SPECIAL FLOOD AND EROSION CONTROL BOARD MEETING

March 29, 2022

5:00 pm, City Council Chambers

Web access via Zoom:

https://bristolct-gov.zoom.us/j/87034316858?pwd=Tkd0d2wvS041TGszbGtsL2FtYmFLQT09

Meeting ID: 870 3431 6858

Passcode: 741803

1. Flood and Erosion Control Board Meeting Minutes Of The Previous Meeting

   Documents:

   FLOOD EROSION CONTROL MARCH 27 2018.PDF

2. City Areas of Flooding

   Documents:

   DPW CITY FLOODING UPDATE.PDF

3. FEMA Flood Assistance Program

   Documents:

   3A SIGNEDMEMO.PDF

4. FEMA Insurance Map Update & Flood Damage Prevention Ordinance Summary

   Documents:

   FLOOD CONTROL BOARD UPDATES.PDF

5. MS4 Program Summary

   Documents:

   MS4 SUMMARY.PDF

6. Addendum
7. Adjournment
8. Signature

Raymond A. Rogozinski, P.E.

Director of Public Works

MARCH 27, 2018

A Special Meeting of the Flood and Erosion Control Board was held on Tuesday, March 27, 2018 at 5:36 p.m. in the City Hall Council Chambers, 111 North Main Street. Present: Mayor Zoppo-Sassu; Council Members Fortier, Hahn, Kelley, Medeiros, Mills, and Preleski.

The call of the meeting was presented:

"Flood and Erosion Control Members
Bristol, Connecticut

SPECIAL FLOOD AND EROSION CONTROL BOARD MEETING

There will be a Special Meeting of the Flood and Erosion Control Board to be held on Tuesday, March 27, 2018 immediately following the Special City Council meeting at 5:30 p.m. in the City Hall Council Chambers, 111 North Main Street, Bristol, Connecticut.

AGENDA

1. *To approve the minutes of the special Flood and Erosion Control Board meeting on March 28, 2017.*

2. *Introduction of the Flood and Erosion Control Board purpose, and to take any action as necessary.*

3. *To receive and discuss updates from the Public Works Dept. regarding current flood mitigation projects on the Copper Mine Brook & Pequabuck River, and to take any action as necessary.*

4. *To receive and discuss updates from the Public Works Dept. regarding Public Works staff inspections and direction to property owners to remove debris and obstructions from waterways within the City, and to take any action as necessary.*

5. *To adjourn.*

Per Order of Mayor Ellen Zoppo-Sassu
DATED this 23rd day of March, 2018."

1. APPROVAL OF MINUTES OF SPECIAL FLOOD AND EROSION CONTROL BOARD MEETING ON MARCH 28, 2017.

On motion of Council Member Fortier and seconded, it was unanimously voted: To approve the minutes of the special Flood and Erosion Control Board meeting on March 28, 2017.

2. INTRODUCTION OF FLOOD AND EROSION CONTROL BOARD PURPOSE.

Public Works Director Veselka stated the Flood and Erosion Control Board works with the City Conservation Commission on mitigation projects and can save money for taxpayers on their flood insurance. He highlighted the powers of the Board.

3. UPDATES REGARDING COPPER MINE BROOK AND PEQUABUCK RIVER FLOOD MITIGATION STUDY.

City Engineer Rogozinski stated there was one project to realign the Copper Mine Brook downstream from the Stevens Street bridge and remove debris from the bridge up to Jerome Avenue. There was an additional component to add storm drainage on Candy Lane. He indicated they were working with the City of New Britain and the Department of Public Health because the project area was within watershed property.

City Engineer Rogozinski noted a structural inspection was performed on the Pequabuck River conduit from the West End to Memorial Boulevard. There were some minor repairs needed in the conduit and sediment inside.

City Engineer Rogozinski stated further that the U.S. Geological Society has a water gauge that was recently reactivated and displays real time readings of water surface elevations on the Pequabuck River.

Council Member Preleski questioned how the department determines the priorities with respect to flood and erosion control.

City Engineer Rogozinski responded that consultants perform studies that assist in the determination of priorities.

Council Member Mills questioned whether there was a difference after the work was completed at Rockwell Park and the Frederick Street bridge.

City Engineer Rogozinski responded that the water surface elevation was lowered after those projects.

4. UPDATES REGARDING STAFF INSPECTIONS TO REMOVE DEBRIS AND OBSTRUCTIONS FROM WATERWAYS.

City Engineer Rogozinski stated the environmental technician walks the Pequabuck River and the Copper Mine Brook in the spring and fall. He noted three property owners had six downed trees. If the trees were not removed, there was a funding source in Public Works to remove the trees.

Mayor Zoppo-Sassu highlighted that adjacent property owners own to the middle of the river and were responsible for debris or obstructions within that area.

5. ADJOURNMENT.

At 5:55 p.m., on motion of Council Member Mederois and seconded, it was unanimously voted: To adjourn.

ATTEST:_____
Therese Pac
Town & City Clerk

Department of Public Works | 860.584.6125

MEMORANDUM

DATE: March 22, 2022

TO: Mayor Jeff Caggiano
Flood and Erosion Control Board
FROM: Raymond A. Rogozinski, P.E., Director of Public Works

RE: City Flooding / Drainage Issues

The Department of Public Works continues to address the various storm drainage issues identified during the heavy rains on July 19 (4 inches), August 19 (approx. 4.5 inches of rain within 1 hr.), August 29 (Tropical Storm Henri 5.5 inches of rain) and September 2 (Tropical Storm Ida 7 inches of rain) throughout the City. A summary of the drainage issues (original 11/x/21 memorandum report attached) along updated action (italics) is provided below:

1. Brace Avenue; Portion of Brace Avenue (south side) from Vera road to Cabot Street received water jumping the curb. They experienced flooding on the July 19 and August 29 storm events (high intensity). DPW jetted and cleaned the storm drainage system. Problem persists. DPW provided sandbags to contain water within roadway. DPW scheduled to confirm piping configuration in area of 106 Brace Ave catch basin is adequate. Appears section of storm drainage piping is undersized. Engineering evaluation/capital project may be required to upgrade system to stream west of Vine Road.

   DPW Capital Improvement Project request $750,000 to upgrade Brace Avenue storm drainage pending BOF approval.

2. Vine road / Duncan Street intersection: Standing water /flooding of intersection due to backup/capacity of receiving stream west of Vine Road. DPW to inspect stream located west of Vine Road to Stafford Ave to ensure there are no blockages.

   DPW performed an inspection of the stream that City storm water discharges to in the rear properties of Vine Road. Several areas of debris have been identified and DPW is in the process of contracting property owners. In addition, the storm drainage has been cleaned/jetted by DPW and a video inspection has been scheduled.

City of Bristol
Public Work Department
111 North Main Street
Bristol, CT 06010
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3. Beth Avenue/Hiltbrand Road intersection: Standing water flooding of intersection due to piping in intersection and capacity of receiving stream. DPW jetted / cleaned lines in intersection. DPW will video inspect drainage piping and evaluate pipe sizing.

   DPW is currently in the process of confirming the size and geometry of the pipe configuration within the intersection and is scheduling to perform a video inspection of the piping system. DPW did replace catch basin tops in preparation of paving, however paving will be deferred until the fall of 2022 pending additional work to increase pipe size.

4. Carolina Road: Area of 65 & 75 Carolina Road experiencing flooding from water entering their property from the road. The garages are lower than the road, therefore water enter the basement. The problem is that there is a large amount of water runoff from the rear of the property located on the east side of Carolina Road that is bypassing storm drainage systems and overloading the City storm drainage which results in water exiting the roadway. DPW has cleaned and jetted the storm drainage system. The problem persist. Grading east of Carolina is difficult to access due to private fencing. DPW recommends a neighborhood meeting to obtain access to rear yards to evaluate grading/drainage. Potential capital improvement project required.

   DPW rejetted/ cleaned the piping system coordination of a meeting with property owners to obtain additional information required.

5. Clark Avenue: Approximately 400 ft. north of Terryville Road (Route 72) water from private property (Ross Auto Parts) is eroding the embanking resulting in sediment & runoff entering Clark Avenue. DPW has notified the property owner and as of this writing the property owner has initiated corrective action. If the problem is not resolved, DPW will issue enforcements fines until corrective action is completed.

   The property owner substantially complete with repairs.

6. Balsam Road: DPW has been contacted by property owner indicated that the City storm drainage is clogged. DPW cleaned and jetting the drainage system, however the property owner indicates that the problem persists. DPW expanded the area of storm drainage cleaned to include the interconnection to Hemlock Street and Hemlock Street to Pine Street. In addition, WPC is scheduled to assist DPW with videoing the storm line to confirm that there is no blockage.

DPW performed a video inspection of the piping system and cleared roots within the downgradient drainage piping. The system is currently operating satisfactorily.

7. Hardwick Road: Area of ponding flooding at the intersection of Hardwick Road and Meadowbrook Drive along with the rear of the properties located on the north side of Harwick Road. Both issues are related to the backup of the stream that flows toward Brook Street. DPW will jet & clean the storm drainage system, remove sediment from the Brook Street culvert and inspect the stream for blockages that flows from Brook Street to the Coppermine Brook north of Artisan Street.

   DPW jetted the storm drainage system and performed an inspection of the stream. Based on the inspection several areas of debris were identified and the property owners are being notified to clean/ remove the material.

8. Louisiana Avenue: The area of Louisiana Avenue at the intersection with John Avenue experienced standing water. The bridge did not overtop. The ponding is a result of City storm drainage at the John Avenue intersection backing up when the water surface of the Coppermine Brook rises and submerges the City outfall. The issue is not pipe capacity of the City's system it is function of the low elevation of the Louisiana Avenue & John Avenue intersection. Correction would require raising the elevation of the intersection that is not practical due to the impact to private property. It should be noted that the City storm drain on the east side of the bridge is also submerged, however the area does not flood due to the higher elevation of the area and storm drain catch basin grates. Louisiana Avenue storm drains have been replaced and the road is scheduled to be paved this September.

   DPW jetted/ cleaned the storm drainage piping. Due to the catch basin top elevation water will continue to pond within the referenced intersection during large/heavy storm events when the water surface elevation of the Coppermine Brook is at the bottom bridge cord.

9. Trout Brook Road/ Sheffield Road: The intersection of Sheffield Road and Trout Brook Road floods due to the high water surface elevation of the Coppermine Brook. City storm drainage currently discharges directly into the Coppermine Brook and backs up with the Coppermine Brook floods. The City storm drainage previously discharged into a drainage channel that runs in the rear of Trout Brook Road property. The referenced channel has not

been maintained by DPW, however DPW will contact property owner to arrange to clear the channel to provide a degree of storage.

DPW has inspected the existing drainage channel and will be contact the property owners request DPW access to clean/ clear channel. Due to wet weather conditions work will be completed in July/August. .

10. Frederick Street Bridge: The area initially flooded during tropical storm Ida due to the Pequabuck River overtopping in the area between Andrew Street and the Frederick Bridge. The bridge did not overtop, the area west of the bridge is the low point of the roadway and experienced flooding. It has been reported by a property owner that the berm upstream of the bridge overtopped and flooded private property. DPW has provided regular maintenance of the area on the bridge to ensure flow during storm events. The existing debris will be removed along with the sediment under the bridge (Inland Wetland permit required to remove sediment). The property owner did request assistance from the City to pump water out from behind the berm. The City did perform a similar task approximately 16 year ago when the berm broke, however since the area is private property and the berm was not breached City resources where not deployed. A potential project to provide future assistance to the property owner would consist of installing a manually operated drain pipe across the berm that would enable the area to be drained without the use of a pump.

    DPW removed sediment and debris from the area of the bridge. BPW authorization an access/easement required to install control valve to drain the area behind the berm.

