2021 MS4 ANNUAL REPORT

Town of Canton, Connecticut

MS4 General Permit
Town of Canton 2021 Annual Report
Permit Number GSM 000091
January 1, 2021 – December 31, 2021
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This report documents Canton's efforts to comply with the conditions of the MS4 General Permit to the maximum extent practicable (MEP) from January 1, 2021 to December 31, 2021.

Part I: Summary of Minimum Control Measure Activities

1. Public Education and Outreach (Section 6 (a)(1) / page 19)

1.1 BMP Summary

BMP	Activities in current reporting period	Sources Used (if applicable)	Method of Distribution	Audience (and number of people reached)	Measurable Goal	Department / Person Responsible	Additional details
1-1 Implement public education and outreach	*Virtual Film Festival*	*Online*	*Farmington River Watershed Association*	*~250*	*Provide access to stormwater literature.*	*Farmington River Watershed Association*	
1-2 Address education/ outreach for pollutants of concern	1. *The impact of impervious cover, septic systems, and fertilizer use was discussed in a brochure and distributed at the Canton*	1. *Distribution of hardcopies* 2. *Not Applicable* 3. *Community Event performed with social distancing. Refuse was collected at waterways, parks, athletic*	1. *Brochures* 2. *Planting of sugar maple at the Community Center.* 3. *The Department of Public Works provided PPE equipment to Town residents.*	1. *~25* 2. *Due to COVID concerns, only Town staff were present* 3. *Town-wide* 4. *~66*	*Educate and provide pet waste and other waste management to the public.*	*Director of Public Works, Land Use, Farmington River Watershed Association*	*Refer to **Appendix IV** for a summary provided by the Farmington River Watershed Association of public education and*

	Town Hall. *2. Earth Day Celebration* *3. Annual Spring Clean-up Event* *4. Virtual River Clean-Up*	*fields, roadways, and schools. The DPW collected the bagged refuse after the event for proper disposal.* *4. Watershed-wide River clean-up*	*4. Farmington River Watershed Association*				*outreach conducted in the Town.*
Additional BMP: *1-3 Hazardous Waste Collection*	*In partenership with Farmington, Granby, and Simsbury. Collection days are provided per year.*	*Multiple websites. See "Additional Details".*	*Announcements through CTDEEP, Facebook, and Town website.*	*≥500*	*Educate and provide hazardous waste collections*	*Director of Public Works.*	

1.2 Describe any Public Education and Outreach activities planned for the next year, if applicable.

1. Continue with Hazardous Waste collection days with the neighboring towns.
2. Update/add links of informational websites and videos that relate to bacteria impairments.
3. All of the above mentioned activities (1-1, 1-2) are planned for 2022, with specific dates to be determined.

2. Public Involvement/Participation (Section 6(a)(2) / page 21)

2.1 BMP Summary

BMP	Status (Complete, Ongoing, In Progress, or Not started)	Activities in current reporting period	Measurable Goal	Department / Person Responsible	Date completed or projected completion date (include the start date for anything that is 'in progress')	Location Posted	Additional details
2-1 Final Stormwater Management Plan publicly available	*Completed*	*Not Applicable.*	*Provide public notice and access to the Town's Stormwater Management Plan.*	*Town Engineer/Town Planner*	*April 1, 2017*	*https://www.townofcantonct.org/content/44105/44701/44841/44983/default.aspx*	
2-2 Comply with public notice requirements for Annual Reports (annually by 2/15)	*Completed Annually*	*Public notice posted on Town Website.*	*Provide public notice and access to the MS4 Annual Report.*	*Town Engineer*	*Feb. 15, 2022*	*https://www.townofcantonct.org/content/44105/44701/44841/44983/default.aspx*	*Previous Annual Reports were submitted by February 15th.*
Additional BMP: *2-3 Hazardous Waste Collection*	*Ongoing*	*In partnership with Farmington, Granby, and Simsbury. Collection days are provided per year.*	*Educate and provide hazardous waste collections*	*Department of Public Works.*	*Annually*	*Press Release: https://www.townofcantonct.org/filestorage/44105/44701/44841/48302/HHW_PRESS_RELEASE_2021.pdf* *DEEP: https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Household-Hazardous-Waste/HHW-Collection-Schedule* *Facebook: https://m.facebook.com/CantonC*	

						T/posts/the-town-of-canton-will-hold-a-household-hazardous-waste-collection-day-on-satur/4455836294443632/?locale=sw_KE&_rdr	
Additional BMP: *2-4 Establish Stormwater Committee.*	*Ongoing*	*This committee meets frequently with Atlas (consultant) over stormwater management techniques, implementation, and BMPs.*	*Coordinate and implement the Stormwater Management Plan across departments and commissions.*	*Department of Public Works/Land Use Departments*	*Established June 2017-Ongoing.*	*Not Applicable*	

2.2 Describe any Public Involvement/Participation activities planned for the next year, if applicable.

1. *Annual Spring Clean-up Event*
2. *Earth Day Celebration*
3. *Brochures to be distributed on the Stormwater Retrofit Program.*

**It should be noted that all future activities are COVID-dependent, and may result in less participation or cancellation.*

3. Illicit Discharge Detection and Elimination (Section 6(*a*)(3) and Appendix B / page 22)

3.1 BMP Summary

BMP	**Status** (Complete, Ongoing, In Progress, or Not started)	**Activities in current reporting period**	**Measurable Goal**	**Department / Person Responsible**	**Date completed or projected completion date** (include the start date for anything that is 'in progress')	**Additional details**
3-1 Develop written IDDE program (Due 7/1/19)	*Complete*	*Not Applicable*	*Develop written plan of IDDE program*	*Chief Administrative Officer/Town Engineer/ Town Planner*	*October 24th, 2018*	*The Town completed a written IDDE Program, which can be located through the Town's website.*
3-2 Develop list and maps of all MS4 stormwater outfalls in priority areas (Due 7/1/20)	*Complete*	*Atlas has completed mapping of all outfalls and priority area mapping. The Town, with the assistance of Atlas, will continue QA/QC processes of reviewing GIS systems and editing as necessary.*	*All outfalls mapped.*	*Town Engineer/Atlas*	*Fall 2021*	*Mapping and data will be continually maintained as outfalls are tested, repaired, etc.*
3-3 Implement citizen reporting program (Ongoing)	*Complete*	*Citizen Reporting is maintained electronically by the Canton Town Planner.*	*Provide a reporting mechanism and log.*	*Chief Administrative Office, Town Engineer, Town Planner*	*Ongoing-started in Nov. 2018.*	*Citizens may report illict discharges by contacting the Land Use Department or reporting dry weather discharges via the Q-Notify System.*
3-4 Establish legal authority to prohibit illicit discharges (Due 7/1/19)	*Complete*	*The Town has written and adopted a Stormwater Connection Ordinance.*	*Establish legal authority to prohibit illicit discharges.*	*Chief Administrative Officer, Town Engineer, Town Planner.*	*October 24th, 2018*	*Stormwater Ordinance Connection: https://ecode360.com/CA2778/laws/LF1053368.pdf*
3-5 Develop record keeping system for IDDE tracking (Due 7/1/17)	*Ongoing*	*The Town continues to maintain a list of reports that include the IDDE.*	*Maintain list.*	*Chief Administrative Officer, Town Engineer, Town Planner*	*October 24th, 2018*	*Maintaining of records of reported IDDEs is maintained by the Town Department of Public Works*

3-6 Address IDDE in areas with pollutants of concern	*Ongoing*	*Dry Weather screening was conducted at 13 outfalls to impaired waterbodies in 2021.*	*Wet weather testing and additional investigation as necessary.*	*Town Engineer, Atlas*	*Ongoing- Started in 2021*	*Atlas assists the Town with impaired outfall sampling and inspections.*
Additional BMPs: 3-7 Consolidate IDDE Tracking Spreadsheets	*Ongoing*	*Continuously working towards developing a master IDDE tracking spreadsheet.*	*Compile all IDDE tracking requirements into one spreadsheet.*	*Town Engineer, Town Planner*	*Ongoing- Started in 2021*	*Tracking of reported IDDEs is maintained by the Town Department of Public Works*

3.2 Describe any IDDE activities planned for the next year, if applicable.

1. Continue wet weather testing at outfalls to impaired waters
2. Continue follow-up dry weather screening/testing
3. Respond to any illicit discharge complaints
4. Ensure all employees involved in IDDE Program understand the logging process.

3.3 Provide a record of all citizen reports of suspected illicit discharges and other illicit discharges occurring during the reporting period and SSOs occurring July 2021 through end of reporting period using the following table. Illicit discharges are any unpermitted discharge to waters of the state that do not consist entirely of stormwater or uncontaminated groundwater except those discharges identified in Section 3(a)(2) of the MS4 general permit when such non-stormwater discharges are not significant contributors of pollution to a discharge from an identified MS4.

Location (Lat long/ street crossing /address and receiving water)	**Date and duration of occurrence**	**Discharge to MS4 or surface water**	**Estimated volume discharged**	**Known or suspected cause / Responsible party**	**Corrective measures planned and completed** (include dates)	**Sampling data** (if applicable)
OF-105	*4/13/2021*	*Yes*	*Unknown*	*TBD*	*Pending SSOs investigation. Sampling data was indicative of elevated concentrations of bacteria, however it is unclear whether the bacteria concentrations are indicative of a septic failure or natural background conditions.*	*Refer to **Part II: Impaired Waters Investigation and Monitoring** of this report.*
OF-107	*4/13/2021*	*Yes*	*Unknown*	*None*	*Based on analytical results, this discharge is groundwater influence.*	*Refer to **Part II: Impaired Waters Investigation and Monitoring** of this report.*

3.4 Provide a summary of actions taken to address septic failures using the table below.

Method used to track illicit discharge reports	Location and nature of structure with failing septic systems	Actions taken to respond to and address the failures	Impacted waterbody or watershed, if known	Dept. / Person responsible
2021 Septic Failures- *Refer to Appendix IV for FVHD documentation.*				
Farmington Valley Health District (FVHD)	*14 Sweetheart Mountain-Septic tank in poor condition*	*New tank installed*	*Unknown*	*FVHD*
	52 Country Lane-no failure	*New tank & fields installed*	*None.*	*FVHD*
	12B Freedom-Truck damaged septic tank	*New tank installed*	*Unknown*	*FVHD*
	32 E Mountain-Unknown nature	*Site evaluation, and new tank installed*	*Unknown*	*FVHD*
	13 Sweetheart Mountain-Pool installation	*New tank installed*	*None.*	*FVHD*
	17 Pond Rd.-Real Estate Inspection	*New tank & fields installed*	*Unknown*	*FVHD*
	19 Deer Run-House sale	*New tank and fields installed*	*Unknown*	*FVHD*
	57 Sterling-Addition	*New building sewer line installed*	*Unknown*	*FVHD*
	17 Mohawk-Deterioriated septic tank	*New tank and d-box installed*	*Unknown*	*FVHD*
	50 Bunker Hill-"old"	*Site evaluation completed, no repair work.*	*Unknown*	*FVHD*
	23 Pine Acres-"leach field is full"	*New tank and fields installed*	*Unknown*	*FVHD*
	144 Indian Hill-fields failing	*New tank and fields installed*	*Unknown*	*FVHD*
	620 Albany-"tank needs replacement"	*New tank installed*	*Unknown*	*FVHD*
	6 Erickson-septic tank in poor condition	*New tank installed*	*Unknown*	*FVHD*
	111 Wright-tank collapse	*New tank installed*	*Unknown*	*FVHD*
	51 Breezy Hill-Addition request	*No action*	*Unknown*	*FVHD*
	8 Silver Mine Acres-septic tank in poor condition	*New tank installed*	*Unknown*	*FVHD*
	17 Woodland-tank in poor condition	*New tank and d-box installed*	*Unknown*	*FVHD*
	50 Bristol-"breakout"	*PE required to design repair*	*Unknown*	*FVHD*
	82 Washburn-new barn	*Building sewer pipe installed*	*None.*	*FVHD*
	25 Old Canton-failure	*New tank and fields installed*	*Unknown*	*FVHD*
	70 Trailsend-failure	*New tank and fields installed*	*Unknown*	*FVHD*
	11 Country-cracked tank	*New tank installed*	*Unknown*	*FVHD*
	50 Cherry Brook-tank in poor condition	*New tank installed*	*Unknown*	*FVHD*

	5 Uplands-tank in poor condition	*New tank and d-box installed*	*Unknown*	*FVHD*
	7 Woodridge Circle-failed inspection	*New tank and fields installed*	*Unknown*	*FVHD*
	6 West View-aged	*New tank and fields installed*	*Unknown*	*FVHD*
	21 Birch Knoll-addition	*New building sewer line installed*	*Unknown*	*FVHD*
	81 Morgan-failure	*New fields installed*	*Unknown*	*FVHD*
	139 Indian Hill-tank in poor condition	*New tank and d-box installed*	*Unknown*	*FVHD*
	10 Shagbark-septic tank in poor condition	*New tank and d-box installed*	*Unknown*	*FVHD*
	308 East Hill-leachfields wet	*Site evaluation complete-no repair work*	*Unknown*	*FVHD*
	30 Morgan-sepic breakout	*Effluent pipe and fields installed*	*Unknown*	*FVHD*
	5 Shagbark-system saturated	*New tank and fields installed*	*Unknown*	*FVHD*
	9 Erickson-leaching fields not working	*New fields installed*	*Unknown*	*FVHD*
	4 Noja-septic tank in poor condition	*New tank installed*	*Unknown*	*FVHD*
	115 Indian Hill-clog in grey water	*Pipe replaced*	*Unknown*	*FVHD*
	121 Indian Hill-needs new leach field	*No action yet*	*Unknown*	*FVHD*
	50 Dry Bridge-old	*Site evaluation completed-no repair work*	*Unknown*	*FVHD*
	41 Country-unknown	*New tank installed*	*Unknown*	*FVHD*
	760 Cherry Brook-addition	*New tank installed.*	*Unknown*	*FVHD*
2022 Septic Failures				

3.5 Briefly describe the method and effectiveness of said method used to track illicit discharge reports.

Residents of the Town of Canton can report illicit discharges directly to the Land Use Department or through the Q-Notify System. Staff then perform investigations on the illicit discharges. Digital Records on the Town server are used for tracking illicit discharges. While illicit discharge reporting from the public has remained low, the current system in place is adequate to meet the requirements of the MS4 Permit.

3.6 IDDE reporting metrics

Metrics	
Estimated or actual number of MS4 outfalls	225 (est.)

Estimated or actual number of interconnections	11 (est.)
Outfall mapping complete	95%
Interconnection mapping complete	80%
System-wide mapping complete (detailed MS4 infrastructure)	60%
Outfall assessment and priority ranking	100%
Dry weather screening of all High and Low priority outfalls complete	100%
Catchment investigations complete	90%
Estimated percentage of MS4 catchment area investigated	60%

3.7 Briefly describe the IDDE training for employees involved in carrying out IDDE tasks including what type of training is provided and how often it is given (minimum once per year).

Best Management Practice is provided to all DPW staff for new procedures, as detrmined by the Stormwater Committee, utilizing the Stormwater Management Plan and information provided by NEMO to train Town employees.

4. Construction Site Runoff Control (Section 6(a)(4) / page 25)

4.1 BMP Summary

BMP	**Status** (Complete, Ongoing, In Progress, or Not started)	**Activities in current reporting period**	**Measurable Goal**	**Department / Person Responsible**	**Date completed or projected completion date** (include the start date for anything that is 'in progress')	**Additional details**
4-1 Implement, upgrade, and enforce land use regulations or other legal authority to meet requirements of MS4 general permit (Due 7/1/20)	*Completed*	*In early January 2022, the Town and Atlas met to discuss aspects of the MS4 Permit. The Town is continuing to research tools and options to enforce land use regulations or other legal authority of privately-ownd properties to meet the requirements of the MS4 Permit.* *The ZEO maintains records of identifieable complaints, inspections, and notices of violations served, orders issued, or any other actions taken in relation to Section 7.13 of the Zoning Regulations.*	*Revise land-use regulations.*	*Town Planner, Zoning Enforcement Officer, Wetlands Agents*	*The updated Zoning Regulations were adopted on April 2nd, 2014. These regulations incorporated a detailed **Stormwater Management Plan Requirement**, (Section 7.13 of the Town's Zoning Regulations), to address all new developments or other disturbances to an existing development that disturbs ten thousand square feet or more of an area exposed to rainfall. Enforcement under the Town's Zoning Regulation is as follows: "The ZEO is authorized to issue a stop work order, cease and desist order, cease and correct order, or any order to undertake specified actions if in his or her judgement the use of land, buildings and other structures, or the construction, reconstruction, enlargement, extension, moving or structural alteration of a building or other structure, are not being carried out in compliance with these regulations, or any permit or variance" (pp 230 of Canton Zoning Regulations, effective 2014, revised October 29, 2021) issued.*	*Zoning Regulations: https://www.townofcantonct.org/filestorage/19342/19345/19617/45153/45254/45238/47139/Zoning_Regulations%3B_No_Appendix%3B_Revised_10-29-21.pdf*
4-2 Develop/Implement plan for interdepartmental coordination in site plan review and approval (Ongoing)	*Completed-Ongoing*	*A Stormwater Management Plan is to be included as part of site plans for all applicable developments. All site plans are submitted to a commission for review. According to these*	*Develop/implement plan for interdepartmental coordination in site plan review and*	*Town Engineer*	*Town municipal departments have coordinated since the beginning of the MS4 Permit in 2017. In 2019, the WPCF and DPW redeveloped their facilities in compliance with MS4 construction requirements, and retain stormwater drainage on-site.*	*Zoning Regulations: https://www.townofcantonct.org/filestorage/19342/19345/19617/45153/45254/45238/47139/Zoning_Regulations%3B_No_Appendix%3B*

		regulations, "Other technical and minor modifications may be approved jointly by the Zoning Enforcement Officer, Building Official and Fire Marshal, or with the consultation of other relvent Town Staff when proposed changes are limited to…drainage; grading; erosion and sedimentation controls…"(Zoning Regulations, effective 2014, revised October 29, 2021).	*approval.*			*Revised_10-29-21.pdf* *In 2019, the WPCF and DPW redeveloped their facilities in compliance with MS4 construction requirements and retain stormwater*
4-3 Review site plans for stormwater quality concerns (Ongoing)	*Completed-Ongoing*	*The Town continues to utilize zoning regulations and processes as a way of reviewing site plans for stormwater quality concerns.*	*Issue review comments, and review revised plans for compliance.*	*Zoning Enforcement Officer, Wetlands Agents, Town Engineer*	*Completed in June 2018. This process is continued to present.*	
4-4 Conduct site inspections (Ongoing)	*Ongoing*	*Active sites are monitoried throughout the year by the Zoning Enforcement Officer and/or Wetlands Agents.*	*Document Inspections and Actions*	*Zoning Enforcement Officer, Wetlands Agents*	*Completed in 2018-Continued throughout permit lifetime.*	
4-5 Implement procedure to allow public comment on site development (Ongoing)	*Completed*	*The procedure of which allows for public comment on site development is as follows; dependent on zoning area type or regulations, a public hearing may be posted through newspaper or by public hearing signs. During this public hearing, comments or concerns may be voiced on site development.*	*Provide an opportunity for public comment/involvement.*	*Town Planner*	*Completed under previous permit.*	*Zoning Regulations: https://www.townofcantonct.org/filestorage/19342/19345/19617/45153/45254/45238/47139/Zoning_Regulations%3B_No_Appendix%3B_Revised_10-29-21.pdf*
4-6 Implement procedure to notify developers about DEEP	*Completed*	*Compliance with the DEEP construction stormwater permit is required through the Town, and is a*	*Notify developers about DEEP permitting*	*Town Planner/Town Engineer*	*Completed-continued throughout permit lifetime.*	

construction stormwater permit (Ongoing)		*standard condition of local land use approval. The DEEP permitting requirements are supplied to applicants in a pre-empted application checklist.*	*obligations.*			

4.2 Describe any Construction Site Runoff Control activities planned for the next year, if applicable.

There are several sites with proposed improvements that will affect stormwater runoff in 2022. The Town will continue to utilize zoning regulations and inspections as a means to ensure BMPs are utilized by site developers.

