Narrative describing existing and proposed conditions, construction sequencing and phasing and methods to control erosion and sedimentation during construction.

(3) [X] Plan(s)

(4) [X] Calculations to show compliance with regulations

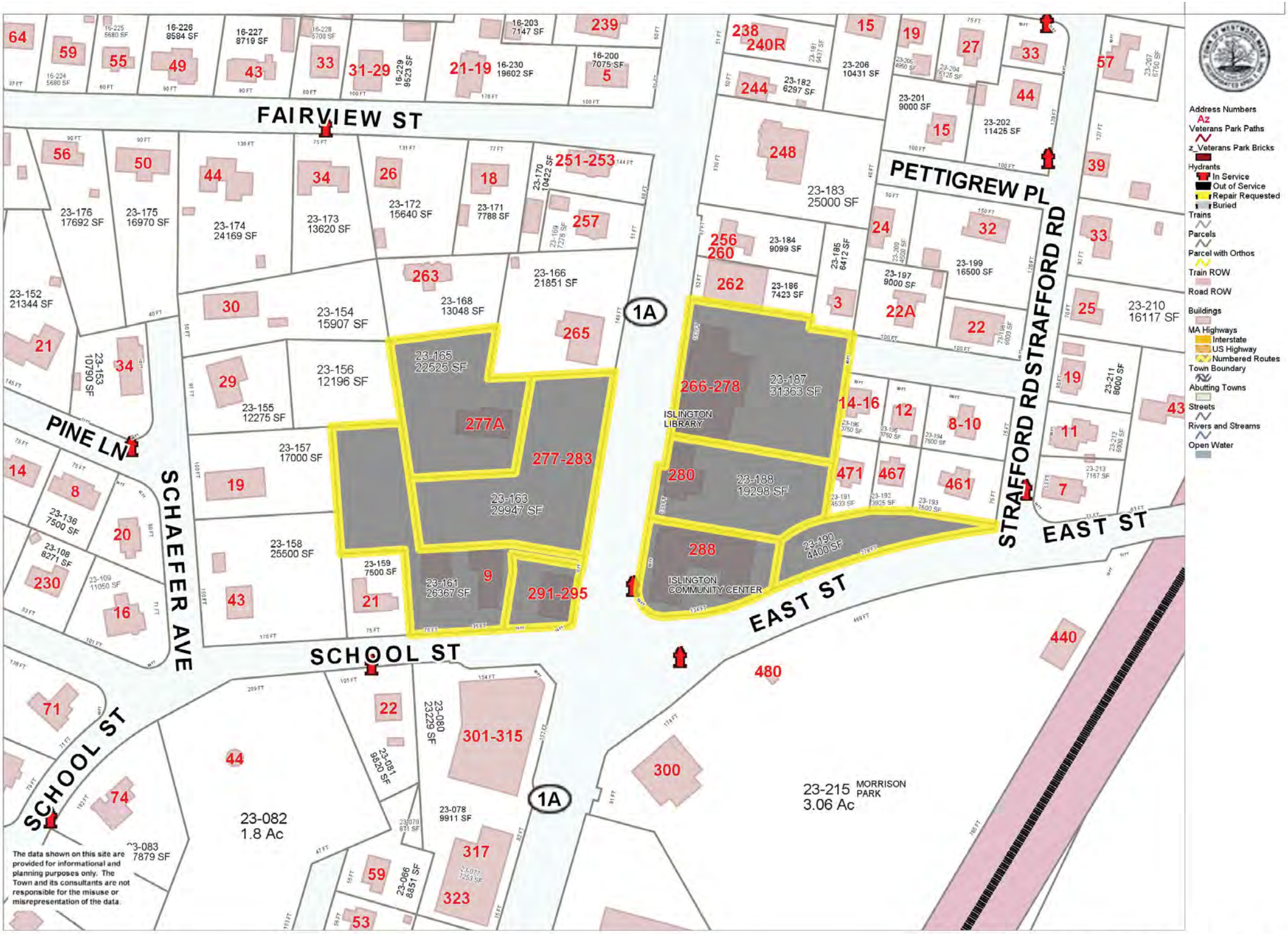
[x] Operation and Maintenance Plan (3 copies) shall at a minimum include:

(1) [X] The name(s) of the owner(s) for all components of the system;

(2) [X] A map showing the location of the stormwater systems and facilities;

(3) [X] Maintenance Agreement with the Stormwater Authority; and

(4) [X] Stormwater Management Easement(s)


FAIRVIEW ST
PETTIGREW PL
STRAFFORD RD
STRAFFORD RD
EAST ST
EAST ST
PINE LN
SCHAEFER AVE
SCHOOL ST
SCHOOL ST
1A
1A
ISLINGTON LIBRARY
ISLINGTON COMMUNITY CENTER
MORRISON PARK
23-215
3.06 Ac
23-082
1.8 Ac
23-165
22525 SF
277A
277-283
23-163
29947 SF
23-161
26367 SF
9
291-295
23-159
7500 SF
23-158
25500 SF
23-157
17000 SF
23-155
12275 SF
23-156
12196 SF
23-154
15907 SF
23-168
13048 SF
23-166
21851 SF
263
265
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31363 SF
266-278
23-188
19298 SF
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23-190
4400 SF
14-16
8-10
12
471
467
461
23-183
25000 SF
248
23-184
9099 SF
256
260
262
23-186
7423 SF
23-185
6412 SF
3
23-199
16500 SF
23-197
9000 SF
22A
22
24
32
23-202
11425 SF
15
23-201
9000 SF
44
23-206
10431 SF
238
240R
244
23-182
6297 SF
15
19
27
33
57
39
33
25
23-210
16117 SF
19
23-211
8000 SF
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7167 SF
7
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8750 SF
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10422 SF
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7278 SF
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23-152
21344 SF
21
23-153
10790 SF
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23-136
7500 SF
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23-108
8271 SF
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11050 SF
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23-083
7879 SF
22
23-080
23229 SF
301-315
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23-081
9820 SF
23-078
9911 SF
317
23-077
7253 SF
323
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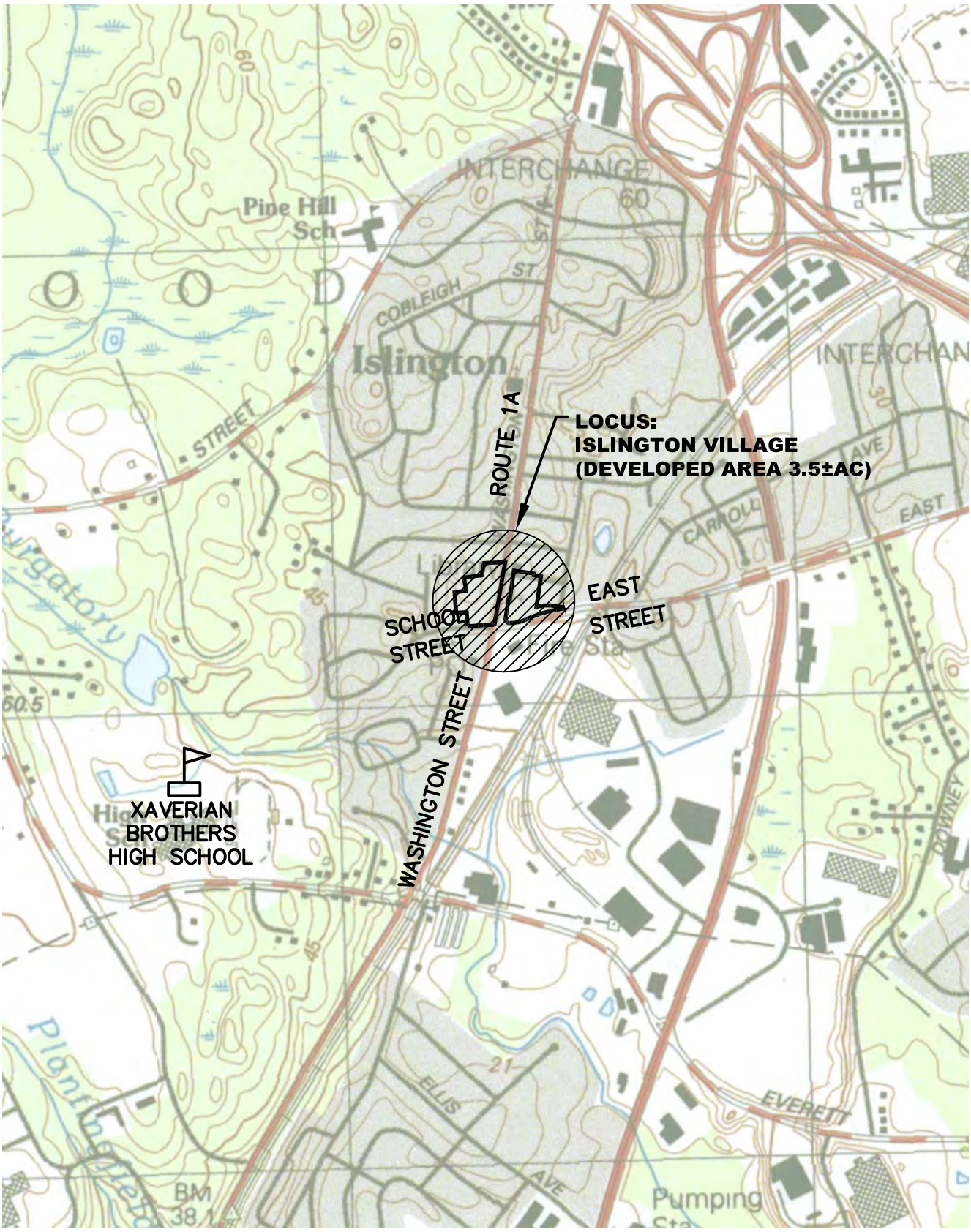
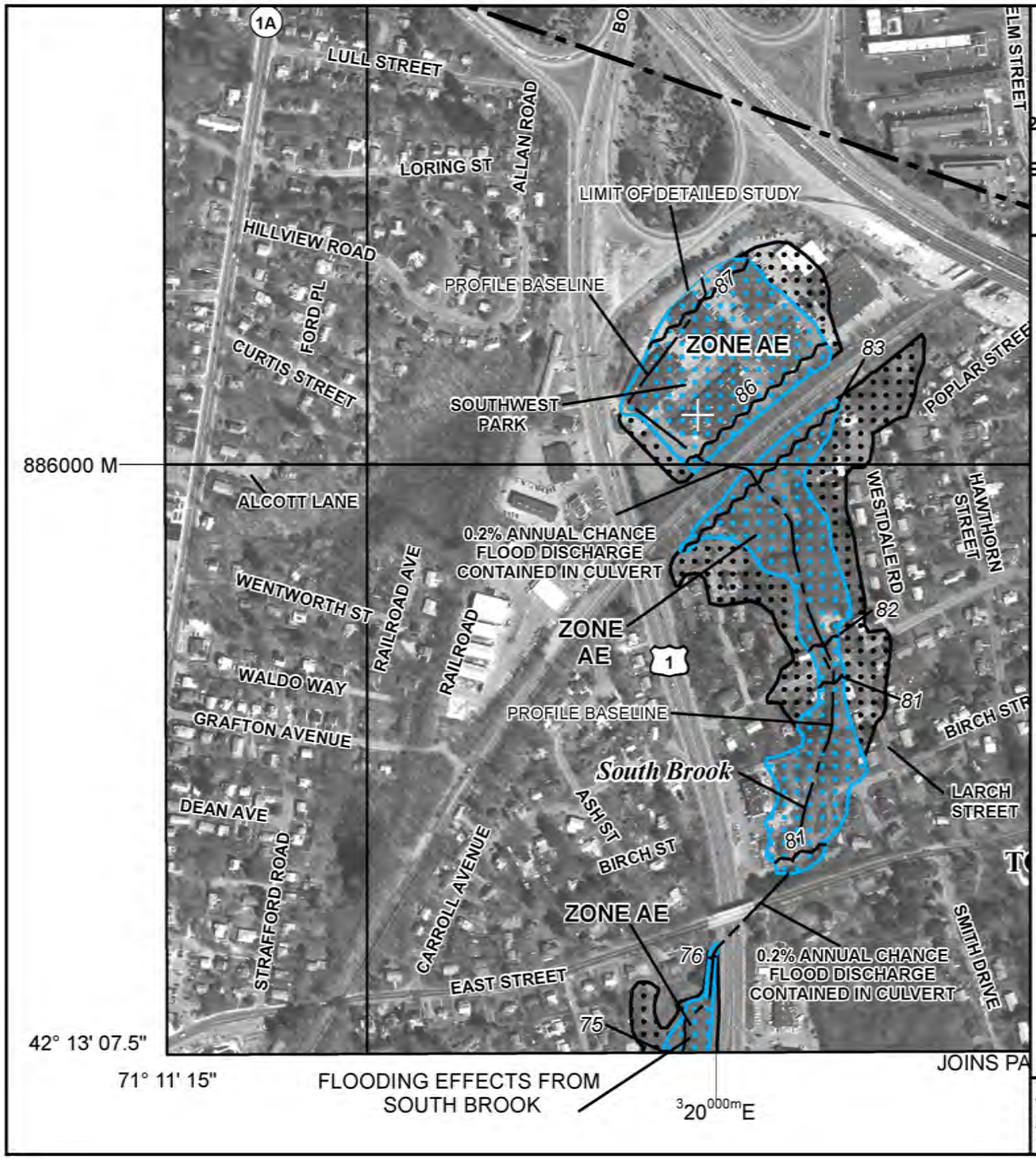
23-066
8851 SF
53
23-079
871 SF
300
480
440
16-225
5680 SF
16-226
8584 SF
16-227
8719 SF
16-228
5700 SF
16-229
9523 SF
16-230
19602 SF
16-203
7147 SF
239
16-200
7075 SF
5
64
59
55
49
43
33
31-29
21-19
16-224
5680 SF
The data shown on this site are provided for informational and planning purposes only. The Town and its consultants are not responsible for the misuse or misrepresentation of the data.
Address Numbers
Az
Veterans Park Paths
z_Veterans Park Bricks
Hydrants
In Service
Out of Service
Repair Requested
Buried
Trains
Parcels
Parcel with Orthos
Train ROW
Road ROW
Buildings
MA Highways
Interstate
US Highway
Numbered Routes
Town Boundary
Abutting Towns
Streets
Rivers and Streams
Open Water
0
200
400 ft
Printed on 10/25/2017 at 03:29 PM
Westwood MapsOnline

Assess. Parcel	Address	Owner	Mailing Address	Deed
School Street Side				
23-161	9 School Street	Petruzziello Properties LLC	21 Eastbrook Rd. Dedham, MA 02026	33427/352(2015)
23-162	291-295 Washington Street	Petruzziello Properties LLC	22 Eastbrook Rd. Dedham, MA 02026	32795/230
23-163	277-283 Washington Street	Town of Westwood	580 High St. Westwood, MA 02090	11159/660
23-165	277A Washington Street	Cohen Realty Limited Partnership (under P&S)	639 Washington St. Dedham, MA 02026	15633/289
		agreement w/Petruzziello)		
East Street Side				
23-187	266-278 Washington Street	Petruzziello Properties LLC	25 Eastbrook Rd. Dedham, MA 02026	32795/230
23-188	280 Washington Street	Town of Westwood	580 High St. Westwood, MA 02090	557/492
23-189	288 Washington Street	Town of Westwood	581 High St. Westwood, MA 02090	21418/237
23-190	East Street (Taking Parcel)	Town of Westwood	582 High St. Westwood, MA 02090	(Taking Parcel)



GCG ASSOCIATES, INC. *84 MAIN STREET* *WILMINGTON, MASSACHUSETTS* *(978) 657-9714*	LOCUS MAP Islington Village Westwood, Massachusetts	*SCALE: 1"=1000'* *DATE: 12/12/2017*

IMAGES OBTAINED FROM: "OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS"



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0181E

FIRM

FLOOD INSURANCE RATE MAP

NORFOLK COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

PANEL 181 OF 430

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DEDHAM, TOWN OF	250237	0181	E
WESTWOOD, TOWN OF	255225	0181	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25021C0181E

EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

MAP SCALE 1" = 500'

250 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0177E

FIRM

FLOOD INSURANCE RATE MAP

NORFOLK COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 177 OF 430

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DEDHAM, TOWN OF	250237	0177	E
WESTWOOD, TOWN OF	255225	0177	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25021C0177E

EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

1.0 PROJECT SUMMARY

The project proponent and property owner proposes to redevelop Islington Village at the north intersection of Washington Street with School and East Streets in Westwood, MA. Redevelopment includes CVS, Public Library, Mixed-use building with retail and 2-bdrm condos, and an existing building renovated to include retail and a relocated daycare.

