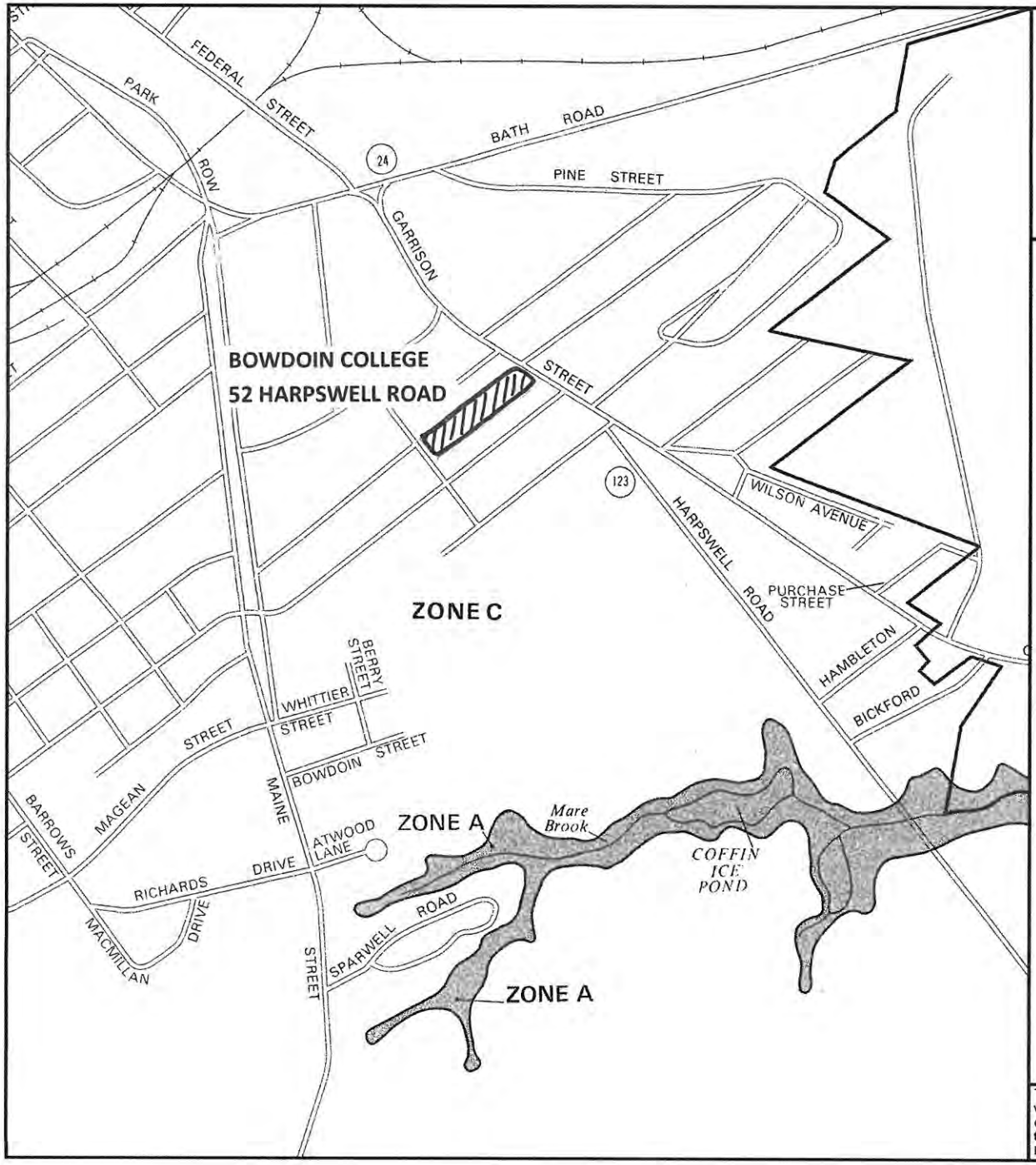


APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
BRUNSWICK, MAINE
CUMBERLAND COUNTY

PANEL 15 OF 35
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230042 0015 B