11. 125 East Road: The property of 125 East Road is accessed via a driveway that crosses a large culvert. The downstream headwall of the culvert has failed and will continue to deteriorate. The approximate cost of replacement is $80,000-110,000. DPW is coordinating with the City's Building Department, Corporation Counsel and ECD to provide assistance to the property owner, however to date the means to facilitate corrective action/assistance is unclear.

    DPW has contacted NRCS of the referenced damaged and performed field inspections with both NRCS and a City consultant WMC Inc. The Department also included the project as part of the City grant request to NVCOG. Based on a review by NRCS it appears the culvert repair/replacement does not meet program requirements and funding is not

available. DPW hired WMC Engineering to perfrom a preliminary evaluation and cost estimate ($532,000 end wall replacement and $750,000 -$800,000 for full replacement).

In my professional experience I do not agree with the estimate and estimate full replacement for a single driveway will be $460,000. However, the cost estimate should be based on utilizing public funds for the purpose of the report. Although the culvert is not the responsibility of the City DPW is currently pursuing grants to complete the project. In addition, permitting and design of the culvert is required ($70,000 & approximately 9-12 months).

Based on the property owners interaction with NRCS it appears that he is under the understanding that NRCS will be replacing his culvert, however as indicated above it does not appear NRCS fund repairs. Once DPW receives official notification from NRCS we will advise the property owner so they can pursue other remedies.

12. George Street: In the rear of the properties in the area of 44 George Street a stone walled concrete bottom channel (approx. 5 ft. x 5 ft.) has/is failing. A garage constructed over the channel has been condemned. Repairs are required throughout the channel, therefore corrective repairs performed by a single property owner may not result in a long term sustained solution. Unrepaired upstream sections of the channel may result in water from above flowing behind downgradient channel section causing failure. A review of property records indicate no City easements in the area, the drainage channel in question is private. DPW has scheduled a meeting with a consultant engineer to review evaluate conceptual design solutions. Ultimately any long term solution will require work on multiple properties. Although it is important for DPW not to provide false expectations to residents by implying that the City will perform corrective action or fund work on private property, there is a potential role the City can provide by facilitating a resolution among the multiple property owners. DPW will continue to coordinate action with the Building Department and the City's Corporation Counsel.

    DPW has contacted NRCS of the referenced damaged and performed field inspections with both NRCS and a City consultant WMC Inc. The Department also included the project as part of the City grant request to NVCOG. Based on a review by NRCS it appears the drainage channel repair/replacement does not meet program requirements and funding is not available. Please see attached WMC letter regarding site conditions and estimated cost ($1,900,000). In addition, DPW scheduled to procure the services of a survey to indicate

property lines / channel location and confirm that there are no City easements associated with the culvert. The estimate cost to perform a survey is $8,500.

13. Litchfield road: The road was paved in 2020 and as a result multiply driveway were impacted (lost driveway lip). Water runoff from the City road is entering driveways. DPW has replaced three driveway aprons. The driveway apron at 44 Litchfield Road requires additional work that will be performed the week of September 12. In order to prevent runoff into the referred driveway DPW has provided sandbags. The driveway at 33 Litchfield Rd is also receiving runoff. Due to the low slope (flatness) of the existing driveway the enter driveway is being replaced to obtain positive flow ($2,200).

    Driveway at 33 Litchfield Road has been paved to eliminate roadway runoff from entering driveway. Storm drainage is proposed at 44 Litchfield Road.

14. Divinity Street: The culvert located east of Peck Lane overtopped and eroded the downstream property (316 Divinity Street). The culvert is currently in the design phase of a project to replace the culvert. The erosion occurred on private property and is not the type of repairs performed by DPW. The property owner has obtained an estimate of $10,500 from the same contractor that performs City storm drainage work Tabacco & Sons. In order for DPW to proceed with the culvert replacement project an easement from the property owner on the impacted area is required, therefore consideration should be made to cover repair cost subject to acquisition of an drainage easement.

    Property prepared. Easement to replace culvert (west side of roadway) procured. WSP completing culvert replacement design.

15. Broad Street/ Todd Street intersection: The area of the Broad Street / Todd Street intersection floods. The flooding occurs when City storm drainage backs up due to a high water surface elevation of the Pequabuck River. Since the catch basin grate elevations on Crowley Auto are lower than the Todd Street storm drainage water exist the City's system and flows into Crowley / Broad Street and the Pequabuck River (as water recedes).

    DPW has contacted the property owners engineer to perform a site visit and determine potential measure to mitigate/reduce storm drainage flow from City storm drainage.

16. King Street / Page Park Road & Bristol Eastern entrance: King Street is a State Road and is not maintained by the DPW, however flooding occurs due to the capacity of the downstream culvert and stream that crosses Bristol Eastern. DPW will inspect the stream from Bristol Eastern to Carpenter Ave/ Stonecrest Drive & West Washington for blockages, however the depth of the King Street roadway flooding can be reduced if the area on Bristol Eastern is excavated/lowered behind the sidewalk approximately 12 inches. Lower the grade behind the sidewalk will result in flooding of the adjacent athletic fields but is critical to maintaining vehicle passage along King Street. The roadway is currently unpassable and as the Route 6 closes due to flooding the closing of this section of King St effectively prevent a detour from Route 6 to route 72.

    DPW has contacted BOE facility manager regrading/drainage onto Bristol Central High School. Concerns expressed associated with draining water to field.

17. Royal Drive / Chippanee Golf Course: Properties along the north side of Royal Drive receive runoff from Chippanee Golf Course (10 hole). Bristol IWC issued order to correct.

    Chippanee Golf Course has performed corrective work including construction of berm along common property line with Royal Drive properties, however the IWC order remains open pending evaluation/determination by the IWC.

18. Chippenwood Lane / Chippanee Golf Course: The properties at the eastern end of Chippenwood Lane receive runoff from Chippanee Golf Course. The drainage channel that discharges from the 11th hole pond runs along the eastern properties of Chippenwood Labe properties. The drainage channel in area has silted in and appears to have insufficient capacity to convey flow to the north. As a result storm water jumps the channel and flows into the Chippenwood lane properties. The drainage channel is on Chipanee property and corrective action would appear to consist of removing sediments/ excavating channel to provide original capacity.

    IWC issued an order to correct. Chippanee Golf Course has performed corrective work removed silt/sediment from drainage channel to improve capacity of channel, however the IWC order remains open pending evaluation/determination of the IWC.

19. James Street: The culvert at the end of James Street was blocked during the August 19 storm by debris. The stream jumped the river embankment, crossed James Street flooded three James Street properties before the flow returned to the stream. DPW cleared the debris and cleaned the road. The culvert pipe section are metal corrugated and sections have failed. The property owner has made repairs. DPW will continue to monitor.

    As indicated above the property owners has made repairs. No additional action required.

20. Stonecrest Drive: The area of Stonecrest Drive adjacent to Sheriden Woods flooded due to the capacity of the downstream channel. DPW Engineering will inspect the area from Stonecrest to West Washington for blockages and DPW Street Division is scheduled to remove sediment in the area of the culvert.

    Culvert was cleaned/ cleared of sediment by DPW.

21. Lake Avenue Culvert: The property owner of 706 Lake Avenue contacted DPW indicating that the condition of culvert has resulted in damage to his property. Based on a preliminary evaluation the property of 706 Lake Ave is approx. 100 ft. upstream of the City culvert and it appears water will overtop the culvert prior to backing up on the subject property. However the property owner is experiencing extensive flooding. The stream located on the property of 706 Lake Ave has silted up in areas and water jumps the stream around a bend upgrade of the house. As a result it appears water from the stream flow between the house and the garage during large flows. The flow erodes portions of the subject property and appears to flow into Lake Avenue where it enters the City storm drainage system (does not cross Lake Ave). The stream is on private property and requires an Engineer to evaluate capacity and corrective action, however the property owner has stated that he does not have the financial means to take corrective action. In addition the potential damage to the private property there is also a potential of damage to Lake Ave due to the redirected stream. DPW will be coordinating with the City's Building Department, Corporation Counsel and ECD to provide assistance to the property owner, however to date the means to facilitate corrective action/assistance is unclear.

    Property owner has cleaned up property. DPW has performed an on-site inspection with NRCS, however the required stream restoration does not meet their program requirements. The site has also been evaluated by WMC Inc. See attached letter and estimated mitigation/ repair measures ($350,000).

Based on the condition of the culvert DPW preparing application for the State's Local Bridge program to replace culvert.

22. DPW landfill: An area of DPW's landfill along the northern section adjacent to Covanta eroded during the 9/2/21 storm. A section of the liner is exposed. A project to repair the erosion in areas throughout the landfill is currently being designed by the engineering firm of Fuss and O'Neil Inc.

    Repairs included as part of the Departments FEMA assistance request and NVCOG grant request for funding $50,000. The design associated with the repairs are currently being designed as part of a larger erosion project totaling $600,000.

23. Glenn Street: The southern gutter of Glenn Street was eroded. DPW will be repairing the roadway (filling with surge stone), however additional investigation is required to control up gradient water flow. The water eroding Glenn Street is bypassing the stream that discharges to 706 Lake Ave.

    DPW repaired roadway erosion.

24. Battle Street: Multiple properties on Battle Street south of Hill Street access their property via drainage culverts. The culverts are private. A number of the culverts eroded during the 9/2/21 storm. It appears that property owners are making repairs and DPW has not been contacted regarding this issue.

    Property owners performing repairs. Notified of potential FEMA IA assistance.

25. Minor St: The gravel portion of Minor Street adjacent to Richie's ice cream eroded along the northern gutter line. DPW is regrading the road and is scheduled to pave the roadway section with funding obtained from the solar farm.

    DPW repaired gravel roadway. Bituminous paving of roadway pending.

26. 595 King Street: The referenced property is receiving runoff from Page Park. There is an up gradient drainage channel that run along the western property lines of the Marilyn Drive houses and crosses the old ski slope. The flow through the swale was shorts circuiting and

a portion of the runoff flows towards the property of 595 King Street. Based on an on-site meeting, the Park Department will perform repairs to the existing swale/piping system to facilitate diversion of runoff across the old sky slope. However, the northern end of Marilyn Drive and the down gradient area between the swale and the 595 King Street will flow to the property. The option of installing an addition diversion channel closer to the King St property does not appear viable due to the grade south of play scape, need to remove trees and the need to direct additional water to the State's drainage system. One potential option is to fill the existing swale that directs flow to 595 King Street, however that would require work within an existing tree area that will limit use of equipment

Repairs completed by Park Department contractor.

27. Jerome Avenue: The home at 396 Jerome Avenue (in floodplain) immediately south of Willow Brook Road experiences regular flooding into structure. The City is investigating options to assist the homeowner.

    Stream located in rear northeast portion of property. Funding available through NRCS to purchase property to create open space. NRCS program requires no funding fom the City, however it does require City to aquire property as open space.

28. Hopmeadow Road: 199 Hopmeadow Road experienced rising stream waters. DPW will investigate downstream culvert condition for maintenance.

    Stream/drainage channel in question is private (not City of Bappears to be located on un-accepted portion of Neuman Place (east of Mano Lane). Additional investigation required.

29. Perkins Street: Property owners at 135 Perkins Street and 120 Perkins Street (west and east of the street culvert) complained about excessive water, high stream velocities and erosion. The City has inspected the properties and culvert, as well as the upstream pond system.

    Erosion a result of large storm events, the culvert did not overflow water was retained within the pipe section. No additional storm drainage has been added/connected to culvert.

30. Sonstrom Road: The property owner at 280 Sonstrom Road indicated there was flooding in the rear lot. A private system traversing the neighbor's rear lot to the City's catch basin has not been maintained. The City's storm drain system appears to be draining properly.

DPW install a catch basin upgrade of the driveway in question.