Project locus includes a total of eight existing parcels of land, four of which are owned by Petruzziello Properties, and four currently owned by the Town of Westwood. For analysis purposes these parcels are divided into two sites: one located on the northwest corner of the intersection of Washington with School Street to be identified as the 'School Street Side,' and the second on the northeast corner of the Washington Street intersection with East Street and identified as the 'East Street Side.' Existing and proposed site summary for each as follows:

East Street Side:
Existing: site is located on the NE intersection of Washington Street with East Street in Westwood, MA and includes four (4) existing parcels of land for an East Street Side site locus total approximate area of 1.75±AC (76,384±SF). One lot is owned by Petruzziello Properties, identified as Map 23, Lot 187, developed to host an existing CVS and dry cleaner with curb cut access to Washington Street. Three parcels are owned by the Town of Westwood identified as: Map 23, Lot 188 containing an existing Community Center w/MMO daycare, Lot 189 containing a Public Library and Lot 190, currently vacant with an existing curb cut access to East Street. Parking supply for each building is serviced by a shared paved parking area located behind the three existing buildings with curb cut access to each Washington Street and East Street. For site design and drainage analysis purposes, a portion of the vacant lot which contains the East Street drive entrance is included in the locus area. Existing developed configuration contains approximately 1.30±AC (56,681±SF) impervious area. Existing stormwater facilities include drainage catch basins and manholes collecting site drainage at the rear of the lot and directing flow to Town drainage located in East Street.

Proposed: construction activities for this site include demolition of the existing Town-owned Community Center and existing Library to be replaced with a mixed-use building containing first floor retail space, 18 2-bedroom condo units and basement level parking garage. The existing CVS/ Dry cleaner building is proposed to be renovated as retail space with a relocated MMO daycare facility at basement level. Proposed impervious area is approximately 1.29±AC (56,141±SF) introducing a minor decrease in impervious area of approximately 540±SF.

Conclusion: With a decrease in impervious area on the East Street Side, the site is not analyzed for recharge detention with Pre and Post analysis. Proposed stormwater facilities upgrades and replacement of existing dainage catch basins and manholes collecting site drainage at the rear of the lot and directing flow to Town drainage located in East Street. A trench drain is proposed for the underground parking and pumped to a treatment stormceptor included in the upgraded drainage system.

School Street Side:
Existing: site is located on the NW intersection of Washington Street with School Street in Westwood, MA and includes four (4) existing parcels of land for a School Street Side site locus total area of 1.99±AC (84,808±SF). Two lots are currently owned by Petruzziello Properties which are identified as Map 23 Lot 161 containing a vacant Tailor Shop, a temporary location for an Historic Blue Heart Tavern and open resource area land to the rear of the parcel and Lot 162 containing a Barber Shop and Café Diva. A third lot identified as Map 23 Lot 165 contains a vacant single family dwelling and is under Purchase & Sales agreement by Petruzziello Properties. The fourth parcel, owned by the Town of Westwood is identified as Map 23 Lot 163 and contains a paved municipal parking area with a 2-3' high stone retaining wall along the rear of the lot. The existing development configuration contains approximately 0.96±AC (41,678±SF) impervious area.

Proposed: construction activities for this site include demolition of the existing Tailor, Café/ Barber Shop and Dwelling, and construction of a new CVS, Public Library, a permanent location for the Blue Heart Tavern with new paved parking provided for each use and equivalent Municipal parking spaces. The proposed redevelopment will introduce an increase in impervious area of 0.52±AC (22,548±SF).

Conclusion: To accommodate recharge and treatment for increase in impervious area, underground infiltration chambers and stormceptors are proposed with overflow design point on School Street. Treatment stormceptor is provided for equivalent flow entering the Washington Street drainage system, and clean roof drainage from CVS is directed into the Town drainage system re-utilizing the roof drain connection point existing at the Barber/Café location. Drainage on municipal parking lot drains both into the stormceptor and infiltrators on Petruzziello property as well as the Washington Street drainage system.

2.0 ENGINEERING METHODS & STANDARDS

The existing conditions or pre-drainage calculations were performed using HydroCAD software for Windows. HydroCAD uses the Soil Conservation Service (SCS), time of concentration by TR55 methodology, reach and pond rating by the Storage Indication Method and Manning's Equation, unit Hydrograph Method and the Storage Indication Method for developing the runoff and reservoir routing hydrographs, respectively.

Drainage calculations for the pre- and post-development conditions were performed for the 2, 10, 25, 50 and 100 year Type III, 24 hour storm events. All calculations generated for pre-, and revised post-development conditions can be found in the attached appendices.

The Massachusetts Department of Environmental Protection (MADEP) Stormwater Management Policy standards were observed in the design of the stormwater management system. These standards included limiting post-development peak discharge rates and volumes to the pre-development peak discharge rates and volumes and recharging stormwater runoff to the groundwater. The Town of Westwood Conservation Commission Rules and Regulations, Town of Westwood Stormwater Rules and Regulations and the Town of Westwood Drainage & Stormwater Design Standards were also utilized in the design of the stormwater management system.

3.0 SELECTION OF STORM EVENTS

The storm events have been compiled from the Town of Westwood Drainage & Stormwater Regulations. Values are based upon 24 hour rainfall from 1998 Cornell University Study.
Rainfall frequency data has been provided as follows:

Frequency (Years)	Rainfall [24-Hour Event (inches)]
2	3.2
10	4.9
25	6.1
50	7.3
100	8.5

4.0 CLASSIFICATION OF SOILS

Drainage classes have been established based on soil maps provided by U.S. Department of Agriculture Soil Conservation Service. Soil maps and descriptions are part of "Norfolk and Suffolk Counties, MA Survey Area Data: Version 12, September 15, 2016.

On-site soils are classified as:

602 - Urban land, 0-15% slopes: HSG NA
626B – Merrimack-Urban land complex, 0-8% slopes: HSG A
628C – Canton-Urban land complex, 3-15% slopes: HSG A

Soils classified as urban land is not assigned a HSG rating thus will be analyzed using hydrologic soil group (HSG) rating D to maintain conservative analysis.

5.0 DESIGN POINTS

Design points (DPs) are discharge points or lines that convey runoff from the study area via overland flow or through drain pipes. The pre-development and post-development areas of disturbance drain to three analysis 'Design Points' described as follows and shown on Figures 5 and 6.

DP-1 A drainage comparison point at located at School Street.

DP-2 A drainage comparison point located at the intersection of Washington Street with School Street.

6.0 ON-SITE PRE-DEVELOPMENT WATERSHEDS

Existing watersheds are delineated based on topography, physical characteristics and drainage networks within and beyond site limits that collect and direct stormwater towards the DPs. Therefore the total study area for the site/ roadway is 2.45 acres which is divided into two (2) pre-development watersheds below:

Sub SC-1A The 131,169 s.f. (3.01 acre) watershed is 8.87% impervious. Runoff travels overland to DP-1, School Street drainage.

Sub SC-2A The 17,015 s.f. (0.39 acre) watershed is 67.31% impervious. Runoff travels overland to DP-2, Washington Street intersection drainage.

Sub SC-2B The 22,496 s.f. (0.53 acre) watershed is 38.16% impervious. Runoff travels overland to DP-2, Washington Street intersection drainage.

Sub SC-2C The 8,252 s.f. (0.19 acre) watershed is 59.03% impervious. Runoff travels overland to DP-2, Washington Street intersection drainage.

Sub SC-2D The 7,452 s.f. (0.17 acre) watershed is 68.85% impervious. Runoff travels overland to DP-2, Washington Street intersection drainage.

7.0 ON-SITE POST-DEVELOPMENT WATERSHEDS

Similar to existing watersheds, the proposed watersheds are delineated based on topography, physical characteristics and drainage networks within the site limits and collect and direct stormwater towards the DPs. Analysis area is divided into post development watersheds described below:

Sub SC-10A The 139,324 s.f. (3.20 acre) watershed is 19.91% impervious. Stormwater runoff is treated through SC-740 Chambers and discharges to post DP-10, School Street.

Sub SC-20A The 27,703 s.f. (0.64 acre) watershed is 79.44% impervious. Runoff travels overland to DP-20, Washington Street intersection drainage.

Sub SC-20B The 19,353 s.f. (0.44 acre) watershed is 74.83% impervious. Runoff travels overland to DP-2, Washington Street intersection drainage.

8.0 GROUNDWATER RECHARGE

The required recharge volumes are dependent on the soil type and are as follows: 0.6 inches of runoff from impervious areas for hydrologic soil group “A”, 0.35 inches of runoff from impervious areas for hydrologic soil group “B” and 0.25 inches of runoff from impervious areas for hydrologic soil group “C” and 0.10 inches of runoff from impervious areas for hydrologic soil group “D”. The recharge stage will store runoff for an extended period of time filtering out sediment and pollutants through the infiltration process.

Infiltration beds are utilized for both recharge and detention capabilities. Collected roadway runoff will be stored within the beds until it can percolate through the bed soils. During more intense storm events, runoff that cannot be stored will flow overland. The infiltration beds are included in order to meet recharge and peak rate/flow attenuation. The purpose of the infiltration beds and stone trenches is to provide no net increase in stormwater runoff from the development as well as to provide the necessary water quality and recharge volumes.

RECHARGE VOLUME REQUIRED:

The following calculations demonstrate required volumes and capacity of infiltration chambers provided to accommodate flows from widened roadway pavement.

Rv = (F) x (newly created impervious area)

Where

Rv=Required recharge volume (cubic feet)
F = Target depth factor corresponding to the HSG
Weighted F value for type A and D soils.
Aimpervious (net)=18627.44/(18627.44+3920.83)*0.6=0.4957
Dimpervious (net)=3920/(18627.44+3920.83)*0.1=0.174
Weighted F = 0.4957+0.0174 = 0.5018

Rv= 0.5018 in*1 ft/12 inch*(18627.44 sf + 3920.83 sf) = 943 cubic feet

RECHARGE VOLUME PROVIDED:

The volume provided by Infiltration, Stormtech SC-740 chambers is as follows:

Volume = Number of units x layup length x installed capacity

Where

Number of units = 16 proposed
Layup length = 7.12 lf
Installed capacity = 10.52 cubic feet per feet

Volume = 16 units x 7.12 lf/unit x 10.52 cf/lf = 1,198 c.f. > *943 Required Recharge*

9.0 WATER QUALITY

The redevelopment includes measures to treat runoff from impervious areas prior to discharge. New stormwater controls have been incorporated into the design that result in a reduction in annual stormwater pollutant loads from the site. Through the use of structural and non-structural BMPs, the water quality volume from the watersheds contributing to the proposed drainage system will undergo treatment. The following BMPs were selected to treat the average annual TSS load from stormwater runoff under the post development condition. Refer to the TSS Removal Calculations below.

- Deep Sump Hooded Catch Basins
  Stormwater runoff from proposed pavement areas will be directed via curbing and site grading to catch basins with deep sumps and hooded outlets. The catch basins will trap and remove sediment and larger particles from the stormwater and will improve the performance of subsequent BMP's. The sumps will be a minimum of 4' in depth and a regular inspection and cleaning schedule has been proposed to ensure optimal effectiveness. When properly designed and maintained, catch basin and manhole sumps are effective in reducing the sediment and pollutant load in runoff.

- Hydrodynamic Separator (STC-450i Unit)
  Hydrodynamic Separators are designed to remove heavy particles, floating debris and hydrocarbons from stormwater. Stormwater enters the system where floatables and oils are separated prior to the clarified stormwater runoff discharging to an outlet pipe. See below for additional information about the TSS rates utilized for these proprietary BMPs.

- Infiltration Chambers (Cultec SC-740)
  Infiltration chambers provide underground storage that are constructed over permeable soils. Pretreatment is critical for effective performance of infiltration basins. Runoff from the design storm is stored until it exfiltrates through the soil of the basin floor. Infiltration beds are utilized for both recharge and detention capabilities. Collected roadway runoff will be stored within the beds until it can percolate through the bed soils. The purpose of the infiltration beds and stone trenches is to provide no net increase in stormwater runoff from the development as well as to provide the necessary water quality and recharge volumes.

Water Quality Volume DP-1

As defined by the MADEP Stormwater Management Policy, the water quality volume to be treated is equal to the first flush volume which is equal to the ½" of runoff from impervious areas (or 1" in critical areas).

Total "new" impervious area = 22,548.27 SF
Required Water Quality Volume = 22,548 SF x 0.5" x (1/12) = 939.5 CF

TSS Removal DP-1

Best Management Practice	Rate of Removal
Deep Sump & Hooded Catch Basin	25%
Water Quality Structure, Stormceptor 450i	84
Infiltration Chambers, SC-740 HD	80%

1.00*(.25) + .75*(.84) + 0.12*(.80) = *90.4% > 80% Required*

Water Quality Volume DP-1

Stormwater runoff can't feasibly be detained prior to discharge to this design point. Alternative analysis has been performed for SC-1 included in this report section I.2.0.

TSS Removal DP-2

Best Management Practice	Rate of Removal
Deep Sump & Hooded Catch Basin	25%
Water Quality Structure, Stormceptor 450i	85%

1.00*(.25) + .75*(.85) = *88.8% > 80% Required*

10.0 SUMMARY OF FLOWS AT DESIGN POINTS

The Massachusetts Department of Environmental Protection (MADEP) Stormwater Management Standards and the Dedham Drainage and Stormwater Design Standards were used in the design of the stormwater management system. These standards included limiting post-development peak discharge rates to the pre-development peak discharge rates and recharging stormwater runoff to the groundwater.