5. Post-construction Stormwater Management (Section 6(*a*)(5) / page 27)

5.1 BMP Summary

BMP	**Status** (Complete, Ongoing, In Progress, or Not started)	**Activities in current reporting period**	**Measurable Goal**	**Department / Person Responsible**	**Date completed or projected completion date** (include the start date for anything that is 'in progress')	**Additional details**
5-1 Establish and/or update legal authority and guidelines regarding LID and runoff reduction in site development planning (Due 7/1/22)	*Completed*	*All new site development or modification, or other disubrance to an existing development that disturbed 10,000 square feet or more of an area exposed to rainfall is required to maintain a Stormwater Management Plan.*	*Adopt BMPs for any activity, operation, or facility which may cause or contribute to the pollution or contamination of stormwater, the storm drain system, or waters of the U.S.*	*Town Planner*	*Completed*	
5-2 Enforce LID/runoff reduction requirements for development and redevelopment projects (Due 7/1/22)	*Ongoing*	*Adopted Zoning Regulations and current Subdivision Regulations incorporate provisions for narrow travel-way widths, alterntive cul-de-sac configurations, permeable pavers, and utilizing ditches for stormwater conveyance. These regulations also allow for the permanent reduction of required parking.*	*Enforce regulations and guildines of LID and runoff reductions.*	*Town Planner*	*In progress- Started in 2021 and to be adopted 2022-2023.*	
5-3 Identify retention and detention ponds in priority areas (Due 7/1/20)	*Ongoing*	*The Town is currently working towards compiling a complete list of retention and detention basins, as well as dry-wells. Atlas will then convert this data into a GIS stormwater mapping software.*	*Compile a list and complete mapping of Town-owned detention basins.*	*Town Engineer/Director of Public Works*	*In Progress- Started 2021*	
5-4 Implement long-term maintenance plan for stormwater basins and treatment structures (Ongoing)	*Ongoing*	*The Town is currently working with Atlas to develop and implement inspections of stormwater basins and treatment structures, and to perform maintenance as needed.*	*Annually inspect and maintain facilities.*	*Town Engineer/Director of Public Works*	*In progress- Started July 1st, 2019.*	

5-5 DCIA mapping (Due 7/1/20)	*Completed*	*DCIA for the Town was calculated with the assistance of Nathan L. Jacobson & Associates. Atlas has mapped the DCIA areas.*	*Provide an understanding of the Town's overall DCIA as related to the MS4 system.*	*Town Engineer, Director of Public Works, Town Planner, Atlas*	*Completed in December 2021*	
5-6 Address post-construction issues in areas with pollutants of concern	*Ongoing*	*It is planned to implement that in post-construccction areas, if erosion or high accumulation of sedimentation are found during annual inspections conducted under the long-term post-construction maintenance plan, the Town will prioritize these areas for DCIA retrofit Projects.*	*Address post-construction areas where erosion or high accumulation of sedimentation are found during annual inspections.*	*Town Engineer, Director of Public Works, Town Planner*	*Ongoing-Started in 2018*	*The Stormwater Retrofit Program was drafted in late 2021, and is under review by the Town. This Retrofit Program will help the Town address areas with pollutants of concern. The draft Stormwater Retrofit Program is located in **Appendix V**.*

5.2 Describe any Post-Construction Stormwater Management activities planned for the next year, if applicable.

1. *Develop process for annual inspections of Post-Construction Stormwater Management activities.*
2. *Develop and implement the monitoring, cleaning, and repairing of settling/silting basins, catch basins, outfalls, swales, etc.*

5.3 Post-Construction Stormwater Management reporting metrics

For details on this requirement, visit https://nemo.uconn.edu/ms4/tasks/post-construction.htm. Scroll down to the DCIA section.

Metrics	
Baseline (2021) Directly Connected Impervious Area (DCIA)	32.14
DCIA disconnected (redevelopment plus retrofits)	TBD
Retrofit projects completed	TBD
DCIA disconnected	TBD
Estimated cost of retrofits	TBD
Detention or retention ponds identified	7 /~7 total

5.4 Briefly describe the method to be used to determine baseline DCIA.

The DCIA Mapping was conducted in substantial accordance with the methodologies presented in the October 25, 2017 UConn CLEAR Webinar, entitled "CT MS4 Mapping Details, Clarifications and Tools", the October 19, 2018 UConn CLEAR Workshop entitled "CT MS4 Mapping Workshop", as well as information contained in the EPA reference entitled "Estimating Change in Impervious Area (IA) and Directly Connected Impervious Area (DCIA) for Massachusetts Small MS4 Permit utilizing Sutherland equations".

The DCIA computations were prepared utilizing Connecticut Environmental Conditions Online MS4 base mapping prepared by UConn CLEAR.

Impaired waters were determined from the report entitled "2018 Integrated Water Quality Report", dated August 01, 2019, prepared by the State of Connecticut Department of Energy and Environmental Protection.

The method to determine the 2012 baseline DCIA was to first compile the CT DEEP drainage basin characteristics in a Microsoft Excel spreadsheet. Information on the Connecticut Environmental Conditions Online MS4 Mapping was used to determine the impervious area breakdown as Buildings, Roads, and Other. For CT DEEP drainage basins that fell in two (2) or more municipalities, the advanced mapping tab of Connecticut Environmental Conditions Online was used to delineate and determine the applicable town CT DEEP basin area. It was assumed that the entire drainage basin characteristics were directly proportional to the applicable town CT DEEP drainage basin area.

In that ConnDOT has a MS4 Stormwater Program which applies to state owned roads and facilities of which the town has no control over, it was decided that the impervious state road area would be determined and deducted from the total impervious road area for each CT DEEP drainage basin, as the impervious road areas associated with state highways and facilities constitutes a considerable portion of the total town impervious road area.

The ConnDOT state highway, parking lot, and facility impervious road areas were then determined for each CT DEEP drainage basin. The ConnDOT state highway, parking lot, and facility impervious road areas were then deducted from the total town impervious road area to determine a town-owned impervious road area for each CT DEEP drainage basin. Subsequent to the above deduction, the total impervious area in acres and percentage was then recomputed for each CT DEEP drainage basin.

The DCIA formula for each of four development types was then utilized to compute the DCIA. The impervious area in acres was assigned to each of the four Sutherland equations, which were modified for the northeastern United States. The Sutherland equation to be utilized was determined using the following methodology:

For impervious percentage less than 6%:
100% of the impervious area was assigned to the slight connectivity Sutherland Equation where DCIA% = 0.01*(IA%)2.0

For an impervious area between 6% and 12 %:
50% of the area was assigned to the partial connectivity Sutherland Equation where DCIA% = 0.04*(IA%)1.7
and
50% was assigned to the average connectivity Sutherland Equation where DCIA% = 0.10*(IA%)1.5

For an impervious area between 12% and 18 %:
50% of the area was assigned to the average connectivity Sutherland Equation where DCIA% = 0.10*(IA%)1.5
and
50% was assigned to the high connectivity Sutherland Equation where DCIA% = 0.40*(IA%)1.2

For an impervious area of greater than 18 %:
100% of the area was assigned to the high connectivity Sutherland Equation where DCIA% = 0.40*(IA%)1.2

The DCIA for each CT DEEP drainage basin was then summed to determine the entire town DCIA. Subsequent to completion of 2012 Baseline DCIA computations, UConn CLEAR Mapping, available on Connecticut Environmental Conditions Online (CT ECO), was revised to separate road impervious area into State Road Impervious Area (Acres) and Town

Road Impervious Area (Acres).

The original 2012 Baseline DCIA computations were revised utilizing the UConn CLEAR State Road Impervious Area (Acres) and Town Road Impervious Area (Acres).

6. Pollution Prevention/Good Housekeeping (Section 6(*a*)(6) / page 31)

6.1 BMP Summary

BMP	**Status** (Complete, Ongoing, In Progress, or Not started)	**Activities in current reporting period**	**Measurable Goal**	**Department / Person Responsible**	**Date completed or projected completion date** (include the start date for anything that is 'in progress')	**Additional details**
6-1 Develop/implement formal employee training program (Ongoing)	*Completed Annually*	*Several meetings were held over the course of the year with Town employees pertaining to the MS4 permit. During these meetings, discussions were had on stormwater management procedures, spill controls, etc.*	*Eliminate non-stormwater discharges into the storm sewers.*	*Director of Public Works, Town Planner, Town Engineer, Fire Marshall*	*Completed Annually.*	*In May of 2021, Atlas conducted a site compliance evaluation at the Department of Public Works, and reviewed the SPCC. During the evaluation, good housekeeping, spill prevention, and material handling practices at the facility were reviewed.*
6-2 Implement MS4 property and operations maintenance (Ongoing)	*Ongoing*	*The Public Works maintains outdoor maintenance at the Town's parks, school grounds, and all other Town-owned land. The Highway Division manages roads, including maintenance, resurfacing, drainage repairs, signage, winter plowing, street sweeping, etc.*	*Eliminates/minimizes spills and/or pollutant releases to the environment and navigable waterways.*	*Director of Public Works*	*Ongoing-Started in 2018.*	*Several dog waste stations have been installed in parks, along trails, and public places throughout the Town. The Town maintenance staff regularly empties and maintains the pet waste cans. Signs related to pet waste and waterfowl have been erected in parks, playgrounds, and along trails.*
6-3 Implement coordination with interconnected MS4s	*Ongoing*	*Atlas has assisted the Town in coordinating between the CTDOT and neighboring municipalities on interconnected MS4s. Currently, 11 interconnections with the CTDOT have been identified and mapped.*	*Update GIS system with interconnected locations.*	*Town Engineer/Atlas*	*Ongoing*	*Figure 4 depicts the location of the CTDOT interconnections, and is located in the attachment "**Figures**".*

6-4 Develop/implement program to control other sources of pollutants to the MS4	*Ongoing*	*The Town utilizes annual training, a plan of action developed with Atlas, as well as BMPs in reducing other possible pollutants to the MS4.*	*Reducing other possible pollutants to the MS4.*	*Land Use Commision/Department of Public Works*	*Ongoing-Started in 2021*	*A plan of action for emergency spills has been created, and is as follows: the Town will immediately notify Atlas of a spill. Atlas will provide spill response and guidance, such as coordinating the elimination of any spill flow to navigable waterways, spill cleanup, reporting, etc.*
6-5 Evaluate additional measures for discharges to impaired waters*	*Ongoing*	*Wet weather sampling events have been conducted, and priority outfalls were identified throughout the Town. Dry weather inspections are continuing to be conducted for the entirety of the Town. As catchments are investigated, the Town will coordinate with Atlas on future measures pertaining to the reduction of bacteria discharge to impaired waters.*	*Pending further investigations, create a program or plan of action to reduce bacterial discharge to impaired waters.*	*Director of Public Works, Town Engineer, Farmington River Watershed Association*	*Ongoing*	*Based on wet-and-dry weather testing, the Town will implement additional measures including but not limited to a retrofit program or source management to correct the problem at municipally-owned or operated facilities, as well as IDDEs, where applicable..*
6-6 Track projects that disconnect DCIA (Ongoing)	*Ongoing*	*A Stormwater Retrofit Program has been drafted, and will be utilized as a method of tracking future DCIA disconnects.*	*Track DCIA disconnects.*	*Director of Public Works, Town Engineer*	*Ongoing-Started in 2021*	*The Town will utilize the Impervious Cover Tracking Sheet created by NEMO. This will allow the Town to track Project information, new developments, redevelopment, retrofits, changes in impervious cover, and cumulative totals. A Draft Stormwater Retrofit Program is located in* ***Appendix IV*** *of this report.*
6-7 Implement infrastructure repair/rehab program (Due 7/1/21)	*Ongoing*	*The Town's method for identifying MS4 infrastructure in need of repair or rehab is as follows:* *1. An annual inspection*	*Reduce/eliminate causes or contributions of pollution or contamination of*	*Director of Public Works*	*Ongoing-Started in 2021*	*The Town has persued funding for storm drainage improvements that may need to be completed.*

		of basins; *2. Rehabilitation work on roadways associated with drainage and paving work;* *3. Notification from Town residents, and follow-up basin inspections.*	*stormwater, the storm drain system, or waters of the U.S.*			
6-8 Develop/implement plan to identify/prioritize retrofit projects (Due 7/1/20)	*Ongoing*	*A Stormwater Retrofit Program has been drafted. Prioritized areas and/or sites were identified based off of DCIA calculations, impaired waterbodies, current stormwater infrastructure, and the MEP of the Town.*	*Develop retrofit projects.*	*Director of Public Works.*	*Ongoing-Started in 2021*	*Refer to **Appendix V** for the draft Stormwater Retrofit Program.*
6-9 Implement retrofit projects to disconnect 2% of DCIA (Due 7/1/22)	*Ongoing*	*As Retrofit Projects are identified, the Town will utilize the Impervious Cover Tracking Sheet to track and work towards disconnecting 2% of DCIA, or the MEP of the Town.*	*Track and reduce DCIA impacts.*	*Director of Public Works*	*Ongoing-Started in 2021*	*Refer to **Appendix V** for the draft Stormwater Retrofit Program.*
6-10 Develop/implement street sweeping program (Ongoing)	*Completed*	*All Town-owned parking lots and streets are annually swept.*	*Track swept lane miles and reduce pollutants to the MS4 system.*	*Director of Public Works.*	*Completed in 2017-Ongoing throughout permit lifetime.*	
6-11 Develop/implement catch basin cleaning program (Ongoing)	*Completed*	*The Town's basin cleaning program is as follows:* *A yearly bid is put forth to contractors, providing a list of catch basins to be cleaned. A daily account of the total basins cleaned, as well as the weight of the material removed from the basins is required. All collected material is tested, and then disposed of at Canton Village Construction Company.*	*Track material usage, and update plan as needed.*	*Director of Public Works*	*Completed in 2017-ongoing throughout permit lifetime.*	*Approximatley 25% of the Town's catch basins are cleaned annually.*

6-12 Develop/implement snow management practices (Due 7/1/18)	*Completed*	*The Town maintains records of applications of sand, anti-icing, or deicing chemicals utilized on an annual basis.*	*Track material usage and update plan as needed.*	*Director of Public Works*	*Completed Annually.*	*The Town has ceased to utilize road sand during winter road applications. Roadway de-icing and anti-icing procedures are utilized to minimize discharge.*

6.2 Describe any Pollution Prevention/Good Housekeeping activities planned for the next year, if applicable.

1. General outfall inspections are to be performed throughout the year, with support from Atlas.

2. Training to applicable employees will be compelted.

3. Street sweeping and basin cleanings will continue in 2022.

6.3 Pollution Prevention/ Good Housekeeping reporting metrics

Metrics	
Employee training provided for key staff	Yes / December 2021
Street sweeping	
Curb miles swept	144 miles
Volume (or mass) of material collected	300 tons
Catch basin cleaning	
Total catch basins in priority areas (value will be less than or equal to total catch basins town or institution-wide)	714
Total catch basins town- (or institution-) wide	1,648
Catch basins inspected	550
Catch basins cleaned	200
Volume (or mass) of material removed from all catch basins	150 tons
Volume removed from catch basins to impaired waters (if known)	TBD
Snow management	
Type(s) of deicing material used	Cargill – Clear Lane Enhanced Deicer
Total amount of each deicing material applied	1,780 tons
Type(s) of deicing equipment used	Truck Spreaders
Lane-miles treated (A lane-mile is a mile of roadway in a single driving lane)	144 miles
Snow disposal location	Mill Pond Park-Parking Area
Staff training provided on application methods & equipment	Yes / December

	2021
Municipal turf management program actions (for permittee properties in basins with N/P impairments)	
Reduction in application of fertilizers (since start of permit)	500 lbs
Reduction in turf area (since start of permit)	1 acres
Lands with high potential to contribute bacteria (dog parks, parks with open water, & sites with failing septic systems)	
Cost of mitigation actions/retrofits	TBD

6.4 Catch basin cleaning program

Provide any updates or modifications to your catch basin cleaning program.
The Town of Canton has found that the current catch basin cleaning program to be more than adequate. Documentation of basins cleaned, amount of material removed, and laboratory testing parameters is well-organized, and provides the Town with a clear focus on priority basins to be cleaned in the next yearly cleaning.

6.5 Retrofit program

Briefly describe the Retrofit Program identification and prioritization process, the projects selected for implementation, the rationale for the selection of those projects and the total DCIA to be disconnected upon completion of each project. (Due 7/1/20)
The Stormwater Retrofit Program was drafted by the Town and Atlas in 2021. The Program was designed to provide guidance on implementing LID, runoff reduction measures, or other means to disconnect or improve stormwater quality. To meet the 2% MEP disconnection goal, DCIA calculations, Urbanized areas, Impaired Waterbodies, and Catchment Rankings were utilized in identifying and prioritizing areas and/or projects to be selected for retrofits. DCIA by Catchment was identified utilizing the the following formulas: **High Connectivity** *DCIA%=0.4*(IA %)^1.2* *Directly Connected Area= (DCIA)(IC Acres)* **Average Connectivity** *DCIA%=0.1*(IA%)^1.5* *Directly Connected Area= (DCIA)(IC Acres)* ***Partial Connectivity*** *DCIA%=0.04*(IA%)^1.7* *Directly Connected Area= (DCIA)(IC Acres)* ***Slight Connectivity*** *DCIA%=0.01*(IA%)^2.0* *Directly Connected Area= (DCIA)(IC Acres)* The Average Connectivity calculation was utilized in assessing the Town's DCIA connectivity, based on the majority of land use defined as agricultural and/or rural, minor

residential communities, and minor-to-moderate commercial or indudustrialized areas. Based on the Average Connectivity calculations for each catchment, no catchments were identified with a connectivity of 11% or greater.

Catchments were then prioritized utilizing the total urbanized area per catchment. Atlas was provided with a shapefile of the 2010 Urbanized Areas for the Town from the 2010 Census or Urban Classificiations, which was imported into ArcGIS for calculation purposes. Utilizing the Overlay-Intersect Tool, Atlas was able to extract the total Urbanized Area acreage per catchment, and then calculate the Urbanized area percentage per catchment utilizing the following formula:

*Urbanized Area (Ac.)/Basin Total Acreage*100*

Based on these calculations, 25 catchments were identified with Urbanized Areas.

Four (4) catchments containing impaired waterbodies were identified for the Town.

Catchment Priority Rankings were conducted for all Sub-Basins in the Town. Multiple factors were taken into consideration when scoring each catchment, including but not limited to DCIA calculations, previous screening results, age of development/structures, density of generating sites, nearby sewer repairs, urbanized areas, and impaired waterbodies. 29 catchments were identified as Problem or High Priority.

Specific criteria was utilizing in defining priority areas for the implementation of non-municipal retrofit projects. The criteria utilized in defining priority areas of non-municipal retrofit projects included High or Problem catchment priority rankings, catchments containing an impaired waterbody, and catchments identified with an urbanized area. Utilizing ArcGIS, Atlas extracted catchments where two (2) or more of the aforementioned criteria were found. Community outreach or project redevelopment is encouraged in these defined catchments.

Municipal-owned retrofit projects were identified for several schools, and other municipal-owned sites such as the Fire Department, Town Hall, etc. These locations were selected based on location and plausibility of future disconnects. Refer to the attached draft Stormwater Retrofit Program (**Appendix V**) for further information on these projects.