EFFECTIVE DATE:
JANUARY 3, 1986

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

SOILS

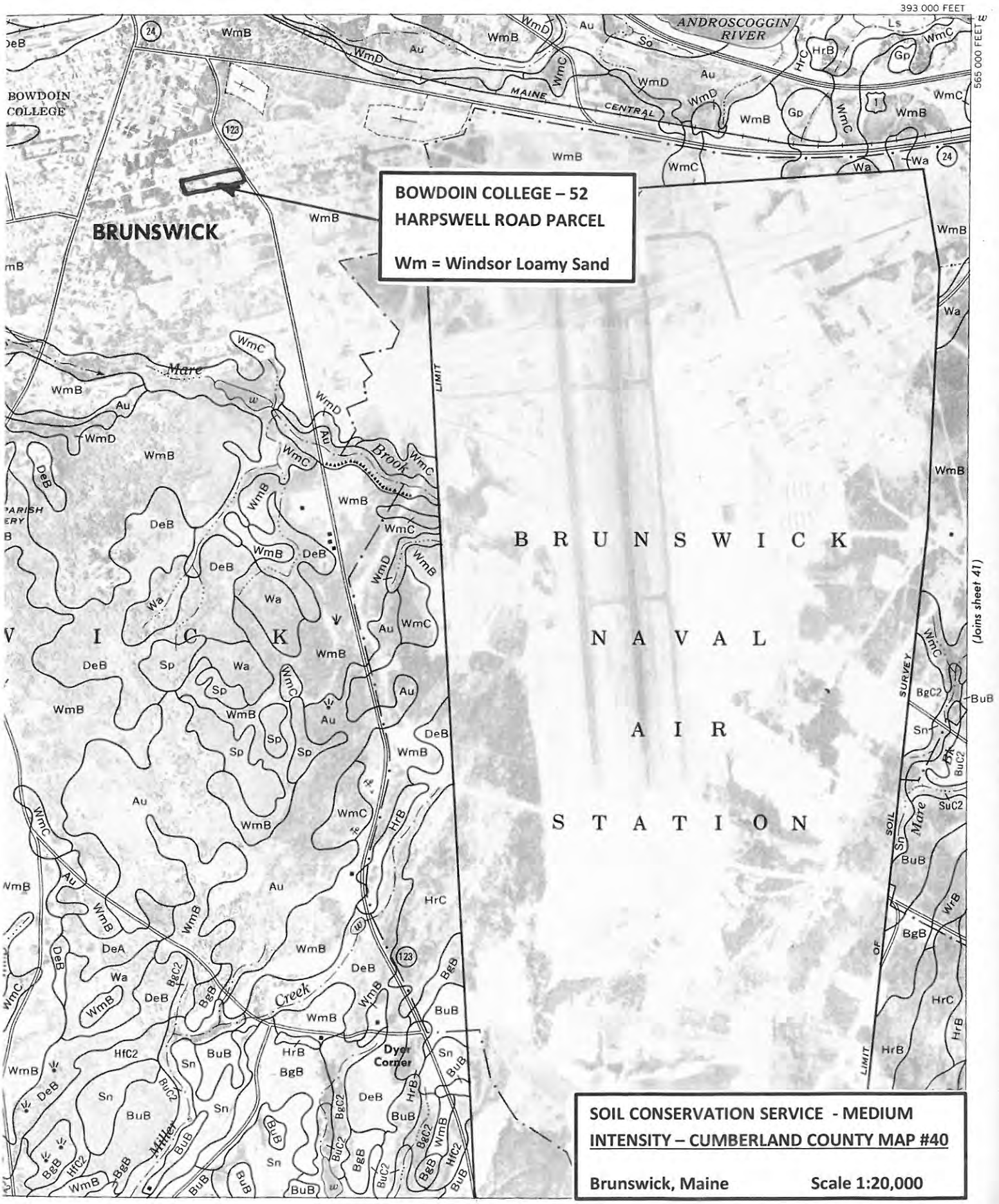

393 000 FEET
565 000 FEET
ANDROSCOGGIN RIVER
BOWDOIN COLLEGE
MAINE CENTRAL
BRUNSWICK
BOWDOIN COLLEGE – 52
HARPSWELL ROAD PARCEL
Wm = Windsor Loamy Sand
Mare Brook
LIMIT
B R U N S W I C K
N A V A L
A I R
S T A T I O N
(Joins sheet 41)
SURVEY
SOIL
Mare Bk
Creek
Dyer Corner
Miller
SOIL CONSERVATION SERVICE - MEDIUM
INTENSITY – CUMBERLAND COUNTY MAP #40
Brunswick, Maine
Scale 1:20,000

TABLE 7.—*Interpretations*

Soils series and map symbols	Suitability as a source of—[1]			Soil features affecting—	
	Topsoil	Sand and gravel	Road fill	Highway and road location	Farm ponds: Reservoir area
Whately: Wg	Poor: organic surface layer.	Poor: excess fines.	Poor: high in clays; high water table may be limiting.	High water table; highly susceptible to frost heave; low shear strength in clay substratum.	Very slow permeability in substratum; high water table.
Whitman: Wh	Poor: coarse fragments.	Poor: excess fines.	Fair to good: high in fines; stony soil material; high water table may be limiting.	High water table; stony soil material; susceptible to frost heaving of stones on cuts and in road subgrades.	Slow permeability in substratum; high water table; stony soil material.
Windsor: WmB, WmC, WmD.	Fair: sandy	Poor to good for sand: poor for gravel.	Good: binder needed.	Cut slopes are unstable; hazard of erosion; cut slopes are difficult to vegetate because of droughtiness.	Rapid permeability; deep water table.
Woodbridge: WrB, WrC, WsB, WsC.	Poor: coarse fragments.	Poor: excess fines.	Fair to good: high in fines; stony soil material; seasonal water table.	Seepage in cut slopes; stony soil material; seasonal water table; frost heaving of stones on cut slopes and in road cuts.	Moderately slow permeability in substratum stony soil material; seasonal water table.

[1] Does not indicate quality of deposit.

Town and Country Planning

Cumberland County is primarily a rural area although it includes within its boundaries Portland, which is Maine's largest and most rapidly growing city. The population of the county is growing, and in recent years there has been an increase in residential and commercial use of the area. Its strategic location and excellent harbor facilities indicate that its population is likely to increase rapidly in the future.

Table 8 is a guide for evaluating areas for specified use. The limitations are rated as slight, moderate, severe, or very severe according to the degree to which the soil is limited in its specific nonfarm uses. A rating of *slight* indicates that the soil has few or no limitations and is considered desirable for the use named. A rating of *moderate* shows that a hazard exists, but that it can be overcome or corrected. A rating of *severe* indicates that use of the soil is seriously limited by a hazard or restriction that is difficult to overcome. A rating of *very severe* indicates one or more limitations of such magnitude that use of the soil for the indicated purpose would require major outlays of time, money, and labor.

Any given soil property does not restrict all types of urban or recreational uses equally. For example, slow permeability and impeded drainage that are moderate limi tions for many uses can severely limit the use of a soil the disposal of sewage effluent from septic tanks.

The following are properties that limit the soils of county in their suitability for each use specified in tabl These limitations are not listed in order of importa The interpretations in table 8 are not a substitute onsite investigations.

Filter fields for sewage disposal: Permeability of soil, depth to a seasonal high water table, natural dr age, depth to an impervious layer or bedrock, stonin slope, hazard of flooding, and hazard of water-table c tamination.

Sewage lagoons: Soil permeability, depth to an pervious layer or bedrock, stoniness, slope, hazard flooding, hazard of water-table contamination, organic-matter content.

Sanitary land fill (trench method): Depth to w table, natural drainage, depth to hard layer or bedr soil permeability, hazard of flooding, slope, stability surface and substratum, stickiness, shrink-swell poten and erodibility.