The following table includes a comparison for pre and post-development runoff values obtained using total peak values from hydrographs in attached calculations.

TABLE 1

PAVEMENT RUNOFF 'SCHOOL STREET SIDE'
PRE vs. POST DEVELOPMENT CONDITIONS

Storm Event	**Peak Runoff Rate (cfs) Pre / Post *(net change)***	
	Design Point DP-1	Design Point DP-2
2 year storm	0.00/ 0.00 (0.00)	2.02 / 2.14 (-0.12)
10 year storm	0.06/ 0.26 (-0.20)	3.73 / 3.62 (0.11)
25 year storm	0.38/ 0.37 (0.01)	4.99 / 4.71 (0.28)
50 year storm	1.05/ 1.01 (0.04)	6.26 / 5.77 (0.49)
100 year storm	2.04/ 1.56 (0.48)	7.54 / 6.82 (0.72)

11.0 COMPLIANCE WITH THE MA DEP STORMWATER HANDBOOK

Per Massachusetts Stormwater Handbook Standard 7: *A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3 and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

This report presents a comparative analysis of the pre-development and post-development hydrologic characteristics of the site, and outlines the proposed measures to mitigate flow, provide groundwater recharge, and improve water quality from the site. The best management practices (BMPs) outlined in this report include measures to meet the municipal and the Massachusetts Department of Environmental Protection (DEP) requirements. Below is a summary of how the design complies with each applicable DEP standard with respect to the Massachusetts Stormwater Handbook Chapter 3 Volume 2 "Checklist for Redevelopment Projects."

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated directly to or cause erosion in wetlands or waters of the Commonwealth.

The proposed stormwater conveyance system does not include any new *untreated* discharges. The overland and subsurface drainage points will remain consistent with the existing condition.

Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Stormwater management systems have been designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge form the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Stormwater management systems have been designed to accommodate increase in impervious area so the loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration chambers, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met as the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post construction load of Total Suspended Solids (TSS).

This standard is met for design analysis points. To aid in removal of total suspended solids, deep sump hooded catch basins, water quality units, and below ground infiltration chambers are proposed.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eiliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Not applicable. This project is not considered a higher potential pollutant load use.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

Not applicable. This project is not located within or near any critical area.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3 and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Redevelopment standards have been met.

Standard 8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentations, and pollution prevention plan) shall be developed and implemented.

A Construction Period Pollution Prevention and Sedimentation Erosion Control Plan, Appendix D, has been developed to outline recommended requirements to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities. Measures are depicted on detail sheets.

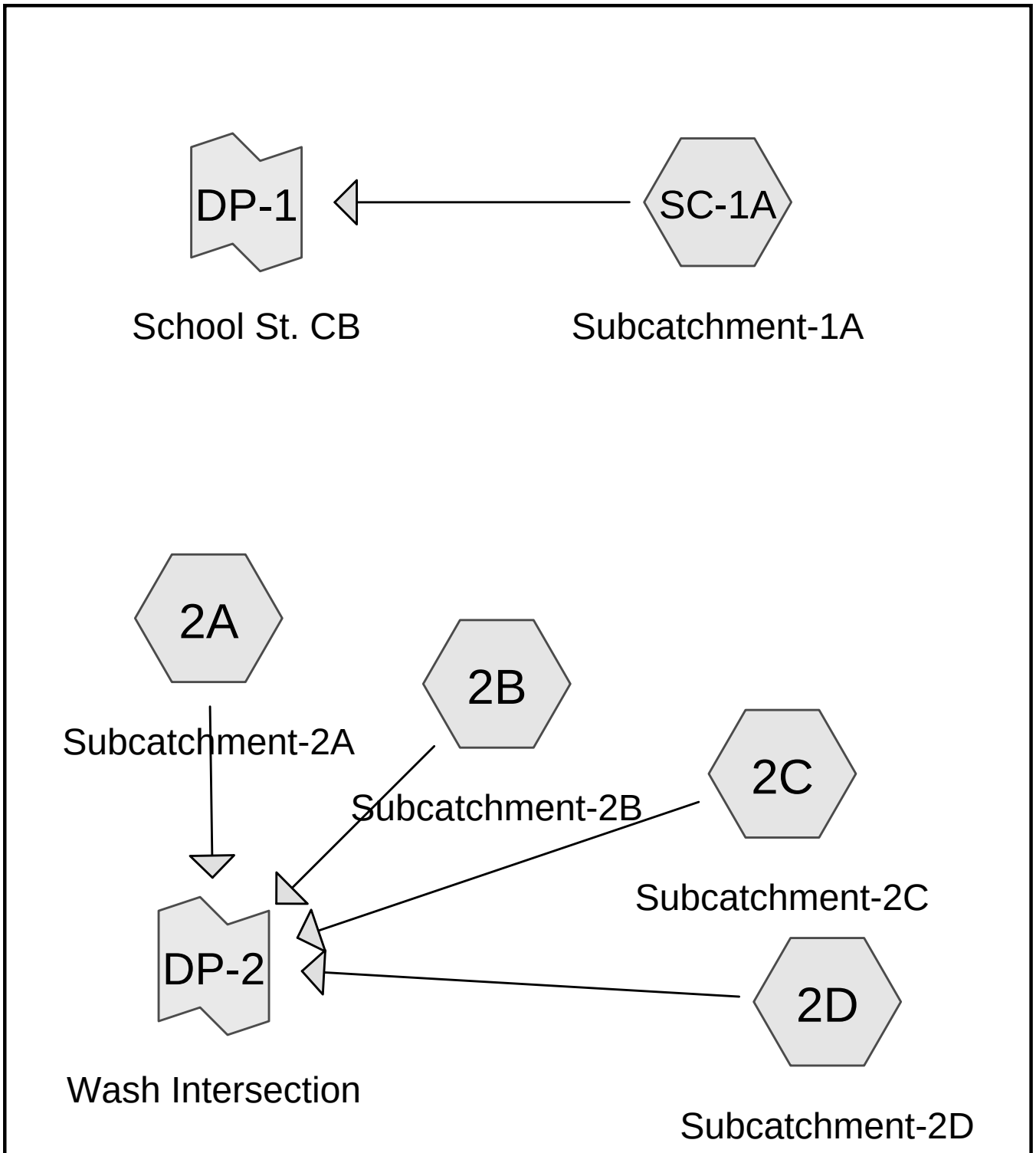
Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An Operation and Maintenance Plan (O&M) has been developed that outlines maintenance requirements to ensure longevity of BMP's. See Appendix D for Long Term Operations & Maintenance Plan.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

The proposed stormwater management system does not include any illicit discharges. See Appendix D for 'Illicit Discharge Statement.'

APPENDIX A
On-site Pre-Development



Routing Diagram for 1753-SCHOOL-PRE

Prepared by {enter your company name here}, Printed 12/12/2017

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.021	96	Gravel surface, HSG A (2A)
0.027	96	Gravel surface, HSG D (2A)
0.135	30	Meadow, non-grazed, HSG A (2B, 2C, 2D, SC-1A)
0.181	78	Meadow, non-grazed, HSG D (2B, 2C, 2D)
0.048	84	Mulch, Fair, HSG D (2A, 2B)
0.027	98	Paved parking, HSG A (2B)
0.531	98	Paved parking, HSG D (2A, 2B, 2C, 2D)
0.286	98	Roofs, HSG A (2A, 2B, 2D, SC-1A)
0.113	98	Roofs, HSG D (2A, 2B, 2C, 2D)
0.045	43	Wetlands- Drained., Fair, HSG A (SC-1A)
2.755	32	Woods/grass comb., Good, HSG A (2A, 2B, 2C, SC-1A)
0.110	79	Woods/grass comb., Good, HSG D (2A, 2B, 2C)
4.279	**51**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
3.269	HSG A	2A, 2B, 2C, 2D, SC-1A
0.000	HSG B	
0.000	HSG C	
1.010	HSG D	2A, 2B, 2C, 2D
0.000	Other	
4.279		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.021	0.000	0.000	0.027	0.000	0.048	Gravel surface	2A
0.135	0.000	0.000	0.181	0.000	0.316	Meadow, non-grazed	2B, 2C, 2D, SC-1A
0.000	0.000	0.000	0.048	0.000	0.048	Mulch, Fair	2A, 2B
0.027	0.000	0.000	0.531	0.000	0.558	Paved parking	2A, 2B, 2C, 2D
0.286	0.000	0.000	0.113	0.000	0.399	Roofs	2A, 2B, 2C, 2D, SC-1A
0.045	0.000	0.000	0.000	0.000	0.045	Wetlands- Drained., Fair	SC-1A
2.755	0.000	0.000	0.110	0.000	2.865	Woods/grass comb., Good	2A, 2B, 2C, SC-1A
3.269	**0.000**	**0.000**	**1.010**	**0.000**	**4.279**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	SC-1A	0.00	0.00	58.0	0.0129	0.011	10.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 2A: Subcatchment-2A Runoff Area=17,015 sf 67.31% Impervious Runoff Depth=2.35"
Flow Length=324' Tc=10.0 min CN=92 Runoff=0.91 cfs 0.077 af

Subcatchment 2B: Subcatchment-2B Runoff Area=22,496 sf 38.16% Impervious Runoff Depth=0.93"
Flow Length=574' Tc=12.1 min CN=72 Runoff=0.42 cfs 0.040 af

Subcatchment 2C: Subcatchment-2C Runoff Area=8,252 sf 59.03% Impervious Runoff Depth=1.84"
Flow Length=172' Tc=5.5 min CN=86 Runoff=0.40 cfs 0.029 af

Subcatchment 2D: Subcatchment-2D Runoff Area=7,452 sf 68.85% Impervious Runoff Depth=2.17"
Flow Length=146' Tc=5.2 min CN=90 Runoff=0.43 cfs 0.031 af

Subcatchment SC-1A: Subcatchment-1A Runoff Area=131,169 sf 8.87% Impervious Runoff Depth=0.00"
Flow Length=597' Tc=21.5 min CN=38 Runoff=0.00 cfs 0.000 af

Link DP-1: School St. CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link DP-2: Wash Intersection Inflow=2.02 cfs 0.176 af
Primary=2.02 cfs 0.176 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.176 af Average Runoff Depth = 0.49"
77.64% Pervious = 3.322 ac 22.36% Impervious = 0.957 ac

Summary for Subcatchment 2A: Subcatchment-2A

Runoff = 0.91 cfs @ 12.14 hrs, Volume= 0.077 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

	Area (sf)	CN	Description
	7,206	98	Paved parking, HSG D
	176	98	Roofs, HSG A
	4,071	98	Roofs, HSG D
	551	32	Woods/grass comb., Good, HSG A
	2,738	79	Woods/grass comb., Good, HSG D
*	182	84	Mulch, Fair, HSG D
	898	96	Gravel surface, HSG A
	1,193	96	Gravel surface, HSG D
	17,015	92	Weighted Average
	5,562		32.69% Pervious Area
	11,453		67.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0484	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	29	0.1034	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	26	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	108	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	82	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.0	324	Total			

Summary for Subcatchment 2B: Subcatchment-2B

Runoff = 0.42 cfs @ 12.19 hrs, Volume= 0.040 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

	Area (sf)	CN	Description
	1,180	98	Paved parking, HSG A
	6,726	98	Paved parking, HSG D
	401	98	Roofs, HSG A
	277	98	Roofs, HSG D
	5,768	32	Woods/grass comb., Good, HSG A
	118	79	Woods/grass comb., Good, HSG D
	1,114	30	Meadow, non-grazed, HSG A
	4,995	78	Meadow, non-grazed, HSG D
*	1,917	84	Mulch, Fair, HSG D
	22,496	72	Weighted Average
	13,912		61.84% Pervious Area
	8,584		38.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	52	0.0960	1.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	14	0.1786	2.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.1731	2.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	83	0.0813	5.79		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	87	0.3736	4.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	275	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.1	574	Total			

Summary for Subcatchment 2C: Subcatchment-2C

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
4,796	98	Paved parking, HSG D
75	98	Roofs, HSG D
309	32	Woods/grass comb., Good, HSG A
1,931	79	Woods/grass comb., Good, HSG D
324	30	Meadow, non-grazed, HSG A
817	78	Meadow, non-grazed, HSG D
8,252	86	Weighted Average
3,381		40.97% Pervious Area
4,871		59.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	107	0.0428	4.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	172	Total			

Summary for Subcatchment 2D: Subcatchment-2D

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.031 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
4,396	98	Paved parking, HSG D
241	98	Roofs, HSG A
494	98	Roofs, HSG D
251	30	Meadow, non-grazed, HSG A
2,070	78	Meadow, non-grazed, HSG D
7,452	90	Weighted Average
2,321		31.15% Pervious Area
5,131		68.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	13	0.1154	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.3398	11.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.2	146	Total			

Summary for Subcatchment SC-1A: Subcatchment-1A

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

	Area (sf)	CN	Description
	11,638	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	113,376	32	Woods/grass comb., Good, HSG A
	4,190	30	Meadow, non-grazed, HSG A
	131,169	38	Weighted Average
	119,531		91.13% Pervious Area
	11,638		8.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Link DP-1: School St. CB

Inflow Area = 3.011 ac, 8.87% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wash Intersection

Inflow Area = 1.268 ac, 54.40% Impervious, Inflow Depth = 1.67" for 2 Year event
Inflow = 2.02 cfs @ 12.12 hrs, Volume= 0.176 af
Primary = 2.02 cfs @ 12.12 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 2A: Subcatchment-2A Runoff Area=17,015 sf 67.31% Impervious Runoff Depth=3.99"
Flow Length=324' Tc=10.0 min CN=92 Runoff=1.50 cfs 0.130 af

Subcatchment 2B: Subcatchment-2B Runoff Area=22,496 sf 38.16% Impervious Runoff Depth=2.12"
Flow Length=574' Tc=12.1 min CN=72 Runoff=1.03 cfs 0.091 af

Subcatchment 2C: Subcatchment-2C Runoff Area=8,252 sf 59.03% Impervious Runoff Depth=3.37"
Flow Length=172' Tc=5.5 min CN=86 Runoff=0.73 cfs 0.053 af

Subcatchment 2D: Subcatchment-2D Runoff Area=7,452 sf 68.85% Impervious Runoff Depth=3.78"
Flow Length=146' Tc=5.2 min CN=90 Runoff=0.73 cfs 0.054 af

Subcatchment SC-1A: Subcatchment-1A Runoff Area=131,169 sf 8.87% Impervious Runoff Depth=0.15"
Flow Length=597' Tc=21.5 min CN=38 Runoff=0.06 cfs 0.037 af

Link DP-1: School St. CB Inflow=0.06 cfs 0.037 af
Primary=0.06 cfs 0.037 af

Link DP-2: Wash Intersection Inflow=3.73 cfs 0.328 af
Primary=3.73 cfs 0.328 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.366 af Average Runoff Depth = 1.03"
77.64% Pervious = 3.322 ac 22.36% Impervious = 0.957 ac