As previously indicated to the BPW DPW resources are allocated to maximize public benefit. Therefore, flooding is addressed along the following priorities:

1. Flooding of public infrastructure/roadways entering private property (homes/buildings)
2. Flooding of public infrastructure/roadways entering private property
3. Flooding of private property entering/impacting public infrastructure/roadways
4. Flooding of private property impacting multiply private properties
5. Flooding of private property impacting single property

Please feel free to contact me with any question at 860-584-6113.

City of Bristol
Public Work Department
111 North Main Street
Bristol, CT 06010
www.bristolct.gov

RESILIENT
Land & Water
Sustainable Solutions, Stream to Shoreline

October 12, 2021

Raymond A Rogozinski, P.E.
Director of Public Works
City of Bristol Public Works Department
111 North Main Street
Bristol, CT 06010

Re: Flood Assistance
Reference Number 1003.001

Dear Mr. Rogozinski:

Resilient Land And Water, LLC ("Resilient Land & Water") has developed the subject memorandum to describe appropriate sources of aid or support for residents that have suffered various types of flood damage, from riverine flooding (i.e., the Pequabuck River) to flooding caused by overwhelmed drainage systems.

Situation

Connecticut was adversely affected by several flood events that occurred in summer 2021. Specifically, flood events occurred on the following dates:

- T.S. Elsa - July 9, 2021
- T.S. Fred - August 19, 2021
- T.S. Henri - August 22-23, 2021
- T.D. Ida - September 1, 2021

However, not all four events caused damage in Bristol. Based on various reports, the rainfall associated with Storm Ida was the most damaging event in Bristol in summer 2021. According to the City, the type of damaged typically experienced in Bristol is nonstructural and often does not exceed 50% value of the house. Damage could include the following:

- Flooding of basements from surface water
- Damage to stored materials in basements
- Damage requiring replacement of HVAC equipment in basement
- Basement flooding due to groundwater
- Basement flooding due to sewage backups
- Sewage backup into first floor living area
- Trees down on property
- Flooding of yards with or without erosion
- Flooding within first floor that damages contents but not the structure
- Damage to culverts that are in place to facilitate to access property/house (such as a driveway culvert)

Although the City has undertaken considerable steps to address methods of reducing flood damage by evaluating improvements in the Pequabuck River and Coppermine Brook watersheds, intense rain events nevertheless can cause flooding. Residents and business owners have reportedly requested information about how to receive financial assistance to address recent damage and minimize future flood damage. However, the appropriate sources of aid or support can often be difficult to identify.

Types of Assistance

Flood Insurance

Flood insurance can be purchased from the National Flood Insurance Program (NFIP) either directly, or through a variety of insurance companies. The Federal government has financial responsibility for underwriting losses. Flood insurance is available anywhere in a community – in or out of mapped floodplains – and changes in the NFIP ("Risk Rating 2.0"[1]) will soon result in new calculations of premiums based on a number of factors.

The maximum limits of coverage available for a residence is $250,000 for the building and $100,000 for contents. Specific items covered can be researched in FEMA's resources related to flood insurance[2]. A property with a mortgage is required to carry flood insurance, as the insurance helps the lender protect its investment. The amount of coverage is determined by the lender, and whether the coverage includes the building or contents is also determined by the lender. If a mortgage has been paid, a property owner can drop flood insurance. However, carrying flood insurance is often advisable given the protections provided.

Damage from mold and/or mildew resulting from the after-effects of a flood is typically covered by flood insurance, but each case is evaluated on an individual basis. Mold/mildew conditions that existed prior to a flooding event are not covered. After a flood, the policyholder is responsible for taking reasonable and appropriate mitigation actions to eliminate mold and mildew.

Flood insurance does not cover basement improvements or items that are not necessary to make the home safe, sanitary, and functional. In other words, items in the basement that are *not* covered include carpeting, finished walls, floors, ceilings, furniture, or personal belongings that are kept in the basement. Necessary items are included under building coverage and some under contents coverage.

NFIP figures for a community are available from FEMA. According to the NFIP profile dated August 31, 2021, Bristol hosts 137 flood insurance policies. Total coverage is $28,937,800 and the total annual premiums paid was $272,604.

A total of 213 flood losses have been paid in Bristol. This is not the number of properties; some properties have filed multiple losses, so the number of properties with losses is lower than 213. However, the breakdown is not visible in the data table. Furthermore, the dates of payment are not provided by FEMA in the data table. To date, the total payout for losses in Bristol is $3,573,886. This equates to an average payout of $16,779 per loss.

[1] https://www.fema.gov/flood-insurance/risk-rating
[2] https://www.floodsmart.gov/how/what-is-covered

The former CCRPA Hazard Mitigation Plan (2016) reported that 32 repetitive loss properties were located in Bristol, with a total of 95 losses adding to $1,594,955. Neglecting changes over the last five years, this demonstrates that losses submitted for repetitive loss properties are about 45% of total losses in Bristol whether calculated from the number of claims (95/213) or when calculated from the losses paid ($1,594,955/$3,573,886).

The NVCOG Hazard Mitigation Plan (2021) notes that the City reports 32 RL properties whereas FEMA's list from 2018 reports 26 RL properties. The discrepancy can be cleared up as needed by the City's floodplain manager through the completion of specific forms issued by FEMA to the City.

While the flood loss profiles for Bristol are not insignificant, the data shows that only a very small percentage of properties in the city (137 properties out of thousands) are carrying flood insurance and claiming losses to be paid under the NFIP.

- ***Recommendation #1: Given that flood insurance is the first line of defense in assisting property owners and residents with responding to flood damage, the City should promote a wider purchase of flood insurance.***

Homeowners Insurance

Flood damage is not covered by homeowners insurance policies. In this context, a flood is defined as water affecting more than one property where the ground surface is normally not submerged[3]. Examples could include an overflowing stream or river, a rapidly expanding pool of water along a road that cannot drain quickly, or sheet flow downhill along a slope into nearby basements.

Some flood coverage can be provided as part of some renters' insurance policies (i.e., USAA), but this is not standard practice and ultimately would not apply to property owners. Additionally, some types of water damage can be covered by homeowners insurance policies, such as a broken pipe, sewage backup, or sump pump failure. The specific details will vary, and a property owner should become familiar with the terms of his or her policy.

- ***Recommendation #2: Property owners should contact their homeowners insurance companies to inquire about add-on coverages such as sump pump failure.***

Not Covered by Insurance

If a flood occurs and adversely impacts a building that is insured with flood insurance, the owner may be able to claim a loss and seek reimbursement for damage to the building or contents. If a building is not insured with flood insurance, the owner cannot seek reimbursement for damage to the building or contents using homeowners insurance. In both cases – *with or without flood insurance* – damage to

[3] The National Flood Insurance Program (NFIP) defines a flood as "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property)"

property outside the building such as landscaping, a driveway, or a vehicle is not covered by insurance. However, flood damage to passenger vehicles is sometimes covered by auto insurance.

- ***Recommendation #3: Property owners should contact their auto insurance companies to inquire about covering flood damage to vehicles.***

FEMA Public Assistance (PA)

PA funding is available to municipalities when expenses are incurred during an event that is later declared a major disaster. If a severe event affects Connecticut and the declaration of a disaster is made, FEMA will specify which counties are eligible for PA reimbursement. If Hartford County is part of the region covered by PA, Bristol can participate. In order to obtain reimbursement under the PA program, the City of Bristol will need to compile detailed records of costs such as cleaning up trees after a wind event or repairing a washed-out road after a flood event.

Reimbursement for private property damage is not available from PA. Community costs are typically divided into the following categories allowed by FEMA:

- Emergency Work:
    - Category A: Debris removal
    - Category B: Emergency protective measures
- Permanent Work:
    - Category C: Roads and bridges
    - Category D: Water control facilities
    - Category E: Public buildings and contents
    - Category F: Public utilities
    - Category G: Parks, recreational, and other facilities

Perhaps of significant interest in Bristol, FEMA may determine that certain emergency protective measures conducted on private property are eligible under the PA Program if:

- The immediate threat is widespread, affecting numerous homes and businesses such that it is a threat to the health and safety of the general public;
- The municipality has legal authority to perform the work; and
- The municipality obtained rights-of-entry and agreements to indemnify and hold harmless the Federal government.

Situations where this may occur are generally limited to:

- Demolition of unsafe private structures that endanger the public
- Installation of fiber-reinforced sheeting to cover damaged roofs
- Provision of emergency access
- Pumping of flooded basements
- Pumping of septic tanks or decontamination of wells causing a pollution threat
- Residential electric meter repair
- Safety inspections

- Stabilizing a slope

The fourth item, pumping of flooded basements, is potentially a suitable tool that the City of Bristol can use to assist property owners will mitigating damage from floods.

We recommend that the City evaluate this possibility in the short-term. To be successful in reimbursement under PA, the City must include the following support documentation: a detailed explanation documenting the City's legal authority and responsibility to enter private property; the basis for the determination that a threat exists to the general public; and copies of the rights-of-entry and agreements to indemnify and hold harmless the Federal government. If the rights-of-entry and agreements to indemnify and hold harmless take time to develop, the City should begin looking into this soon, so they may be in place before the next severe storm.

- ***Recommendation #4: Take steps to ensure that pumping of flooded basements is eligible for PA reimbursement if a disaster is later declared.***

FEMA Individual Assistance (IA)

IA funding is available to properties owners in municipalities when exceptional individual expenses are incurred during an event that is later declared a major disaster. If a disaster affects Connecticut, FEMA will specify which counties are eligible for IA reimbursement. If Hartford County is part of the region covered by IA, Bristol individuals can participate. Unfortunately, IA is not a typical outcome for a flood disaster in Connecticut. Consider the following:

- The State's most recent disaster declaration for a flood (for the events of September 25, 2018) *did not include IA eligibility anywhere in the State.* Furthermore, Hartford County was not eligible for PA reimbursement for this event.
- Hurricane Sandy was the last time IA was available in Connecticut, but Hartford County was not included as an eligible area.

The last three flood events that resulted in the availability of IA in Hartford County were:

- T.S. Irene, DR-4023-CT, August 2011
- Nor'easter, DR-1700-CT, April 2007
- T.S. Floyd, DR-1302-CT, August 1999

More than ten years have passed since IA was available in Hartford County and, therefore, in Bristol. This demonstrates that long periods of time may occur between floods that are sufficiently severe for FEMA to make IA possible.

The specific types of assistance under the IA program are found within the following broad categories:

- Mass Care/Emergency Services
- Individuals and Households Program (IHP)
- Disaster Case Management
- Crisis Counseling Assistance and Training Program

- Disaster Legal Services
- Disaster Unemployment Assistance
- Voluntary Agency Coordination

We will focus here on IHP because that is the category typically employed in Connecticut during the rare occurrences that IA has been available, and is also the category that includes reimbursement for repairs. FEMA is clear in its statements that "IHP assistance is not a substitute for insurance and cannot compensate for all losses." IHP assistance comprises two provisions: Housing Assistance and Other Needs Assistance (ONA):

- Housing Assistance may be provided in the form of financial assistance (funds provided to an applicant) or direct assistance (housing provided to the applicant by FEMA). Examples of financial assistance include lodging reimbursement, rental assistance, home repair assistance, and home replacement assistance. *The most important factor to understand is that the housing assistance part of IHP is for home repair services. This can include the foundation, walls, windows, roofing, heating systems, and utilities but <u>will not</u> fencing or landscaping.* In some cases, Housing Assistance may include access and egress, including privately-owned roads and bridges. This is a potentially intriguing use of IA, as flood insurance and homeowners insurance do not cover driveways. However, a person should never assume that IA will be available for access-related repairs.
- The ONA provision of the IHP provides financial assistance for disaster-related necessary expenses and needs that are not covered by insurance or provided by any other source. Some covered expenses are funeral assistance, medical assistance, childcare, assistance for moving, and assistance for cleaning. Personal property assistance is available if Small Business Administration (SBA) coverage does help (see Page 8 for more about SBA). Personal property assistance can help pay for things like appliances and bedding, but only for mobility-impaired residents. In general, ONA is rarely used and only nominally helpful in Bristol as presented below.