Describe plans for continuing the Retrofit program and how to achieve a goal of 1% DCIA disconnection annually in future years. (Due 7/1/22)

The Stormwater Retrofit Program, included in **Attachment V,** is designed to comply with *Section (6) (B) (ii)* of the CTDEEP 2017-2022 MS4 Permit. The Town of Canton will work towards disconnecting existing DCIA. The initial focus of the Stormwater Retrofit Program will first be applied to Town-owned properties, parks, and other facilities, followed by a focus of non-municipal facilities, parks, communities, or other redevelopments. Progress towards the DCIA disconnects will be tracked and continuously updated, with a goal to disconnect one percent (1%) of DCIA or to the MEP each year following the fifth year of the MS4 permit.

Part II: Impaired waters investigation and monitoring

1. Impaired waters investigation and monitoring program

For details on this requirement, visit https://nemo.uconn.edu/ms4/tasks/monitoring.htm. Refer to the yellow column of the Monitoring comparison chart and the Impaired waters monitoring flowchart.

1.1 Indicate which stormwater pollutant(s) of concern occur(s) in your municipality or institution. This data is available on the MS4 map viewer: http://s.uconn.edu/ctms4map.

Nitrogen/ Phosphorus ☐ Bacteria ☒ Mercury ☐ Other Pollutant of Concern ☐

1.2 Describe program status

Discuss 1) the status of monitoring work completed, 2) a summary of the results and any notable findings, and 3) any changes to the Stormwater Management Plan based on monitoring results.
The Town of Canton, with the assistance of Atlas, has completed all dry weather inspections and wet weather sampling at outfalls to impaired waterbodies. Dry weather inspections throughout the entirety of the Town will continue into the following year, to be conducted again in the spring. Notable findings include indications of bacterial impairment. However, further investigations into SSOs is necessary to make determinations on whether the bacterial impairments are the results of IDDE or natural background conditions. Changes to the Stormwater Management Plan are not recommended at this time.

2. Screening data for outfalls to impaired waterbodies (Section 6(i)(1) / page 41)

2.1 Screening data

Complete the table below to report data for any wet weather sampling completed for MS4 outfalls that discharge directly to a stormwater impaired waterbody during the reporting period. For details on this requirement, visit www.nemo.uconn.edu/ms4/tasks/monitoring.htm. Refer to the yellow column of the Monitoring comparison chart and the Impaired waters monitoring flowchart.

Each Annual Report will add on to the previous year's data showing a cumulative list of sampling data. **You may also attach an excel spreadsheet with the same data rather than copying it into this table**. If you do attach a spreadsheet, please write "See Attachment" below.

Outfall ID	**Latitude / Longitude**	**Sample date**	**Parameter** (Nitrogen, Phosphorus, Bacteria, or Other pollutant of concern)	**Results**	**Name of Laboratory (if used)**	**Follow-up required? ***
OF-206	*41.865117/-72.902721*	*6/14/2021*	*Bacteria*	*- E. coli **5,480** col/100ml - T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-105	*41.864327/-72.911845*	*6/14/2021*	*Bacteria*	*-E.coli **2,280** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-103	*41.864326/-72.911968*	*6/14/2021*	*Bacteria*	*No discharge.*	*Phoenix Environmental Laboratories*	*Yes*
OF-104	*41.864327/-72.911845*	*6/14/2021*	*Bacteria*	*-E.coli **15,500** col/100ml -T Coliform **>24,200***	*Phoenix Environmental*	*Yes*

				col/100ml	*Laboratories*	
OF-108	*41.856804/-72.915978*	*6/14/2021*	*Bacteria*	*-E.coli **1,970** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-107	*41.856826/-72.915981*	*6/14/2021*	*Bacteria*	*-E.coli **2,060** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-109	*41.855805/-72.921108*	*6/14/2021*	*Bacteria*	*-E.coli **275** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-110	*41.856027/-72.920136*	*6/14/2021*	*Bacteria*	*-E.coli **988** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-40	*41.840474/-72.924501*	*6/14/2021*	*Bacteria*	*-E.coli **24,110** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-39	*41.840631/-72.924348*	*6/14/2021*	*Bacteria*	*-E.coli **933** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-104	*41.864327/-72.911845*	*9/1/2021*	*Bacteria*	*-E.coli **3,080** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-206	*41.865117/-72.902721*	*9/1/2021*	*Bacteria*	*-E.coli **369** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-40	*41.840474/-72.924501*	*9/1/2021*	*Bacteria*	*-E.coli **120** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-105	*41.864327/-72.911845*	*9/1/2021*	*Bacteria*	*-E.coli **602** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-107	*41.856826/-72.915981*	*9/1/2021*	*Bacteria*	*-E.coli **556** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*
OF-108	*41.856804/-72.915978*	*9/1/2021*	*Bacteria*	*-E.coli **905** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*	*Yes*

Follow-up investigation required (last column) if the following pollutant thresholds are exceeded:

Pollutant of concern	**Pollutant threshold**
Nitrogen	Total N > 2.5 mg/l
Phosphorus	Total P > 0.3 mg/l
Bacteria (fresh waterbody)	• E. coli > 235 col/100ml for swimming areas or 410 col/100ml for all others • Total Coliform > 500 col/100ml
Bacteria (salt waterbody)	• Fecal Coliform > 31 col/100ml for Class SA and > 260 col/100ml for Class SB • Enterococci > 104 col/100ml for swimming areas or 500 col/100 for all others
Other pollutants of concern	Sample turbidity is 5 NTU > in-stream sample

3. Follow-up investigations (Section 6(i)(1)(D) / page 43)

Provide the following information for outfalls exceeding the pollutant threshold.

Outfall ID	Status of drainage area investigation	Control measure to address impairment
All above listed outfalls	*Investigations are being conducted on the surrounding drainage area, with a focus on surrounding runoff from agricultural land, septic repairs, and septic failures.*	*Potential measures that may be used in addressing bacterial impairments include aquatic vegetative buffer and control runoff measures implemented. Discussions are underway within the Town on how to address potential septic failures or repairs at privately-owned properties.*

4. Prioritized outfall monitoring (Section 6(i)(1)(D) / page 43)

Once outfall sampling has been completed for at least 50% of outfalls to impaired waters, identify 6 of the highest contributors of any pollutants of concern. Begin monitoring these outfalls on an annual basis by July 1, 2021. **You may also attach an excel spreadsheet with the same data rather than copying it to this table.** If you do attach a spreadsheet, please write "See Attachment" below.

Outfall	Latitude / Longitude	Sample Date	Parameter(s)	Results	Name of Laboratory (if used)
OF-104	*41.864327/-72.911845*	*6/14/2021*	*Bacteria*	*-E.coli **15,500** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-206	*41.865117/-72.902721*	*6/14/2021*	*Bacteria*	*- E. coli **5,480** col/100ml - T Coliform >24,200 col/100ml*	*Phoenix Environmental Laboratories*
OF-40	*41.840474/-72.924501*	*6/14/2021*	*Bacteria*	*-E.coli **24,110** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-105	*41.864327/-72.911845*	*6/14/2021*	*Bacteria*	*-E.coli **2,280** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-107	*41.856826/-72.915981*	*6/14/2021*	*Bacteria*	*-E.coli **2,060** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-108	*41.856804/-72.915978*	*6/14/2021*	*Bacteria*	*-E.coli **1,970** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-104	*41.864327/-72.911845*	*9/1/2021*	*Bacteria*	*-E.coli **3,080** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-206	*41.865117/-72.902721*	*9/1/2021*	*Bacteria*	*-E.coli **369** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-40	*41.840474/-72.924501*	*9/1/2021*	*Bacteria*	*-E.coli **120** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-105	*41.864327/-72.911845*	*9/1/2021*	*Bacteria*	*-E.coli **602** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-107	*41.856826/-72.915981*	*9/1/2021*	*Bacteria*	*-E.coli **556** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*
OF-108	*41.856804/-72.915978*	*9/1/2021*	*Bacteria*	*-E.coli **905** col/100ml -T Coliform **>24,200** col/100ml*	*Phoenix Environmental Laboratories*

Part III: Additional IDDE Program Data

1. Assessment and Priority Ranking of Catchments data (Appendix B (A)(7)(c) / page 5)

Provide a list of all catchments with ranking results (DEEP basins may be used instead of manual catchment delineations).

1. Catchment ID (DEEP Basin ID)	2. Category	3. Rank
4309-00-1	Low Priority	4
4319-11-1	Low Priority	4
4309-01-1	Problem	7
4309-02-1	Problem	8
4309-00-2-R1	Low Priority	5
4309-00-2-R2	Problem	6
4308-19-2-R1	Low Priority	2
4308-18-1	Low Priority	5
4309-03-1	Problem	6
4318-00-1	Low Priority	4
4308-18-2-R1	Low Priority	1
4309-05-1	Problem	6
4318-04-1-L1	Problem	9
4309-04-1	High Priority	11
4300-14-1	Problem	7
4309-00-2-R4	High Priority	14
4318-04-1	Low Priority	1
4308-00-2-R1	Exempt	0
4309-00-2-R3	Low Priority	4
4300-00-4+R6	Low Priority	2
4317-00-1	Problem	6
4300-15-1	High Priority	12
4312-01-1	High Priority	10
4300-00-4+R7	Exempt	0
4309-00-2-R5	High Priority	16
4300-16-1	Problem	8
4300-00-4+R8	Low Priority	5
4312-00-1	Problem	11
4300-00-4+R9	Problem	7
4300-00-4+R10	High Priority	10
4300-18-1-L1	High Priority	14
4310-00-3-L2	Problem	9
4310-00-3-R5	Low Priority	4
4312-00-2-L2	High Priority	14

4300-17-1	High Priority	11
4300-00-4+R11	High Priority	14
4300-18-1	High Priority	10
4312-00-2-L1	Problem	7
4317-01-1	Problem	7
4300-16-2-R1	High Priority	12
4300-00-4+R12	High Priority	11
4312-02-1	Problem	8

2. Outfall and Interconnection Screening and Sampling data (Appendix B (A)(7)(d) / page 7)

2.1 Dry weather screening and sampling data from outfalls and interconnections

For details on this requirement, visit https://nemo.uconn.edu/ms4/tasks/monitoring.htm. Refer to the blue column of the Monitoring comparison chart and the IDDE baseline monitoring flowchart.

Provide sample data for outfalls where flow is observed. Only include Pollutant of concern data for outfalls that discharge into stormwater impaired waterbodies. **You may also attach an excel spreadsheet with the same data rather than copying it to this table.** If you do attach a spreadsheet, please write "See Attachment" below.

Outfall / Interconnection ID	Latitude / Longitude	Screening / sample date	Ammonia	Chlorine	Conductivity	Salinity	E. coli or enterococcus	Surfactants	Water Temp	Pollutant of concern	If required, follow-up actions taken
OF-105	*41.864327/-72.911845*	*4/13/2021*	*<0.05 mg/L*	*<0.02 mg/L*	*54 umhos/cm*	*<0.5 ppt*	*E. coli-* ***845*** *col/100ml*	*0.06 mg/L*	-	*Bacteria*	*Results of this flow during dry weather indicated a potential bacterial impact, however, further investigation is needed to confirm whether or not the bacterial impact is naturally occurring.*
OF-107	*41.856826/-72.915981*	*4/13/2021*	*<0.05 mg/L*	*<0.02 mg/L*	*203 umhos/cm*	*<0.5 ppt*	*E. coli-10 col/100ml*	*<0.06mg/L*	-	*None.*	*Results of this dry weather flow are indicative of groundwater influence, and not an Illicit Discharge.*

2.2 Wet weather sample and inspection data

For details on this requirement, visit https://nemo.uconn.edu/ms4/tasks/monitoring.htm. Refer to the green column of the Monitoring comparison chart and the IDDE catchment investigation flowchart.

Provide sample data for outfalls and key junction manholes of any catchment area with at least one System Vulnerability Factor. **You may also attach an excel spreadsheet with the same data rather than copying it to this table.** If you do attach a spreadsheet, please write "See Attachment" below.

Outfall / Interconnection ID	Latitude / Longitude	Sample date	Ammonia	Chlorine	Conductivity	Salinity	E. coli or Enterococcus	Surfactants	Water Temp	Pollutant of concern
*System Vulnerability Factors are currently under investigation, and will be added to the next annual report. Refer to **Section 1: Catchment Investigation Data, 3.1 System Vulnerability Factor Summary** for more information.*										

1. Catchment Investigation data (Appendix B (A)(7)(e) / page 9)

For details on this requirement, visit www.nemo.uconn.edu/ms4/tasks/monitoring.htm. Refer to the green column of the Monitoring comparison chart and the IDDE catchment investigation flowchart.

3.1 System Vulnerability Factor Summary

For those catchments being investigated for illicit discharges (i.e. categorized as high priority, low priority, or problem) document the presence or absence of System Vulnerability Factors (SVF). If present, report which SVF's were identified. An example is provided below.

Outfall ID	Receiving Water	System Vulnerability Factors
The Town of Canton's sanitary sewer is currently managed by the Town of Canton's Water Pollution Control Facility (WPCF). The storm sewer and sanitary sewer have historically been separate, and remain so in the present day. Therefore, SVFs 4, 5, 6, 7, 8, and 9 are not applicable to the Town. Other SVFs are currently under investigation, and will be updated in the next annual report. These investigations include coordination between the WPCF, as well as the Farmington Valley Health District.		

Where SVFs are:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages.
2. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs.
3. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints.

4. Common or twin-invert manholes serving storm and sanitary sewer alignments.
5. Common trench construction serving both storm and sanitary sewer alignments.
6. Crossings of storm and sanitary sewer alignments.
7. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system;
8. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.
9. Areas formerly served by combined sewer systems.
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old in medium and densely developed areas.
11. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).
12. History of multiple local health department or sanitarian actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

3.2 Key junction manhole dry weather screening and sampling data

You may also attach an excel spreadsheet with the same data rather than copying it to this table. If you do attach a spreadsheet, please write "See Attachment" below.

Key Junction Manhole ID	Latitude / Longitude	Screening / Sample date	Visual/ olfactory evidence of illicit discharge	Ammonia	Chlorine	Surfactants

3.3 Wet weather investigation outfall sampling data

You may also attach an excel spreadsheet with the same data rather than copying it to this table. If you do attach a spreadsheet, please write "See Attachment" below.

Outfall ID	Latitude / Longitude	Sample date	Ammonia	Chlorine	Surfactants

3.4 Data for each illicit discharge source confirmed through the catchment investigation procedure

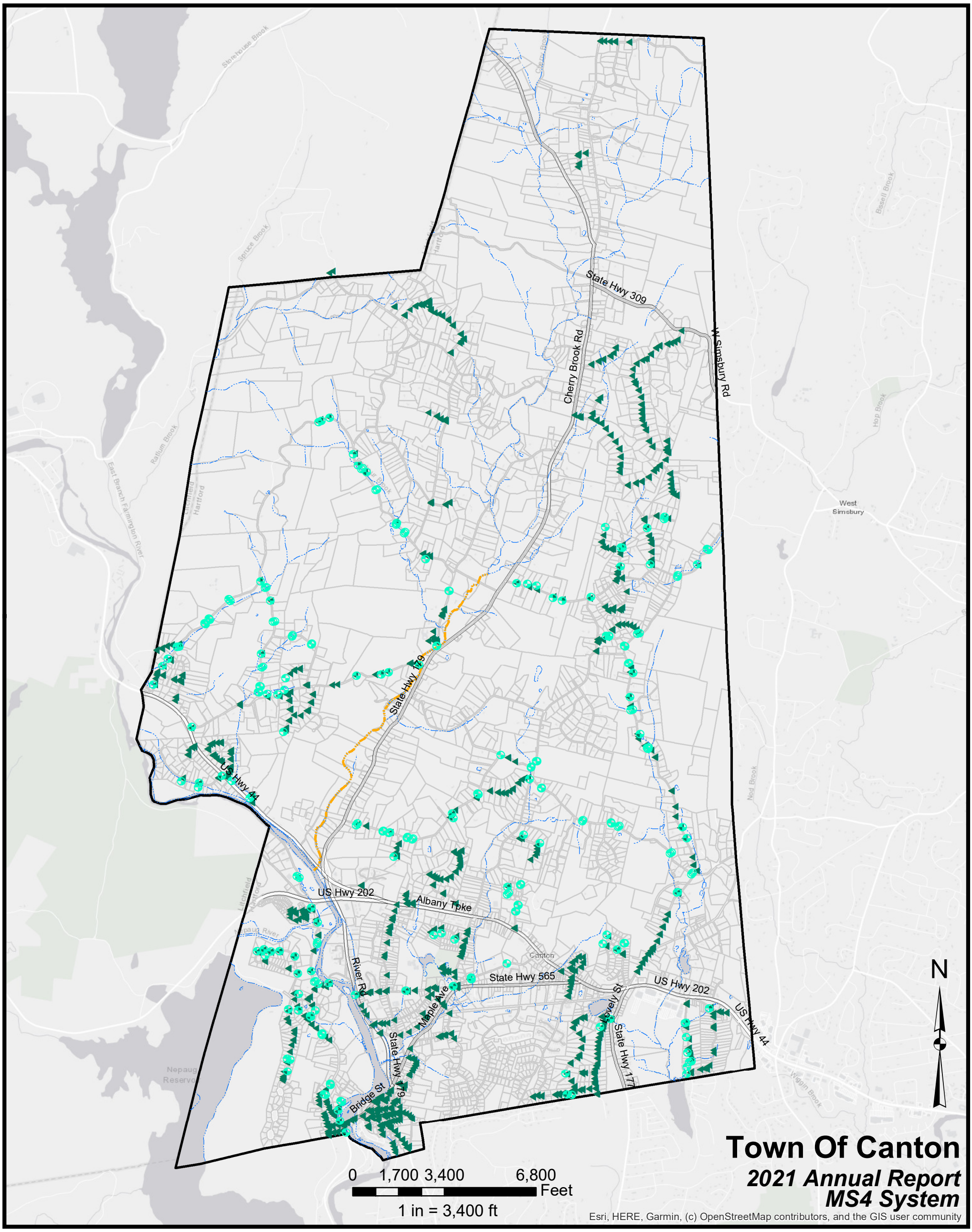
Discharge location	Source location	Discharge description	Method of discovery	Date of discovery	Date of elimination	Mitigation or enforcement action	Estimated volume of flow removed

Part IV: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Chief Elected Official or Principal Executive Officer	Document Prepared by
Print name: Robert Bessel	Print name: Kay Lehoux, Environmental Scientist-Atlas
Signature / Date: 2/9/2022	Signature / Date: 4/1/2022
Email: rbessel@townofcantonct.org	Email: Kay.Lehoux@oneatlas.com

FIGURES



Town Of Canton

2021 Annual Report
MS4 System

Legend

- Outfall
- Catch Basin
- Impaired Waterbody
- Surface Water
- Main Road
- Canton Town Line
- Parcel