Earth-covered fallout shelters: Refers to shelters of which are below ground level and a minimum of 3 of earth covering the entire shelter. Shelters need t

gineering properties—Continued

Farm ponds—Con. Embankment	Drainage	Sprinkler irrigation	Terraces and diversions	Grassed waterways	Pipeline (construction and maintenance)
Hazard of erosion; fair to poor stability; poor to good compaction.	High water table; outlets may be difficult to locate; very slow permeability in substratum.	High water table; excess moisture generally is available.[2]	On lowest part of landscape; nearly level.[2]	On lowest part of landscape; nearly level.[2]	High water table; low shear strength in substratum.
Stony soil material; fair to poor stability; poor to good compaction.	High water table; outlets may be difficult to locate; slow permeability in substratum.	High water table; excess moisture generally is available.[2]	On lowest part of landscape; nearly level.[2]	On lowest part of landscape; nearly level.[2]	High water table; firm substratum; stony soil material.
Pervious; susceptible to piping; hazard of erosion; fair to poor stability; fair to good compaction.	Excessively drained.[2]	Low available water capacity.	Hazard of erosion; difficult to vegetate; rapid permeability.	Hazard of erosion; difficult to vegetate; rapid permeability.	Unstable trench walls.
Fair to good stability; poor to good compaction; stony soil material.	Moderately slow to slow permeability in substratum; seepage spots; seasonal water table.	Moderate available water capacity; moderate intake rate.	Seepage spots; stony soil material.	Seepage spots; stony soil material.	Firm, stable substratum; stony soil material; seasonal water table.

[2] Practice not applicable or not needed.

y or have a minimum soil drainage problem. Soil and e factors are: drainage class, depth to bedrock, hazard flooding, slope, stoniness and rockiness, and permeabil-.

Residences on public sewage systems: Depth to bedck, slope, erodibility, drainage, stoniness or rockiness, ıter table, flooding, frost susceptibility, and shear ength.

Pipe and sewer lines: Depth to bedrock, depth to ter table, slope, stoniness and rockiness, texture and ısistence of substratum (as these soil properties effect ıbility of trench walls), and shear strength.

Cemetery: Depth to bedrock, depth to water table, ainage, presence of fragipan or claypan, texture, stoniss or rockiness, slope, and flooding.

Developed tent, picnic, or trailer sites: Slope, drain- or general wetness, stoniness or rockiness, depth to drock, soil texture, flooding, erodibility, plasticity or ckiness, and moisture holding capacity.

Camp or cottage sites: Refers to the development of es for small buildings such as hunting, fishing, or recreonal camps designed primarily for seasonal or intertent use. This part-time use places less pressure upon ıd areas in regard to acceptance of septic effluent, abil- to maintain vegetation, and foundation requirements as compared to urban sites used year-round. This less frequent use permits a wider range of interpretation regarding site requirements. The soil and site factors important to this use are: drainage or general wetness, stoniness or rockiness, depth to bedrock, depth to water table, flooding, soil texture, slope, and depth to fragipan or claypan.

Playing fields, shooting ranges: Refers to the development of sites used for play areas, such as ball fields, playgrounds, archery or gunnery ranges. Play areas, such as football or baseball fields, that are used intensively by high schools or similar institutions are not considered for these interpretations. The soil factors that influence the suitability of a site for this use are: slope, drainage or general wetness, texture of the surface, stoniness and rockiness, depth to bedrock, depth to water table, flooding, moisture holding capacity, erodibility, rapidity of runoff, stickiness, plasticity, and permeability.

Golf fairways—landscaping: Refers to the development of golf fairways only. Greens are special areas formed and molded from selected soil material and are not subject to the common soil limitations. The soil factors involved are: slope, stoniness or rockiness, texture, wetness (general), flooding, droughtiness, and erodibility.

TABLE 8.—*Limitations for specified uses*

Soil	Sewage disposal systems		Sanitary land fills	Earth-covered fallout shelters	Residences on public sewage systems
	Filter fields	Sewage lagoons			
Suffield silt loam, 15 to 25 percent slopes, eroded.	Very severe: slow to very slow permeability in substratum; slope; seepage.	Very severe: slope.	Very severe: slope; erodibility; rapid runoff; hazard of surface water pollution.	Slight.	Severe: low shear strength; slope.
Suffield silt loam, 25 to 45 percent slopes, eroded.	Very severe: slow to very slow permeability in substratum; slope; seepage.	Very severe: slope.	Very severe: slope; erodibility; rapid runoff.	Slight.	Severe: low shear strength; slope.
Swanton fine sandy loam.	Very severe: high water table; slow to very slow permeability in substratum.	Slight.	Very severe: high water table; excess surface water.	Very severe: high water table; poor drainage outlets; differential settling in places.	Very severe: high water table; differential settling in places; frost action.
Tidal marsh. Not suitable for town and country use.					
Walpole fine sandy loam.	Very severe: high water table; rapid permeability; hazard of ground water pollution.	Very severe: rapid permeability; coarse textured throughout.	Very severe: high water table; rapid permeability.	Very severe: high water table; frost action; excessive wetness.	Very severe: high water table; frost action; excessive wetness.
Whately fine sandy loam.	Very severe: high water table; slow to very slow permeability in substratum.	Moderate: 1½ to 3 feet to clay substratum; high amount of organic material on surface.	Very severe: high water table; seepage; excess surface water; hazard of surface stream pollution.	Very severe: high water table; excessive wetness; frost action.	Very severe: high water table; excess surface water; frost action; low shear strength.
Whitman fine sandy loam.	Very severe: high water table; moderately slow to slow permeability; hazard of surface water pollution.	Slight.	Very severe: excess surface water most of year; hazard of surface water pollution.	Very severe: high water table; excessive wetness; frost action.	Very severe: high water table; excess surface water; slow surface runoff.
Windsor loamy sand, 0 to 8 percent slopes.	Moderate: rapid permeability; hazard of ground water pollution.	Very severe: pervious substratum; compacts poorly; piping; unstable.	Very severe: rapid permeability; hazard of ground water pollution.	Slight.	Slight.
Windsor loamy sand, 8 to 15 percent slopes.	Moderate: rapid permeability; hazard of ground water pollution.	Very severe: pervious substratum; slope.	Very severe: rapid permeability; hazard of ground water pollution; slope.	Slight.	Slight.