IA figures for the City of Bristol were accessed from the following FEMA data sets[4]:

- Housing Assistance Program Data for Owners
- Housing Assistance Program Data for Renters
- Registration Intake and Individuals Household Program

According to these data sets, the nor'easter of April 2007 resulted in 45 individual registrations in Bristol. A figure of $27,078 was approved for the IHP, split into a figure of $26,585 for Housing Assistance and a figure of $492 for ONA. Renters' assistance was *not* approved through IA for the April 2007 nor'easter. Without further details about how reimbursements were used, only broad conclusions can be made about the levels of individual assistance that each property may have obtained. Dividing $27,078 by 45 properties, the amount per property averages $602. This is significantly lower than the averages discussed on Page 2-3 for flood insurance payouts.

Detailed data were also available for T.S. Irene of August 2011. Approximately 115 owners were approved for $434,416 in total damage, and 16 renters were approved for $29,709 in total damage. The breakdown for Housing Assistance and ONA was not available for T.S. Irene as it was for the nor'easter

[4] Data were not available for floods prior to the early 2000s.

of April 2007. Without details available, only broad conclusions can be made about the levels of individual assistance that each property may have obtained. Dividing $434,416 by 115 owner-occupied properties, the amount per property averages $3,778. While the per-property average after T.S. Irene is certainly larger than the $602 per property after the nor'easter of April 2007, neither figure is significant relative to replacement of walls, floors, heating equipment, etc.; and they are significantly lower than the averages discussed on Page 2-3 for flood insurance payouts. Turning to the rental payouts, and dividing $29,709 by 16 renters, the reimbursement per applicant is about $1,800; this probably covers only a couple months of rent.

The bottom line regarding the IA reimbursements in the City of Bristol after the flood events of 2007 and 2011 is that they were likely much lower than the flood insurance reimbursements received by neighbors who carried flood insurance.

- ***Recommendation #5: Given that flood insurance can be accessed more frequently than IA reimbursements and tends to result in higher reimbursement, the City should promote a wider purchase of flood insurance (this is the same as Recommendation #1).***

In order to help the State of Connecticut facilitate eligibility under the IA program, a municipality such as Bristol must compile detailed records about specific private property damages. These records are then sent to DEMHS to aggregate with other communities and build a case for IA assistance in the affected counties. At the same time, DEMHS may conduct its own damage assessments. This is reportedly occurring in October 2021 to help determine whether IA should be available for the flood following T.S. Ida.

Increased Cost of Compliance (ICC)

ICC is available to property owners that have flood insurance. If a property owner receives a determination from the City's floodplain administrator that the home or building is substantially or repetitively damaged, the owner (flood insurance policy holder) may file a claim for ICC coverage. A policyholder may receive up to $30,000 to help offset the costs to bring a home or business into compliance with floodplain management ordinance or regulations through elevation, floodproofing, etc.

- ***Recommendation #6: The City's floodplain manager should work with owners of damaged property to address ICC on a case-by-case basis, since the substantial damage threshold is likely not reached during most flood events.***

Commercial Flood Insurance and Business Interruption Insurance

Damage from flooding typically is not covered under a standard commercial insurance policy for a business. Some *private* insurance companies offer commercial flood insurance to small and medium-sized business owners and commercial buildings. Typical private flood insurance policies include the coverages offered by the NFIP with the additional option of business interruption coverage. With business interruption coverage, a business can be covered up to a maximum payout or reimbursement based on a set rate ($ per day) for up to a maximum number of days.

Flood damage to vehicles owned by a business and used for business purposes would typically be covered by the vehicle insurance policies, as explained above for residential vehicles.

- ***Recommendation #7: The City's business outreach teams (i.e., a chamber of commerce and/or the Economic and Community Development Department) should be prepared to provide information about private insurance companies that can be contacted to purchase insurance.***

Small Business Administration (SBA) Disaster Loans

Businesses located in declared disaster areas, private nonprofit organizations, homeowners, and renters affected by declared disasters may be eligible for SBA loans. Loans can be used for losses not covered by insurance or FEMA IA. Losses can include physical damage or business interruption. As with PA and IA, the eligibility is tied to a declared disaster. A property must be in a declared disaster area to be eligible for SBA disaster assistance.

Homeowners may apply for up to $200,000 to replace or repair a primary residence. Renters and homeowners may borrow up to $40,000 to replace or repair personal property such as clothing, furniture, cars, and appliances. An important point is that proceeds from insurance coverage on a home or property will be deducted from the total damage estimate to determine the eligible loan amount. In other words, SBA loans are used for expenses in excess of flood insurance and other insurance reimbursements.

SBA can issue physical disaster loans of up to $2 million to qualified businesses or most private nonprofit organizations. These loan proceeds may be used for the repair or replacement of real property, machinery and equipment, fixtures, and inventory. Like the homeowner assistance described in the preceding paragraph, the SBA Business Physical Disaster Loan covers disaster losses that are not fully covered by insurance.

- ***Recommendation #8: The City's outreach teams (i.e., the floodplain manager and the Economic and Community Development Department) should be prepared to provide information about SBA loans if a disaster declaration is activated.***

State Funds and Programs Available to Avoid Future Flood Damage

Two types of approaches are generally available to avoid future damages: developing capacity for response and securing funds to develop and administer programs to reduce future flooding. The following are ideas for future consideration.

- Response mechanisms to have in place prior to a flood could include acquiring more pump-out vehicles and securing mutual assistance MOUs to get help from other communities and/or organizations. If response can be deployed rapidly and across a wider area, then the duration of exposure of building materials and contents to water can be shortened, perhaps reducing the cost to recover. Various state and federal grant programs can be accessed for pump-out vehicles, such as the Assistance to Firefighters grant program administered by FEMA.

- The development of programs to pay for flood control and mitigation is currently receiving increased attention in the State of Connecticut. The State has taken an interest in the capacities of Flood and Erosion Control Boards, and has set aside resources to help set up stormwater utilities in Connecticut municipalities. The City of New London has recently implemented a stormwater utility that will collect fees from property owners and pay for stormwater management improvements that can reduce flooding caused by impaired or overwhelmed drainage systems. The Connecticut Institute for Resilience and Climate Adaptation (CIRCA) plans to administer a municipal assistance grant program in 2022 to help municipalities get started with stormwater utilities.

Summary

The following table provides a summary of coverage for each of the types of damage listed on Page 1.

Item	***Coverage or Reimbursement Possible?***					
	Flood Insurance	Homeowners Insurance	Commercial/ Business Insurance	FEMA PA*	FEMA IA*	SBA*
Flooding of basements from surface water	Yes	No	Yes, if included in a private policy	No	Yes	Yes
City's efforts to pump water from basements	No	No	No	Yes	No	No
Damage to stored materials in basements	No	No	Yes, if included in a private policy	No	No	Yes
Damage requiring replacement of HVAC equipment in basement	Yes	No	Yes, if included in a private policy	No	Yes	Yes
Basement flooding due to groundwater	Yes, if related to the flood event	No	Yes, if included in a private policy	No	Yes, if related to the flood event	Yes, if related to the flood event
Basement flooding due to sewage backups	Yes, if related to the flood event	Yes, if *not* related to a flood event	Yes, if included in a private policy	No	Yes, if related to the flood event	Yes, if related to the flood event
Sewage backup into first floor living area	Yes, if related to the flood event	Yes, if *not* related to a flood event	Yes, if included in a private policy	No	Yes, if related to the flood event	Yes, if related to the flood event
Trees down on property	No	Yes, depending on damage	Yes, if included in a private policy	No	No	No
Flooding of yards with or without erosion	No	No	Yes, if included in a private policy	No	No	No

Item	***Coverage or Reimbursement Possible?***					
	Flood Insurance	Homeowners Insurance	Commercial/ Business Insurance	FEMA PA*	FEMA IA*	SBA*
Flooding within first floor that damages contents but not the structure	Yes	No	Yes, if included in a private policy	No	Yes	Yes
Damage to culverts that are in place to facilitate to access property/house (such as a driveway culvert)	No	No	Yes, if included in a private policy	Depends on ownership and location	Possibly, if approved	No

*Disaster declaration is needed for IA, PA, and SBA

In summary, the approach to reducing and addressing flood damage may be complex and require a multi-faceted approach. At a minimum, the City should promote more widespread purchase of flood insurance, as the reimbursements from flood insurance will tend to exceed reimbursements from the FEMA IA program; and are not merely loans like the SBA programs.

Please contact the undersigned if you have any questions.

Sincerely,

David Murphy, P.E, Certified Floodplain Manager (CFM)

MEMORANDUM

DATE: March 22, 2022
TO: Mayor Jeff Caggiano, Flood and Erosion Control Board
Raymond Rogozinski, P.E., Public Works Director
Nancy Levesque, P.E., City Engineer
FROM: Carol Noble, P.E., Environmental Engineer, Certified Floodplain Manager

RE: Proposed FEMA Insurance Map Update & Flood Damage Prevention Ordinance Fact Sheet

This Memorandum is prepared to address summary information on the floodplain program in Bristol:

- The City's Flood Damage Prevention (aka floodplain) ordinance allows residents to participate in the National Flood Insurance program (NFIP), managed by Federal Emergency Management Agency (FEMA). (Most homeowners insurance do not cover flooding). The City has participated in the program since 1981, when the initial flood ordinance was established.
- The ordinance regulates flood prone areas to help mitigate flooding effects.
- The flood prone areas in the City are established by FEMA Flood Insurance Study and are mapped on Flood Insurance Rate Maps (FIRMs)
- Bristol is part of 3 major drainage basins in the state. The majority of Bristol (about 85%) drains to the Coppermine Brook and Pequabuck River, which are in the Farmington River watershed basin. About 10% of Bristol's land area in the southeastern section drains to the Eight Mile/Quinnipiac River basin. A small area (approximately 5% of Bristol's land area) in the southwestern portion (Cedar Lake and the area southwest of Witches Rock and Falls Brook roads) drains to the Housatonic Basin.
    - Quinnipiac Watershed: In 2016, FEMA updated the flood study documents for the Quinnipiac basin of the state. Because of limited land area in the upper basin, the updates had little effect on the Bristol City map designations.
    - Farmington River Watershed: Bristol's "Official" floodplain study and maps for Hartford County were published in 2008. FEMA began the study update in September 2018, performing field survey in the detailed study areas. In May 2020, FEMA published a "Discovery Report", documenting the three levels of study and indicating the priority study areas based on funding (attached). Priorities are established based on community input at discovery meeting, as well as FEMA's means management strategy. In July 2020, the work maps were presented and FEMA provided an informational webinar (available upon request). Preliminary maps, scheduled for Spring 2021, have been delayed, but are anticipated by Summer 2022. After the Preliminary maps are issued, a community engagement period is initiated to include public notification and appeal processes. The new study and maps will not become effective until formally adopted, a public process that takes over 1 year.
- FEMA offers a Community Rating System "CRS" program that lowers FEMA flood insurance rates due to tighter/more restrictive management and regulatory requirements. DPW wants to move forward with CRS to coincide with new maps, estimated to be adopted in 1-2 years.

For more information, please feel free to contact me at 860-584-6111.

Discovery Report

Farmington Watershed, HUC-8 01080207
Hartford, Litchfield, and New Haven Counties, Connecticut and
Berkshire and Hampden Counties, Massachusetts
Communities listed inside cover
Report Number 01

May 2020

FEMA

VI. Next Step: Prioritization of Study Areas

As discussed during the Discovery Meeting, three levels of study may be used during the study of the Farmington Watershed: (1) detailed study, (2) approximate study/base level engineering, and (3) redelineation. **Figure 3** shows the type of studies that will be conducted on the streams within the Farmington Watershed.