Fig No.
1

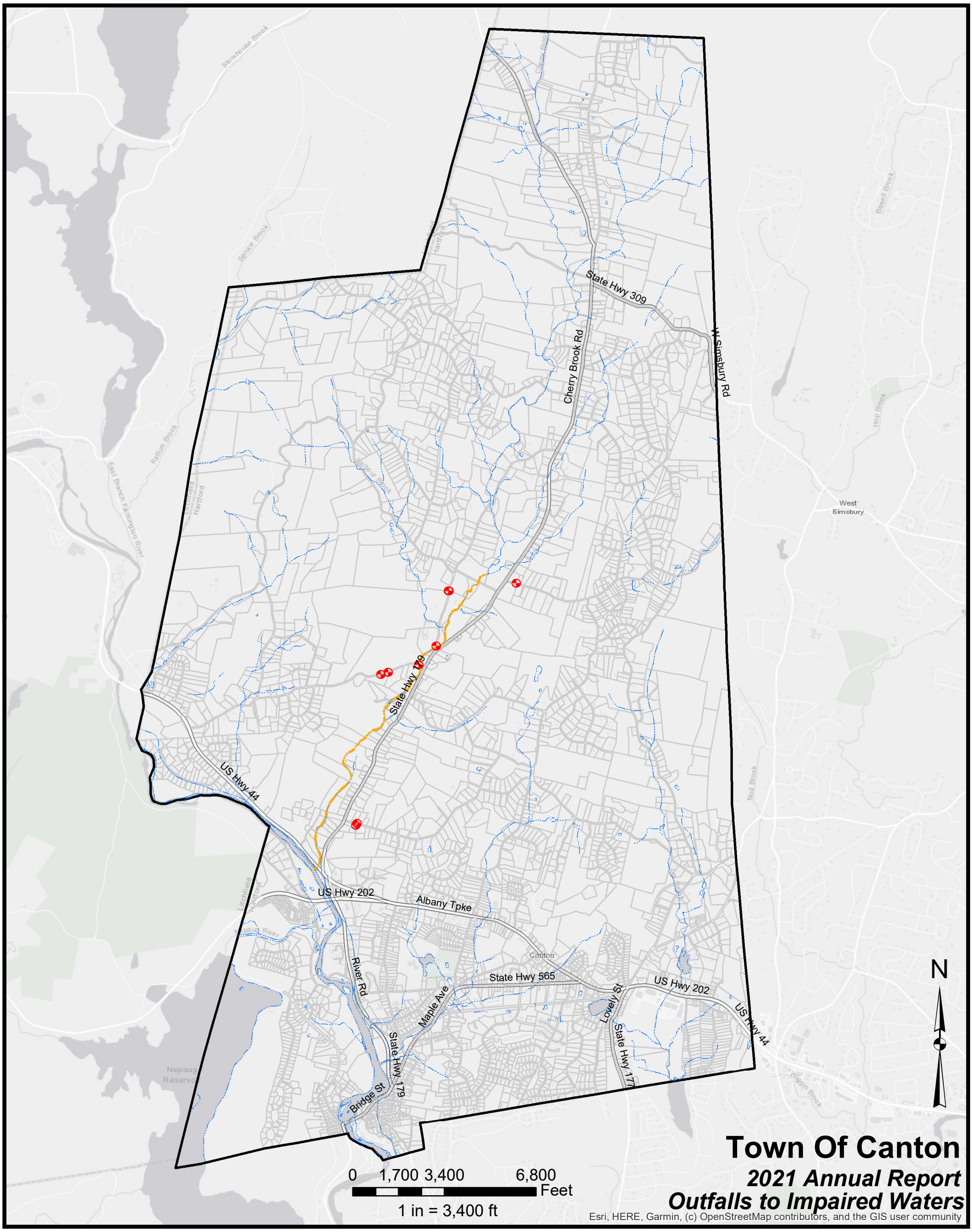
Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

290 Roberts Street Suite 301
East Hartford,CT 06108



Legend

- Outfall to Impaired Waterbody
- Parcel
- Impaired Waterbody
- Surface Water
- Main Road
- Canton Town Line

Fig No.
2

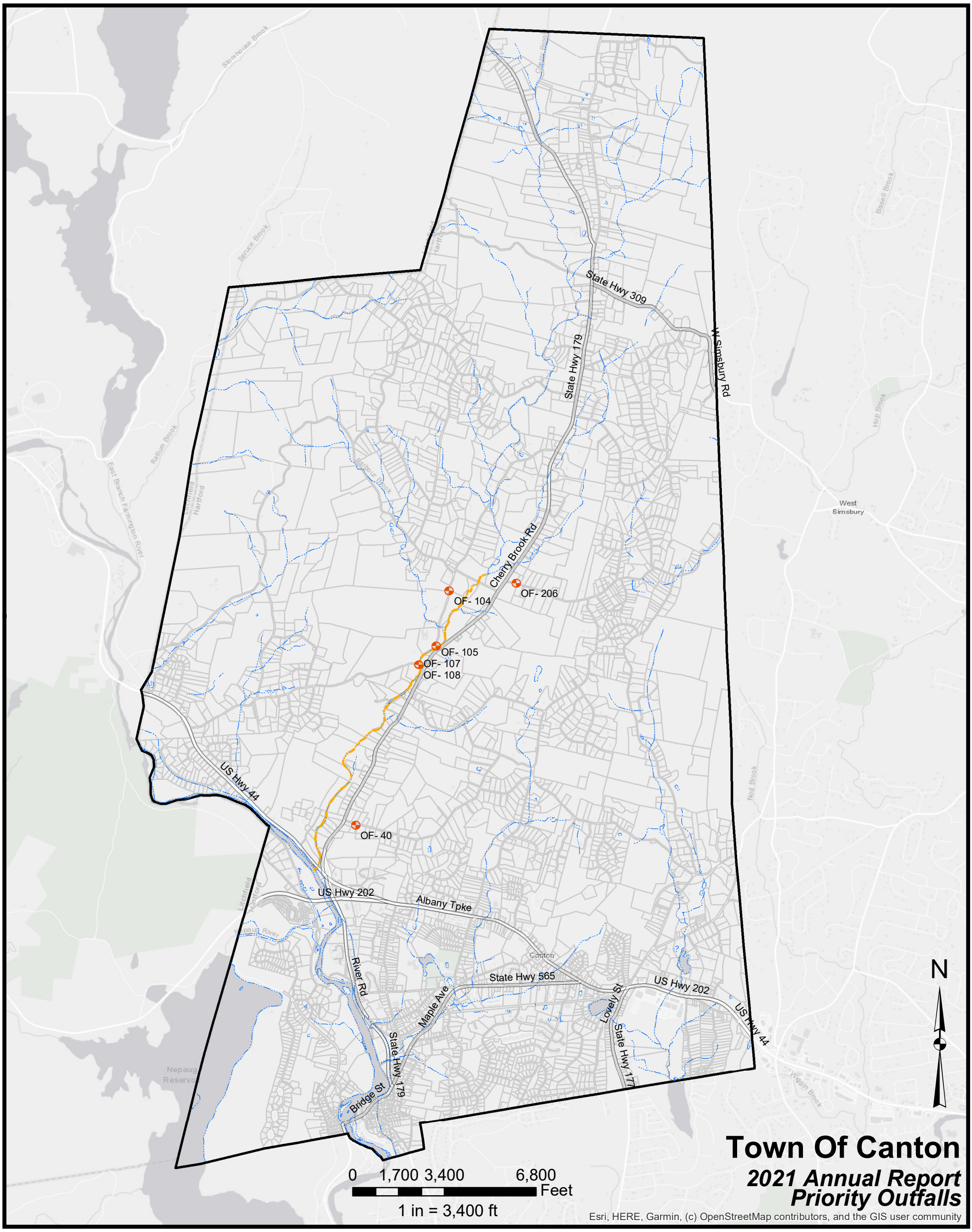
Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

290 Roberts Street Suite 301
East Hartford,CT 06108



Town Of Canton

2021 Annual Report
Priority Outfalls

Legend

- Priority Outfall
- Parcel
- Impaired Waterbody
- Surface Water
- Main Road
- Canton Town Line

Fig No.
3

Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

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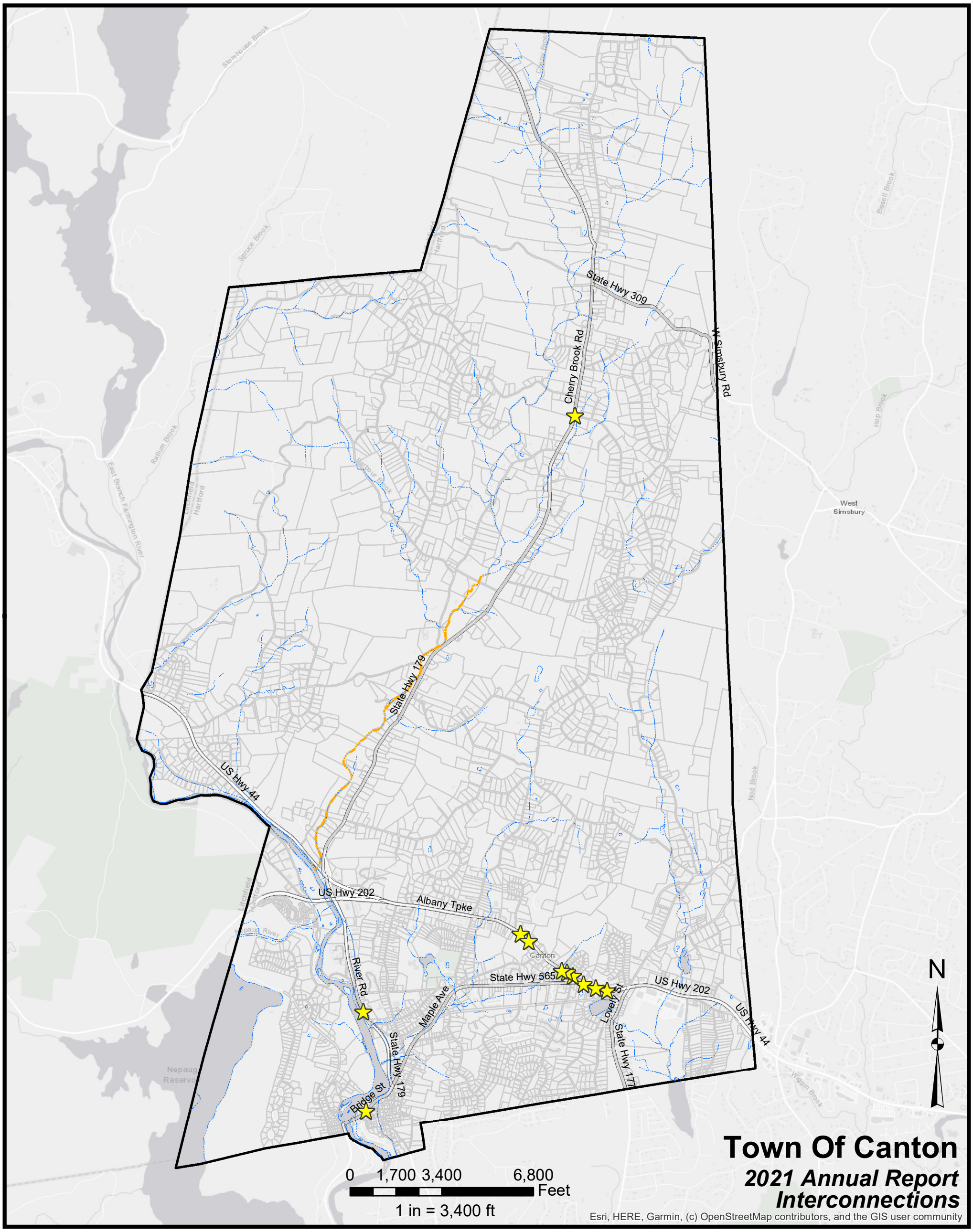
East Hartford,CT 06108



Town Of Canton

2021 Annual Report Interconnections

Legend

- CTDOT Interconnections
- Parcel
- Impaired Waterbody
- Surface Water
- Main Road
- Canton Town Line

Fig No.
4

Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

290 Roberts Street Suite 301
East Hartford,CT 06108

Town Of Canton

2021 Annual Report
Urbanized Area by Catchment

0 1,700 3,400 6,800 Feet

1 in = 3,400 ft

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Legend

- Impaired Waterbody
- Surface Water
- Main Road
- Urbanized Area
- Canton Town Line
- Parcel

Fig No.
5

Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

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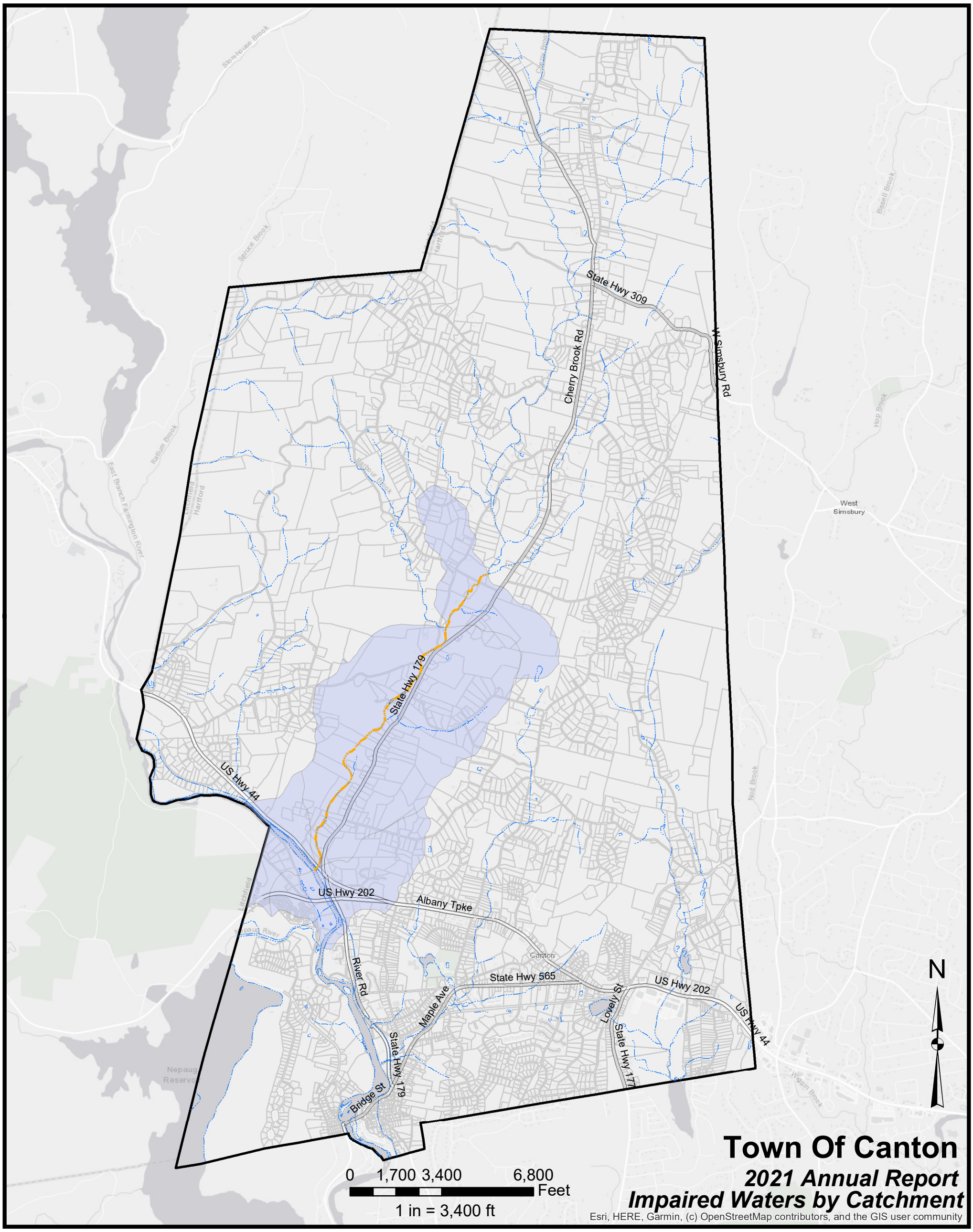
Town Of Canton

2021 Annual Report

Impaired Waters by Catchment



Legend

- Impaired Waterbody
- Surface Water
- Main Road
- Catchments Associated with Impaired Waterbodies
- Canton Town Line
- Parcel

Fig No.
6

Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

290 Roberts Street Suite 301
East Hartford,CT 06108

ATTACHMENT I –Dry Weather Inspections

Town of Canton MS4

Dry Weather Sampling

Analytical Results

Outfall ID	Inspection Date	Condition	Discharge Description	Screening Indicators						
				Chlorine Residual	Ammonia as Nitrogen	MBAS	Conductivitiy	Salinity	Escherichia Coli	Total Coliforms
				mg/L			umhos/cm	ppt	MPN/100mL	
OF-105	4/13/21	Good	Slight oily sheen, some suspended solids, algae at discharge mouth. Mostly clear, no odor.	<0.02	<0.05	0.06	54	<0.5	845	24,200
OF-107	4/13/21	Fair	Clear, no odor, no foam.	<0.02	<0.05	<0.05	203	<0.5	10	272

Notes:

* All highlighted bacterial concentrations are required for follow-up investigations.

*Highlighting is based on the following criteria;

1. E. Coli >235/100mL for Swimming Areas, and >410 col/100mL for all others.
2. Total Coliform > 500 col/100mL
3. Fecal Coliform >31 col/100 mL for Class SA and >260 col/100mL for Class SB
4. Enterococci >104 col/100mL for Swimming Areas and >500 col/100mL for all others.
5. Ammonia >0.5 mg/L
6. Surfactants (MBAS) > 0.25 mg/L
7. Chlorine: detectable level
8. Conductivity >1,500 uS
9. Salinity ≥ 0.5 ppt

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290 Roberts Street, Suite 301
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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:37 PM

Outfall ID: OF-39
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Other
Diameter	18”
Condition	Good
Erosion Control	Fair

Notes

This outfall takes runoff directly from road, discharges next to OF 40.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:37 PM

Outfall ID: OF-40
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Other
Diameter	18”
Condition	Good
Erosion Control	Good

Notes

Next to OF 39.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 13, 2021 1:59 PM

Outfall ID:
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Endwall
Diameter	
Condition	Poor
Erosion Control	Excellent

Notes

Endwall is deteriorated enough where suspected groundwater is entering catch basin.

Outfall:

Discharge: Yes

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:36 PM

Outfall ID: OF-109
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Endwall
Diameter	12”
Condition	Good
Erosion Control	Good

Notes

Part of OF pipe silted in.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:36 PM

Outfall ID: OF-110
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Endwall
Diameter	24”
Condition	Fair
Erosion Control	Fair

Notes

Endwall and part of outfall is slightly broken. Part of outfall is silted in.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 13, 2021 1:39 PM

Outfall ID:
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Other
Diameter	6”
Condition	Fair
Erosion Control	Excellent

Notes

This is possibly from a residence. ATC has no indication of where this pipe comes from.

Outfall:

Discharge:

Yes

Illicit Discharge Flow Type:

Heavy

Illicit Discharge Description:

Discharging from clay pipe. Pipe comes from direction of residence. No samples collected.

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:36 PM

Outfall ID: OF-107
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Endwall
Diameter	18”
Condition	Good
Erosion Control	Good

Notes

OF discharge area filled with leaf litter.

Outfall:

Discharge: Yes

Illicit Discharge Flow Type:

Low

Illicit Discharge Description:

Upon further investigation, a cb uphill from OF had a clay pipe discharging heavily onto cb from residence .

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:44 PM

Outfall ID: OF-108
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Endwall
Diameter	18”
Condition	Good
Erosion Control	Fair

Notes

Next to OF 108. Discharge area filled with leaf litter. Some silt and sediment in pipe.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:20 PM

Outfall ID: OF-105
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Flared End
Diameter	18”
Condition	Good
Erosion Control	Good

Notes

OF Is directly next to outfall 106. This outfall is discharging, connected to school zone. High algae at discharge location.

Outfall:

Discharge:

Yes

Illicit Discharge Flow Type:

Steady

Illicit Discharge Description:

Slight oily sheen, some suspended solids, algae at discharge mouth. Mostly clear, no odor.