related to town and country planning—Continued

Pipelines and sewer lines (construction and maintenance)	Cemeteries	Developed sites for tents, trailers, and picnics	Sites for camps and cottages	Playing fields and shooting ranges	Golf fairways and landscaping
Severe: low shear strength; sticky and plastic when wet; slope.	Very severe: sticky and plastic when wet; seepage in cuts; slope.	Very severe: slow to very slow permeability; sticky and plastic when wet; slope.	Very severe: slope; erodibility.	Very severe: sticky and plastic when wet; slope.	Very severe: slope: sticky and plastic when wet; dries slowly.
Severe: low shear strength; sticky and plastic when wet; slope.	Very severe: sticky and plastic when wet; seepage in cuts; slope.	Very severe: slow to very slow permeability; sticky and plastic when wet; slope.	Very severe: slope; erodibility.	Very severe: sticky and plastic when wet; slope.	Very severe: slope; erodibility; sticky and plastic when wet.
Very severe: high water table; cuts are unstable; differential settling in places.	Very severe: high water table; excess surface water; substratum sticky and plastic when wet.	Very severe: high water table; excess surface water; slow surface runoff; frost action.	Very severe: high water table; excess surface water; frost action.	Very severe: excess surface water; slow surface runoff; dries slowly.	Very severe: excess surface water; slow surface runoff; dries slowly; difficult to maintain desirable sod.
Severe: high water table; cut faces will slough.	Very severe: high water table; excessive wetness most of year.	Very severe: high water table; excessive wetness most of year.	Very severe: high water table; excessive wetness most of year.	Very severe: excessive wetness most of year.	Very severe: excessive wetness most of year.
Very severe: high water table; low shear strength in substratum.	Very severe: high water table; excess surface water; ponding in excavation.	Very severe: high water table; slow to very slow permeability; excess surface water.	Very severe: high water table; slow to very slow permeability; excess surface water.	Very severe: excess surface water; slow surface runoff.	Very severe: excess surface water; slow surface runoff
Very severe: high water table; excess surface water.	Very severe: high water table; excessive wetness; compact substratum; ponding in excavation.	Very severe: high water table; excess surface water; frost action.	Very severe: high water table; excess surface water; frost action.	Very severe: excess surface water; slow surface runoff.	Very severe: excess surface water; slow surface runoff.
Severe: unstable substratum; trench walls may slough.	Moderate: droughty; loose sandy surface.	Moderate: droughty; rapid permeability; ground water pollution from septic sewage effluent.	Moderate: droughty; rapid permeability; ground water pollution from septic sewage effluent.	Severe: droughty; difficult to maintain desirable sod; subject to wind blow.	Severe: droughty; difficult to maintain desirable sod; subject to wind blow.
Severe: unstable substratum; trench walls may slough.	Moderate: droughty; loose sandy surface.	Severe: droughty; rapid permeability; ground water pollution from septic sewage effluent; slope.	Severe: droughty; rapid permeability; ground water pollution from septic sewage effluent; slope.	Very severe: droughty; difficult to maintain desirable sod; slope; subject to wind blow.	Severe: droughty; difficult to maintain desirable sod; subject to wind blow.

WATER, SEWER, FIRE DEPARTMENT LETTERS

Brunswick Sewer District
10 PINE TREE ROAD
BRUNSWICK, MAINE 04011
TELEPHONE (207) 729-0148 bsd@brunswicksewer.org FAX (207) 729-0149

January 17, 2014

John C. Simoneau
Capital Projects Manager
Bowdoin College
3800 College Station
Brunswick, ME 04011

Re: Stevens Home Renovation
52 Harpswell Road, Brunswick, Maine

Subj: Willingness and Capacity to Serve

Dear John,

This letter is in response to your request for an "ability to serve" letter regarding renovationof the former Stevens Home at 52 Harpswell Road in Brunswick, Maine. I have reviewed the material provided and conclude that the project as proposed will not adversely affect facilities of the District. **The Brunswick Sewer District (BSD) has both the willingness and capacity to serve the proposed project.**

It will be necessary for the project to secure an entrance permit. The project will be subject to the BSD entrance charge program. The permit will be issued upon receipt of payment for the entrance charge. Based on our phone conversations I expect the occupancy of the building to nearly double, as will estimated flows. As soon as you know the anticipated increase in flow, let me know so I can calculate the entrance charge. Please note that either party can petition for a recalculation of the entrance charge within three years of the permit date if the anticipated flow varies by more than 10% from the actual flow recorded. For more information on the entrance charge please visit www.brunswicksewer.org/ecp.html#4.

In addition to the entrance charge, the following conditions will apply to the issuance of the entrance permit.

1. Project sanitary sewer service line will be privately owned and maintained in accordance with provisions of District Rules & Regulations.

2. All sewer-related construction will be performed to District standards.

3. All sanitary sewer construction will comply with provisions of the Maine State Plumbing Code.

4. Design and construction of project sanitary sewers will exclude all non-sanitary ground, surface, foundation drain, floor drain, and roof drain waters. Sump pump discharges are not allowed.

5. Horizontal clearance between utility infrastructures will be sufficient to allow future utility maintenance operations without disturbance to adjacent utility infrastructure.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Robert A. Pontau Jr., PE
Assistant General Manager

CC: Darcy Dutton, Customer Service Specialist, Brunswick Sewer District
Wesley Wharff, Collections Supervisor, Brunswick Sewer District
Leonard Blanchette, General Manager, Brunswick Sewer District

Bowdoin College

January 16, 2014

Robert Pontau Jr.
Brunswick Sewer District
10 Pine Tree Road
Brunswick ME 04011

Re: Bowdoin College- 52 Harpswell Road

Dear Mr. Pontau:

Bowdoin College is preparing a site plan application for the renovation of the former Stevens Home at 52 Harpswell Road in Brunswick.

The college intends to continue the use of the existing sewer service for the building. The renovation will create a dormitory with a maximum capacity of 36 beds. I have attached the plans for your reference.

Could you please provide a letter indicating that the District has the ability to service the referenced project.

Please contact me at 725-3979 should you have any questions regarding this project.

Thank you.

Sincerely,

John C. Simoneau
Capital Projects Manager

cc: Don Borkowski
J. Simoneau
File

Office of Facilities Management

3800 College Station • Brunswick • Maine 04011-8429 • Tel 207.725.3445 • Fax 207.725.3449

Bowdoin College

January 16, 2014

Craig Douglas, District Engineer
Brunswick & Topsham Water District
PO Box 489
Topsham ME 04086

Re: Bowdoin College- 52 Harpswell Road

Dear Mr. Douglas:

Bowdoin College is preparing a site plan application for the renovation of the former Stevens Home at 52 Harpswell Road in Brunswick.