Summary for Subcatchment 2A: Subcatchment-2A

Runoff = 1.50 cfs @ 12.14 hrs, Volume= 0.130 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

	Area (sf)	CN	Description
	7,206	98	Paved parking, HSG D
	176	98	Roofs, HSG A
	4,071	98	Roofs, HSG D
	551	32	Woods/grass comb., Good, HSG A
	2,738	79	Woods/grass comb., Good, HSG D
*	182	84	Mulch, Fair, HSG D
	898	96	Gravel surface, HSG A
	1,193	96	Gravel surface, HSG D
	17,015	92	Weighted Average
	5,562		32.69% Pervious Area
	11,453		67.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0484	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	29	0.1034	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	26	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	108	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	82	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.0	324	Total			

Summary for Subcatchment 2B: Subcatchment-2B

Runoff = 1.03 cfs @ 12.17 hrs, Volume= 0.091 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

	Area (sf)	CN	Description
	1,180	98	Paved parking, HSG A
	6,726	98	Paved parking, HSG D
	401	98	Roofs, HSG A
	277	98	Roofs, HSG D
	5,768	32	Woods/grass comb., Good, HSG A
	118	79	Woods/grass comb., Good, HSG D
	1,114	30	Meadow, non-grazed, HSG A
	4,995	78	Meadow, non-grazed, HSG D
*	1,917	84	Mulch, Fair, HSG D
	22,496	72	Weighted Average
	13,912		61.84% Pervious Area
	8,584		38.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	52	0.0960	1.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	14	0.1786	2.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.1731	2.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	83	0.0813	5.79		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	87	0.3736	4.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	275	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.1	574	Total			

Summary for Subcatchment 2C: Subcatchment-2C

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.73 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
4,796	98	Paved parking, HSG D
75	98	Roofs, HSG D
309	32	Woods/grass comb., Good, HSG A
1,931	79	Woods/grass comb., Good, HSG D
324	30	Meadow, non-grazed, HSG A
817	78	Meadow, non-grazed, HSG D
8,252	86	Weighted Average
3,381		40.97% Pervious Area
4,871		59.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	107	0.0428	4.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	172	Total			

Summary for Subcatchment 2D: Subcatchment-2D

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.73 cfs @ 12.08 hrs, Volume= 0.054 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
4,396	98	Paved parking, HSG D
241	98	Roofs, HSG A
494	98	Roofs, HSG D
251	30	Meadow, non-grazed, HSG A
2,070	78	Meadow, non-grazed, HSG D
7,452	90	Weighted Average
2,321		31.15% Pervious Area
5,131		68.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	13	0.1154	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.3398	11.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.2	146	Total			

Summary for Subcatchment SC-1A: Subcatchment-1A

Runoff = 0.06 cfs @ 14.01 hrs, Volume= 0.037 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

	Area (sf)	CN	Description
	11,638	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	113,376	32	Woods/grass comb., Good, HSG A
	4,190	30	Meadow, non-grazed, HSG A
	131,169	38	Weighted Average
	119,531		91.13% Pervious Area
	11,638		8.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Link DP-1: School St. CB

Inflow Area = 3.011 ac, 8.87% Impervious, Inflow Depth = 0.15" for 10 Year event
Inflow = 0.06 cfs @ 14.01 hrs, Volume= 0.037 af
Primary = 0.06 cfs @ 14.01 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wash Intersection

Inflow Area = 1.268 ac, 54.40% Impervious, Inflow Depth = 3.11" for 10 Year event
Inflow = 3.73 cfs @ 12.12 hrs, Volume= 0.328 af
Primary = 3.73 cfs @ 12.12 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 2A: Subcatchment-2A Runoff Area=17,015 sf 67.31% Impervious Runoff Depth=5.17"
Flow Length=324' Tc=10.0 min CN=92 Runoff=1.92 cfs 0.168 af

Subcatchment 2B: Subcatchment-2B Runoff Area=22,496 sf 38.16% Impervious Runoff Depth=3.08"
Flow Length=574' Tc=12.1 min CN=72 Runoff=1.51 cfs 0.132 af

Subcatchment 2C: Subcatchment-2C Runoff Area=8,252 sf 59.03% Impervious Runoff Depth=4.50"
Flow Length=172' Tc=5.5 min CN=86 Runoff=0.96 cfs 0.071 af

Subcatchment 2D: Subcatchment-2D Runoff Area=7,452 sf 68.85% Impervious Runoff Depth=4.94"
Flow Length=146' Tc=5.2 min CN=90 Runoff=0.94 cfs 0.070 af

Subcatchment SC-1A: Subcatchment-1A Runoff Area=131,169 sf 8.87% Impervious Runoff Depth=0.42"
Flow Length=597' Tc=21.5 min CN=38 Runoff=0.38 cfs 0.105 af

Link DP-1: School St. CB Inflow=0.38 cfs 0.105 af
Primary=0.38 cfs 0.105 af

Link DP-2: Wash Intersection Inflow=4.99 cfs 0.442 af
Primary=4.99 cfs 0.442 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.548 af Average Runoff Depth = 1.54"
77.64% Pervious = 3.322 ac 22.36% Impervious = 0.957 ac

Summary for Subcatchment 2A: Subcatchment-2A

Runoff = 1.92 cfs @ 12.14 hrs, Volume= 0.168 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

	Area (sf)	CN	Description
	7,206	98	Paved parking, HSG D
	176	98	Roofs, HSG A
	4,071	98	Roofs, HSG D
	551	32	Woods/grass comb., Good, HSG A
	2,738	79	Woods/grass comb., Good, HSG D
*	182	84	Mulch, Fair, HSG D
	898	96	Gravel surface, HSG A
	1,193	96	Gravel surface, HSG D
	17,015	92	Weighted Average
	5,562		32.69% Pervious Area
	11,453		67.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0484	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	29	0.1034	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	26	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	108	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	82	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.0	324	Total			

Summary for Subcatchment 2B: Subcatchment-2B

Runoff = 1.51 cfs @ 12.17 hrs, Volume= 0.132 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

	Area (sf)	CN	Description
	1,180	98	Paved parking, HSG A
	6,726	98	Paved parking, HSG D
	401	98	Roofs, HSG A
	277	98	Roofs, HSG D
	5,768	32	Woods/grass comb., Good, HSG A
	118	79	Woods/grass comb., Good, HSG D
	1,114	30	Meadow, non-grazed, HSG A
	4,995	78	Meadow, non-grazed, HSG D
*	1,917	84	Mulch, Fair, HSG D
	22,496	72	Weighted Average
	13,912		61.84% Pervious Area
	8,584		38.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	52	0.0960	1.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	14	0.1786	2.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.1731	2.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	83	0.0813	5.79		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	87	0.3736	4.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	275	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.1	574	Total			

Summary for Subcatchment 2C: Subcatchment-2C

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.96 cfs @ 12.08 hrs, Volume= 0.071 af, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

Area (sf)	CN	Description
4,796	98	Paved parking, HSG D
75	98	Roofs, HSG D
309	32	Woods/grass comb., Good, HSG A
1,931	79	Woods/grass comb., Good, HSG D
324	30	Meadow, non-grazed, HSG A
817	78	Meadow, non-grazed, HSG D
8,252	86	Weighted Average
3,381		40.97% Pervious Area
4,871		59.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	107	0.0428	4.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	172	Total			

Summary for Subcatchment 2D: Subcatchment-2D

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.94 cfs @ 12.08 hrs, Volume= 0.070 af, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

Area (sf)	CN	Description
4,396	98	Paved parking, HSG D
241	98	Roofs, HSG A
494	98	Roofs, HSG D
251	30	Meadow, non-grazed, HSG A
2,070	78	Meadow, non-grazed, HSG D
7,452	90	Weighted Average
2,321		31.15% Pervious Area
5,131		68.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	13	0.1154	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.3398	11.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.2	146	Total			

Summary for Subcatchment SC-1A: Subcatchment-1A

Runoff = 0.38 cfs @ 12.59 hrs, Volume= 0.105 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

	Area (sf)	CN	Description
	11,638	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	113,376	32	Woods/grass comb., Good, HSG A
	4,190	30	Meadow, non-grazed, HSG A
	131,169	38	Weighted Average
	119,531		91.13% Pervious Area
	11,638		8.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Link DP-1: School St. CB

Inflow Area = 3.011 ac, 8.87% Impervious, Inflow Depth = 0.42" for 25 Year event
Inflow = 0.38 cfs @ 12.59 hrs, Volume= 0.105 af
Primary = 0.38 cfs @ 12.59 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wash Intersection

Inflow Area = 1.268 ac, 54.40% Impervious, Inflow Depth = 4.19" for 25 Year event
Inflow = 4.99 cfs @ 12.12 hrs, Volume= 0.442 af
Primary = 4.99 cfs @ 12.12 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 2A: Subcatchment-2A Runoff Area=17,015 sf 67.31% Impervious Runoff Depth=6.35"
Flow Length=324' Tc=10.0 min CN=92 Runoff=2.33 cfs 0.207 af

Subcatchment 2B: Subcatchment-2B Runoff Area=22,496 sf 38.16% Impervious Runoff Depth=4.09"
Flow Length=574' Tc=12.1 min CN=72 Runoff=2.01 cfs 0.176 af

Subcatchment 2C: Subcatchment-2C Runoff Area=8,252 sf 59.03% Impervious Runoff Depth=5.65"
Flow Length=172' Tc=5.5 min CN=86 Runoff=1.20 cfs 0.089 af

Subcatchment 2D: Subcatchment-2D Runoff Area=7,452 sf 68.85% Impervious Runoff Depth=6.12"
Flow Length=146' Tc=5.2 min CN=90 Runoff=1.15 cfs 0.087 af

Subcatchment SC-1A: Subcatchment-1A Runoff Area=131,169 sf 8.87% Impervious Runoff Depth=0.80"
Flow Length=597' Tc=21.5 min CN=38 Runoff=1.05 cfs 0.201 af

Link DP-1: School St. CB Inflow=1.05 cfs 0.201 af
Primary=1.05 cfs 0.201 af

Link DP-2: Wash Intersection Inflow=6.26 cfs 0.559 af
Primary=6.26 cfs 0.559 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.760 af Average Runoff Depth = 2.13"
77.64% Pervious = 3.322 ac 22.36% Impervious = 0.957 ac

Summary for Subcatchment 2A: Subcatchment-2A

Runoff = 2.33 cfs @ 12.14 hrs, Volume= 0.207 af, Depth= 6.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

	Area (sf)	CN	Description
	7,206	98	Paved parking, HSG D
	176	98	Roofs, HSG A
	4,071	98	Roofs, HSG D
	551	32	Woods/grass comb., Good, HSG A
	2,738	79	Woods/grass comb., Good, HSG D
*	182	84	Mulch, Fair, HSG D
	898	96	Gravel surface, HSG A
	1,193	96	Gravel surface, HSG D
	17,015	92	Weighted Average
	5,562		32.69% Pervious Area
	11,453		67.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0484	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	29	0.1034	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	26	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	108	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	82	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.0	324	Total			

Summary for Subcatchment 2B: Subcatchment-2B

Runoff = 2.01 cfs @ 12.17 hrs, Volume= 0.176 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

	Area (sf)	CN	Description
	1,180	98	Paved parking, HSG A
	6,726	98	Paved parking, HSG D
	401	98	Roofs, HSG A
	277	98	Roofs, HSG D
	5,768	32	Woods/grass comb., Good, HSG A
	118	79	Woods/grass comb., Good, HSG D
	1,114	30	Meadow, non-grazed, HSG A
	4,995	78	Meadow, non-grazed, HSG D
*	1,917	84	Mulch, Fair, HSG D
	22,496	72	Weighted Average
	13,912		61.84% Pervious Area
	8,584		38.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	52	0.0960	1.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	14	0.1786	2.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.1731	2.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	83	0.0813	5.79		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	87	0.3736	4.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	275	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.1	574	Total			

Summary for Subcatchment 2C: Subcatchment-2C

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.20 cfs @ 12.08 hrs, Volume= 0.089 af, Depth= 5.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

Area (sf)	CN	Description
4,796	98	Paved parking, HSG D
75	98	Roofs, HSG D
309	32	Woods/grass comb., Good, HSG A
1,931	79	Woods/grass comb., Good, HSG D
324	30	Meadow, non-grazed, HSG A
817	78	Meadow, non-grazed, HSG D
8,252	86	Weighted Average
3,381		40.97% Pervious Area
4,871		59.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	107	0.0428	4.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	172	Total			

Summary for Subcatchment 2D: Subcatchment-2D

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 0.087 af, Depth= 6.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

Area (sf)	CN	Description
4,396	98	Paved parking, HSG D
241	98	Roofs, HSG A
494	98	Roofs, HSG D
251	30	Meadow, non-grazed, HSG A
2,070	78	Meadow, non-grazed, HSG D
7,452	90	Weighted Average
2,321		31.15% Pervious Area
5,131		68.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	13	0.1154	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.3398	11.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.2	146	Total			

Summary for Subcatchment SC-1A: Subcatchment-1A

Runoff = 1.05 cfs @ 12.49 hrs, Volume= 0.201 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

	Area (sf)	CN	Description
	11,638	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	113,376	32	Woods/grass comb., Good, HSG A
	4,190	30	Meadow, non-grazed, HSG A
	131,169	38	Weighted Average
	119,531		91.13% Pervious Area
	11,638		8.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Link DP-1: School St. CB

Inflow Area = 3.011 ac, 8.87% Impervious, Inflow Depth = 0.80" for 50 Year event
Inflow = 1.05 cfs @ 12.49 hrs, Volume= 0.201 af
Primary = 1.05 cfs @ 12.49 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Wash Intersection

Inflow Area = 1.268 ac, 54.40% Impervious, Inflow Depth = 5.29" for 50 Year event
Inflow = 6.26 cfs @ 12.12 hrs, Volume= 0.559 af
Primary = 6.26 cfs @ 12.12 hrs, Volume= 0.559 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 2A: Subcatchment-2A Runoff Area=17,015 sf 67.31% Impervious Runoff Depth=7.54"
Flow Length=324' Tc=10.0 min CN=92 Runoff=2.74 cfs 0.245 af

Subcatchment 2B: Subcatchment-2B Runoff Area=22,496 sf 38.16% Impervious Runoff Depth=5.14"
Flow Length=574' Tc=12.1 min CN=72 Runoff=2.53 cfs 0.221 af

Subcatchment 2C: Subcatchment-2C Runoff Area=8,252 sf 59.03% Impervious Runoff Depth=6.82"
Flow Length=172' Tc=5.5 min CN=86 Runoff=1.43 cfs 0.108 af

Subcatchment 2D: Subcatchment-2D Runoff Area=7,452 sf 68.85% Impervious Runoff Depth=7.30"
Flow Length=146' Tc=5.2 min CN=90 Runoff=1.36 cfs 0.104 af

Subcatchment SC-1A: Subcatchment-1A Runoff Area=131,169 sf 8.87% Impervious Runoff Depth=1.27"
Flow Length=597' Tc=21.5 min CN=38 Runoff=2.04 cfs 0.319 af