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 13, 2021 1:08 PM

Outfall ID: OF-106
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Flared End
Diameter	12”
Condition	Good
Erosion Control	Good

Notes

Directly next to OF 106. No discharge, in good condition.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:42 PM

Outfall ID: OF-104
Inspection Date: April 13, 2021

Material	Plastic
Subtype	Other
Diameter	12”
Condition	Fair
Erosion Control	Fair

Notes

OF is mostly silted in. Discharges to farm/wetland area. Receives discharge from Connecting OF/culvert 103, which comes from a ditch.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:42 PM

Outfall ID: OF-103
Inspection Date: April 13, 2021

Material	Plastic
Subtype	Other
Diameter	12”
Condition	Poor
Erosion Control	Fair

Notes

Cb to small ditch on side of road, leads to OF 104.

Outfall:

Discharge: No

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Canton Dry Weather Inspections

Submitted By: ATC Group Services, LLC
Submitted Time: April 8, 2021 3:35 PM

Outfall ID: OF-206
Inspection Date: April 13, 2021

Material	Concrete
Subtype	Other
Diameter	18”
Condition	Poor
Erosion Control	Poor

Notes

OF is mostly silted in. Needs to be cleared. Channel is mostly blocked by leaf litter and dirt.

Outfall:

Discharge:

No

ATTACHMENT II –Wet Weather Inspections

Town of Canton MS4

Wet Weather Sampling

Analytical Results

Outfall ID	Inspection Date	Condition	Discharge Description	General Parameters							Bacterial			
				Temperature (°C)	pH (SU)	Dissolved Oxygen (mg/L)	SPC (uS/cm)	ORP (mV)	Turbidity (NTU)	Odor	Escherichia Coli	Enterococci Bacteria	Fecal Coliforms	Total Coliforms
											MPN/100mL			
OF-206	6/14/21	Fair	Clear, silty	16.6	5.58	7.28	53	-140.8	30.5	No	5,480	199,900	2,720	>24,200
OF-105	6/14/21	Excellent	Light brown-clear, silty	16.3	5.49		19.1	-171.1	20.59	No	2,280	12,000	1,670	>24,200
OF-103	6/14/21	--	No discharge. Clogged.	--	--	--	--	--	--	--	--	--	--	--
OF-104	6/14/21	Poor	Dark yellow, foam	17.3	5.79	17.3	61.4	-194.2	51.17	No	15,500	>24,200	10,500	>24,200
OF-108	6/14/21	Fair	Dark yellow	17.3	5.96	6.58	90.3	-195.2	12.68	No	1,970	>24,200	1,620	>24,200
OF-107	6/14/21	Fair	Dark yellow	17.1	5.96	7.17	86.9	-192.5	21.03	No	2,060	24,200	933	>24,200
OF-109	6/14/21	Excellent	Clear	16.3	5.78	8.5	54.2	-186.5	16.54	No	275	373	256	>24,200
OF-110	6/14/21	Good	Clear	16	5.42	5.99	160.4	-166.8	9.66	No	988	331	256	>24,200
OF-40	6/14/21	Good	Foam, yellow	18	5.93	7.01	179.8	-195.6	15.96	No	4,110	5,480	1,520	>24,200
OF-39	6/14/21	Good	Light yellow	17.8	5.76	6.53	85.3	-188.1	9.28	No	933	3,440	1,020	>24,200

Notes:

* All highlighted bacterial concentrations are required for follow-up investigations.

*Highlighting is based on the following criteria;

1. E. Coli >235/100mL for Swimming Areas, and >410 col/100mL for all others.
2. Total Coliform > 500 col/100mL
3. Fecal Coliform >31 col/100 mL for Class SA and >260 col/100mL for Class SB
4. Enterococci >104 col/100mL for Swimming Areas and >500 col/100mL for all others.

PHOTOGRAPHIC LOG

ATC Group Services LLC
290 Roberts Street, Suite 301
East Hartford, CT 06108

Client Name:	**Site Location:**	**ATC Project # / Date:**
Town of Canton	*Town of Canton MS4 Outfalls*	0722641500 *June 14, 2021*

Outfall ID	
OF-39	

Outfall ID	
OF-40	

PHOTOGRAPHIC LOG

ATC Group Services LLC
290 Roberts Street, Suite 301
East Hartford, CT 06108

Client Name:	**Site Location:**	**ATC Project # / Date:**
Town of Canton	*Town of Canton MS4 Outfalls*	0722641500 *June 14, 2021*

Outfall ID	
OF-110	

Outfall ID	
OF-109	

PHOTOGRAPHIC LOG

ATC Group Services LLC
290 Roberts Street, Suite 301
East Hartford, CT 06108

Client Name:	Site Location:	ATC Project # / Date:
Town of Canton	*Town of Canton MS4 Outfalls*	0722641500 *June 14, 2021*

Outfall ID	
OF-108	

Outfall ID	
OF-107	

PHOTOGRAPHIC LOG

ATC Group Services LLC
290 Roberts Street, Suite 301
East Hartford, CT 06108

Client Name:	**Site Location:**	**ATC Project # / Date:**
Town of Canton	*Town of Canton MS4 Outfalls*	0722641500 *June 14, 2021*

Outfall ID
OF-104

Outfall ID
OF-103

PHOTOGRAPHIC LOG

ATC Group Services LLC
290 Roberts Street, Suite 301
East Hartford, CT 06108

Client Name:	**Site Location:**	**ATC Project # / Date:**
Town of Canton	*Town of Canton MS4 Outfalls*	0722641500 *June 14, 2021*

Outfall ID	
OF-105	

Outfall ID	
OF-206	

Town of Canton

MS4 General Permit

Priority Outfall Sampling

Outfall ID	Inspection Date	Condition	Discharge Description	Discharge Visual	General Parameters							Bacterial	
					Temperature (°C)	pH (SU)	Dissolved Oxygen (mg/L)	SPC (uS/cm)	ORP (mV)	Turbidity (NTU)	Odor	Escherichia Coli	Total Coliforms
												MPN/100mL	
OF-206	9/1/21	Good	OF not discharging, sample taken from road runoff. Dark yellow with some floating particulates.		20.2	7.38	7.11	213.9	146	18.66	No	**369**	**>24,200**
OF-104	9/1/21	Good	Slight septic odor, clear to light opaque with floating suspended solids, highly turbid. outfall not discharging; sampled from road		19.9	6.69	6.27	49.2	159.7	151	Yes	**3,080**	**>24,200**
OF-105	9/1/21	Excellent	Clear, OF in excellent condition, strong flow.		17.5	6	7.42	71.2	185	5.25	No	**602**	**>24,200**
OF-107	9/1/21	Good	Outfall in good condition, slight oily sheen and slight foaming, ponding present.		18.6	6.37	5.82	63.4	164.8	6.72	No	**556**	**>24,200**
OF-108	9/1/21	Excellent	Slight flow, color is opaque with a slight yellow tint.		19.6	7.16	19.7	20	128.9	14.7	No	**908**	**>24,200**
OF-40	9/1/21	Excellent	Outfall in excellent condition, steady flow with significant foaming, water a clear with minimal suspended particles.		20	6.89	6.01	204.7	142.8	7.45	No	**120**	**>24,200**

Notes:

* All highlighted bacterial concentrations are required for follow-up investigations.

*Highlighting is based on the following criteria;

1. E. Coli >235/100mL for Swimming Areas, and >410 col/100mL for all others.
2. Total Coliform > 500 col/100mL
3. Fecal Coliform >31 col/100 mL for Class SA and >260 col/100mL for Class SB
4. Enterococci >104 col/100mL for Swimming Areas and >500 col/100mL for all others.

ATTACHMENT III- Catchment Assessment and Priority Ranking Matrix

Town of Canton
Catchment Assessment
and
Priority Ranking Matrix

Catchment ID	Number of Outfalls Included	Receiving Water(s)	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Sewer Repair Nearby?	Urbanized Area	DCIA >11%	Impaired Waterbody	Score	Priority Ranking *Low Priority: 0-5* *Problem: 6-9* *High Priority: ≥10*
Information Source			Catchment inspections and sample results	GIS Maps	Municipal Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Municipal Staff, GIS Maps	Land Use, Municipal Staff	GIS and Storm System Maps	Other	Municipal Staff, GIS Maps	CLEAR	CLEAR	CLEAR		
Scoring Criteria			Yes = 3 (Problem Catchment) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	Description	Yes=2 No=0	Yes =1 No = 0	Yes =1 No = 0	Yes =1 No = 0		
4309-00-1	None	Cherry Brook	0	0		0	1	3	0		0	Cleared Agricultural farmland with some residential housing		0	0	0	4	Low Priority
4319-11-1	None	Unnamed stream	0	3		0	0	1	0		0	Wooded		0	0	0	4	Low Priority
4309-01-1	None	Cherry Brook, unnamed streams	0	0		0	1	3	0		3	Cleared agricultural land, some wooded areas with light residential		0	0	0	7	Problem
4309-02-1	None	Cherry Brook, Titan's Pond	0	3		0	1	1	0		3	Wooded with light residential housing		0	0	0	8	Problem
4309-00-2-R1	None	Cherry Brook,unnamed streams	0	0		0	1	1	0		3	Wooded with residential housing		0	0	0	5	Low Priority
4309-00-2-R2	None	Cherry Brook, unnamed streams	0	0		0	2	1	0		3	Mainly residential housing with wooded areas.		0	0	0	6	Problem
4308-19-2-R1	None	Unnamed stream	0	0		0	1	1	0		0	Wooded area with light residential housing		0	0	0	2	Low Priority
4308-18-1	None	Spruce Brook, unnamed streams	0	0		0	1	1	0		3	Wooded with light residential housing		0	0	0	5	Low Priority
4309-03-1	None	Unnamed streams	0	0		0	2	1	0		3	Residential housing with light cleared agricultural farmland and lightly wooded areas		0	0	0	6	Problem
4318-00-1	None	Towards Hop Brook River in Simsbury	0	0		0	3	1	0		0	Mainly residential housing with wooded areas.		0	0	0	4	Low Priority
4308-18-2-R1	None	Spruce Brook, unnamed streams	0	0		0	0	1	0		0	Wooded area with Ski mountain		0	0	0	1	Low Priority
4309-05-1	17	Barbour Brook	0	0		0	2	1	0		3	Residential housing with light cleared agricultural farmland and lightly wooded areas		0	0	0	6	Problem
4318-04-1-L1	15	Unnamed streams	0	0		0	3	2	0		3	Mainly residential housing with lightly wooded areas		1	0	0	9	Problem
4309-04-1	6	Unnamed streams	3	0		0	3	2	0		3	Mainly residential housing with lightly wooded areas		0	0	0	11	High Priority
4300-14-1	16	Unnamed streams	0	0		0	2	1	0		3	A mixture of cleared agriculutural farmland and residential housing, as well as lightly wooded areas		1	0	0	7	Problem
4309-00-2-R4	2	Cherry Brook, unnamed streams	3	0		3	1	1	0		3	Mainly cleared agricultural farmland with light residential housing and wooded areas		0	0	3	14	High Priority
4318-04-1	None	Towards Od Reservoir in Simsbury	0	0		0	0	0	0		0	Wooded		1	0	0	1	Low Priority
4308-00-2-R1	None	Towards Hallman Pond	0	0		0	0	0	0		0	Wooded		0	0	0	0	Exempt
4309-00-2-R3	None	Cherry Brook, unnamed streams	3	0		0	1	0	0		0	Cleared agricultural farmland		0	0	0	4	Low Priority
4300-00-4+R6	None	Towards Chase Pond	0	0		0	1	1	0		0	Wooded with light residential housing		0	0	0	2	Low Priority

Town of Canton
Catchment Assessment
and
Priority Ranking Matrix

Catchment ID	Number of Outfalls Included	Receiving Water(s)	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Sewer Repair Nearby?	Urbanized Area	DCIA >11%	Impaired Waterbody	Score	Priority Ranking *Low Priority: 0-5* *Problem: 6-9* *High Priority: ≥10*
Information Source			Catchment inspections and sample results	GIS Maps	Municipal Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Municipal Staff, GIS Maps	Land Use, Municipal Staff	GIS and Storm System Maps	Other	Municipal Staff, GIS Maps	CLEAR	CLEAR	CLEAR		
Scoring Criteria			Yes = 3 (Problem Catchment) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	Description	Yes=2 No=0	Yes =1 No = 0	Yes =1 No = 0	Yes =1 No = 0		
4309-00-2	None	Cherry Brook	0	0		0	1	3	0		0	Cleared Agricultural farmland with some residential housing		0	0	0	4	Low Priority
4317-00-1	None	Towards Jim Brook	0	3		0	1	1	0		0	Wooded with light residential housing		1	0	0	6	Problem
4300-15-1	20	Cherry Brook, Humphrey Pond	0	3		0	3	3	0		3	Mainly residential housing with lightly wooded areas		0	0	0	12	High Priority
4312-01-1	23	Jim Brook	0	3		0	2	1	0		3	A mixture of residential housing and lightly wooded areas		1	0	0	10	High Priority
4300-00-4+R7	None	Chase Pond	0	0		0	0	0	0		0	Wooded		0	0	0	0	Exempt
4309-00-2-R5	9	Cherry Brook	3	0		3	2	1	0		3	Mainly residential with wooded areas		1	0	3	16	High Priority
4300-16-1	29	Cherry Brook, Bahre Pond	0	0		0	2	2	0		3	Mainly residential with wooded and cleared agricultural farmland areas		1	0	0	8	Problem
4300-00-4+R8	5	Chase Pond	0	0		0	2	2	0		0	Mainly residental housing with wooded areas and lightly cleared agricultural farmland		1	0	0	5	Low Priority
4312-00-1	4	Werner Woods Dam, Burke Pond	0	3		0	2	2	0		3	Mainly residential housing with wooded areas.		1	0	0	11	Problem
4300-00-4+R9	None	Farmington River	0	0		0	3	2	0		0	Cleared agriculutral farmland and/or industrial/commercial sites		1	1	0	7	Problem
4300-00-4+R10	13	Nepaug River, Holkfelder Pond	0	0		0	3	2	0		3	Cleared agricultural farmland and/or industrial/commercial sites		1	1	0	10	High Priority
4300-18-1-L1	3	Unnamed Stream, Upper Mills Pond	0	3		0	3	3	0		3	Residential housing with lightly wooded areas, as well industrial/commercial sites		1	1	0	14	High Priority
4310-00-3-L2	None	Nepaug Reservoir	0	3		0	3	2	0		0	Residential with wooded areas, as well as a reservoir		1	0	0	9	Problem
4310-00-3-R5	7	Nepaug River, Holkfelder Pond	0	0		0	2	1	0		0	Residential housing with wooded areas		1	0	0	4	Low Priority
4312-00-2-L2	14	Cooper Pond, Roaring Brook	0	3		0	3	3	0		3	A mixture of residential housing and industrial/commercial sites, as well as wooded areas		1	1	0	14	High Priority
4300-17-1	3	Unnamed streams	0	3		0	2	1	0		3	Mainly residential housing with wooded areas.		1	1	0	11	High Priority
4300-00-4+R11	23	Rattlesnake Hill Brook, Farmington River	0	3		0	3	3	0		3	A mixture of resiential housing and industrial/commercial sites		1	1	0	14	High Priority
4300-18-1	2	Unnamed Streams, Lower Mills Pond	0	3		0	1	1	0		3	Mainly open parks with light residential housing		1	1	0	10	High Priority
4312-00-2-L1	None	Bond Pond	0	3		0	1	1	0		0	Residential housing with lightly wooded areas		1	1	0	7	Problem

Town of Canton
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Catchment ID	Number of Outfalls Included	Receiving Water(s)	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Sewer Repair Nearby?	Urbanized Area	DCIA >11%	Impaired Waterbody	Score	Priority Ranking *Low Priority: 0-5* *Problem: 6-9* *High Priority: ≥10*
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Scoring Criteria			Yes = 3 (Problem Catchment) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	Description	Yes=2 No=0	Yes =1 No = 0	Yes =1 No = 0	Yes =1 No = 0		
4309-00-1	None	Cherry Brook	0	0		0	1	3	0		0	Cleared Agricultural farmland with some residential housing		0	0	0	4	Low Priority
4317-01-1	None	Unnamed Pond	0	0		0	3	3	0		0	Industrial/commercial site(s) with wooded areas		1	0	0	7	Problem
4300-16-2-R1	None	Unnamed Stream, Rattlesnake Hill Brook	0	3		0	2	2	0		3	Residential housing with wooded areas		1	1	0	12	High Priority
4300-00-4+R12	9	Spring Brook	0	0		0	3	3	0		3	Highly populated area with residential housing		1	1	0	11	High Priority
4312-02-1	2	Towards Secret lake and Cherry Park Pond in Avon	0	0		0	3	3	0		0	Residential housing		1	1	0	8	Problem

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

[2] Catchments that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of State of Connecticut Integrated Water Quality Report.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age of development and infrastructure:

- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Aging septic systems are septic systems 30 years or older in residential areas.

[8] Any river or stream that is culverted for distance greater than a simple roadway crossing.

Pending investigation

ATTACHMENT IV- Miscellaneous Documentation

Town of Canton and FRWA Correspondence

The Farmington River Watershed Association continued its research in Canton by sampling for coliform bacteria at our CB-C1 site, located just upstream of the Cherry Brook confluence with the Farmington River. We also began a new water quality sampling program for chloride (from road salt application) as part of the Izaak Walton League of America's Winter Salt Watch. The first of the two Canton Salt Watch sites is located in Cherry Brook on Barbourtown Road in front of Cherry Brook Primary School, and the second is located on Jim Brook, downstream of the Shoppes at Farmington Valley on Albany Turnpike. We also downloaded data and relaunched our HOBO temperature data logger, which is located in Cherry Brook upstream from the North Canton Volunteer Fire Association. Finally, FRWA completed a riffle bioassessment for aquatic macroinvertebrates in the unnamed tributary that runs through the Swan Preserve on Case St and confluences with Cherry Brook on the other side of route 179. This type of assessment provides biological metrics for water quality under the CT DEEP RBV program guidelines.

FRWA held their 34th Annual Farmington River Cleanup on September 25, as part of the Connecticut River Conservancy's Source to Sea Cleanup. The cleanup brought in approximately 125 volunteers, nearly half of which met at the Collinsville Canoe and Kayak parking lot. The river was relieved of several tires, washed out MDC traffic cones, construction materials, and a full pan of used motor oil. On October 21 we met with about fifty 7th grade students from the Kingswood Oxford School of West Hartford at an educational outing throughout Collinsville. The students took a walk through downtown to learn about how the Farmington River had been used to increase development in Collinsville by powering the axe factory and hydroelectric dam. Students then visited Collinsville Canoe and Kayak for a discussion about commercial uses of rivers today as well as the effects of development on water quality and riverine habitats, and they ended their trip with a walk to the WPCF where we discussed treatment procedures. FRWA 4th Annual Wild & Scenic Film Festival was held on November 19th at the Collinsville Town Hall Auditorium. The festival is sponsored by the South Yuba River Citizens League (SYRCL), and it reached 263 people in person and virtually.