Each level of study uses a different methodology, as summarized below:

(1) Riverine Zone AE (Detailed Study)

- Most detailed and most expensive riverine study
- Structures and cross-sections are field surveyed
- Streamgage data or regression equations used for hydrology, and Hydrologic Engineering Center's River Analysis System (HEC-RAS) modeling used for hydraulics
- Flood way data table and flood profiles are included in the FIS
- Mapping:
  - *Base Flood Elevations (BFEs), appeal eligible*
  - *Cross sections*
  - *Flood way*
  - *1 percent annual exceedance probability (100-year flood) floodplain*
  - *0.2 percent annual exceedance probability (500-year flood) floodplain*

(2) Riverine Zone A (Base Level Engineering)

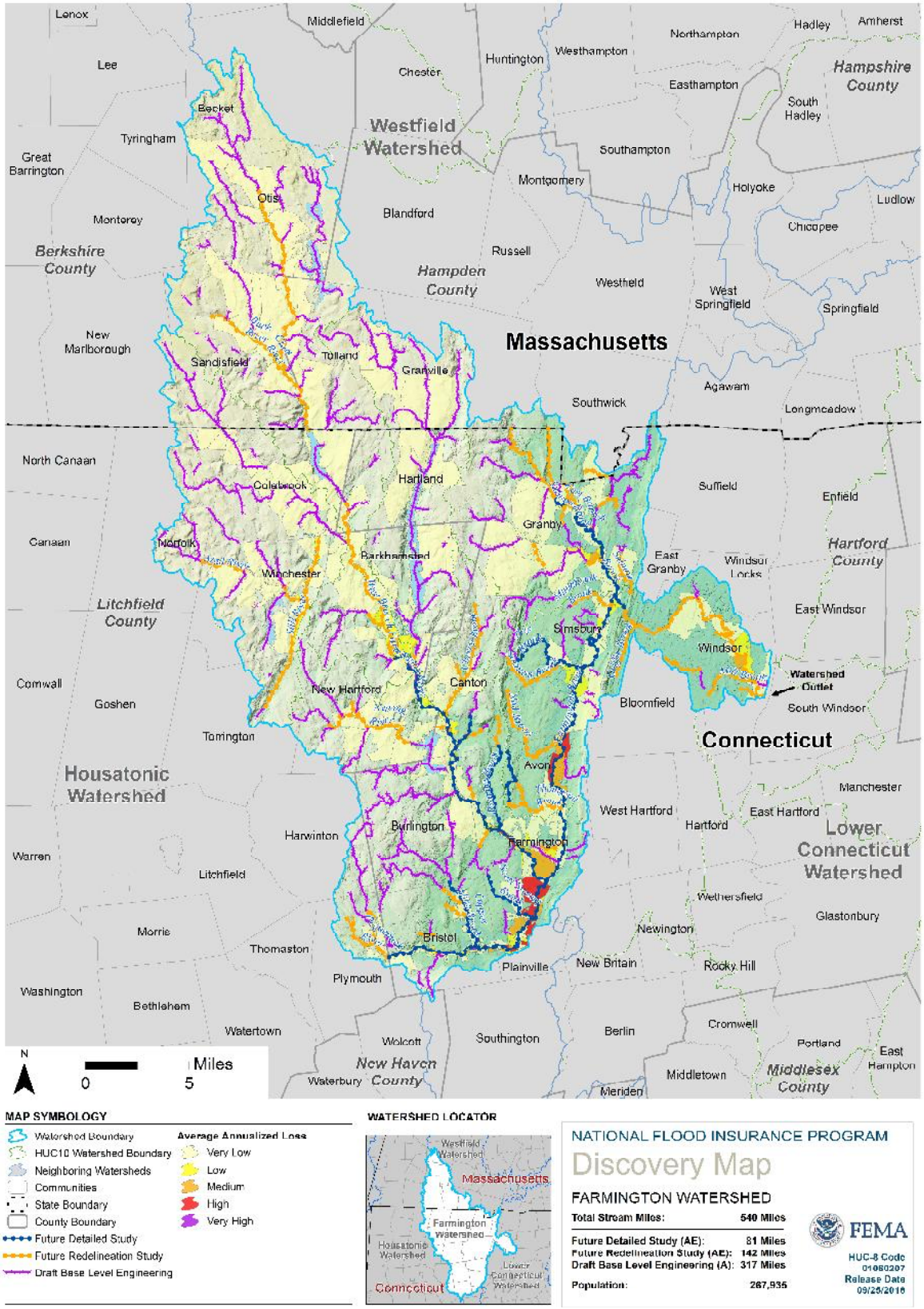
- Hydrologic and hydraulic modeling analysis based on new terrain data
- Streamgage data or regression equations used for hydrology, and HEC-RAS modeling used for hydraulics
- No field survey
- Cross-sectional values derived from new LiDAR terrain data
- Mapping: Approximate delineation for the 1-percent annual-chance event, no BFEs
- Also available: Delineations and analysis grids for 0.2-, 2-, 4-, 10-, and 1-percent ± annual-chance events

(3) Redelineation (Zone AE)

- No new engineering analysis
- Acceptable when effective BFEs are considered accurate
- Effective elevation data are transferred to new LiDAR terrain data to create new floodplain delineations for a FIRM
- FIS data: same as effective study

FEMA Region I used the information provided by communities—as shared in this Discovery Report—to help determine priority areas for study in the next phase of the Risk MAP process. The final selection and prioritization of areas for new study depended on the funds that Congress allocates to Region I for this purpose. Additionally, individual communities may choose to conduct their own studies of priority areas and/or take mitigation actions, and provide that information to FEMA Region I for consideration as part of the updated maps the communities may receive in the future.

Figure 3. Discovery Map, Farmington Watershed



MEMORANDUM

DATE: March 22, 2022

TO: Mayor Jeff Caggiano, Flood and Erosion Control Board
Raymond Rogozinski, P.E., Public Works Director
Nancy Levesque, P.E., City Engineer

FROM: Carol Noble, P.E., Environmental Engineer

RE: MS4 Program Summary for March 29, 2022 Flood and Erosion Control Board

This Memorandum is prepared to address summary information on the MS4 Program, as it relates to flooding and erosion control:

- The attached Powerpoint presentation summarizes the Municipal Separate Storm Sewer System (MS4), which is a federal program (unfunded), administered by the State of CT, to reduce non-point source pollution at a local level.
- The program requires participating municipalities/institutions to address stormwater management in a plan addressing 6 methods of control; Public Education & Outreach, Public Involvement & Participation, Illicit Discharge Detection & Elimination, Construction Site Stormwater Runoff Controls, Post Construction Stormwater Management, and Pollution Prevention/Good Housekeeping.
- The State of CT relates non-point source pollution to impervious area coverage, specifically Directly Connected Impervious Area (DCIA), i.e. impervious area (typically pavements or roofs) which drain directly to stormdrains and surface waters. The permit goal is a reduction of 2% of system-wide DCIA through retrofit projects.
- Erosion Control is primarily addressed in the Construction Site Stormwater Controls, Post Construction Runoff Controls, and Pollution Prevention sections; which address short-term and long-term controls to keep sediments from leaving a property.
- The Illicit Discharge Detection & Elimination (IDDE) section addresses communications, discovery and prohibition authority to keep non-stormwater discharge from storm drains. Bristol's Environmental Protection Tech is instrumental in administering this section.
- With respect to flooding, the post-development control section addresses development – related impacts. The addition of impervious area from development both increases runoff and decreases natural infiltration of soils. The program mandates provisions for Low Impact Development (LID), to incorporate natural processes into development by minimizing impervious areas, providing infiltration potential in the design, and providing stormwater management controls. LID practices promote healthy balances throughout the proposed development with controls, such as bioswales, porous pavements, infiltration islands, native plantings, and other "green" infrastructure, to mimic pre-development characteristics of a site

For more information, please feel free to contact me at 860-584-6111.

MS4 - Municipal Separate Storm Sewer System

- MS4 Basics
- MS4 Permit Overview
- Stormwater Management Plan
- Bristol MS4 Highlights/Discussion

Bristol Flood and Erosion Control Board

March 29, 2022

MS4 Overview

NPDES - National Pollutant Discharge Elimination System
- Permits issued by EPA or authorized states

MS4 - Municipal Separate Storm Sewer System
- A publicly owned stormwater runoff conveyance system
- Discharges to the waters of the U.S.

Regulatory History

1972
- Clean Water Act
- NPDES developed to address point source pollution
- Sewage Treatment Plants and Industrial Wastewater

1990
- EPA regulates MS4 Phase I
- NPDES expanded to address non-point source pollution
- Towns/Cities with populations >100,000

1999
- MS4 Phase II
- Towns/Cities with populations <100,000 (Small MS4's)
- Non-Traditional MS4s (state and federal institutions)

2004
- CT DEEP issued Small MS4 General Permit
- 113 Towns/Cities

2017
- CT DEEP re-issued Small MS4 General Permit, added 8 towns and all institutions

Image from Bristol GIS, 2019 aerial, 75 Battisto Road (Bristol WPC)

MS4 Basics

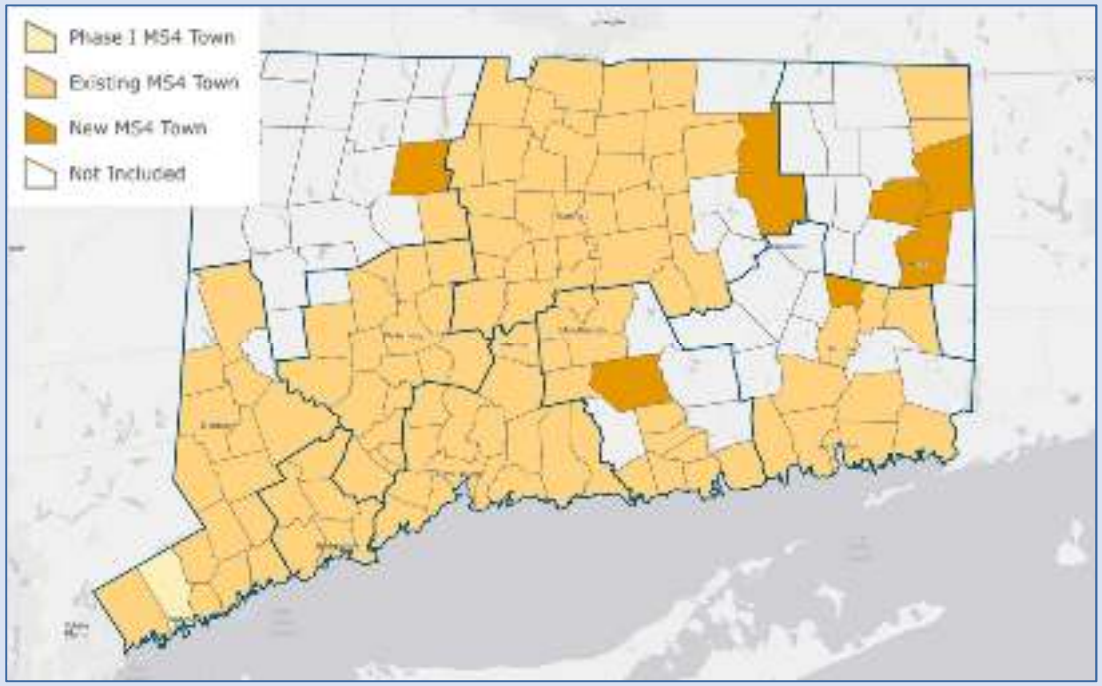
Examples of Non-Point Source Pollution

- Septic Systems
- Fertilizers
- Erosion
- Grass / Leaves
- Pet Waste
- Motor Oil
- Trash
- Detergents