Link DP-1: School St. CB Inflow=2.04 cfs 0.319 af
Primary=2.04 cfs 0.319 af

Link DP-2: Wash Intersection Inflow=7.54 cfs 0.678 af
Primary=7.54 cfs 0.678 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.997 af Average Runoff Depth = 2.80"
77.64% Pervious = 3.322 ac 22.36% Impervious = 0.957 ac

Summary for Subcatchment 2A: Subcatchment-2A

Runoff = 2.74 cfs @ 12.14 hrs, Volume= 0.245 af, Depth= 7.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

	Area (sf)	CN	Description
	7,206	98	Paved parking, HSG D
	176	98	Roofs, HSG A
	4,071	98	Roofs, HSG D
	551	32	Woods/grass comb., Good, HSG A
	2,738	79	Woods/grass comb., Good, HSG D
*	182	84	Mulch, Fair, HSG D
	898	96	Gravel surface, HSG A
	1,193	96	Gravel surface, HSG D
	17,015	92	Weighted Average
	5,562		32.69% Pervious Area
	11,453		67.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0484	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	29	0.1034	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	26	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	108	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	82	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.0	324	Total			

Summary for Subcatchment 2B: Subcatchment-2B

Runoff = 2.53 cfs @ 12.17 hrs, Volume= 0.221 af, Depth= 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

	Area (sf)	CN	Description
	1,180	98	Paved parking, HSG A
	6,726	98	Paved parking, HSG D
	401	98	Roofs, HSG A
	277	98	Roofs, HSG D
	5,768	32	Woods/grass comb., Good, HSG A
	118	79	Woods/grass comb., Good, HSG D
	1,114	30	Meadow, non-grazed, HSG A
	4,995	78	Meadow, non-grazed, HSG D
*	1,917	84	Mulch, Fair, HSG D
	22,496	72	Weighted Average
	13,912		61.84% Pervious Area
	8,584		38.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	52	0.0960	1.55		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	14	0.1786	2.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.1731	2.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	83	0.0813	5.79		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	87	0.3736	4.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	275	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.1	574	Total			

Summary for Subcatchment 2C: Subcatchment-2C

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.108 af, Depth= 6.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
4,796	98	Paved parking, HSG D
75	98	Roofs, HSG D
309	32	Woods/grass comb., Good, HSG A
1,931	79	Woods/grass comb., Good, HSG D
324	30	Meadow, non-grazed, HSG A
817	78	Meadow, non-grazed, HSG D
8,252	86	Weighted Average
3,381		40.97% Pervious Area
4,871		59.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	107	0.0428	4.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	172	Total			

Summary for Subcatchment 2D: Subcatchment-2D

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.104 af, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
4,396	98	Paved parking, HSG D
241	98	Roofs, HSG A
494	98	Roofs, HSG D
251	30	Meadow, non-grazed, HSG A
2,070	78	Meadow, non-grazed, HSG D
7,452	90	Weighted Average
2,321		31.15% Pervious Area
5,131		68.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0700	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.1	13	0.1154	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	83	0.3398	11.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.2	146	Total			

Summary for Subcatchment SC-1A: Subcatchment-1A

Runoff = 2.04 cfs @ 12.41 hrs, Volume= 0.319 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

	Area (sf)	CN	Description
	11,638	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	113,376	32	Woods/grass comb., Good, HSG A
	4,190	30	Meadow, non-grazed, HSG A
	131,169	38	Weighted Average
	119,531		91.13% Pervious Area
	11,638		8.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Link DP-1: School St. CB

Inflow Area = 3.011 ac, 8.87% Impervious, Inflow Depth = 1.27" for 100 Year event
Inflow = 2.04 cfs @ 12.41 hrs, Volume= 0.319 af
Primary = 2.04 cfs @ 12.41 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

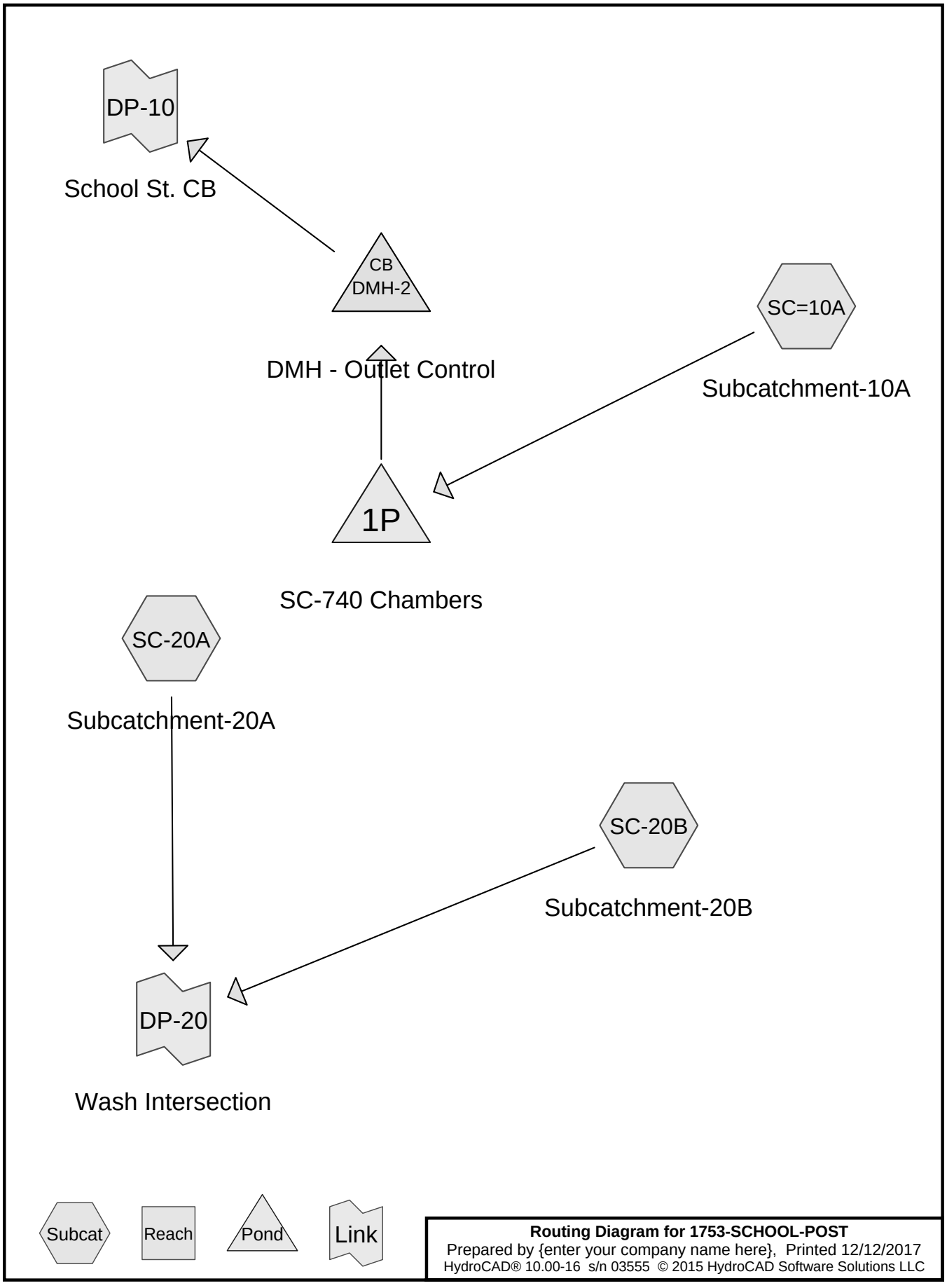
Summary for Link DP-2: Wash Intersection

Inflow Area = 1.268 ac, 54.40% Impervious, Inflow Depth = 6.42" for 100 Year event
Inflow = 7.54 cfs @ 12.12 hrs, Volume= 0.678 af
Primary = 7.54 cfs @ 12.12 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

APPENDIX B
On-site Post-Development

Islington VIllage
Westwod, MA
1753



Routing Diagram for 1753-SCHOOL-POST

Prepared by {enter your company name here}, Printed 12/12/2017

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.165	30	Meadow, non-grazed, HSG A (SC-20A, SC=10A)
0.165	78	Meadow, non-grazed, HSG D (SC-20A, SC-20B)
0.429	98	Paved parking, HSG A (SC-20A, SC=10A)
0.212	98	Paved parking, HSG D (SC-20A, SC-20B, SC=10A)
0.569	98	Roofs, HSG A (SC-20A, SC-20B, SC=10A)
0.265	98	Roofs, HSG D (SC-20A)
0.045	43	Wetlands- Drained., Fair, HSG A (SC=10A)
2.429	32	Woods/grass comb., Good, HSG A (SC-20B, SC=10A)
4.279	**57**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
3.637	HSG A	SC-20A, SC-20B, SC=10A
0.000	HSG B	
0.000	HSG C	
0.642	HSG D	SC-20A, SC-20B, SC=10A
0.000	Other	
4.279		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.165	0.000	0.000	0.165	0.000	0.330	Meadow, non-grazed	SC-20A, SC-20B, SC=10A
0.429	0.000	0.000	0.212	0.000	0.641	Paved parking	SC-20A, SC-20B, SC=10A
0.569	0.000	0.000	0.265	0.000	0.834	Roofs	SC-20A, SC-20B, SC=10A
0.045	0.000	0.000	0.000	0.000	0.045	Wetlands- Drained., Fair	SC=10A
2.429	0.000	0.000	0.000	0.000	2.429	Woods/grass comb., Good	SC-20B, SC=10A
3.637	**0.000**	**0.000**	**0.642**	**0.000**	**4.279**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	SC=10A	0.00	0.00	58.0	0.0129	0.011	10.0	0.0	0.0
2	1P	104.35	106.70	10.0	-0.2350	0.011	12.0	0.0	0.0
3	DMH-2	106.60	106.10	50.0	0.0100	0.011	12.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 SC-20A: Subcatchment-20A Runoff Area=27,703 sf 79.44% Impervious Runoff Depth=2.54"
Flow Length=133' Tc=13.3 min CN=94 Runoff=1.43 cfs 0.135 af

Subcatchment SC-20B: Subcatchment-20B Runoff Area=19,353 sf 74.83% Impervious Runoff Depth=1.76"
Tc=6.0 min CN=85 Runoff=0.90 cfs 0.065 af

Subcatchment SC=10A: Runoff Area=139,324 sf 19.91% Impervious Runoff Depth=0.04"
Flow Length=597' Tc=21.5 min CN=45 Runoff=0.02 cfs 0.012 af

Pond 1P: SC-740 Chambers Peak Elev=102.87' Storage=6 cf Inflow=0.02 cfs 0.012 af
Discarded=0.02 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.012 af

Pond DMH-2: DMH - Outlet Control Peak Elev=106.60' Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=0.00 cfs 0.000 af

Link DP-10: School St. CB Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link DP-20: Wash Intersection Inflow=2.14 cfs 0.200 af
Primary=2.14 cfs 0.200 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.212 af Average Runoff Depth = 0.59"
65.54% Pervious = 2.804 ac 34.46% Impervious = 1.474 ac

Summary for Subcatchment SC-20A: Subcatchment-20A

Runoff = 1.43 cfs @ 12.18 hrs, Volume= 0.135 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
905	98	Paved parking, HSG A
6,466	98	Paved parking, HSG D
3,080	98	Roofs, HSG A
11,557	98	Roofs, HSG D
208	30	Meadow, non-grazed, HSG A
5,487	78	Meadow, non-grazed, HSG D
27,703	94	Weighted Average
5,695		20.56% Pervious Area
22,008		79.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.6200	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.8	48	0.0208	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	16	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	52	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.3	133	Total			

Summary for Subcatchment SC-20B: Subcatchment-20B

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
1,646	98	Paved parking, HSG D
12,835	98	Roofs, HSG A
3,168	32	Woods/grass comb., Good, HSG A
1,704	78	Meadow, non-grazed, HSG D
19,353	85	Weighted Average
4,872		25.17% Pervious Area
14,481		74.83% Impervious Area

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

Summary for Subcatchment SC=10A: Subcatchment-10A

Runoff = 0.02 cfs @ 15.60 hrs, Volume= 0.012 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.20"

	Area (sf)	CN	Description
	17,782	98	Paved parking, HSG A
	1,104	98	Paved parking, HSG D
	8,851	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	102,626	32	Woods/grass comb., Good, HSG A
	6,996	30	Meadow, non-grazed, HSG A
	139,324	45	Weighted Average
	111,587		80.09% Pervious Area
	27,737		19.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Pond 1P: SC-740 Chambers

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.04" for 2 Year event
Inflow = 0.02 cfs @ 15.60 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 15.69 hrs, Volume= 0.012 af, Atten= 0%, Lag= 5.9 min
Discarded = 0.02 cfs @ 15.69 hrs, Volume= 0.012 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 102.87' @ 15.69 hrs Surf.Area= 641 sf Storage= 6 cf

Plug-Flow detention time= 5.8 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 5.8 min (1,127.2 - 1,121.4)

Volume	Invert	Avail.Storage	Storage Description
#1	102.85'	663 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 2,404 cf Overall - 746 cf Embedded = 1,657 cf x 40.0% Voids
#2	103.35'	746 cf	**StormTech SC-740** x 16 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 Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		1,409 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.85	641	0	0
106.60	641	2,404	2,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.85'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	106.70'	**12.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.35' / 106.70' S= -0.2350 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 15.69 hrs HW=102.87' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.85' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond DMH-2: DMH - Outlet Control

[57] Hint: Peaked at 106.60' (Flood elevation advised)

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 106.60' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.60'	**12.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.60' / 106.10' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.60' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Link DP-10: School St. CB

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-20: Wash Intersection

Inflow Area = 1.080 ac, 77.54% Impervious, Inflow Depth = 2.22" for 2 Year event
Inflow = 2.14 cfs @ 12.14 hrs, Volume= 0.200 af
Primary = 2.14 cfs @ 12.14 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 SC-20A: Subcatchment-20A Runoff Area=27,703 sf 79.44% Impervious Runoff Depth=4.21"
Flow Length=133' Tc=13.3 min CN=94 Runoff=2.30 cfs 0.223 af

Subcatchment SC-20B: Subcatchment-20B Runoff Area=19,353 sf 74.83% Impervious Runoff Depth=3.28"
Tc=6.0 min CN=85 Runoff=1.65 cfs 0.121 af

Subcatchment SC=10A: Runoff Area=139,324 sf 19.91% Impervious Runoff Depth=0.41"
Flow Length=597' Tc=21.5 min CN=45 Runoff=0.47 cfs 0.109 af

Pond 1P: SC-740 Chambers Peak Elev=106.95' Storage=1,409 cf Inflow=0.47 cfs 0.109 af
Discarded=0.04 cfs 0.068 af Primary=0.26 cfs 0.080 af Outflow=0.30 cfs 0.148 af

Pond DMH-2: DMH - Outlet Control Peak Elev=106.85' Inflow=0.26 cfs 0.080 af
12.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=0.26 cfs 0.080 af