Date	Activity	Audience	Audience #	Topic(s)	Partner(s)
May-August	Coliform bacterial monitoring	Frwa.org, CT DEEP	Public access	Water quality (bacteria)	CT DEEP
June	HOBO temperature data logger deployment	CT DEEP	Public access	Water quality (temperature)	CT DEEP VSTeM network
September 25	34th annual Farmington River Clean Up	Farmington Valley resident volunteers	~125	Litter clean-up	Connecticut River Conservancy, Collinsville Canoe & Kayak
October	Riffle aquatic macroinvertebrate bioassessment	CT DEEP	Public access	Water quality (biological)	CT DEEP VSTeM network
October 21	Kingswood Oxford School field trip	7th grade students	~50	Education: socio-economic	Kingswood Oxford School, Collinsville Canoe & Kayak

				impacts of rivers, impacts of development on river systems	
November 19	Wild and Scenic Film Festival	Canton and Farmington Valley residents	263 (both virtual and in-person)	NPS Wild and Scenic Rivers Designation	SYRCL
Winter	Winter Salt Watch	Waterreporter.org	Public access	Water quality (chloride)	Izaak Walton League of America

FVHD

Farmington Valley Health District

95 River Road, Suite C • Canton, CT 06019 • Phone (860) 352-2333 • Fax (860) 352-2542

Avon • Barkhamsted • Canton • Colebrook • East Granby • Farmington • Granby • Hartland • New Hartford • Simsbury

Canton septic system "repairs" with FVHD involvement

January 1, 2021 – December 31, 2021

Address	Reason for "repair"	Resolution
14 Sweetheart Mtn	"septic tank in poor condition"	new tank installed
52 Country Lane	no failure	new tank & fields installed
12B Freedom	truck damaged septic tank	new tank installed
32 E Mountain	?	site eval & new tank installed
13 Sweetheart Mtn	pool installation	new tank installed
17 Pond Rd	real estate inspection	new tank & fields installed
19 Deer Run	house sale	new tank & fields installed
57 Sterling	addition	new building sewer line installed
17 Mohawk	deteriorated septic tank	new tank & d-box installed
50 Bunker Hill	"old"	site eval. complete/no repair work
23 Pine Acres	"leach field is full"	new tank & fields installed
144 Indian Hill	fields failing	new tank & fields installed
620 Albany	"tank needs replacement"	new tank installed
6 Erickson	"septic tank in poor condition"	new tank installed

Canton septic system "repairs" with FVHD involvement

January 1, 2021 – December 31, 2021

Address	Reason for "repair"	Resolution
111 Wright	"tank collapsed"	new tank installed
51 Breezy Hill	addition request	no action
8 Silver Mine Acres	"septic tank in poor condition"	new tank installed
17 Woodland	"tank in poor condition"	new tank & dbox installed
50 Bristol	"breakout"	PE required to design repair
82 Washburn	new barn	building sewer pipe installed
25 Old Canton	"failure"	new tank & fields installed
70 Trailsend	failure	new tank & fields installed
11 Country	"cracked tank"	new tank installed
50 Cherry Brook	"tank in poor condition"	new tank installed
5 Uplands	"tank in poor condition"	new tank & dbox installed
7 Woodridge Circle	"failed inspection"	new tank & fields installed
6 West view	"age"	new tank & fields installed
21 Birch knoll	addition	new building sewer line installed
81 Morgan	"failure"	new fields installed
139 Indian Hill	"tank in poor condition"	new tank & dbox installed
10 Shagbark	"septic tank in poor condition"	new tank & dbox installed

Canton septic system "repairs" with FVHD involvement

January 1, 2021 – December 31, 2021

Address	Reason for "repair"	Resolution
308 East Hill	"leachfields wet"	site eval. complete/no repair work
30 Morgan	"septic breakout"	effluent pipe & fields installed
5 Shagbark	"system saturated"	new tank & fields installed
9 Erickson	"leaching fields not working"	new fields installed
4 Noja	"septic tank in poor condition"	new tank installed
115 Indian Hill	"clog in grey water"	pipe replaced
121 Indian Hill	"needs new leach field"	no action yet
50 Dry Bridge	"old age"	site eval. complete/no repair work
41 Country		new tank installed
760 Cherry Brook	addition	new tank installed

ATTACHMENT V- Stormwater Retrofit Program

STORMWATER RETROFIT PROGRAM

TOWN OF CANTON

PREPARED FOR:

Town of Canton

PREPARED BY:

Atlas
290 Roberts Street-Suite 301
East Hartford, Connecticut 06108

December 28, 2021

6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

December 2021

Project No. 0722641522

MR. ROBERT MARTIN
TOWN OF WALLINFORD
CONNECTICUT 06492

Subject: **Stormwater Retrofit Program**
Town of Canton

Dear Mr. Martin,

Atlas is pleased to present this Stormwater Retrofit Program.
If you have any questions, please call us at (860) 608-8576.

Respectfully submitted,
Atlas

Name: Luke Whitehouse
Title: Environmental Division Manager
Luke.Whitehouse@oneatlas.com

Name: Kay Lehoux
Title: Environmental Scientist
Kay.Lehoux@oneatlas.com

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EXECUTIVE SUMMARY

The goal of this Stormwater Retrofit Program is to comply with *Section (6) (B) (ii)* of the Connecticut Department of Energy and Environmental Protection (CTDEEP) 2017-2022 General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit). Specifically, the Town of Canton (Town) will work towards disconnecting existing Directly Connected Impervious Areas (DCIA). According to the MS4 Permit, "an area of DCIA is considered disconnected when the appropriate portion of the Water Quality Volume has been retained in accordance with the requirements of Section 6(a)(5)(B)(i) or (ii) of this general permit" (CTDEEP, 2017). For clarification, the MS4 Permit defines the following:

> A Retrofit Project is *"One that modifies an existing developed site for the primary purpose of disconnecting DCIA. The DCIA calculation performed pursuant to Section 6(a)(5)(C) shall serve as the baseline for the retrofit Program required in this section*" (*NEMO, 2021).*
>
> A Low Impact Development (LID) is defined as a means "*to maintain, mimic, or replicates pre-development hydrology through the use of numerous site design principles and small-scale treatment practices distributed throughout a site to manage runoff volume and water quality at the source" (NEMO, 2021).*

To accomplish the disconnecting of DCIA, LID, runoff reduction measures, or any other means by which stormwater is infiltrated into the ground or reused for other purposes without a surface or storm sewer discharge may be implemented (CTDEEP, 2017).

The following document provides guidance on implementing LID, runoff reduction measures, or other means to disconnect or improve stormwater quality. It should be noted that the following programs or practices in this document are considered a Retrofit Project *only* if it disconnects an area, whether it be commercial, residential, or industrial, that was *directly connected to the MS4*. Areas that implement the following programs or practices, as provided for guidance in this document or otherwise, that are not directly connected to the Town's MS4 system (while still beneficial in other ways) *cannot be counted towards the Town's disconnect percentage.*

Retrofits Projects will be clearly defined throughout this document, easily accessible, and clearly defined henceforth with **bolded and underlined text.** Important factors pertaining to LID, runoff reduction measures, or other means by which stormwater is infiltrated have been italicized throughout this document, with the exception of quoted, referenced material.

1. OBJECTIVES AND BENEFITS OF STORMWATER RETROFITS

The objective of a stormwater retrofit program, according to the CTDEEP, is

> *"…To remedy problems associated with, and improve water quality-mitigation functions of, older, poorly designed or poorly maintained stormwater management. The incorporation of stormwater retrofits into existing developed sites or redevelopment projects can reduce adverse impacts of uncontrolled stormwater runoff systems.*

Stormwater retrofits can also remedy local nuisance conditions and maintenance problems in older areas, as well as improve the appearance of existing facilities" (CTDEEP, 2004).

2. WHEN IS RETROFITTING APPROPRIATE?

Site constraints may exist, and are common in developed areas. Site constraints can often limit the type of stormwater Retrofit Projects that are possible, as well as their overall effectiveness. Specific factors, such as location of existing utilities, buildings, wetlands, maintenance access, and adjacent land uses may affect the retrofitting of an existing stormwater management facility. Stormwater should not be infiltrated in Aquifer Protection Areas where there is a high pollutant load, sites with existing subsurface contamination, or a drinking water wellhead area (UCONN, 2020). *Consider the following site-specific factors to determine the appropriateness of stormwater Retrofit Project implementation:*

Table 1 – Site Considerations for Determining the Appropriateness of Stormwater Retrofits

Factor	Consideration
Retrofit Purpose	What are the primary and secondary (if any) purposes of the retrofit project? Are the retrofits designed primarily for stormwater quantity control, quality control, or a combination of both?
Construction/Maintenance Access	Does the site have adequate construction and maintenance access and sufficient construction staging area? Are maintenance responsibilities for the retrofits clearly defined?
Subsurface Conditions	Are the subsurface conditions at the site (soil permeability and depth to groundwater/bedrock) consistent with the proposed retrofit regarding subsurface infiltration capacity and constructability?
Utilities	Do the locations of existing utilities present conflicts with the proposed retrofits, require relocation, or design modifications?
Conflicting Land Uses	Are the retrofits compatible with adjacent land uses of nearby properties?
Wetlands, Sensitive Water Bodies, and Vegetation	How do the retrofits affect adjacent or downgradient wetlands, sensitive receiving waters, and vegetation? Do the retrofits minimize or mitigate impacts where possible?
Complementary Restoration Projects	Are there opportunities to combine stormwater retrofits with complementary projects such as stream stabilization, habitat restoration, or wetland restoration/mitigation?
Permits and Approvals	Which local, state, and federal regulatory agencies have jurisdiction over the proposed retrofit project, and can regulatory approvals be obtained for the retrofits?
Public Safety	Does the retrofit increase the risk to public health and safety?
Cost	What are the capital and long-term maintenance costs associated with the stormwater retrofits? Are the retrofits cost-effective in terms of anticipated benefits?

Source: NEMO (N.D)

3. STORMWATER RETROFIT OPTIONS

3.1 Low Impact Development (LID) Management Practices

LID practices include natural or fabricated swales, depressions, and/or vegetated areas that are designed to capture, filter, and infiltrate stormwater runoff utilizing soils and vegetation (USEPA, 2014). The implementation of LID Practices lower long-term life cycles costs, perform better, and provide additional benefits such as improved aesthetics and enhanced property values. *While LID practices generally require a lower initial investment, they may require continuous maintenance of established vegetation*. However, established LID practices may be maintained in the same manner as landscaping. LID Practices should follow the following rules:

1. *Is it safe, both environmentally and for human health?*
2. *Aesthetically pleasing*
3. *Compliant with the Connecticut Department of Energy and Environmental Protection applicable and local regulations (UCONN, 2021).*

3.1.1 Bioretention and Infiltration Basins

Many towns, communities, and commercial or industrial facilities utilize bioretention or infiltration basins as a means to infiltrate pollutants of concerns (POC), reduce peak flow or total water volume, as well as adding an aesthetically pleasing area to the location.

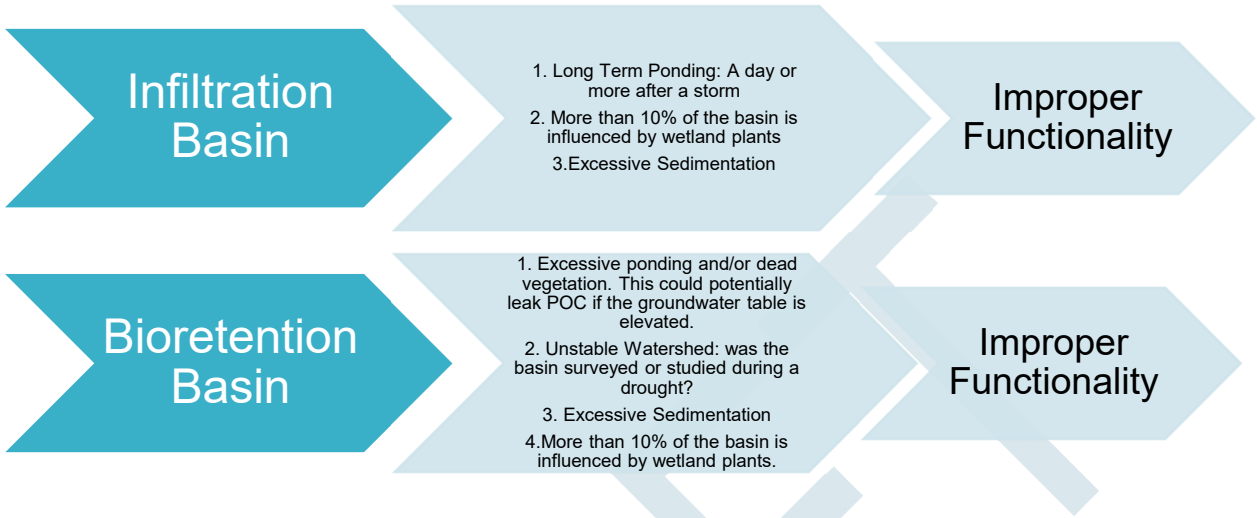
Typically, an infiltration basin has more potential in reducing peak flow or total water volume, as well as removing POC. Infiltration basins often have an increased advantage of phosphorus and nitrogen uptake, as well as some anaerobic conditions for bacterial removal (UCONN, 2021). *Infiltration basins can be utilized for the less frequent large-storm events that may exceed the capacity of upgradient practices.*

Bioretention basins create habitat, nutrient cycling, and aesthetics, and are often preferred for the reduced installation and maintenance costs. *Bioretention basins are generally utilized on a smaller scale, and are designed for typical storm events*. Bioretention basins are more likely to be maintained if aesthetically pleasing, therefore; considerations should be made to provide suitable plant species of which will create environmentally friendly habitats while maintaining public support or interest (PCA, 2020).

Properly Functioning Bioretention or Infiltration Basins

Bioretention or infiltration basins (while an excellent addition to stormwater infrastructure) must function properly in order to meet regulation criteria, reduce POC, and provide a safe and healthy environment for the surrounding area. **Graphic 1** provides examples of bioretention or infiltration basins that are considered poorly functioning.

Graphic 1: Improper Functionality of Bioretention or Infiltration Basins



Source: Created by Atlas Technical Consultants (2021).

Considerations on the Rehabilitation of Bioretention or Infiltration Basins

When working towards disconnection goals, several factors should be considered when identifying if a basin should be rehabbed or retrofitted, and are as follows:

Table 2 –Considerations on the Rehabilitation of a Bioretention or Infiltration Basins

Factor	Consideration
Regulatory Standards	Does it still meet the applicable regulatory criteria?
Financial Incentives	What will it cost to rehabilitate (removal of sedimentation, etc.) or retrofit?
Human Health	Is this in an area where it can affect human health? For example, will it create a mosquito breeding ground near schools or public areas?
Water Table	Is the water table greatly influencing the filtration of this Bioretention Pond?
Outlet Structure	What type of outlet structure is being utilized, and again, what are the costs for rehab or retrofit?

Source: Created by Atlas Technical Consultants (2021)

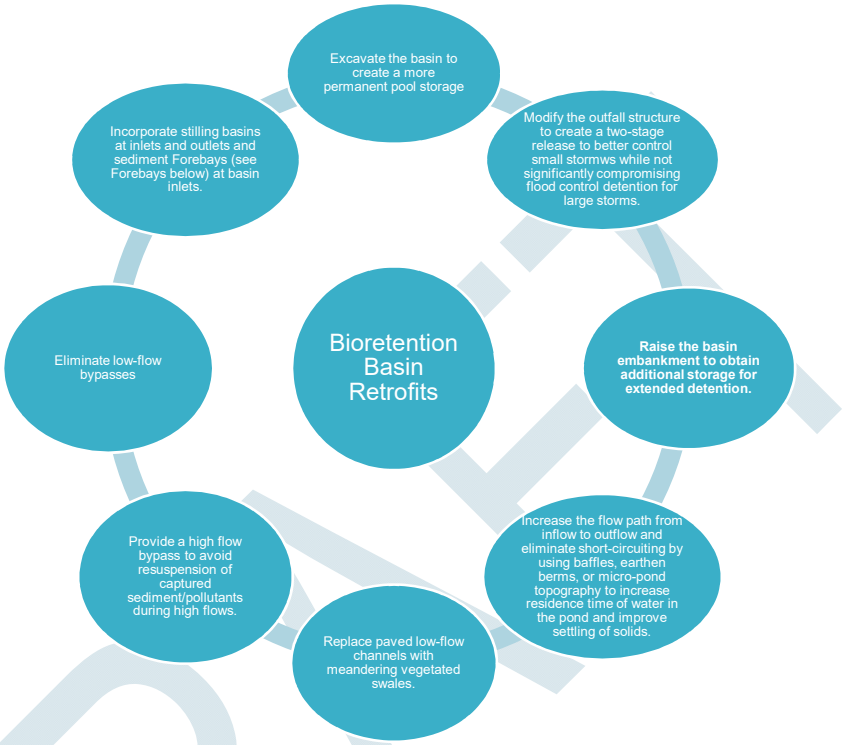
3.1.2 Bioretention and Infiltration Basins Variations

CONVENTIONAL BIORETENTION BASIN

A conventional bioretention basin, often referred to as a *detention basin*, typically consists of stormwater discharge into the basin, the temporary storage of unfiltered stormwater, and the eventual discharge to a designed outfall location. An underdrain typically lines the basin, allowing for stormwater, which has infiltrated the surficial material, to discharge to a designed outfall. An overflow is generally added in the event of a large storm. Some woody materials (trees, small bushes) may be present, which allows for the uptake of infiltrated stormwater in the evapotranspiration zone, decreasing the amount of discharged stormwater (UCONN, 2021).

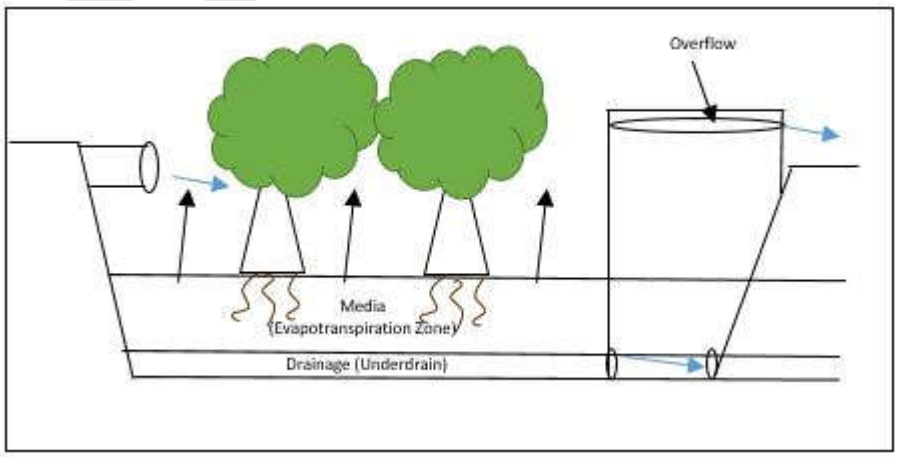
Graphic 2 summarizes modifications to existing Bioretention basins for improved water quality mitigation. **<u>If the following modifications are made to a basin that is directly connected to the MS4 System, then it can be considered a Retrofit Project.</u>**

Graphic 2: Bioretention Basin Retrofit Projects for Improved Water Quality Mitigation



Source: Adapted from Claytor, Center for Watershed Protection, 2000; Pennsylvania Association of Conservation Districts et al., 1998; and NJDEP, 2000.

Graphic 3: Conventional Bioretention Basin



Source: Created by Atlas Technical Consultants (2021),

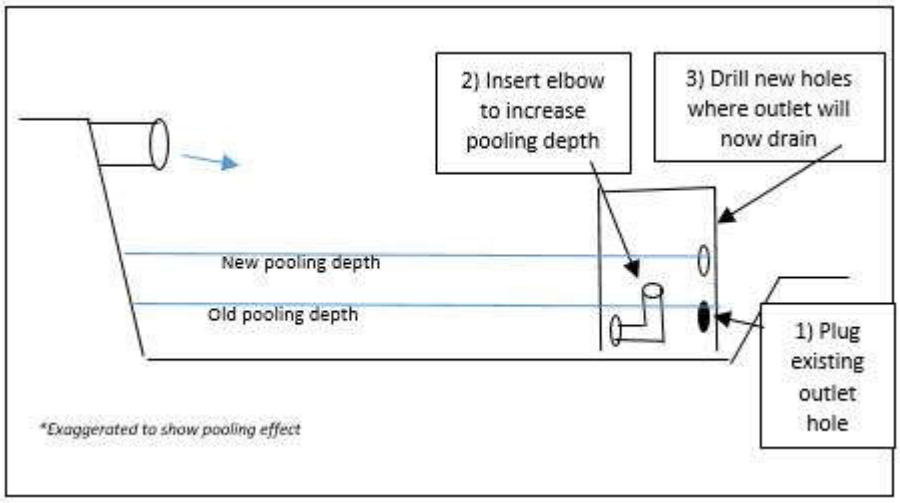
SOGGY BIORETENTION BASINS

If a bioretention basin is continuously found soggy, then retrofitting the basin into a wetland or detention basin may be the best option. Converting a bioretention basin into a wetlands area or detention basin will provide higher peak flow rate and water volume reduction than other Retrofit Projects, however, *it will not increase the amount of POC removed.*

For a converted bioretention basin or detention basin to be considered a Retrofit Project, first, determine if this basin is directly connected to the MS4 System. Then, install an elbow into the basin to increase pooling, which in turn will increase the peak flow and total water volume that is contained within the basin. A "T" can be installed rather than an elbow, if it is decided that the original outlet should remain in the event of a large storm and/or heavy soil saturation.