The college intends to continue the use of the existing domestic water and fire services feeding the building. The renovation will create a dormitory with a maximum capacity of 36 beds. I have attached the plans for your reference.

Could you please provide a letter indicating that the District has the ability to service the referenced project.

Please contact me at 725-3979 should you have any questions regarding this project.

Thank you.

Sincerely,

John C. Simoneau
Capital Projects Manager

cc: Don Borkowski
J. Simoneau
File

Office of Facilities Management

3800 College Station • Brunswick • Maine 04011-8429 • Tel 207.725.3445 • Fax 207.725.3449

Bowdoin College

January 16, 2014

Chief Kenneth Brillant
Brunswick Fire Department
21 Town Hall Place
Brunswick ME 04011

Re: Bowdoin College- 52 Harpswell Road

Dear Mr. Brilliant:

Bowdoin College is preparing a site plan application for the renovation of the former Stevens Home at 52 Harpswell Road.

The renovation will convert the former assisted living facility to a dormitory with a maximum capacity of 36 beds. I have attached the plans for your reference. The building has an existing dry type sprinkler system install around 2000. Harriman Architects-Engineers has reviewed the system and found it to have adequate coverage and to be serviceable. The project will include minor revisions to this system as needed due to room layout changes. The project includes replacing the fire alarm with a new addressable fire alarm system. The building footprint will remain the same and the only changes to the site will be the elimination of one of the driveway road cuts.

Could you please review the attached plan and provide a statement indicating if the existing hydrants will be sufficient, the driveway provides adequate access and if there are any other fire protection measures to be taken.

Please contact me at 725-3979 should you have any questions regarding this project.

Thank you.

Sincerely,

John C. Simoneau
Capital Projects Manager

cc: Don Borkowski
J. Simoneau
File

Office of Facilities Management

3800 College Station • Brunswick • Maine 04011-8429 • Tel 207.725.3445 • Fax 207.725.3449

STORM WATER

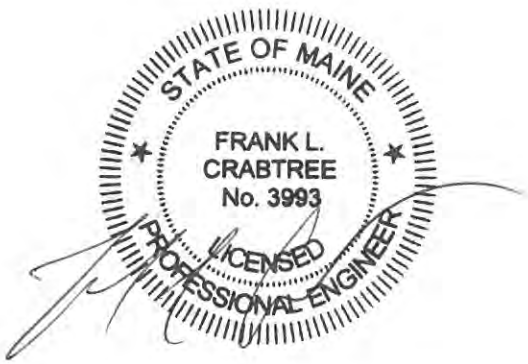
STORM WATER ASSESSMENT

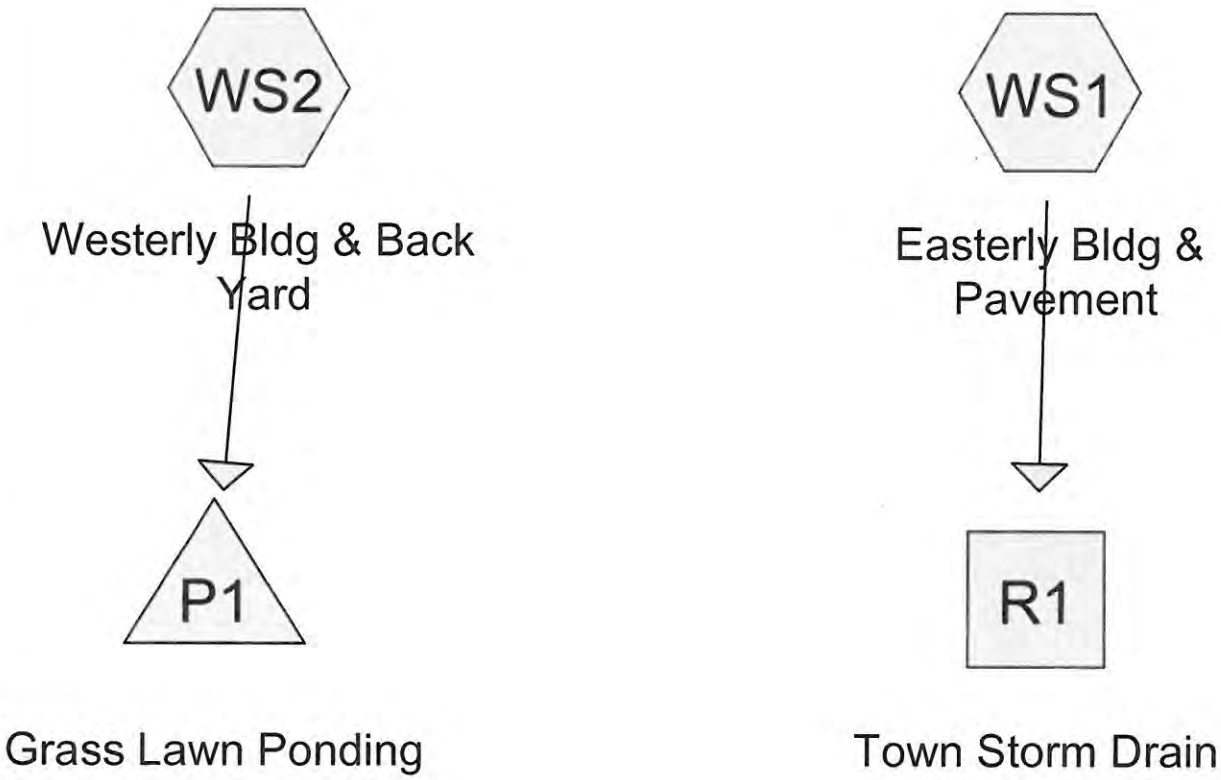
The former elderly housing facility is being renovated into student housing for the college. The existing building size is being maintained, with no addition. The existing drives and parking will remain mostly unaltered, except for removal of some small paved areas, and addition of a new backyard sidewalk to the campus. The net increase in site impervious area will be only 1400 sq. ft.