Link DP-10: School St. CB Inflow=0.26 cfs 0.080 af
Primary=0.26 cfs 0.080 af

Link DP-20: Wash Intersection Inflow=3.62 cfs 0.344 af
Primary=3.62 cfs 0.344 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.454 af Average Runoff Depth = 1.27"
65.54% Pervious = 2.804 ac 34.46% Impervious = 1.474 ac

Summary for Subcatchment SC-20A: Subcatchment-20A

Runoff = 2.30 cfs @ 12.18 hrs, Volume= 0.223 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
905	98	Paved parking, HSG A
6,466	98	Paved parking, HSG D
3,080	98	Roofs, HSG A
11,557	98	Roofs, HSG D
208	30	Meadow, non-grazed, HSG A
5,487	78	Meadow, non-grazed, HSG D
27,703	94	Weighted Average
5,695		20.56% Pervious Area
22,008		79.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.6200	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.8	48	0.0208	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	16	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	52	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.3	133	Total			

Summary for Subcatchment SC-20B: Subcatchment-20B

Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.121 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

Area (sf)	CN	Description
1,646	98	Paved parking, HSG D
12,835	98	Roofs, HSG A
3,168	32	Woods/grass comb., Good, HSG A
1,704	78	Meadow, non-grazed, HSG D
19,353	85	Weighted Average
4,872		25.17% Pervious Area
14,481		74.83% Impervious Area

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

Summary for Subcatchment SC=10A: Subcatchment-10A

Runoff = 0.47 cfs @ 12.55 hrs, Volume= 0.109 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.90"

	Area (sf)	CN	Description
	17,782	98	Paved parking, HSG A
	1,104	98	Paved parking, HSG D
	8,851	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	102,626	32	Woods/grass comb., Good, HSG A
	6,996	30	Meadow, non-grazed, HSG A
	139,324	45	Weighted Average
	111,587		80.09% Pervious Area
	27,737		19.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Pond 1P: SC-740 Chambers

[93] Warning: Storage range exceeded by 0.35'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.41" for 10 Year event
Inflow = 0.47 cfs @ 12.55 hrs, Volume= 0.109 af
Outflow = 0.30 cfs @ 13.80 hrs, Volume= 0.148 af, Atten= 37%, Lag= 74.9 min
Discarded = 0.04 cfs @ 12.25 hrs, Volume= 0.068 af
Primary = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 106.95' @ 13.80 hrs Surf.Area= 641 sf Storage= 1,409 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 233.8 min (1,198.4 - 964.7)

Volume	Invert	Avail.Storage	Storage Description
#1	102.85'	663 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,404 cf Overall - 746 cf Embedded = 1,657 cf x 40.0% Voids
#2	103.35'	746 cf	**StormTech SC-740** x 16 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 Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		1,409 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.85	641	0	0
106.60	641	2,404	2,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.85'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	106.70'	**12.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.35' / 106.70' S= -0.2350 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 12.25 hrs HW=102.94' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.26 cfs @ 13.80 hrs HW=106.95' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.26 cfs @ 1.70 fps)

Summary for Pond DMH-2: DMH - Outlet Control

[57] Hint: Peaked at 106.85' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 2 by 0.15'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.30" for 10 Year event
Inflow = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af
Outflow = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 106.85' @ 13.80 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.60'	**12.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.60' / 106.10' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.26 cfs @ 13.80 hrs HW=106.85' (Free Discharge)
1=Culvert (Inlet Controls 0.26 cfs @ 1.70 fps)

Summary for Link DP-10: School St. CB

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.30" for 10 Year event
Inflow = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af
Primary = 0.26 cfs @ 13.80 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-20: Wash Intersection

Inflow Area = 1.080 ac, 77.54% Impervious, Inflow Depth = 3.83" for 10 Year event
Inflow = 3.62 cfs @ 12.13 hrs, Volume= 0.344 af
Primary = 3.62 cfs @ 12.13 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 SC-20A: Subcatchment-20A Runoff Area=27,703 sf 79.44% Impervious Runoff Depth=5.40"
Flow Length=133' Tc=13.3 min CN=94 Runoff=2.91 cfs 0.286 af

Subcatchment SC-20B: Subcatchment-20B Runoff Area=19,353 sf 74.83% Impervious Runoff Depth=4.40"
Tc=6.0 min CN=85 Runoff=2.20 cfs 0.163 af

Subcatchment SC=10A: Runoff Area=139,324 sf 19.91% Impervious Runoff Depth=0.84"
Flow Length=597' Tc=21.5 min CN=45 Runoff=1.36 cfs 0.224 af

Pond 1P: SC-740 Chambers Peak Elev=107.04' Storage=1,409 cf Inflow=1.36 cfs 0.224 af
Discarded=0.04 cfs 0.069 af Primary=0.37 cfs 0.003 af Outflow=0.41 cfs 0.072 af

Pond DMH-2: DMH - Outlet Control Peak Elev=106.92' Inflow=0.37 cfs 0.003 af
12.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=0.37 cfs 0.003 af

Link DP-10: School St. CB Inflow=0.37 cfs 0.003 af
Primary=0.37 cfs 0.003 af

Link DP-20: Wash Intersection Inflow=4.71 cfs 0.449 af
Primary=4.71 cfs 0.449 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.673 af Average Runoff Depth = 1.89"
65.54% Pervious = 2.804 ac 34.46% Impervious = 1.474 ac

Summary for Subcatchment SC-20A: Subcatchment-20A

Runoff = 2.91 cfs @ 12.18 hrs, Volume= 0.286 af, Depth= 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

Area (sf)	CN	Description
905	98	Paved parking, HSG A
6,466	98	Paved parking, HSG D
3,080	98	Roofs, HSG A
11,557	98	Roofs, HSG D
208	30	Meadow, non-grazed, HSG A
5,487	78	Meadow, non-grazed, HSG D
27,703	94	Weighted Average
5,695		20.56% Pervious Area
22,008		79.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.6200	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.8	48	0.0208	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	16	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	52	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.3	133	Total			

Summary for Subcatchment SC-20B: Subcatchment-20B

Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.163 af, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

Area (sf)	CN	Description
1,646	98	Paved parking, HSG D
12,835	98	Roofs, HSG A
3,168	32	Woods/grass comb., Good, HSG A
1,704	78	Meadow, non-grazed, HSG D
19,353	85	Weighted Average
4,872		25.17% Pervious Area
14,481		74.83% Impervious Area

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

Summary for Subcatchment SC=10A: Subcatchment-10A

Runoff = 1.36 cfs @ 12.43 hrs, Volume= 0.224 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.10"

	Area (sf)	CN	Description
	17,782	98	Paved parking, HSG A
	1,104	98	Paved parking, HSG D
	8,851	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	102,626	32	Woods/grass comb., Good, HSG A
	6,996	30	Meadow, non-grazed, HSG A
	139,324	45	Weighted Average
	111,587		80.09% Pervious Area
	27,737		19.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Pond 1P: SC-740 Chambers

[93] Warning: Storage range exceeded by 0.44'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.84" for 25 Year event
Inflow = 1.36 cfs @ 12.43 hrs, Volume= 0.224 af
Outflow = 0.41 cfs @ 12.57 hrs, Volume= 0.072 af, Atten= 70%, Lag= 8.2 min
Discarded = 0.04 cfs @ 12.10 hrs, Volume= 0.069 af
Primary = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 107.04' @ 12.57 hrs Surf.Area= 641 sf Storage= 1,409 cf

Plug-Flow detention time= 637.8 min calculated for 0.072 af (32% of inflow)
Center-of-Mass det. time= 461.9 min (1,391.4 - 929.5)

Volume	Invert	Avail.Storage	Storage Description
#1	102.85'	663 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,404 cf Overall - 746 cf Embedded = 1,657 cf x 40.0% Voids
#2	103.35'	746 cf	**StormTech SC-740** x 16 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 Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		1,409 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.85	641	0	0
106.60	641	2,404	2,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.85'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	106.70'	**12.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.35' / 106.70' S= -0.2350 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 12.10 hrs HW=102.93' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.32 cfs @ 12.57 hrs HW=106.98' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.32 cfs @ 1.80 fps)

Summary for Pond DMH-2: DMH - Outlet Control

[57] Hint: Peaked at 106.92' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 2 by 0.19'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.01" for 25 Year event
Inflow = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af
Outflow = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 106.92' @ 12.57 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.60'	**12.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.60' / 106.10' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.32 cfs @ 12.57 hrs HW=106.88' (Free Discharge)
1=Culvert (Inlet Controls 0.32 cfs @ 1.80 fps)

Summary for Link DP-10: School St. CB

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.01" for 25 Year event
Inflow = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af
Primary = 0.37 cfs @ 12.57 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-20: Wash Intersection

Inflow Area = 1.080 ac, 77.54% Impervious, Inflow Depth = 4.98" for 25 Year event
Inflow = 4.71 cfs @ 12.12 hrs, Volume= 0.449 af
Primary = 4.71 cfs @ 12.12 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 SC-20A: Subcatchment-20A Runoff Area=27,703 sf 79.44% Impervious Runoff Depth=6.59"
Flow Length=133' Tc=13.3 min CN=94 Runoff=3.52 cfs 0.349 af

Subcatchment SC-20B: Subcatchment-20B Runoff Area=19,353 sf 74.83% Impervious Runoff Depth=5.54"
Tc=6.0 min CN=85 Runoff=2.74 cfs 0.205 af

Subcatchment SC=10A: Runoff Area=139,324 sf 19.91% Impervious Runoff Depth=1.38"
Flow Length=597' Tc=21.5 min CN=45 Runoff=2.66 cfs 0.368 af

Pond 1P: SC-740 Chambers Peak Elev=107.19' Storage=1,409 cf Inflow=2.66 cfs 0.368 af
Discarded=0.04 cfs 0.070 af Primary=1.01 cfs 0.017 af Outflow=1.04 cfs 0.087 af

Pond DMH-2: DMH - Outlet Control Peak Elev=107.15' Inflow=1.01 cfs 0.017 af
12.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.01 cfs 0.017 af

Link DP-10: School St. CB Inflow=1.01 cfs 0.017 af
Primary=1.01 cfs 0.017 af

Link DP-20: Wash Intersection Inflow=5.77 cfs 0.554 af
Primary=5.77 cfs 0.554 af

Total Runoff Area = 4.279 ac Runoff Volume = 0.922 af Average Runoff Depth = 2.59"
65.54% Pervious = 2.804 ac 34.46% Impervious = 1.474 ac

Summary for Subcatchment SC-20A: Subcatchment-20A

Runoff = 3.52 cfs @ 12.18 hrs, Volume= 0.349 af, Depth= 6.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

Area (sf)	CN	Description
905	98	Paved parking, HSG A
6,466	98	Paved parking, HSG D
3,080	98	Roofs, HSG A
11,557	98	Roofs, HSG D
208	30	Meadow, non-grazed, HSG A
5,487	78	Meadow, non-grazed, HSG D
27,703	94	Weighted Average
5,695		20.56% Pervious Area
22,008		79.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.6200	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.8	48	0.0208	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	16	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	52	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.3	133	Total			

Summary for Subcatchment SC-20B: Subcatchment-20B

Runoff = 2.74 cfs @ 12.09 hrs, Volume= 0.205 af, Depth= 5.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

Area (sf)	CN	Description
1,646	98	Paved parking, HSG D
12,835	98	Roofs, HSG A
3,168	32	Woods/grass comb., Good, HSG A
1,704	78	Meadow, non-grazed, HSG D
19,353	85	Weighted Average
4,872		25.17% Pervious Area
14,481		74.83% Impervious Area

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

Summary for Subcatchment SC=10A: Subcatchment-10A

Runoff = 2.66 cfs @ 12.37 hrs, Volume= 0.368 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=7.30"

	Area (sf)	CN	Description
	17,782	98	Paved parking, HSG A
	1,104	98	Paved parking, HSG D
	8,851	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	102,626	32	Woods/grass comb., Good, HSG A
	6,996	30	Meadow, non-grazed, HSG A
	139,324	45	Weighted Average
	111,587		80.09% Pervious Area
	27,737		19.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Pond 1P: SC-740 Chambers

[93] Warning: Storage range exceeded by 0.59'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 1.38" for 50 Year event
Inflow = 2.66 cfs @ 12.37 hrs, Volume= 0.368 af
Outflow = 1.04 cfs @ 12.37 hrs, Volume= 0.087 af, Atten= 61%, Lag= 0.2 min
Discarded = 0.04 cfs @ 11.95 hrs, Volume= 0.070 af
Primary = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 107.19' @ 12.35 hrs Surf.Area= 641 sf Storage= 1,409 cf

Plug-Flow detention time= 546.0 min calculated for 0.087 af (24% of inflow)
Center-of-Mass det. time= 377.9 min (1,287.1 - 909.2)

Volume	Invert	Avail.Storage	Storage Description
#1	102.85'	663 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,404 cf Overall - 746 cf Embedded = 1,657 cf x 40.0% Voids
#2	103.35'	746 cf	**StormTech SC-740** x 16 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 Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		1,409 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.85	641	0	0
106.60	641	2,404	2,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.85'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	106.70'	**12.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.35' / 106.70' S= -0.2350 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 11.95 hrs HW=102.90' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.89 cfs @ 12.37 hrs HW=107.18' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.89 cfs @ 2.37 fps)

Summary for Pond DMH-2: DMH - Outlet Control

[57] Hint: Peaked at 107.15' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 2 by 0.39'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.06" for 50 Year event
Inflow = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af
Outflow = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
Primary = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 107.15' @ 12.37 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.60'	**12.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.60' / 106.10' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.89 cfs @ 12.37 hrs HW=107.08' (Free Discharge)
1=Culvert (Inlet Controls 0.89 cfs @ 2.37 fps)

Summary for Link DP-10: School St. CB

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.06" for 50 Year event
Inflow = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af
Primary = 1.01 cfs @ 12.37 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link DP-20: Wash Intersection

Inflow Area = 1.080 ac, 77.54% Impervious, Inflow Depth = 6.16" for 50 Year event
Inflow = 5.77 cfs @ 12.12 hrs, Volume= 0.554 af
Primary = 5.77 cfs @ 12.12 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 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 SC-20A: Subcatchment-20A Runoff Area=27,703 sf 79.44% Impervious Runoff Depth=7.78"
Flow Length=133' Tc=13.3 min CN=94 Runoff=4.12 cfs 0.412 af

Subcatchment SC-20B: Subcatchment-20B Runoff Area=19,353 sf 74.83% Impervious Runoff Depth=6.70"
Tc=6.0 min CN=85 Runoff=3.27 cfs 0.248 af

Subcatchment SC=10A: Runoff Area=139,324 sf 19.91% Impervious Runoff Depth=2.01"
Flow Length=597' Tc=21.5 min CN=45 Runoff=4.23 cfs 0.535 af

Pond 1P: SC-740 Chambers Peak Elev=107.37' Storage=1,409 cf Inflow=4.23 cfs 0.535 af
Discarded=0.04 cfs 0.070 af Primary=1.56 cfs 0.039 af Outflow=1.60 cfs 0.109 af

Pond DMH-2: DMH - Outlet Control Peak Elev=107.27' Inflow=1.56 cfs 0.039 af
12.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.56 cfs 0.039 af