An attempt can be made to introduce wetland plants; however, based on soil type (for example, heavy infiltrative), they may not survive. As pooling depths increase, so too does the chance of potential safety concerns for the public (i.e. drowning). A fence should always be installed to surround the basin.

Graphic 4: From Bioretention to Wetlands or Detention Basins



Source: Created by Atlas Technical Consultants (2021),

NATURALIZED BASIN

A familiar sight in bioretention or infiltration basins is an abundance of woody material in the form of trees or small bushes. While some basins may have poor functionality with woody material growth, there are potential benefits of maintaining woody systems in a bioretention or infiltration basin. **Prior to shifting maintenance techniques or implementing other modifications to encourage woody growth, determine if this basin directly discharges to the Town's MS4 System. If directly connected, it can be considered a Retrofit Project.**

Woody systems (naturalized basin) allow for a higher rate of water volume to be infiltrated. Based on this higher rate of infiltrated stormwater, the POC load removed is greater than bioretention or infiltration basins functioning normally. Trees will occupy approximately 1% of water uptake in

bioretention or infiltration basins, as opposed to no woody vegetation (UCONN, 2021). Other benefits include less maintenance and lower costs. There is a high potential of attracting mosquito populations for naturalized basins. *It is recommended that naturalized basins not be constructed within 500 feet (ft.) of a public area.*

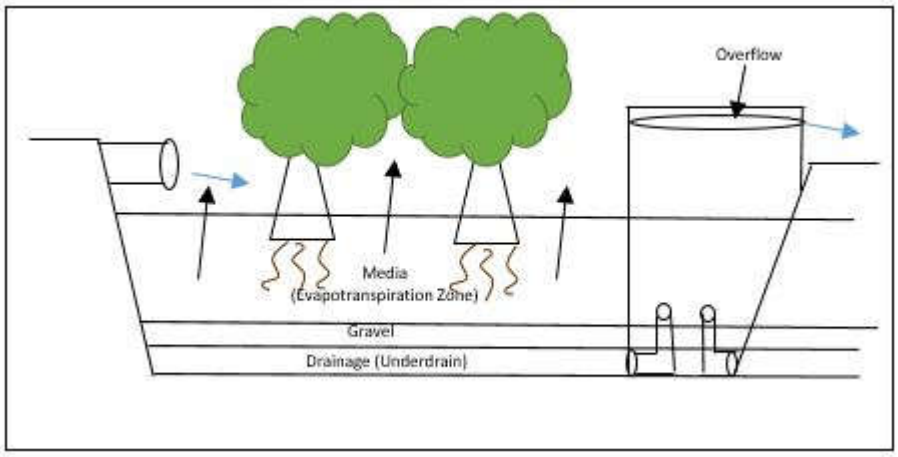
Studies have not been conducted on whether old woody growth or new woody growth is more beneficial in the uptake of POC or water. In theory, newer growth would promote soil movement due to root growth, and would increase the surface area for higher rates of infiltration (UCONN, 2021).

INTERNAL WATER STORAGE (IWS)

A conventional bioretention or infiltration basin may not always meet the needs of a site or community, particularly in areas of high stormwater volume. An internal water storage (IWS), if created properly, will reduce volume output by approximately 35%, as well as increasing the evapotranspiration rate. This system can also remove approximately 58% of nitrogen input (UCONN, 2021).. **To be considered a Retrofit Project; first determine if this basin directly discharges to the Town's MS4 system.**

As with a conventional bioretention or infiltration basins, an underdrain will line the bottom of the basin. The underdrain will be followed by gravel. *It should be noted that processed gravel should NOT be utilized.* The sedimentation caused by processed/fine gravel does not allow for ponding or storage area of infiltrated water, and will reduce the peak flow intercepted. An elbow is then installed into the underdrain, forcing the water to pond internally. A total of 18-inches only should be the increase in internal ponding. This internal ponding will preserve the filtration system, and improve peak flow and total water volume, with the exception of soil group 'D' (UCONN, 2021)..

Graphic 5: Internal Water Storage



Source: Created by Atlas Technical Consultants (2021),

FOREBAYS

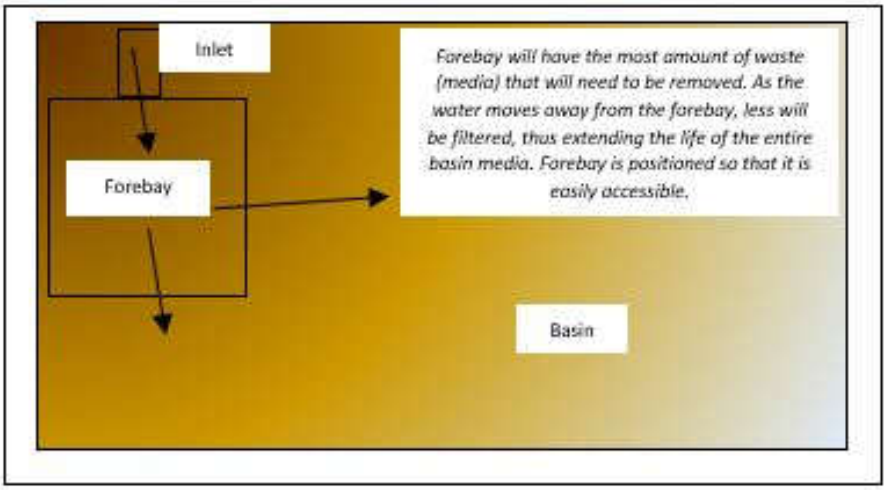
Forebays are designed and utilized to slow stormwater runoff, as well as provide pretreatment of runoff and facilitate the separation of suspended solids (MADEP, N.D). Advantages include the following:

> "*Provides pretreatment of runoff before delivery to other best management practices (BMPs), slows velocities of incoming stormwater, easily accessed for sediment removal, longevity is high with proper maintenance, relatively inexpensive compared to other BMPs, and a greater detention time than proprietary separators" (MADEP, N.D.).*

With the implementation of a forebay, media life expectancy can be extended up to approximately 500-years. The implementation of a forebay allows for the removal of phosphorus, nitrogen, metals, and sediment. **The implementation of a forebay can only be considered a Retrofit Project if the basin, pond, etc., directly discharges to the MS4 system.**

Disadvantages of a forebay include the removal of only coarse sediment fractions; therefore, soluble pollutants will remain and potentially discharge to the entirety of the basin. There is also no recharge to groundwater in a forebay, as well as no control of the volume of runoff. *Frequent maintenance is essential* (MADEP. N.D.).

Graphic 6: Forebays



Source: Created by Atlas Technical Consultants (2021).

Graphic 7: Forebay Implementation

Source: MADEP. No Date. Sediment Forebays.

MEDIA AMENDMENTS FOR AGEING SYSTEMS

Soils are part of fundamental design characteristics of most construction practices, including those of stormwater practices. Properly functioning media provide rapid infiltration rates, attenuate POC, and generally allow for plant growth (PCA, 2021). *Thus, as basins age, so too does the media.* Several amendments, including compost, woodchips, or the by-products of water treatment (water treatment residuals) for drinking water can be applied to increase infiltration, attenuate POC, and promote healthy plant growth. Water treatment residuals, as defined by the Minnesota Pollution Control Agency, are primarily sediment, metals (aluminum, or, or calcium), oxide/hydroxides, activated carbon, and lime removed during purification processes of raw water (PCA, 2021). **In order to be considered a Retrofit Project, media amendments should be made to basins, forebays, IWS, etc. that are directly connected to the MS4 system.**

Table 3– Media Amendments

Media	Benefits	POC Potentially Attenuated	Considerations
Compost	❖ Increases soil infiltration rate ❖ Reduces runoff ❖ Improves soil porosity ❖ Increases soil moisture holding capacity ❖ Reduces maintenance needs ❖ Alleviates compaction from construction activities	❖ Hydrocarbons ❖ Solvents ❖ Heavy metals	❖ Unstable composts may utilize available nitrogen and stunt plant growth ❖ Compost from bio solids and/or animal manure may contain unwanted nutrients. ❖ Ages relatively rapidly
Woodchips	❖ Slowly release nutrients if maintained properly ❖ Effectively retain and slowly release moisture ❖ Provide weed control ❖ Relatively cheap ❖ Resists compaction	❖ Nitrogen ❖ Oil & Grease ❖ Carbon source in the degradation of nitrate, sulphate, ammonia, and ammonium ❖ Some heavy metals	❖ Leachate from fresh woodchips is acidic, which may produce chemical oxygen demand (COD) and release unwanted nutrients. ❖ Negative aquatic response to leachate has been observed near wood chipping facilities

			❖ Woodchips from recycled wood may contain creosote, dyes, or other toxic materials.
Spent Lime	❖ Reduces the impact of phosphorus to receiving waters.	❖ Dissolved Phosphorus	❖ Due to spent lime's absorptive properties, there is a potential to contain chemicals that may be of an environmental concern.
Aluminum and Iron Water Treatment Residuals (WTR)	❖ Improves plant growth	❖ Phosphorus retention, particularly dissolved ❖ Several studies show AL- and Fe-WTR are effective at retaining nitrogen when nitrogen is found in high amounts.	❖ Potential of leaching, thus damaging aquatic environments ❖ Leaching potential is dependent on soil pH.
Alum	❖ Reduces soil pH ❖ Reduces Turbidity/ Total Suspended Solids ❖ No restrictions for use as fill material or cover	❖ Nitrogen ❖ Phosphorus ❖ Metals ❖ Bacteria	❖ Studies have not been conducted on PCBs or PFAS additives of Alum-treated soils ❖ Extensive study is necessary of the discharge watershed area. (Harper. N.D)

Source: Created by Atlas Technical Consultants (2021), Adapted from PCA, 2021, and Harper, N.D.

3.1.3 Bioretention or Infiltration Basin Inspections

Maintenance of bioretention or infiltration basins is essential in preserving the functionality of basins and promoting high quality stormwater discharge. The following checklist can be utilized in performing bioretention or infiltration basin inspections:

Table 4– Bioretention or Infiltration Basin Checklist

Factor	Consideration	Observations	Maintenance Performed
Bed Surface	Is there excessive sediment, caking, trash, or moldy mulch?		
Evidence of Underdrainage or Observation Wells	Is this system functioning properly? Is there excessive sediment or clogging?		
Mulch/Media	Does the media need replaced? Is there standing water that is not infiltrating?		
Bed Drainage	Time your bed drainage: Is water ponding for longer than a day?		
Outlet Structure	Is there evidence of clogging or outflow release velocities that are great than the designed flow?		

Source: Created by Atlas Technical Consultants (2021), adapted from MADEP and UCONN NEMO.

3.1.4 Rain Gardens

Rain gardens are a relatively easy and aesthetic Retrofit Project option for small communities or homes. According to NEMO, a rain garden is "a depression (about 6 inches deep), that collects stormwater runoff from a roof, driveway, or yard, and allows it to infiltrate into the ground" (CLEAR, 2021.). Typically, a residential rain garden is 50 to 100 square feet, and includes a variety of native shrubs and plants. *A rain garden should never be installed in a low area or an area that is wet; it is not a water garden or wetland.*

Graphic 8: Rain Garden Retrofit Benefits

Source: Created by Atlas Technical Consultants (2021)

Promoting the installation of rain gardens is easy; encourage the utilization of the Rain Garden Application, created by the CT NEMO Program. Once a community or home has installed a rain garden, encourage citizen reporting to track disconnects and retrofits. **To track these Retrofit Projects, communities considering the implementation of a rain garden should be defined internally as to whether it is directly connected to the MS4 system.**

3.2 Rainwater Harvesting/Stormwater Reuse & Rain Barrel Programs

Managing stormwater in areas of tight spaces, highly commercialized or industrial areas, as well as intensely residential communities can pose issues with volume control, increased flooding and erosion, and an increase in non-point source pollution. The implementation of a rainwater harvesting/ stormwater reuse and rain barrel program can greatly reduce the aforementioned issues related to stormwater in these area types, as well as reducing the cost of potable water, promote potable water resource conservation, remove 100% of solids, nutrients, metals, pathogens, and toxins, and increase soil moisture for urban greenery (PCA. 2021). **Areas that implement a Rainwater Harvesting/Stormwater Reuse & Rain Barrel Programs of which are directly connected to the Town's MS4 system can be considered a Retrofit Project.**

Data compiled from the Neighborhood Rain Barrel Partnership Project indicated, "…the average 50-gallon rain barrel could capture a 0.26-inch precipitation event, or 64 percent of the 28 precipitation events monitored" (EPA, 2008). The implementation of such a program could greatly increase the quality of stormwater, as well as involve the community in protecting the Town's navigable waterways.

Potentially, with the utilization of ordinances or other legal means, the Town could require rain harvesting of an agreed upon percentage for commercial developments. Other considerations include historical land uses, facilities, or industrial uses may contaminate rainwater harvesting (PCA, 2021). **Table 5** describes the implementation, applications, and considerations of executing such a program.

Table 5– Rainwater Harvesting/Stormwater Reuse & Rain Barrel Programs

Program	Implementation	Application	Considerations
Rain Barrels	❖ Rain Barrels are typically small scale (25-100-gallons). ❖ Install at the downspout of a gutter system. ❖ Gravity is the simplest method of delivery; complex systems can be designed to deliver water from several barrels. ❖ Town may want to offer an agreed upon rebate residents or businesses that purchase specified rain barrels.	❖ Collects and store rainwater for watering landscapes and gardens ❖ Cumulative effect includes volume reduction over entire watershed area ❖ Removes 100% of 100% of solids, nutrients, metals, pathogens, & toxins that would have potentially reached MS4 system.	❖ Typical costs range from $50 to $230 for a 55-gallon drum. ❖ Plastic, food-grade 55-gallon drums range from $15 to $20. ❖ Barrel should include overflow deflection ❖ Routing features should be installed to keep water away from structure foundations ❖ Not to be utilized for tar & gravel, asbestos shingle, or treated cedar shake roof types. ❖ A fine screen over all openings or emptying of barrels should be conducted to prevent mosquito breeding. ❖ Disconnected in the winter to prevent deformation of the system
Cisterns	❖ Greater storage capacity ❖ Stored above or below ground ❖ Delivered utilized a pump system ❖ A surface stormwater pond (Bioretention or infiltration basin) could be designed to overflow into the cistern as well.	❖ Typically utilized to irrigate landscapes, gardens, and ballparks on a regular basis ❖ Reduces strain on municipal water supplies during peak summer months. ❖ Potential for use in non-potable services (toilets, urinal flushing)	❖ Typical costs range from $200 to $10,000 based on size, materials, and structural requirements ❖ Often complex system that requires continuous maintenance ❖ Designed overflow from a basin may need treatment prior to use for irrigation purposes.

Source: Created by Atlas Technical Consultants (2021), resourced from the Minnesota Pollution Control Agency (PCA) Pollution Prevention & the MS4 Program.

3.3 Credit Trading Program

Stormwater POC have long afflicted navigable waterways, with negative effects including algae blooms, resource degradation, toxicity, and even an increase in drinking water treatment costs. Options in reducing stormwater POC often include LID-implementation, community participation, ordinances, and legal action. However, these practices may not always have the desired effect, particularly in areas of high industrial or commercialized infrastructure (point sources). A Credit

Trading Program may be the solution, as it holds businesses accountable for stormwater pollution and promotes the increased quality of stormwater discharge.

To find a successful Trading Credit Program, one need not look far. The Connecticut and New York Credit Trading Program (known as the Nitrogen Control Program for Long Island Sound) has been found to be incredibly effective in the reduction of nitrogen discharged to the Sound. The reduction of nitrogen input into the Sound was achieved by first achieving the total maximum daily load (TMDL) of nitrogen that could be discharged, and the implementation of an initiative nitrogen-trading program among sewage treatment plants located throughout the state. Established in 2002, by 2014 65 percent of nitrogen loading from sewage treatment plants had been reduced (CTDEEP, 2020).

To reduce the amount of the POC discharged, participating developers purchase credits from the Town. **Developers directly connected to the MS4 system that participate in this program can be considered a Retrofit Project, as it pertains specifically to the area of previously connected surface that was disconnected.** The amount of credits purchased is the equivalent of the POC in mass. Developers would then pay a fee on a per/lb. basis over a 30-year reduction period, for example. Developers then create and/or monitor POC removal from the stormwater infrastructure. The removal of the POC would be reported in mass. *Developers that remove over the standards for their specific POC removal goal can sell credits to other developers who cannot meet their POC removal goal.* **Table 6** demonstrates the annual re-evaluation of developers of trading versus treating.

Table 6 – Performance of the NCE, 2002-2009

Trading Year	Credit Prices (Dollars)	Purchased (Dollars)	Sold (Dollars)	Purchased (1,000 Credits)	Sold (1,000 Credits)
2002	$1.65	$1,317,223	$2,357,323	798	1,429
2003	$2.14	$2,116,875	$2,428,636	989	1,135
2004	$1.90	$1,786,736	$2,659,804	940	1,400
2005	$2.11	$2,467,757	$1,315,392	1,170	623
2006	$3.40	$3,828,114	$2,394,956	1,126	704
2007	$4.36	$5,159,019	$2,072,001	1,183	475
2008	$4.50	$6,148,327	$2,660,688	1,366	591
2009	$4.54	$4,390,023	$2,835,447	967	625
Total		$27,214,074	$18,724,247	8,539	6,982

Source: CTDEEP. 2020.

The implementation of a Credit Trading Program may create economic activity within the Town, motivate developers through monetary incentive, and create an annual re-evaluation on treating versus trading based on annual increases or decreases in credit costs. Considerations should be made in the potential buy back of credits - *if all developers meet the POC removal goal within the threshold (ex. 30-years), the Town will be liable for buying back all credits.* Funding may be available through the Clean Water State Revolving Fund (CWSRF) (EPA, 2021).

3.4 Buffer Ordinance

A buffer can be defined as "small areas or strips of land in permanent vegetation, designed to intercept pollutants and manage other environmental concerns" (PCA, N.D.). *Buffers present numerous advantages, including POC removal, erosion reduction, restore the integrity of water resources, contribute organic matter to aquatic ecosystems, provide riparian wildlife habitat, and bring scenic or recreational opportunity to the area* (EPA, 2002). **Buffers implemented in areas directly connected to the Town's MS4 system can be considered a Retrofit Project, as it pertains specifically to the area of previously connected surface that was disconnected.**

The United States Environmental Protection Agency (EPA) has created a model buffer ordinance, with suggested language or guidance in creating buffer ordinances, and is included in **Appendix III**. Design standards of a buffer ordinance, at a minimum, should include the following:

Table 7 – Buffer Ordinance Design Standards

Standard	Considerations
Establish minimum width to apply to all buffers.	Customize requirements according to functions, values, and water body size.
Determine how areas are to be calculated.	Identify flexibility in standard (using an average buffer width, etc.) Should allow changes to be made to adjust for slope, soils, encroaching land uses, or water utilization.
Vegetative Specifications	Vegetative mixes based on soils, slope, region.
Signage	Specify minimum spacing of signage to identify buffer and prevent encroachment

Source: Created by Atlas Technical Consultants (2021). Adapted from PCA Pollution Prevention and the MS4 Program.