The long narrow developed 2.25-acre residential parcel currently has two distinct watershed areas. The easterly portion, designated WS1 near Harpswell Road, sheds runoff into two catch basins, one on the parcel and one in the street. The renovation project will result in a net decrease in impervious drives and walks of approximately 1500 sq.ft. in this watershed. The table below shows the Post-Development rate of runoff to the Town's storm drainage system at the catch basin, designated R1, as a slight decrease of 0.1 cubic feet per second(cfs).

The larger watershed WS2 to the west includes half of the building roof, paved parking, and large grasses lawn areas. The rainfall currently collects on the flat grassed depressions in the Windsor Loamy Sand soil, and infiltrates into the ground. The addition of 2900 sq.ft. of paved walk will not alter the storm runoff significantly, as shown by the table. The large shallow ponding areas of the back yard are designated P1, and show a depth of ponded water that increases only 0.18 ft. during one of the storms.

WATERSHED WS1 at R1			WATERSHED WS2 at P1		
	Pre-Developed	Post-Developed		Pre-Developed	Post-Developed
2-Year Storm	0.28 cfs	0.18 cfs		75.31 elev.	75.34 elev.
10-Year Storm	0.83 cfs	0.67 cfs		75.70 elev.	75.88 elev.
25-Year Storm	1.12 cfs	0.94 cfs		76.01 elev.	76.01 elev.





Subcat Reach Pond Link

Drainage Diagram for Bowdoin College 52 Harpswell-PRE
Prepared by HARRIMAN, Printed 1/20/2014
HydroCAD® 9.10 s/n 00770 © 2010 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment WS1: Easterly Bldg & Runoff Area=18,970 sf 54.09% Impervious Runoff Depth>0.60"
Flow Length=155' Tc=6.9 min CN=69 Runoff=0.28 cfs 0.022 af

Subcatchment WS2: Westerly Bldg & Back Runoff Area=79,040 sf 17.38% Impervious Runoff Depth>0.03"
Flow Length=175' Tc=26.5 min CN=47 Runoff=0.01 cfs 0.005 af

Reach R1: Town Storm Drain Inflow=0.28 cfs 0.022 af
Outflow=0.28 cfs 0.022 af

Pond P1: Grass Lawn Ponding Peak Elev=75.31' Storage=54 cf Inflow=0.01 cfs 0.005 af
Discarded=0.01 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.003 af

Summary for Subcatchment WS1: Easterly Bldg & Pavement

Runoff = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	3,520	98	Bldg roof
*	6,740	98	Pavements
	4,810	39	>75% Grass cover, Good, HSG A
	3,900	30	Woods, Good, HSG A
	18,970	69	Weighted Average
	8,710		45.91% Pervious Area
	10,260		54.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	30	0.0100	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
1.0	50	0.0080	0.80		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.00"
0.8	75	0.0150	1.64	0.04	**Pipe Channel, PVC Pipe** 6.0" Round w/ 5.0" fill Area= 0.0 sf Perim= 0.8' r= 0.03' n= 0.010
6.9	155	Total			

Summary for Subcatchment WS2: Westerly Bldg & Back Yard

Runoff = 0.01 cfs @ 15.55 hrs, Volume= 0.005 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	4,700	98	Bldgs
*	9,037	98	Pavement
	48,423	39	>75% Grass cover, Good, HSG A
	16,880	30	Woods, Good, HSG A
	79,040	47	Weighted Average
	65,303		82.62% Pervious Area
	13,737		17.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	30	0.0200	0.06		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
18.0	145	0.0100	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
26.5	175	Total			

Summary for Reach R1: Town Storm Drain

Inflow Area = 0.435 ac, 54.09% Impervious, Inflow Depth > 0.60" for 2 Year event
Inflow = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P1: Grass Lawn Ponding

Inflow Area = 1.815 ac, 17.38% Impervious, Inflow Depth > 0.03" for 2 Year event
Inflow = 0.01 cfs @ 15.55 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 17.87 hrs, Volume= 0.003 af, Atten= 21%, Lag= 138.9 min
Discarded = 0.01 cfs @ 17.87 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 75.31' @ 17.87 hrs Surf.Area= 737 sf Storage= 54 cf

Plug-Flow detention time= 87.3 min calculated for 0.003 af (75% of inflow)
Center-of-Mass det. time= 40.3 min (1,045.9 - 1,005.6)

Volume	Invert	Avail.Storage	Storage Description
#1	75.30'	9,960 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.30	600	0	0
76.00	10,000	3,710	3,710
76.50	15,000	6,250	9,960

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.30'	**0.01 cfs Exfiltration 2.4 "/Hr. at all elevations**
#2	Primary	76.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 17.87 hrs HW=75.31' (Free Discharge)
↑—**1=Exfiltration 2.4 "/Hr.** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.30' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment WS1: Easterly Bldg & Runoff Area=18,970 sf 54.09% Impervious Runoff Depth>1.60"
Flow Length=155' Tc=6.9 min CN=69 Runoff=0.83 cfs 0.058 af

Subcatchment WS2: Westerly Bldg & Back Runoff Area=79,040 sf 17.38% Impervious Runoff Depth>0.36"
Flow Length=175' Tc=26.5 min CN=47 Runoff=0.29 cfs 0.055 af

Reach R1: Town Storm Drain Inflow=0.83 cfs 0.058 af
Outflow=0.83 cfs 0.058 af

Pond P1: Grass Lawn Ponding Peak Elev=75.70' Storage=2,121 cf Inflow=0.29 cfs 0.055 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Summary for Subcatchment WS1: Easterly Bldg & Pavement

Runoff = 0.83 cfs @ 12.11 hrs, Volume= 0.058 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	3,520	98	Bldg roof
*	6,740	98	Pavements
	4,810	39	>75% Grass cover, Good, HSG A
	3,900	30	Woods, Good, HSG A
	18,970	69	Weighted Average
	8,710		45.91% Pervious Area
	10,260		54.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	30	0.0100	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
1.0	50	0.0080	0.80		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.00"
0.8	75	0.0150	1.64	0.04	**Pipe Channel, PVC Pipe** 6.0" Round w/ 5.0" fill Area= 0.0 sf Perim= 0.8' r= 0.03' n= 0.010
6.9	155	Total			