Link DP-10: School St. CB Inflow=1.56 cfs 0.039 af
Primary=1.56 cfs 0.039 af

Link DP-20: Wash Intersection Inflow=6.82 cfs 0.660 af
Primary=6.82 cfs 0.660 af

Total Runoff Area = 4.279 ac Runoff Volume = 1.195 af Average Runoff Depth = 3.35"
65.54% Pervious = 2.804 ac 34.46% Impervious = 1.474 ac

Summary for Subcatchment SC-20A: Subcatchment-20A

Runoff = 4.12 cfs @ 12.18 hrs, Volume= 0.412 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
905	98	Paved parking, HSG A
6,466	98	Paved parking, HSG D
3,080	98	Roofs, HSG A
11,557	98	Roofs, HSG D
208	30	Meadow, non-grazed, HSG A
5,487	78	Meadow, non-grazed, HSG D
27,703	94	Weighted Average
5,695		20.56% Pervious Area
22,008		79.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.6200	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.8	48	0.0208	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	16	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	52	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
13.3	133	Total			

Summary for Subcatchment SC-20B: Subcatchment-20B

Runoff = 3.27 cfs @ 12.09 hrs, Volume= 0.248 af, Depth= 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
1,646	98	Paved parking, HSG D
12,835	98	Roofs, HSG A
3,168	32	Woods/grass comb., Good, HSG A
1,704	78	Meadow, non-grazed, HSG D
19,353	85	Weighted Average
4,872		25.17% Pervious Area
14,481		74.83% Impervious Area

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

Summary for Subcatchment SC=10A: Subcatchment-10A

Runoff = 4.23 cfs @ 12.35 hrs, Volume= 0.535 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.50"

	Area (sf)	CN	Description
	17,782	98	Paved parking, HSG A
	1,104	98	Paved parking, HSG D
	8,851	98	Roofs, HSG A
*	1,965	43	Wetlands- Drained., Fair, HSG A
	102,626	32	Woods/grass comb., Good, HSG A
	6,996	30	Meadow, non-grazed, HSG A
	139,324	45	Weighted Average
	111,587		80.09% Pervious Area
	27,737		19.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0550	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.5	140	0.0179	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	48	0.0417	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	40	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	231	0.0087	0.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	58	0.0129	5.39	2.94	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.011
21.5	597	Total			

Summary for Pond 1P: SC-740 Chambers

[93] Warning: Storage range exceeded by 0.77'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 2.01" for 100 Year event
Inflow = 4.23 cfs @ 12.35 hrs, Volume= 0.535 af
Outflow = 1.60 cfs @ 12.35 hrs, Volume= 0.109 af, Atten= 62%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.80 hrs, Volume= 0.070 af
Primary = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 107.37' @ 12.35 hrs Surf.Area= 641 sf Storage= 1,409 cf

Plug-Flow detention time= 441.6 min calculated for 0.109 af (20% of inflow)
Center-of-Mass det. time= 280.6 min (1,176.3 - 895.7)

Volume	Invert	Avail.Storage	Storage Description
#1	102.85'	663 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,404 cf Overall - 746 cf Embedded = 1,657 cf x 40.0% Voids
#2	103.35'	746 cf	**StormTech SC-740** x 16 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 Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		1,409 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.85	641	0	0
106.60	641	2,404	2,404

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.85'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	106.70'	**12.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 104.35' / 106.70' S= -0.2350 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 11.80 hrs HW=102.92' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.56 cfs @ 12.35 hrs HW=107.37' (Free Discharge)
↑**2=Culvert** (Inlet Controls 1.56 cfs @ 2.79 fps)

Summary for Pond DMH-2: DMH - Outlet Control

[57] Hint: Peaked at 107.27' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 2 by 0.57'

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.15" for 100 Year event
Inflow = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af
Outflow = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 107.27' @ 12.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.60'	**12.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 106.60' / 106.10' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.56 cfs @ 12.35 hrs HW=107.27' (Free Discharge)
1=Culvert (Inlet Controls 1.56 cfs @ 2.79 fps)

Summary for Link DP-10: School St. CB

Inflow Area = 3.198 ac, 19.91% Impervious, Inflow Depth = 0.15" for 100 Year event
Inflow = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af
Primary = 1.56 cfs @ 12.35 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

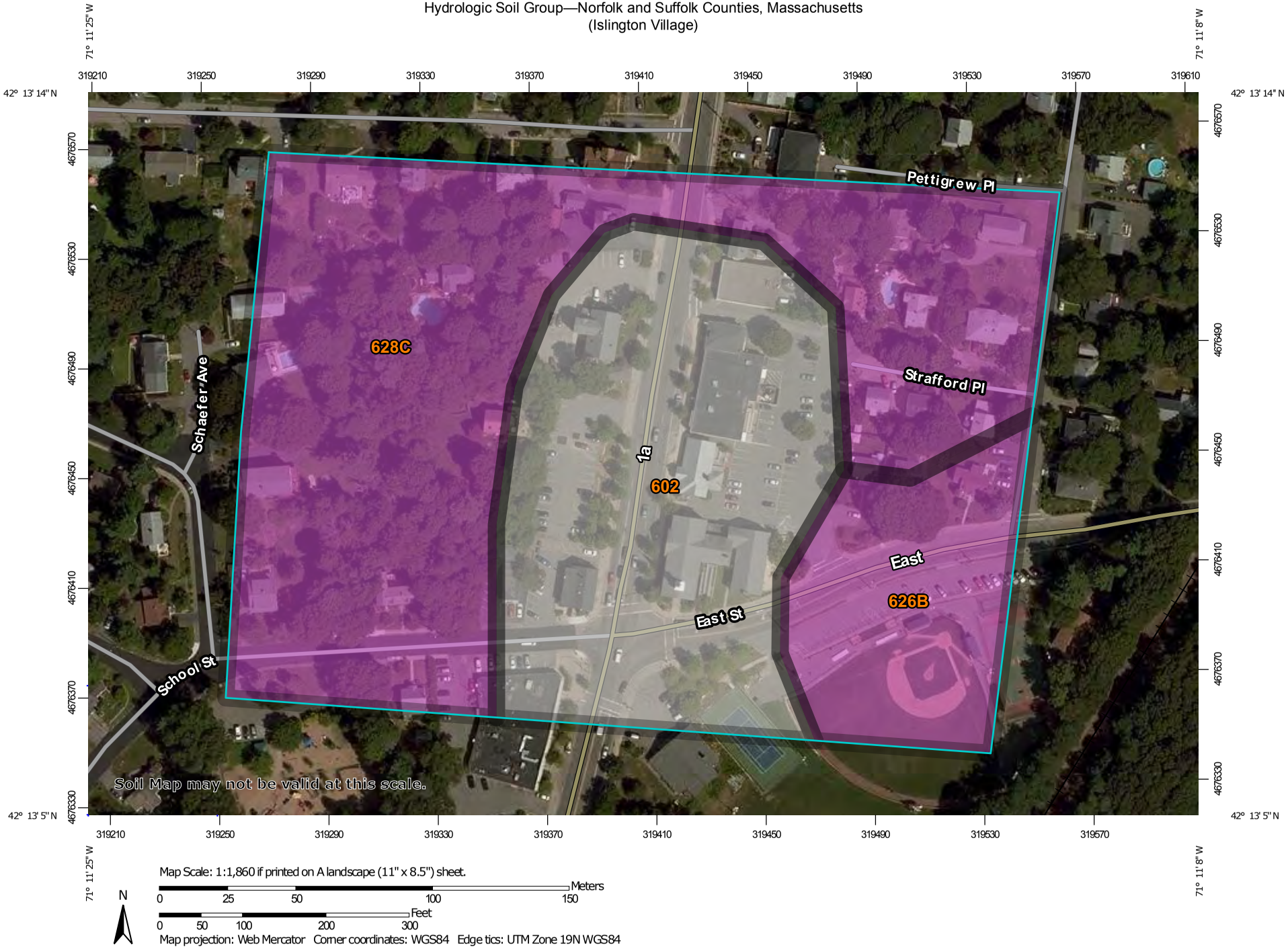
Summary for Link DP-20: Wash Intersection

Inflow Area = 1.080 ac, 77.54% Impervious, Inflow Depth = 7.33" for 100 Year event
Inflow = 6.82 cfs @ 12.12 hrs, Volume= 0.660 af
Primary = 6.82 cfs @ 12.12 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

APPENDIX C
Soil Map & Classifications

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts
(Islington Village)



Map Scale: 1:1,860 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Aug 10, 2014—Aug 25, 2014

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Norfolk and Suffolk Counties, Massachusetts (MA616)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
602	Urban land, 0 to 15 percent slopes		4.9	33.8%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	2.0	13.9%
628C	Canton-Urban land complex, 3 to 15 percent slopes	A	7.5	52.3%
Totals for Area of Interest			**14.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D
Stormwater Standards

Islington VIllage
Westwod, MA
1753

STANDARD #8

CONSTRUCTION PERIOD POLLUTION PREVENTION AND SEDIMENTATION EROSION CONTROL PLAN

ISLINGTON VILLAGE
WESTWOOD, MASSACHUSETTS

I. INTRODUCTION

The maintenance program below provides for a general construction plan with specific requirements for the **Islington Village** project and stormwater management controls. The program is based on the recommended standards presented in the DEP Stormwater Management Policy Handbook dated March 1997 and Guidelines for Stormwater Management and Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, by Thomas R. Schueler, July 1987.

II. RESPONSIBILITY AND IMPLEMENTATION

The implementation and execution of this maintenance program shall be the responsibility of the construction period contractor.

Construction activities shall conform to the approved project construction plans referenced below and any other regulations or requirements of the Town of Westwood. Staw filter tubes and silt fence shall be installed prior to construction. All sediment controls shall be in place before construction shall begin and shall be properly maintained throughout the course of construction. During construction, silt laden runoff shall not be permitted.

All BMPs and sediment controls shall be inspected, by the contractor, on a weekly basis and within 24 hours of a rain event that generates more than ½" of rain in a 24 hour period.

Should any dewatering activities be required, the contractor shall make certain that the all pumped water is free of sediment prior to discharging. The methods for removing any sediment shall be approved by the Town prior to any dewatering activities commence.

III. MAINTENANCE AND INSPECTION SCHEDULE

Maintenance of Stormwater BMP's

The following temporary and permanent erosion and sediment control BMP's are to be implemented in the stormwater management system and shall be monitored and maintained to assure continuous and effective performance. All inspections shall be conducted in accordance with the required schedule indicated below. Maintenance and repair shall be performed as required or if the effectiveness of the BMP is diminished.

A. Catch Basins with Deep Sumps

Each catch basin shall be protected with silt sacks and stone, as shown on the details contained in the project plan set referenced below. All accumulated sediment, debris, etc., should be removed as necessary. All sediment and debris removed from the silt sacks or catch basins

shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Catch basins with deep sumps should also be inspected on a monthly basis. Any required maintenance or repairs noted during the inspection should be addressed immediately.

B. Straw Filter Tubes & Silt Fence

Straw tubes shall be installed per project plan set referenced below and should be inspected regularly, as well as after each rainfall event, to ensure that they are intact and the area behind the tube is not filled with sediment. If there is excessive ponding behind the straw tube or accumulated sediments reach the top of the sock, an additional sock should be added on top or in front of the existing filter sock in these areas, without disturbing the soil or accumulated sediment. If the straw tube was overtopped during a storm event, the operator should consider installing an additional straw tube on top of the original, placing an additional straw tube further up the slope, or using an additional BMP, such as a compost blanket in conjunction with the tube(s).

Maintenance requires the removal of sediment before it has accumulated to one-half of the above ground height of any perimeter control

C. Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary seeding (perform weekly if establishment is less than 80%)
b. Temporary mulching
c. Permanent seeding (perform weekly if establishment is less than 80%)
d. Placement of sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

D. Preserve Natural Vegetation and Buffer Zones

Inspect limit of disturbance boundary for encroachment and Injury/exposure of tree roots. Inspections shall be conducted daily.

E. Dust Control

Apply/re-apply dust control measures to minimize dust from the site. Dust control activities shall be performed daily during dry weather

Inspection Requirements

All temporary and permanent erosion and sediment controls shall be inspected by qualified personnel. Inspection Technician shall assess the conditions of the site, the effectiveness of any erosion and sediment controls and provide recommendations and directions to ensure

effective control of stormwater runoff, and suitable water quality discharge from construction activity.

Inspections shall include the entire area within the limit of disturbance of construction activity and stockpile/staging areas. A report shall be prepared identifying all areas of erosion, sediment accumulation, the condition and of all BMP's (structural and non-structural) and identify those in need of repair.

Maintenance

The site contractor is responsible for the installation and maintenance of all construction period erosion and sedimentation controls and BMP's. Prior to acceptance and approval of the completed stormwater management system, the entire system shall be inspected and cleaned in order to ensure the system will function as designed.

If it is observed through the course of construction that modifications to the system are necessary to provide proper treatment the work shall be performed prior to the next storm event.

IV. REFERENCES

- Plan Set: Islington Village Site Plans, Washington, East and School Streets, Westwood, Massachusetts, prepared by GCG Associates, Inc. and dated December 12, 2017.

STANDARD #9

STORMWATER AND DRAINAGE OPERATION AND MAINTENANCE PLAN

ISLINGTON VILLAGE
WESTWOOD, MASSACHUSETTS

I. INTRODUCTION

The maintenance program below provides for a general construction plan with specific requirements for the **Islington Village** project and stormwater management controls. The program is based on the recommended standards presented in the DEP Stormwater Management Policy Handbook dated March 1997 and Guidelines for Stormwater Management and Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, by Thomas R. Schueler, July 1987.

II. RESPONSIBILITY AND IMPLEMENTATION

Owner/Operator: Supreme Development
c/o Giorgio Petruzziello
21 Eastbrook Road
Dedham, MA 02026

The property owner is the owner of all components of the drainage system as listed in Section III below, until property ownership is transferred, at which the drainage system becomes the property of the successive owner. The implementation, execution, and financing of this maintenance program and emergency repairs shall be the responsibility of the property owner until property ownership is transferred, at which time maintenance and repairs shall be the responsibility of the successive owner.

III. MAINTENANCE AND INSPECTION SCHEDULE

A. Catch Basin With Deep Sump System and Drainage Manhole

Catch basins with deep sumps and drainage manholes should be inspected four (4) times per year and after every major storm event. All accumulated sediment, debris, organic matter, etc., should be removed during this time. All sediment and debris removed from the catch basins should be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Any required maintenance or repairs noted during the inspection should be addressed immediately. During each inspection, the drains should be inspected for evidence of clogging, and if necessary, any maintenance shall be performed so that it functions as designed. The catch basin shall be cleaned twice per year, and when sediment in the bottom of the sump reaches 24 inches below the bottom of the outlet pipe. At a minimum, inspection of the catch basin shall be performed during the last week of April and the first week of October each year.