Bristol CT Photos

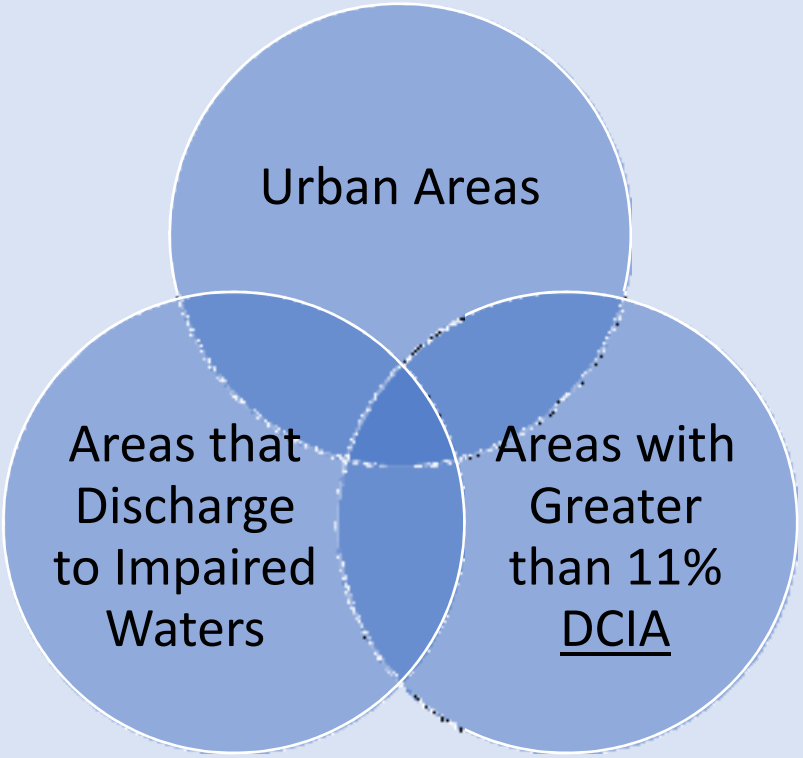
MS4 Permit Overview in CT

- 121 municipalities are regulated under the Small MS4 General Permit
- 113 municipalities since 2004
- A general permit is issued by CT DEEP under the authority of Section 22a-430b of the CT General Statutes. https://portal.ct.gov/-/media/DEEP/Permits_and_Licenses/Water_Discharge_General_Permits/MS4gppdf.pdf?la=en
- Operators of regulated MS4s are required to reduce the discharge of pollutants to the "maximum extent practicable" (MEP), protect water quality and satisfy the requirements of the Clean Water Act
- Registration and Stormwater Management Plan certifications are required for general permit authorization of MS4 discharges. Annual reports are required using the measurable goals for each minimum control measure as benchmarks for evaluating program effectiveness



CT MS4 Municipalities. University of Connecticut Center for Land Use Education and Research and CT Nonpoint Education for Municipal Officials. Retrieved from https://nemo.uconn.edu/ms4/basics/towns-institutions.htm

MS4 Priority Areas



Directly Connected Impervious Area (DCIA)

Retrieved from UCONN NEMO "What Type of Impervious Cover do you Have?"
https://nemo.uconn.edu/ic-guide/step2-type.htm

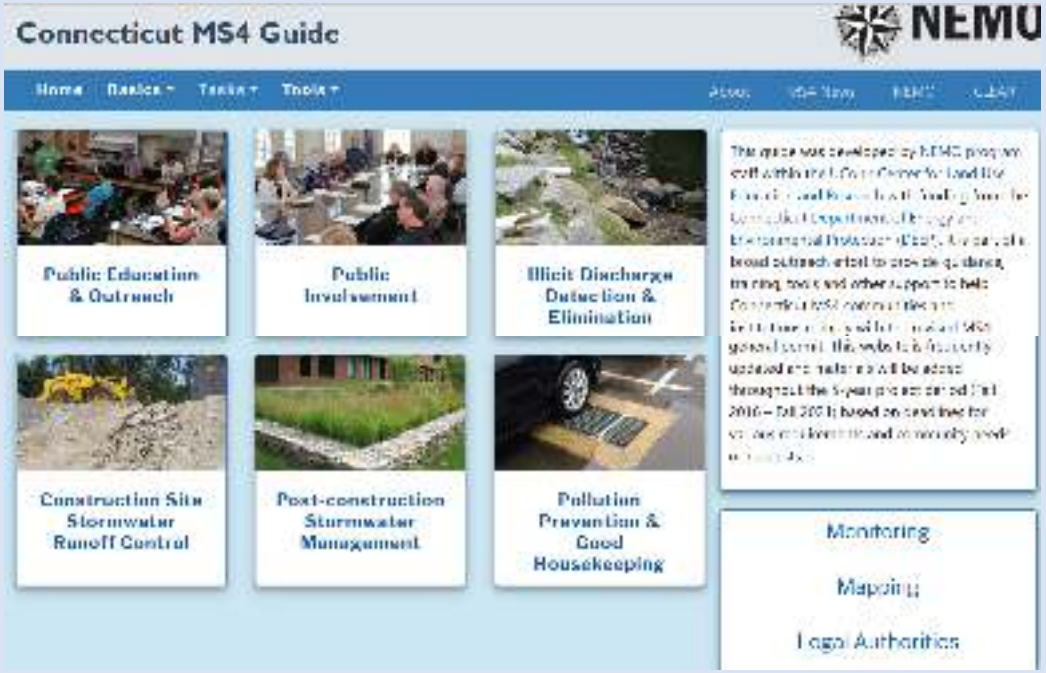
Non-Directly Connected Impervious Area (nDCIA)

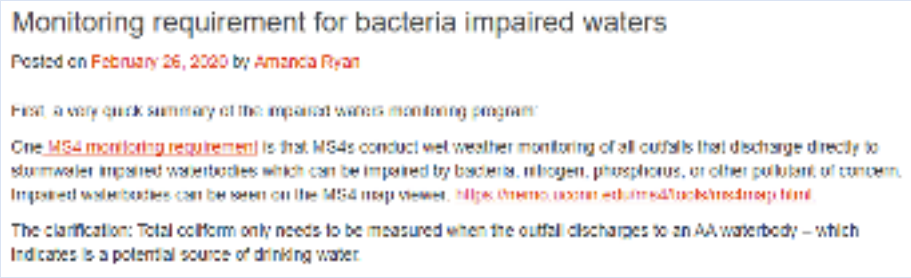
Retrieved from UCONN NEMO "What Type of Impervious Cover do you Have?"
https://nemo.uconn.edu/ic-guide/step2-type.htm

Priority areas means areas in the Urbanized Area and in catchments with more than 11% DCIA or catchments that discharge to an impaired waterbody. If any one of these conditions exists, it's part of the priority area.

MS4 Assistance Program

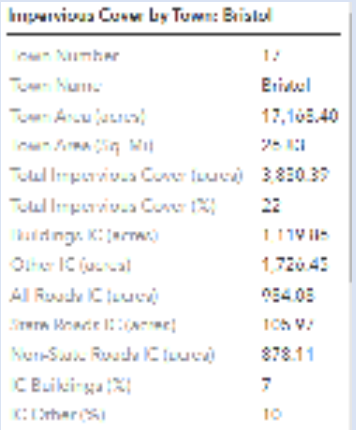
NEMO-Nonpoint Education for Municipal Officials



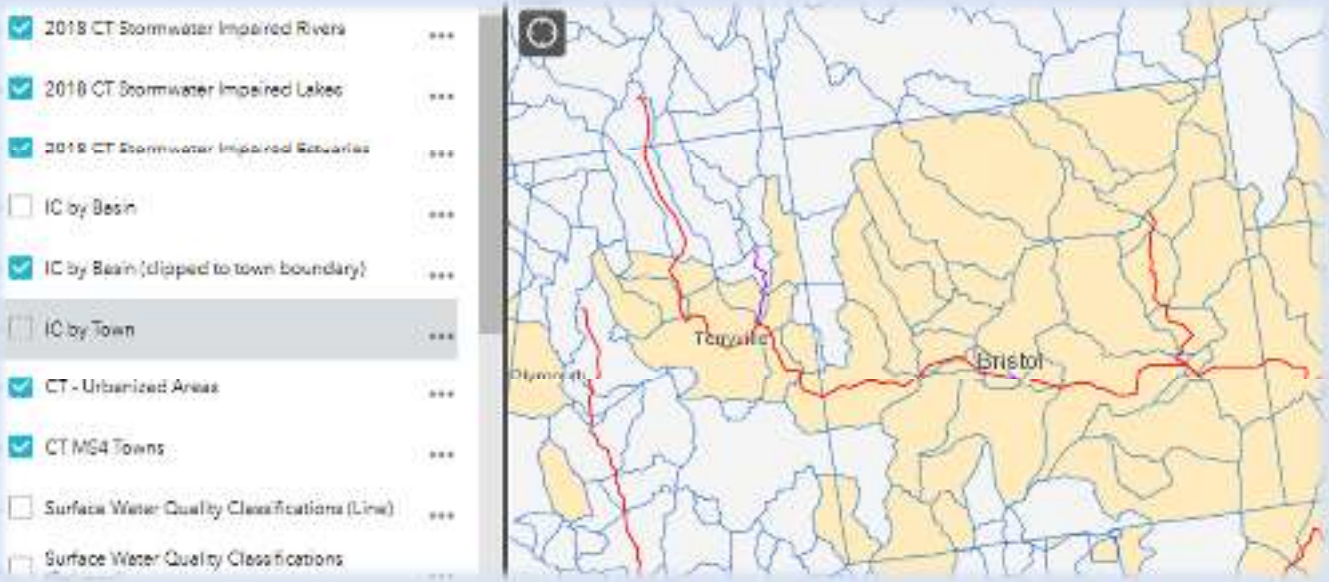


MS4 Permit Overview

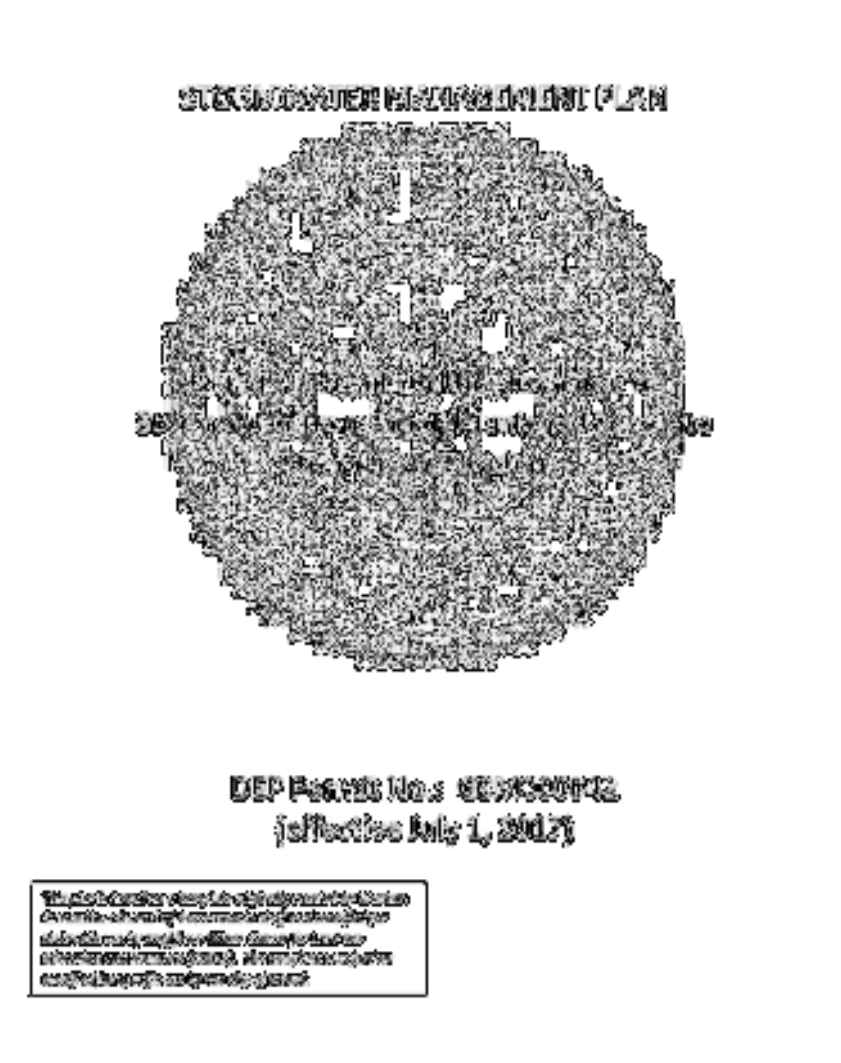
Bristol on the MS4 Map



Impervious Cover by Town: Bristol	
Town Number	17
Town Name	Bristol
Town Area (acres)	17,165.40
Town Area (Sq. Mi)	26.82
Total Impervious Cover (acres)	3,830.37
Total Impervious Cover (%)	22
Buildings IC (acres)	1,119.05
Other IC (acres)	1,726.43
All Roads IC (acres)	954.05
State Roads IC (acres)	105.94
Non-State Roads IC (acres)	878.11
IC Buildings (%)	7
IC Other (%)	10