Summary for Subcatchment WS2: Westerly Bldg & Back Yard

Runoff = 0.29 cfs @ 12.60 hrs, Volume= 0.055 af, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	4,700	98	Bldgs
*	9,037	98	Pavement
	48,423	39	>75% Grass cover, Good, HSG A
	16,880	30	Woods, Good, HSG A
	79,040	47	Weighted Average
	65,303		82.62% Pervious Area
	13,737		17.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	30	0.0200	0.06		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
18.0	145	0.0100	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
26.5	175	Total			

Summary for Reach R1: Town Storm Drain

Inflow Area = 0.435 ac, 54.09% Impervious, Inflow Depth > 1.60" for 10 Year event
Inflow = 0.83 cfs @ 12.11 hrs, Volume= 0.058 af
Outflow = 0.83 cfs @ 12.11 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P1: Grass Lawn Ponding

Inflow Area = 1.815 ac, 17.38% Impervious, Inflow Depth > 0.36" for 10 Year event
Inflow = 0.29 cfs @ 12.60 hrs, Volume= 0.055 af
Outflow = 0.01 cfs @ 12.40 hrs, Volume= 0.006 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 12.40 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 75.70' @ 20.00 hrs Surf.Area= 5,974 sf Storage= 2,121 cf

Plug-Flow detention time= 222.0 min calculated for 0.006 af (12% of inflow)
Center-of-Mass det. time= 78.0 min (969.3 - 891.4)

Volume	Invert	Avail.Storage	Storage Description
#1	75.30'	9,960 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.30	600	0	0
76.00	10,000	3,710	3,710
76.50	15,000	6,250	9,960

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.30'	**0.01 cfs Exfiltration 2.4 "/Hr. at all elevations**
#2	Primary	76.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.40 hrs HW=75.32' (Free Discharge)
↑—**1=Exfiltration 2.4 "/Hr.** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.30' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment WS1: Easterly Bldg & Runoff Area=18,970 sf 54.09% Impervious Runoff Depth>2.15"
Flow Length=155' Tc=6.9 min CN=69 Runoff=1.12 cfs 0.078 af

Subcatchment WS2: Westerly Bldg & Back Runoff Area=79,040 sf 17.38% Impervious Runoff Depth>0.62"
Flow Length=175' Tc=26.5 min CN=47 Runoff=0.60 cfs 0.094 af

Reach R1: Town Storm Drain Inflow=1.12 cfs 0.078 af
Outflow=1.12 cfs 0.078 af

Pond P1: Grass Lawn Ponding Peak Elev=76.01' Storage=3,778 cf Inflow=0.60 cfs 0.094 af
Discarded=0.01 cfs 0.006 af Primary=0.03 cfs 0.001 af Outflow=0.04 cfs 0.007 af

Summary for Subcatchment WS1: Easterly Bldg & Pavement

Runoff = 1.12 cfs @ 12.11 hrs, Volume= 0.078 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	3,520	98	Bldg roof
*	6,740	98	Pavements
	4,810	39	>75% Grass cover, Good, HSG A
	3,900	30	Woods, Good, HSG A
	18,970	69	Weighted Average
	8,710		45.91% Pervious Area
	10,260		54.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	30	0.0100	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
1.0	50	0.0080	0.80		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.00"
0.8	75	0.0150	1.64	0.04	**Pipe Channel, PVC Pipe** 6.0" Round w/ 5.0" fill Area= 0.0 sf Perim= 0.8' r= 0.03' n= 0.010
6.9	155	Total			

Summary for Subcatchment WS2: Westerly Bldg & Back Yard

Runoff = 0.60 cfs @ 12.52 hrs, Volume= 0.094 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	4,700	98	Bldgs
*	9,037	98	Pavement
	48,423	39	>75% Grass cover, Good, HSG A
	16,880	30	Woods, Good, HSG A
	79,040	47	Weighted Average
	65,303		82.62% Pervious Area
	13,737		17.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	30	0.0200	0.06		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
18.0	145	0.0100	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
26.5	175	Total			

Summary for Reach R1: Town Storm Drain

Inflow Area = 0.435 ac, 54.09% Impervious, Inflow Depth > 2.15" for 25 Year event
Inflow = 1.12 cfs @ 12.11 hrs, Volume= 0.078 af
Outflow = 1.12 cfs @ 12.11 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P1: Grass Lawn Ponding

Inflow Area = 1.815 ac, 17.38% Impervious, Inflow Depth > 0.62" for 25 Year event
Inflow = 0.60 cfs @ 12.52 hrs, Volume= 0.094 af
Outflow = 0.04 cfs @ 20.00 hrs, Volume= 0.007 af, Atten= 94%, Lag= 448.8 min
Discarded = 0.01 cfs @ 12.25 hrs, Volume= 0.006 af
Primary = 0.03 cfs @ 20.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 76.01' @ 20.00 hrs Surf.Area= 10,055 sf Storage= 3,778 cf

Plug-Flow detention time= 254.9 min calculated for 0.007 af (8% of inflow)
Center-of-Mass det. time= 119.9 min (993.6 - 873.7)