B. Isolator Row on Infiltration Bed

The isolator row should be inspected after every major storm event during the first three months following construction. The system shall be inspected to determine that it is draining fully within

72 hours following a storm event. If it is not, remedial action will be required. The system shall then be inspected yearly to ensure that the facilities are operating as intended. All accumulated sediment, debris, organic matter, etc., should be removed during this time. All sediment removed should be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Inspections conducted at intervals during and after storms will help determine if the facility is meeting the expected infiltration rates. The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. Infiltrator rows shall adhere to the following maintenance schedule:

- Inspect Isolator Row — Annually
- Jet/Vacuum — Annually

C. Infiltration Chamber Systems (Chambers/Drywells)

The roadway runoff infiltration systems should be inspected after every major storm event during the first three months following construction. The system shall be inspected to determine that it is draining fully within 72 hours following a storm event. If it is not, remedial action will be required. The system shall then be inspected yearly to ensure that the facilities are operating as intended. All accumulated sediment, debris, organic matter, etc., should be removed during this time. All sediment removed should be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Inspections conducted at intervals during and after storms will help determine if the facility is meeting the expected infiltration rates. Recharge Systems shall adhere to the following maintenance schedule:

- Remove accumulated debris — Annually
- Inspect infiltration beds — Annually
- Jet/Vacuum — as required

D. Water Quality Structure (Stormceptor)

The performance of all stormwater quality measures decrease as they fill with sediment. Although the maintenance frequency will be site specific, SSR Hydro Conduit generally recommends annual maintenance be performed when the sediment volume in the unit reaches 15% of the total storage. Oil is removed through the inspection/ cleanout pipe and sediment is removed through the outlet riser pipe. Alternatively, oil could be removed from the outlet riser pipe if water is removed from the treatment chamber, lowering the oil level below the drop pipes. In the event of any hazardous material spill, CSR Hydro Conduit recommends maintenance be performed immediately. Maintenance should be performed by a licensed liquid waste hauler. Recharge Systems shall adhere to the following maintenance schedule:

- Vacuum truck stormceptor cleaning — Annually

Maintenance shall be performed by the Vacuum Service Industry, a well-established sector of the service industry that cleans underground tanks, sewers, and catch basins. Costs to clean a stormceptor will vary based on the size of the unit and transportation distances.

The requirements for the disposal of material from a Stormceptor are similar to that of any other Best Management Practices (BMP's). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as a hazardous waste. In some areas, mixing the water with the sediment will create a slurry that can be discharged into a trunk sanitary sewer. In all disposal options, approval from the disposal facility agency is required. Petroleum waste products collected I stormceptor (oil/ chemical/ fuel spills) should be removed by a licensed waste management company.

E. Rip-Rap

It is recommended that dumped rip-rap be inspected monthly and cleaned two times per year. Excessive sediment and debris should be removed as necessary and should typically be done after the street has been swept of sediment accumulated debris from winter sanding operations. Barren areas or eroded areas in should be repaired immediately. All sediment removed should be handled properly and disposed of in accordance with local, state, and federal guidelines and regulations.

F. Grassed Slope

Grassed slope area adjacent to the roadway (where possible) should be mowed weekly between the months of May to September and a minimum of once per year in March or early April. Regular maintenance tasks include mowing, fertilizing, watering, pruning, weeding, and pest control. Maintain an average grass height of 4-6 inches to maintain the depth necessary to serve as a conveyance. Re-seed periodically to maintain the dense growth of grass vegetation.

G. Street Sweeping

Driveway, associated parking areas, and sidewalks adjacent to the roadway (where possible) should be swept by a street sweeper a minimum of once per year in March or early April. Street sweeping four times per year is recommended. Vacuum street sweepers are recommended.

IV. REFERENCES

- Plan Set: Islington Village Site Plans, Washington, East and School Streets, Westwood, Massachusetts, prepared by GCG Associates, Inc. and dated December 12, 2017.

STANDARD #10

STORMWATER AND DRAINAGE
ILLICIT DISCHARGE STATEMENT

ISLINGTON VILLAGE
WESTWOOD, MASSACHUSETTS

All illicit discharges to the stormwater management system are prohibited.

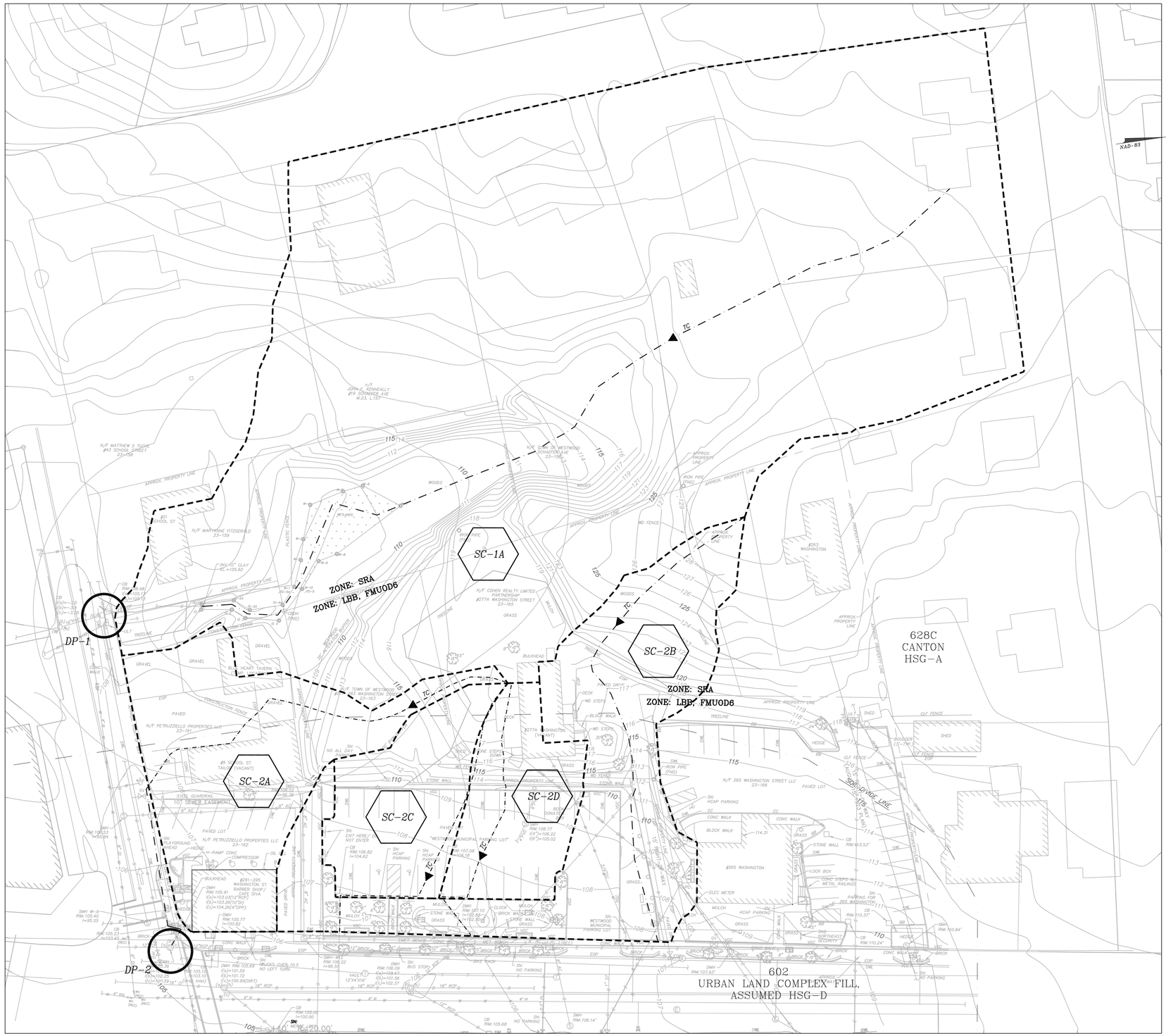
I. STATEMENT

This site as shown on the plan titled "Islington Village Site Plans, Washington, East and School Streets, Westwood, Massachusetts, prepared by GCG Associates, Inc. and dated December 12, 2017" does not contain any illicit discharges, this was confirmed using visual screening as required by standard 10 of the "Massachusetts Stormwater Handbook" Vol. 1, Ch. 1 page 25. The project proponent, owner, or lessee (in perpetuity) must comply with local, state, and federal regulations for the discharge of illicit discharges from the site. Illicit discharges are discharges that are not entirely comprised of storm water. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities:

- Fire fighting
- Water line flushing
- Landscape irrigation
- Uncontaminated ground water
- Potable water sources
- Foundation drains
- Air conditioning condensation
- Footing drains
- Individual car washing
- Water used for street washing and water used to clean residential buildings without detergents

The project proponent, owner, or lessee (in perpetuity) shall adhere to this report on file with the Town of Westwood.

FIGURES



LEGEND:

- SC-1A — SUBCATCHMENT
- DP-1 — DESIGN POINT
- TC — TIME OF CONCENTRATION OVERLAND FLOW LINE
- EDGE OF SUBCATCHMENT
- SOIL DIVIDE LINE
- 723B — NRCS SOIL CLASSIFICATION

NOTES:

1. HOUSE AND DRIVEWAYS SHOWN ON ABUTTING PROPERTIES ARE FOR SCHEMATIC PURPOSES.
2. CONTOUR ELEVATION LINES SHOWN OUTSIDE OF PROJECT LOCUS ARE OBTAINED FROM WESTWOOD GIS.

PRE DRAINAGE PLAN
SCHOOL STREET SIDE

ISLINGTON VILLAGE
WESTWOOD, MA
NORFOLK COUNTY

GCG ASSOCIATES, INC.
WILMINGTON MASSACHUSETTS

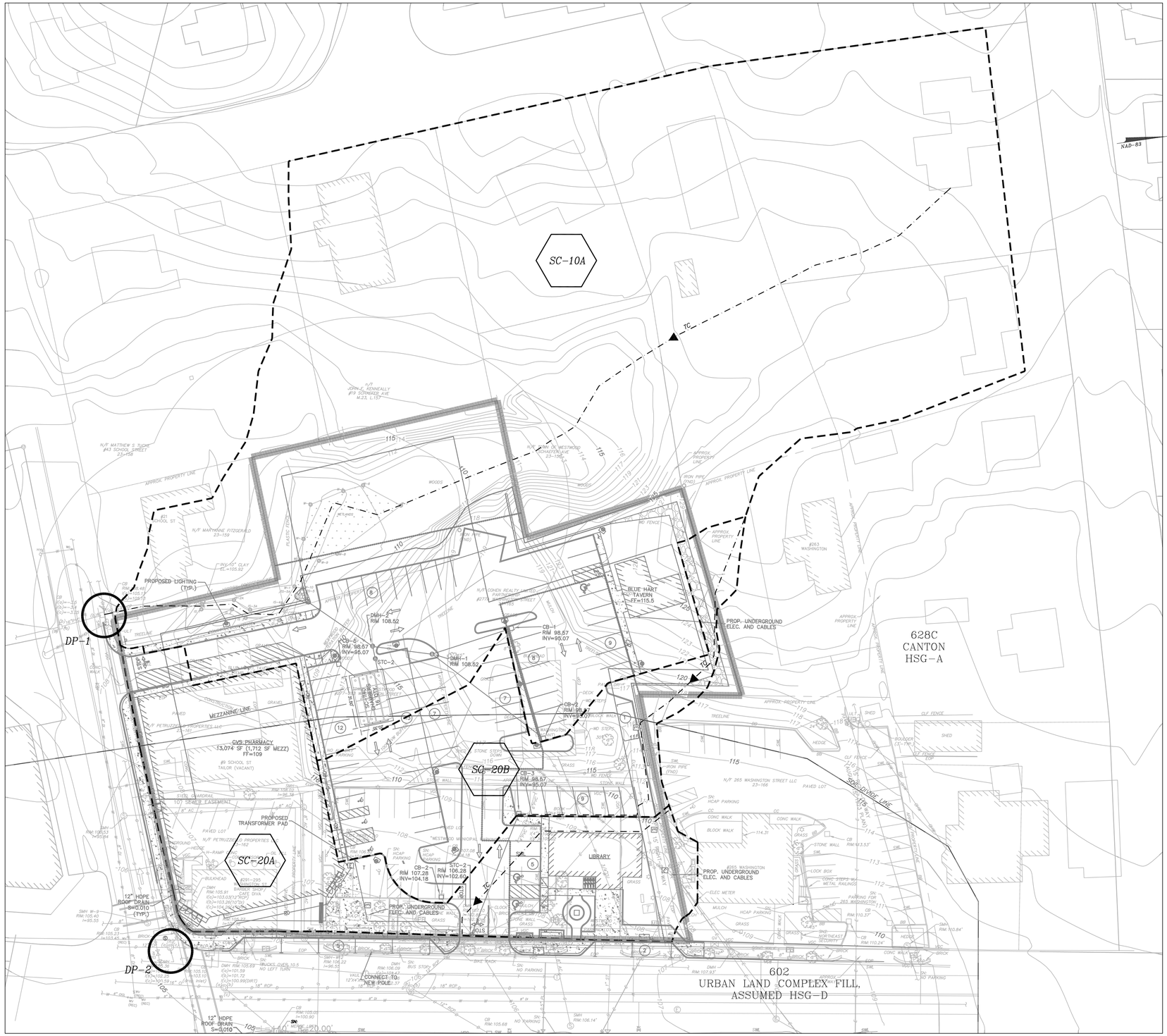
COMMONWEALTH OF MASSACHUSETTS
MICHAEL J. CARTER
CIVIL
No. 35907
REGISTERED PROFESSIONAL ENGINEER
12/12/17

SCALE: 1"=30' DATE: DECEMBER 12, 2017

JOB NO.\FILE NAME: 1753-STORMWATER-PRE

DESIGNED BY: S.B.H.
DRAWN BY: S.B.H.
CHECKED BY: M.J.C.

PLAN NO. 1 OF 2



LEGEND:

- SC-1A — *SUBCATCHMENT*
- DP-1 — *DESIGN POINT*
- TC — *TIME OF CONCENTRATION OVERLAND FLOW LINE*
- *EDGE OF SUBCATCHMENT*
- *SOIL DIVIDE LINE*
- 723B — *NRCS SOIL CLASSIFICATION*

NOTES:

1. HOUSE AND DRIVEWAYS SHOWN ON ABUTTING PROPERTIES ARE FOR SCHEMATIC PURPOSES.
2. CONTOUR ELEVATION LINES SHOWN OUTSIDE OF PROJECT LOCUS ARE OBTAINED FROM WESTWOOD GIS.

POST DRAINAGE PLAN
SCHOOL STREET SIDE

ISLINGTON VILLAGE
WESTWOOD, MA
NORFOLK COUNTY

COMMONWEALTH OF MASSACHUSETTS
MICHAEL J. CARTER
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GCG ASSOCIATES, INC.
WILMINGTON MASSACHUSETTS

SCALE: 1"=30' DATE: DECEMBER 12, 2017

JOB NO.\FILE NAME: 1753-STORMWATER-POST

DESIGNED BY: S.B.H.
DRAWN BY: S.B.H.
CHECKED BY: M.J.C.

PLAN NO. 2 OF 2