Bristol's Stormwater Management Plan (SMP)



- Bristol's plan on implementing its MS4 Program
- Plan can be found here: *http://www.bristolct.gov/226/Informational-Links*

Six Minimum Control Measures (MCMs)

- MCM 1 -Public Outreach & Education
- MCM 2 - Public Involvement / Participation
- MCM 3 - Illicit Discharge Detection & Elimination
- MCM 4 - Construction Site Stormwater Runoff Control
- MCM 5 - Post Construction Stormwater Management
- MCM 6 - Pollution Prevention / Good Housekeeping

Plus, outfall monitoring

MCM 1 – Public Outreach & Education

This minimum control measure outlines a program to communicate common sources of stormwater pollution and the impacts of polluted stormwater to the public. This can be accomplished through distributing educational materials to the community and conducting outreach activities. The following BMPs and implementation schedule serve as Bristol's MS4 Public Education Program.

Goals:

- Raise public awareness that polluted stormwater runoff is the most significant source of water quality problems;
- Motivate residents to use Best Management Practices (BMPs) that reduce polluted stormwater runoff; and
- Reduce polluted stormwater runoff in town as a result of increased awareness and utilization of BMPs.

BMP	Lead department / individual	Month / year of implementation	Measurable goal
BMP 1-1 Implement public education program	Department of Public Works engineering (DPW eng)/Environmental engineer (env eng)	By June 2018 and continue until permit expires	By June 2018 and at least once per year, update the public works community page to include additional links with information on impacts of stormwater discharges on water bodies and impacts of stormwater discharges to reduce pollutants in stormwater runoff".
BMP 1-2 Address education/ outreach for pollutants of concern	DPW eng/env eng	By June 2018 and continue until permit expires	By June 2018, compile to the public works community page additional links to include information on the management of pet waste, application of fertilizers, herbicides and pesticides, impervious cover and impacts of illicit discharges and improper disposal of waste into the MS4 and discharges associated with stormwater pollutants of concern

Sustainable CT
Local Actions. Statewide Impact.

Permit tasks for MCM 1:

Update and implement public education and outreach program

MCM 2 – Public Involvement & Participation

This minimum control measure identifies the process for public involvement and participation in the town's stormwater management efforts.

Goals:

- Involve the community in planning and implementing the town's stormwater management activities.
- Provide a minimum 30 day notice to the public for this plan and annual reports.

MCP	Lead department / individual	Month / year or frequency	Measurable goal
[illegible] Comply with public notice requirements for the annual Annual Reports	[illegible]	July 1, 2019 and continue until permit expires	Publish a public notice on City's website and provide [illegible] information for public input and information on MS4 and annual reports.
[illegible] Public Information/Participation	[illegible]	June 2019 and continue until permit expires	[illegible]
[illegible] Pequabuck River Watershed Plan	[illegible]	June 2019 and continuing for plan implementation	[illegible] participation

Bristol Green Team

Permit tasks for MCM 2:

Post draft Annual Report
Submit final Annual Report to DEEP

MCM 3 – IDDE (Illicit Discharge Detection & Elimination)

Goal:

Find the source of any illicit discharges; eliminate those illicit discharges; and ensure ongoing screening and tracking to prevent and eliminate future illicit discharges.

SMP	[illegible]	Month / year of implementation	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Re: Notice of Violation – Debris along the edge of the tributary – Avenue

An inspection of the above mentioned property was conducted on Jun[illegible] indicate that you own both sides of the brook. It appears that th[illegible] debris within the river.

You are required to take the following actions and repairs.

- Immediately remove all trash/debris along the sides of the rive[illegible] fallen into the river.
- Keep all dumpsters closed and all trash contained within a dump[illegible]

Stormwater Management Plan

Permit tasks for MCM 3:

Citizen reporting program
Record illicit discharge abatement activities
Maintain Inventory of known SSOs (5 year look back)
Develop written IDDE program
Establish IDDE legal authority
Map all MS4 outfalls
Complete dry weather outfall sampling (for high & low priority catchments)
Detailed MS4 mapping

MCM 4 – Construction Runoff Controls

SMP	Lead department / individual	Min. City / year of implementation	Measurable goal
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Stormwater Permit Information for Developers and Contractors

If your project disturbs more than one acre of land, regardless of zoning, you are responsible for the requirements of the Connecticut Department of Energy & Environmental Protection (DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities ("Construction Stormwater General Permit").

If your project is greater than 5 acres, you are required to submit a registration for the Construction Stormwater General Permit at least 60 days prior to the planned commencement of the construction activity. A copy of your Storm water Pollution Control Plan shall be provided to the City upon request.

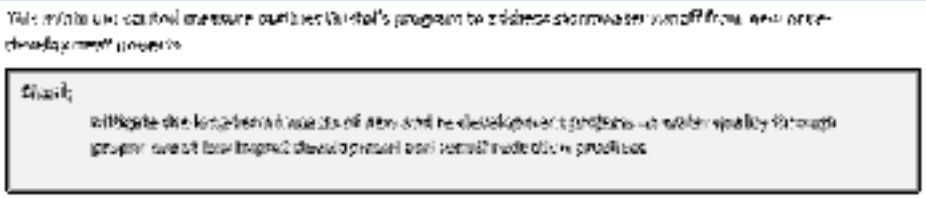
If your project is between one and five acres, you must adhere to the erosion and sediment control and use regulations of the City of Bristol which can be found in the Code of Ordinances, Zoning Regulations and Inland Wetland and Watercourses Regulations, as well as the Connecticut Guidelines for Soil Erosion and Sediment Control and the Connecticut Stormwater Quality Manual. No registration or plan review and certification is required for such construction activity provided a City of Bristol land use commission (i.e. Planning, Zoning, or Inland Wetland) reviews and issues a written approval of the proposed erosion and sediment control measures, pursuant to the requirements of section 22a-329 of the Connecticut General Statutes.

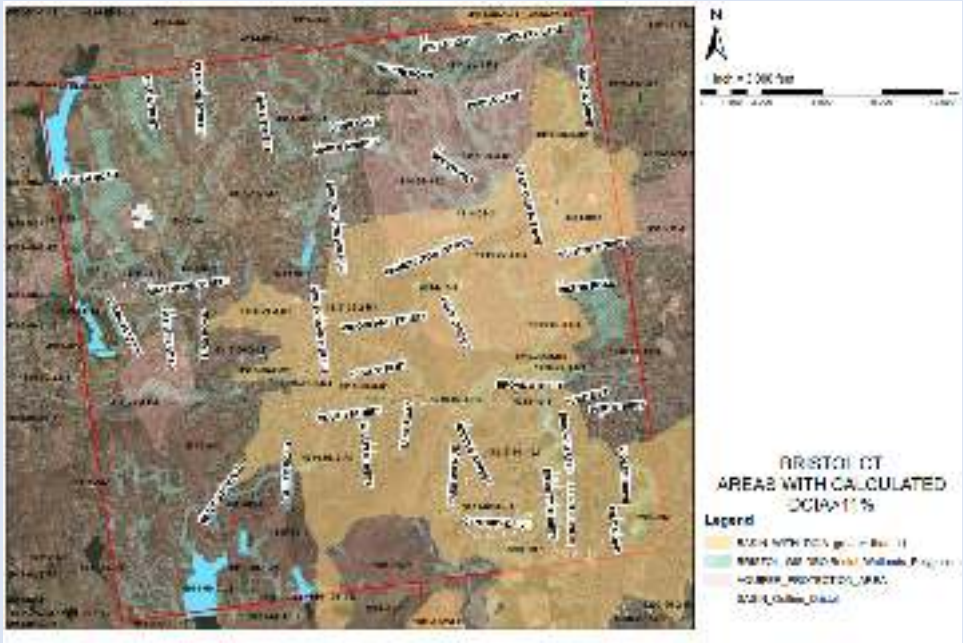
Stormwater Management Plan

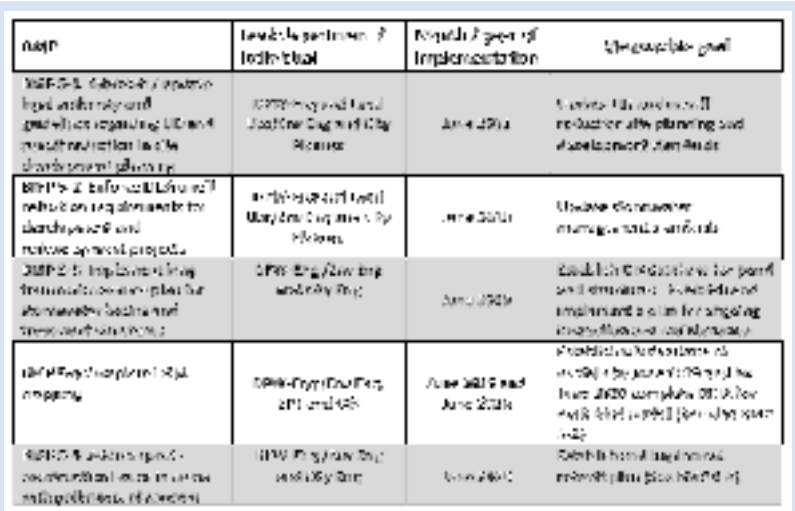
Permit tasks for MCM 4:

Interdepartmental Coordination plan
Site plan review for stormwater practices
Site inspections for stormwater practices
Receive public input to development projects
Notify developers of DEEP construction general permit