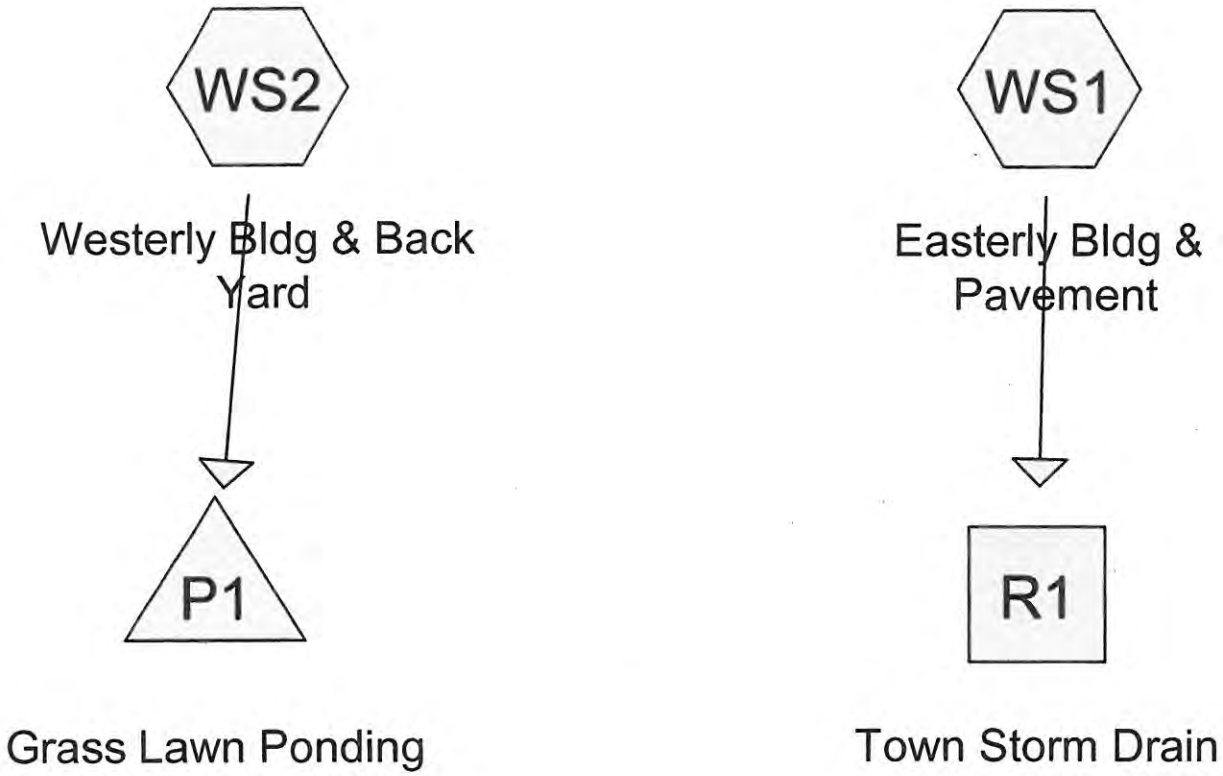
Volume	Invert	Avail.Storage	Storage Description
#1	75.30'	9,960 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.30	600	0	0
76.00	10,000	3,710	3,710
76.50	15,000	6,250	9,960

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.30'	**0.01 cfs Exfiltration 2.4 "/Hr. at all elevations**
#2	Primary	76.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=75.31' (Free Discharge)
↑—**1=Exfiltration 2.4 "/Hr.** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.02 cfs @ 20.00 hrs HW=76.01' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.20 fps)



Subcat Reach Pond Link

Drainage Diagram for Bowdoin College 52 Harpswell-POST
Prepared by HARRIMAN, Printed 1/20/2014
HydroCAD® 9.10 s/n 00770 © 2010 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment WS 1: Easterly Bldg & Runoff Area=18,970 sf 46.44% Impervious Runoff Depth>0.45"
Flow Length=155' Tc=6.9 min CN=65 Runoff=0.18 cfs 0.016 af

Subcatchment WS2: Westerly Bldg & Back Runoff Area=79,040 sf 21.90% Impervious Runoff Depth>0.07"
Flow Length=175' Tc=26.5 min CN=50 Runoff=0.02 cfs 0.010 af

Reach 1R: Town Storm Drain Inflow=0.18 cfs 0.016 af
Outflow=0.18 cfs 0.016 af

Pond 1P: Grass Lawn Ponding Peak Elev=75.34' Storage=204 cf Inflow=0.02 cfs 0.010 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Summary for Subcatchment WS 1: Easterly Bldg & Pavement

Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.016 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	3,520	98	Bldg roof
*	5,290	98	Pavements
	6,260	39	>75% Grass cover, Good, HSG A
	3,900	30	Woods, Good, HSG A
	18,970	65	Weighted Average
	10,160		53.56% Pervious Area
	8,810		46.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	30	0.0100	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
1.0	50	0.0080	0.80		**Sheet Flow, Paved** Smooth surfaces n= 0.011 P2= 3.00"
0.8	75	0.0150	1.64	0.04	**Pipe Channel, PVC Pipe** 6.0" Round w/ 5.0" fill Area= 0.0 sf Perim= 0.8' r= 0.03' n= 0.010
6.9	155	Total			

Summary for Subcatchment WS2: Westerly Bldg & Back Yard

Runoff = 0.02 cfs @ 14.09 hrs, Volume= 0.010 af, Depth> 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	4,700	98	Bldgs
*	12,607	98	Pavement
	44,853	39	>75% Grass cover, Good, HSG A
	16,880	30	Woods, Good, HSG A
	79,040	50	Weighted Average
	61,733		78.10% Pervious Area
	17,307		21.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	30	0.0200	0.06		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
18.0	145	0.0100	0.13		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.00"
26.5	175	Total			

Summary for Reach 1R: Town Storm Drain

Inflow Area = 0.435 ac, 46.44% Impervious, Inflow Depth > 0.45" for 2 Year event
Inflow = 0.18 cfs @ 12.13 hrs, Volume= 0.016 af
Outflow = 0.18 cfs @ 12.13 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: Grass Lawn Ponding

Inflow Area = 1.815 ac, 21.90% Impervious, Inflow Depth > 0.07" for 2 Year event
Inflow = 0.02 cfs @ 14.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 14.05 hrs, Volume= 0.006 af, Atten= 55%, Lag= 0.0 min
Discarded = 0.01 cfs @ 14.05 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 75.34' @ 20.00 hrs Surf.Area= 1,115 sf Storage= 204 cf

Plug-Flow detention time= 135.6 min calculated for 0.006 af (54% of inflow)
Center-of-Mass det. time= 41.7 min (1,000.7 - 959.1)

Volume	Invert	Avail.Storage	Storage Description
#1	75.30'	9,840 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.30	600	0	0
76.00	9,800	3,640	3,640
76.50	15,000	6,200	9,840

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.30'	**0.01 cfs Exfiltration 2.4 "/Hr. at all elevations**
#2	Primary	76.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 14.05 hrs HW=75.31' (Free Discharge)
↑—**1=Exfiltration 2.4 "/Hr.** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.30' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)