MCM 5 – Post-Construction Stormwater





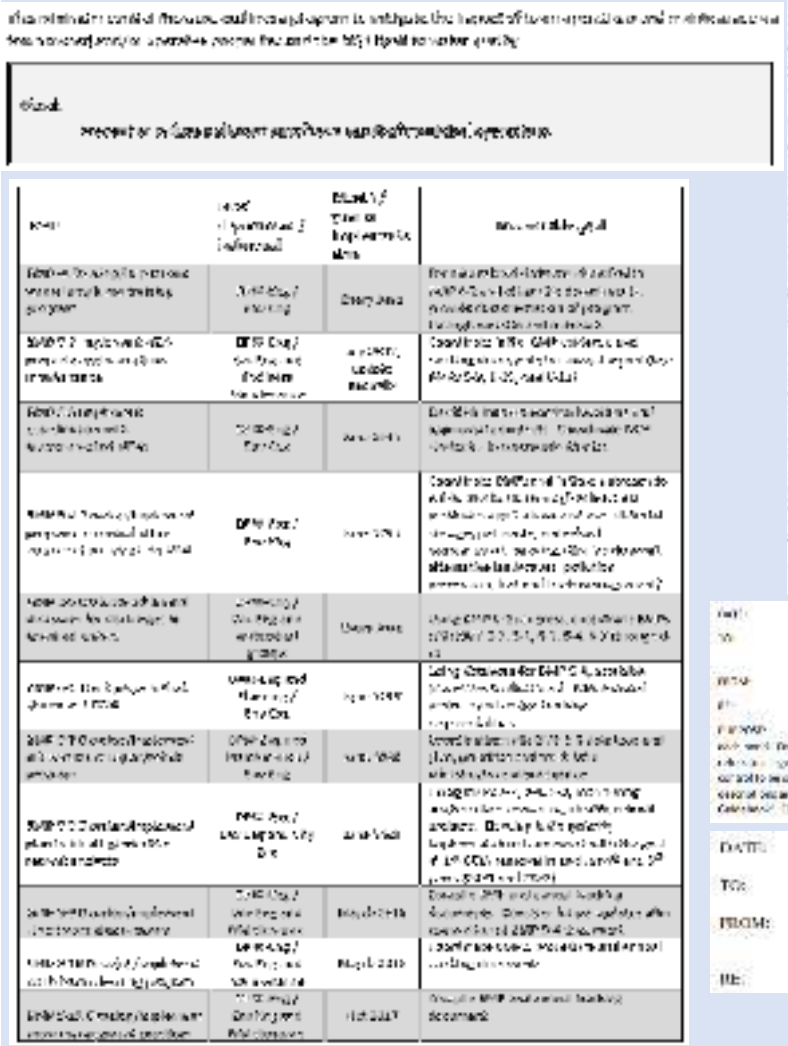


Stormwater Management Plan

Permit tasks for MCM 5:

Maintenance plan for SW ponds & treatment structures
Determine baseline DCIA
Review regulations for LID barriers
Legal authority for SW retention standards

MCM 6 – Good Housekeeping / Pollution Prevention

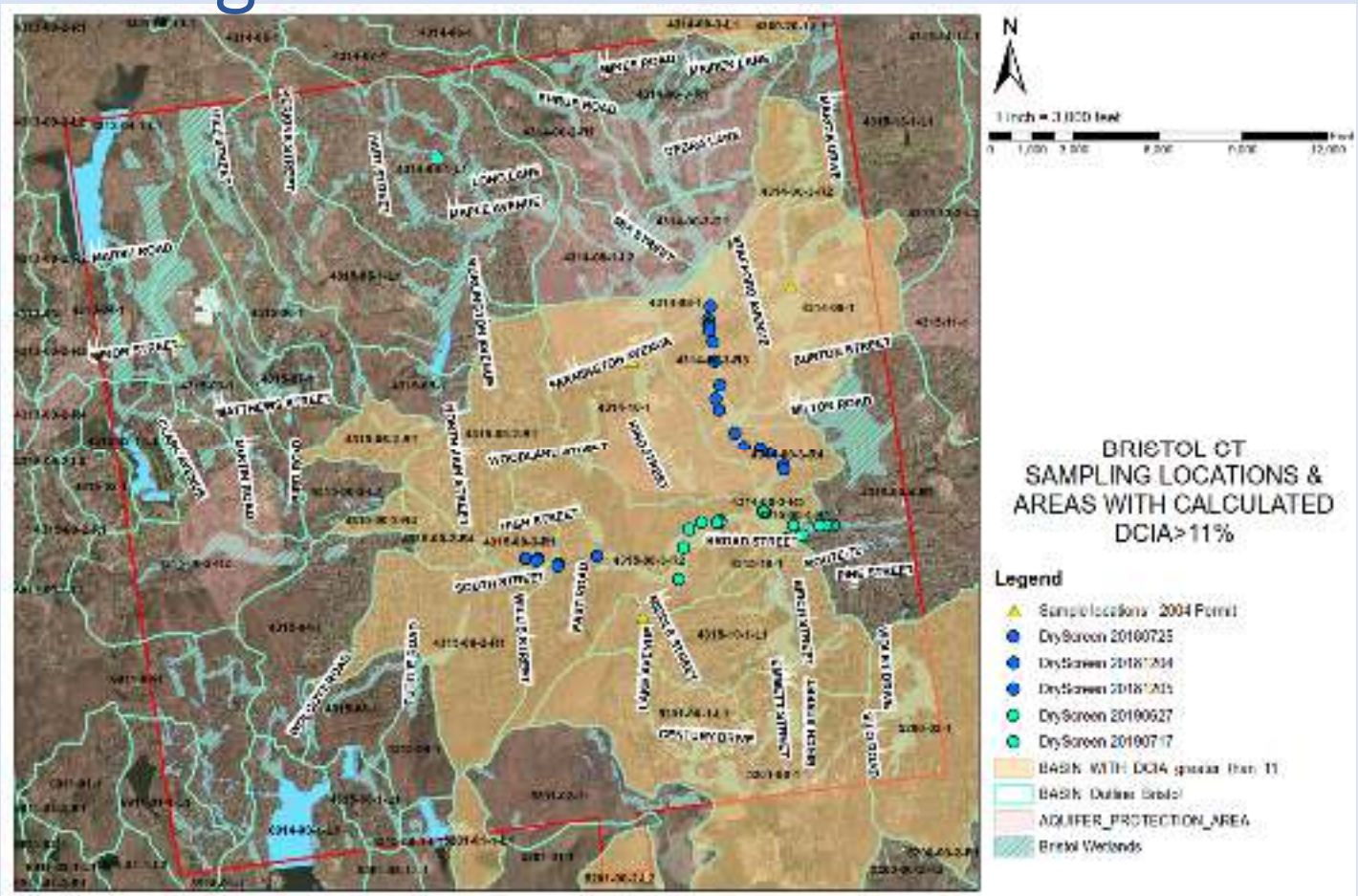


Permit tasks for MCM 6:

- Employee stormwater management training program
- Track DOA (additions and substractions)
- Sweep streets in Priority Areas at least 1x per year
- MS4 Property O&M
- Log catch basin inspections & cleanings (including volume of material removed)
- Develop/implement deicing material SOP
- Implement snow/ice SOP to minimize stormwater pollution
- Establish catch basin inspection and cleaning schedule
- Develop alternate plan for sweeping streets outside Priority Area (if not sweeping < 1x per year)
- Develop retrofit plan
- Inspect all catch basins in Priority Areas
- Implement projects from retrofit plan
- Inspect all catch basins outside Priority Areas
- 2% impervious disconnection goal

Stormwater Management Plan

Outfall Monitoring



Two parts of permit:

1. All outfalls to impaired waters (wet weather) for listed pollutants of concern (nitrogen, phosphorus, bacteria, other (turbidity))

2. IDDE – categorize and rank outfalls, dry weather sampling for high or low priority outfalls, catchment investigations for problem outfalls and screened outfalls exhibiting illicit discharge/SSOs, with follow-up to isolate source of illicit discharge

Permit tasks for Monitoring:

Monitor 6 'worst' outfalls to impaired waters annually

Screen all outfalls to impaired waters

Stormwater Management Plan

SMP – Bristol Watershed Characteristics

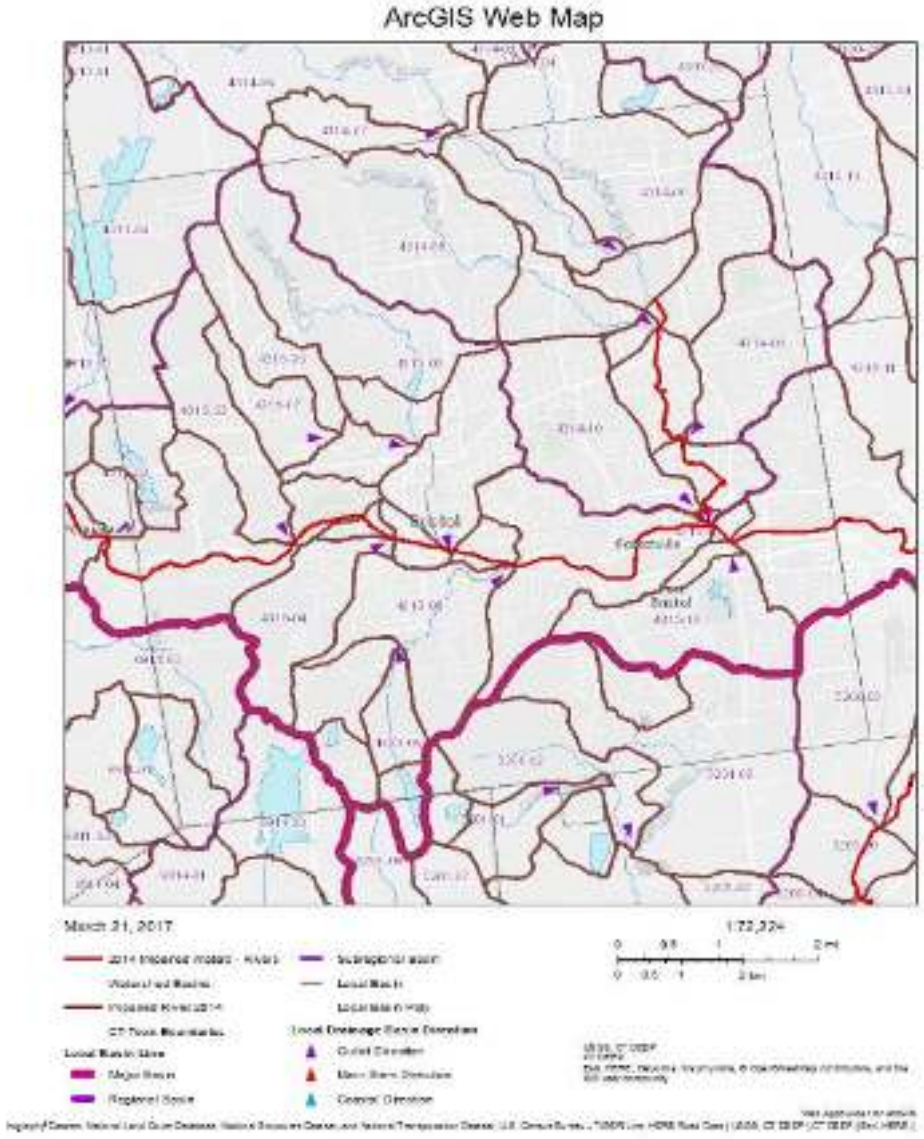


Figure 1 City of Bristol Local Watershed Map

TABLE 1
Water Quality Surface Classifications
Bristol, CT

Drainage Basin Number	% Treated Land Area In Basin	Name	Surface Water Quality	Impaired per Water Quality Standards
4616	42.0	Pequabuck River	B	Yes
4714	29.8	Coppermine Brook	A	Yes
5301	8.7	Eight Mile River	B	-
4614	4.5	Poland Brook	A	
5011	3.5	Hancock Brook	A	
5104	1.8	Mad River	A	
5300	1.7	Quinnipiac River	B	Yes

TABLE 2
Bristol Impaired Water Bodies

Waterbody ID	Water Impairment Description	[illegible]	Potential Sources	Pollutants	Causes/Potential Sources
Pequabuck River – Surface Water Quality Classification – C					
Pequabuck River [illegible]	Fecal coliform exceeding US [illegible] Canal [illegible]	7.01	Combined Sewer Overflows	Coliform bacteria [illegible] Phosphorus	Urban runoff/storm sewers, [illegible] wildlife/pets, other
Copperminee Brook – Surface Water Quality Classification – A					
Copperminee Brook [illegible]	Fecal coliform [illegible]	7.01	Combined Sewer Overflows	Coliform bacteria [illegible]	Urban runoff/storm sewers, [illegible] wildlife/pets, other
Quinnipiac River [illegible] not listed in Table 1, is impaired for Dissolved Oxygen [illegible]					

Water

[illegible]

Wastewater

[illegible]

Bristol MS4 Highlights

QUESTIONS?