Following the implementation of a buffer ordinance, a Town-wide campaign can be utilized to inform developers and property owners of the benefits of a vegetated buffer. To reach the desired audience, brochures, signage at municipal locations, workshops, or seminars can be provided by the Town (PCA, N.D.).

Maintenance of buffers will generally consist of mowing, removal of refuse or debris, inspections for erosion and infiltration, and the replacement of damaged or dead plants. The installation of a vegetated buffer is estimated at $0.50 per square foot, as well as costs relating to labor or maintenance supplies (PCA, N.D.). Applications of a vegetated buffer can include natural drainage in residential areas, along roads in place of curbing, parking lot islands, low-flow conveyance in place of structural conveyance, pretreatment prior to discharge to open water, provide aesthetic appeal, and provide a natural habitat within urbanized areas (PCA, N.D).

3.5 Additional Disconnect Strategies

3.5.1 Curbless Streets

Curbless streets, or streets that are sloped to vegetative areas, allow stormwater to drain into permeable areas adjacent to the property. By eliminating curbs or gutters, there are fewer infrastructure costs and higher infiltration rates (PCA, 2021). *If curbs cannot be eliminated, then they can sometimes be slotted to re-route runoff to vegetated areas.* Existing stormwater infrastructure should be evaluated and expanded if needed (NEMO, 2004). **Curbs or gutters that are eliminated in areas that discharge directly to the MS4 system can be considered a Retrofit Project.**

3.5.2 Permeable Pavement

As the Town continues to maintain its properties, permeable paving materials can be utilized during upgrades. *Examples of permeable materials include modular concrete paving blocks, modular concrete, plastic lattice, cast-in-place concrete grids, and/or designed permeable pavement*. Considerations pertaining to site-specific factors should include "traffic volumes, soil permeability, maintenance, sediment loads, and land use…" (NEMO, 2004). **Sites that implement permeable pavements of which were previously directly connected to the Town's MS4 system can be considered a Retrofit Project.**

4. STORMWATER DISCONNECT TRACKING

4.1 Directly Connected Impervious Areas (DCIA)

Under the Pollution Prevention/Good Housekeeping portion of the general permit, the Town must develop a retrofit program to disconnect existing DCIA by 1% per year, or a total of 2% to the maximum extent practicable (MEP). *Previous disconnections going back to 2012 can be counted toward this disconnection requirement.*

According to the MS4 General Permit, the Town must make a serious attempt to comply with DCIA disconnects. However, based on attenuating factors, including MS4 size, the ability to finance, the capacity to perform operations and maintenance, and local conditions, the MEP may be less than a total of 2% disconnected for the Town of Canton (CTDEEP, 2017).

For the purpose of maximum extent practicable (MEP) for the Town, an investigation was conducted by Nathan L. Jacobson & Associates on DCIA for each catchment in the Town. Catchments were defined by utilizing the Town's Sub-Basins. High Connectivity, Average Connectivity, Partial Connectivity, and Slight Connectivity were calculated utilizing the following formulas:

High Connectivity

DCIA%=0.4(IA %)^1.2*

Directly Connected Area= (DCIA)(IC Acres)

Average Connectivity

DCIA%=0.1(IA%)^1.5*

Directly Connected Area= (DCIA)(IC Acres)

Partial Connectivity

DCIA%=0.04(IA%)^1.7*

Directly Connected Area= (DCIA)(IC Acres)

Slight Connectivity

DCIA%=0.01(IA%)^2.0*

Directly Connected Area= (DCIA)(IC Acres)

The Average Connectivity calculation was utilized in assessing the Town's DCIA connectivity based on the majority of land utilization defined as agricultural and/or rural, minor residential communities, and minor-to-moderate commercial or industrialized areas. Based on the

calculations provided, no catchments have a connectivity of 11% or greater. Refer to **Appendix IV** for the Town's complete DCIA Computations.

Please note that in all tables henceforth, catchments are organized by drainage waterbodies. Refer to *Section 4.3* for information regarding impaired waters in the Town of Canton. **Figures** pertaining to the DCIA and all future sections are located in **Appendix II**.

Table 8 – DCIA

Catchment ID	Basin Total Acreage (Ac.)	Town Impervious Area Acreage (Ac)	Town Impervious Area Percentage (%)	DCIA Acreage (Average) (Ac)	DCIA Percentage (Average) (%)
Farmington River Branch					
4300-14-1	810.68	22.14	2.73	0.00	0.00
4300-15-1	531.77	23.89	4.49	0.00	0.00
4300-16-1	1,089.79	80.11	7.35	1.99	0.80
4300-16-2-R1	201.66	24.43	12.11	4.22	0.52
4300-17-1	559.19	73.31	13.11	4.75	1.74
4300-18-1	41.61	8.62	20.72	0.00	0.00
4300-18-L1	285.10	35.01	12.28	4.30	0.75
4300-00-4+R6	32.78	0.53	1.62	0.00	0.00
4300-00-4+R7	1.63	0.00	0.00	0.00	0.00
4300-00-4+R8	167.86	12.36	7.36	2.00	0.12
4300-00-4+R9	154.60	15.00	9.70	3.02	0.23
4300-00-4+R10	308.14	34.67	11.25	3.77	0.62
4300-00-4+R11	485.18	60.93	12.56	4.45	1.36
4300-00-4+R12	373.29	50.49	13.53	4.97	1.26
East Branch Farmington River					
4308-00-2-R1	23.86	0.00	0.00	0.00	0.00
4308-18-1	359.52	10.16	2.83	0.00	0.00
4308-18-2-R1	424.46	0.98	0.23	0.00	0.00
4308-19-2-R1	23.34	0.22	0.94	0.00	0.00
Cherry Brook					
4309-00-1	107.66	1.32	1.23	0.00	0.00
4309-00-2-R1	684.65	17.64	2.58	0.00	0.00
4309-00-2-R2	1,352.78	50.56	3.74	0.00	0.00
4309-00-2-R3	33.19	0.56	1.69	0.00	0.00
4309-00-2-R4	318.16	11.08	3.48	0.00	0.00
4309-00-2-R5	1,038.65	36.69	3.53	0.00	0.00
4309-01-1	81.98	2.30	2.81	0.00	0.00
4309-02-1	785.18	16.70	2.13	0.00	0.00

Catchment ID	Basin Total Acreage (Ac.)	Town Impervious Area Acreage (Ac)	Town Impervious Area Percentage (%)	DCIA Acreage (Average) (Ac)	DCIA Percentage (Average) (%)
4309-03-1	769.55	33.18	4.31	0.00	0.00
4309-04-1	396.54	13.14	3.31	0.00	0.00
4309-05-1	1,054.20	25.33	2.40	0.00	0.00
Nepaug River					
4310-00-3-L2	442.22	5.79	1.31	0.00	0.00
4310-00-3-R5	115.62	6.53	5.65	0.00	0.00
Roaring Brook					
4312-00-1	156.69	6.06	3.87	0.00	0.00
4312-00-2-L1	91.44	19.18	20.98	0.00	0.00
4312-00-2-L2	756.73	99.38	13.13	8.79	4.37
4312-01-1	833.93	34.51	4.14	0.00	0.00
4312-02-1	18.87	3.78	20.03	0.00	0.00
Nod Brook					
4317-00-1	300.00	4.81	1.60	0.00	0.00
4317-01-1	38.39	2.30	5.99	0.00	0.00
Hop Brook					
4318-00-1	107.59	2.81	2.61	0.00	0.00
4318-04-1	4.77	0.00	0.00	0.00	0.00
4318-04-1-L1	649.33	39.94	6.15	1.53	0.30
West Branch Salmon Brook					
4319-11-1	5.76	0.00	0.00	0.00	0.00

Source: Created by Atlas Technical Consultants (2021). Referenced from (CITE WADE)

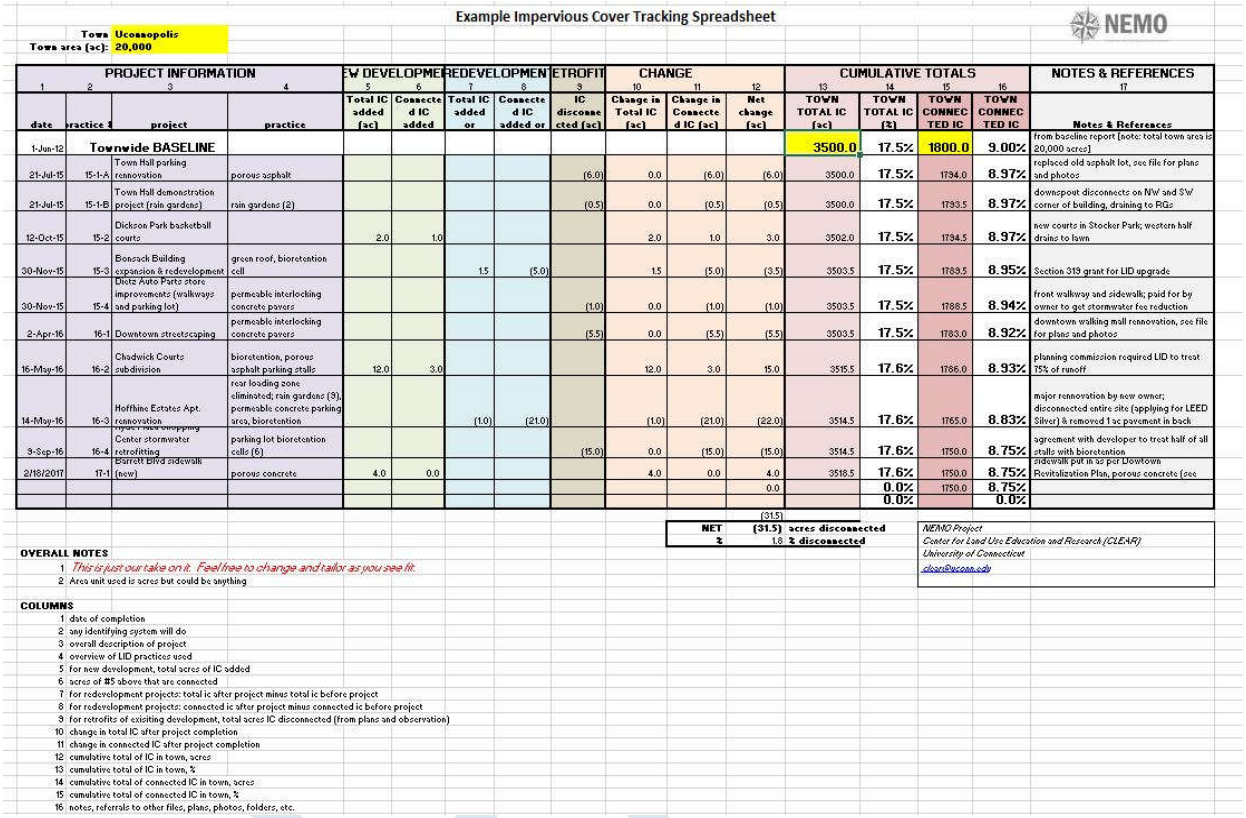
4.1.1 Impervious Cover Tracking

Existing DCIA by 1% per year, or a total of 2% disconnect to the maximum extent practicable (MEP) is required under the MS4 Permit. A disconnect is defined as infiltrating the first inch of rain. Previous disconnections going back to 2012 can be counted toward this disconnection requirement. Stormwater should not be infiltrated in Aquifer Protection Areas where there is a high pollutant load, at sites with existing subsurface contamination, or a drinking water wellhead area (UCONN, 2020).

UConn, along with CT NEMO, have provided a tool- the Impervious Cover Disconnection Spreadsheet-that is useful for DCIA disconnection tracking purposes. Included in the Disconnection Spreadsheet is Project Information, New Developments, Redevelopments, Retrofits, Change, and Cumulative Totals. This spreadsheet will allow the Town to easily track and compute disconnects from the MS4 system during redevelopment or retrofitting, or

connections to the MS4 system with new developments. **Graphic 9** provides an example of disconnection tracking. This spreadsheet is included in **Appendix V**.

Graphic 9: Impervious Cover Disconnection Spreadsheet



Example Impervious Cover Tracking Spreadsheet

NEMO

Town: Uconnopolis
Town area (ac): 20,000

PROJECT INFORMATION				NEW DEVELOPMENT		REDEVELOPMENT		RETROFIT	CHANGE			CUMULATIVE TOTALS				NOTES & REFERENCES
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
date	practice #	project	practice	Total IC added (ac)	Connected IC added	Total IC added or	Connected IC added or	IC disconnected (ac)	Change in Total IC (ac)	Change in Connected IC (ac)	Net change (ac)	TOWN TOTAL IC (ac)	TOWN TOTAL IC (%)	TOWN CONNECTED IC	TOWN CONNECTED IC	Notes & References
1-Jun-12		Townwide BASELINE										3500.0	17.5%	1800.0	9.00%	from baseline report (note: total town area is 20,000 acres)
21-Jul-15	15-1-A	Town Hall parking renovation	porous asphalt					(6.0)	0.0	(6.0)	(6.0)	3500.0	17.5%	1794.0	8.97%	replaced old asphalt lot, see file for plans and photos
21-Jul-15	15-1-B	Town Hall demonstration project (rain gardens)	rain gardens (2)					(0.5)	0.0	(0.5)	(0.5)	3500.0	17.5%	1793.5	8.97%	downspout disconnects on NW and SW corner of building, draining to RGs
12-Oct-15	15-2	Dickson Park basketball courts		2.0	1.0				2.0	1.0	3.0	3502.0	17.5%	1794.5	8.97%	new courts in Stocker Park; western half drains to lawn
30-Nov-15	15-3	Bonzack Building expansion & redevelopment	green roof, bioretention cell			1.5	(5.0)		1.5	(5.0)	(3.5)	3503.5	17.5%	1789.5	8.95%	Section 319 grant for LID upgrade
30-Nov-15	15-4	Dietz Auto Parts store improvements (walkways and parking lot)	permeable interlocking concrete pavers					(1.0)	0.0	(1.0)	(1.0)	3503.5	17.5%	1788.5	8.94%	front walkway and sidewalk; paid for by owner to get stormwater fee reduction
2-Apr-16	16-1	Downtown streetscaping	permeable interlocking concrete pavers					(5.5)	0.0	(5.5)	(5.5)	3503.5	17.5%	1783.0	8.92%	downtown walking mall renovation, see file for plans and photos
16-May-16	16-2	Chadwick Courts subdivision	bioretention, porous asphalt parking stalls	12.0	3.0				12.0	3.0	15.0	3515.5	17.6%	1786.0	8.93%	planning commission required LID to treat 75% of runoff
14-May-16	16-3	Hoffhine Estates Apt. renovation	rear loading zone eliminated; rain gardens (3), permeable concrete parking area, bioretention			(1.0)	(21.0)		(1.0)	(21.0)	(22.0)	3514.5	17.6%	1765.0	8.83%	major renovation by new owner; disconnected entire site (applying for LEED Silver) & removed 1 ac pavement in back
3-Sep-16	16-4	Center stormwater retrofitting	parking lot bioretention cells (6)					(15.0)	0.0	(15.0)	(15.0)	3514.5	17.6%	1750.0	8.75%	agreement with developer to treat half of all stalls with bioretention
2/18/2017	17-1	Burrett Blvd sidewalk (new)	porous concrete	4.0	0.0				4.0	0.0	4.0	3518.5	17.6%	1750.0	8.75%	sidewalk put in as per Downtown Revitalization Plan, porous concrete (see
											0.0		0.0%	1750.0	8.75%	
											0.0		0.0%		0.0%	
											(31.5)					
									NET		(31.5)	acres disconnected				
									%		1.8	% disconnected				

NEMO Project
Center for Land Use Education and Research (CLEAR)
University of Connecticut
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OVERALL NOTES

1. *This is just our take on it. Feel free to change and tailor as you see fit.*
2. Area unit used is acres but could be anything

COLUMNS

1. date of completion
2. any identifying system will do
3. overall description of project
4. overview of LID practices used
5. for new development, total acres of IC added
6. acres of #5 above that are connected
7. for redevelopment projects: total ic after project minus total ic before project
8. for redevelopment projects: connected ic after project minus connected ic before project
9. for retrofits of exisiting development, total acres IC disconnected (from plans and observation)
10. change in total IC after project completion
11. change in connected IC after project completion
12. cumulative total of IC in town, acres
13. cumulative total of IC in town, %
14. cumulative total of connected IC in town, acres
15. cumulative total of connected IC in town, %
16. notes, referrals to other files, plans, photos, folders, etc.

4.2 Urbanized Areas

The 2010 Census of Urban Classification defines an Urban Area as “densely developed territory, and encompass [es] residential, commercial, and other non-residential urban land use” (Census, 2010). There are two clearly defined Urban Areas: an Urbanized Area must contain 50,000 or more people, and an Urban Cluster must contain at least 2,500 and less than 50,000 people (Census, 2010). For purposes of this Stormwater Retrofit Program, data pertaining to an Urbanized Area was utilized.

Atlas was provided with a shapefile of the 2010 Urbanized Areas for the Town, which was imported into ArcGIS for calculation purposes. Utilizing the Overlay-Intersect tool, Atlas was able to extract the total Urbanized Area acreage per catchment, and then calculate the Urbanized Area percentage per catchment utilizing the following formula:

*Urbanized Area (Ac)/Basin Total Acreage*100*

Table 9 includes catchments found to contain Urbanized Areas only, as well as the results of the Urbanized Area Acreage extraction and Urbanized Area Percentage results. **Figure 1** depicts the Urbanized Areas and corresponding catchments.

Table 9 – Urbanized Areas by Catchment

Catchment ID	Basin Total Acreage (Ac.)	Urbanized Area (Ac)	Urbanized Area Percentage (%)
Farmington River			
4300-14-1	810.68	70.44	8.68
4300-15-1	531.77	6.23	1.17
4300-16-1	1,089.79	229.28	21.03
4300-16-2-R1	201.66	201.66	100.00
4300-17-1	559.19	400.71	71.65
4300-18-1	41.61	41.61	100.00
4300-18-L1	285.10	281.08	98.58
4300-00-4+R8	167.86	134.11	79.89
4300-00-4+R9	154.60	67.08	43.38
4300-00-4+R10	308.14	244.10	79.21
4300-00-4+R11	485.18	473.78	97.65
4300-00-4+R12	373.29	368.11	98.61
Cherry Brook			
4309-00-2-R5	1,038.65	190.06	18.29
4309-05-1	1,054.20	0.06	0.005
Nepaug River			
4310-00-3-L2	442.22	54.72	12.37
4310-00-3-R5	115.62	113.86	98.47
Roaring Brook			
4312-00-1	156.69	156.69	100.00
4312-00-2-L1	91.44	74.07	2.31
4312-00-2-L2	756.73	651.86	86.14
4312-01-1	833.93	385.82	46.26
4312-02-1	18.87	18.87	100.00
Nod Brook			
4317-00-1	300.00	298.82	99.6
4317-01-1	38.39	38.16	99.4
Hop Brook			
4318-04-1	4.77	4.77	100.00
4318-04-1-L1	649.33	166.89	25.70

Source: Created by Atlas (2021). Total Urbanized Area Acreage calculated utilizing ArcGIS.

4.3 Impaired Waterbodies

CT ECO, a partnership between the CTDEEP and UConn, has based the state's impaired waters on the following specifications; waters listed as impaired by the EPA and waters that were listed as having adopted a Total Maximum Daily Load (TMDL) for either one or all of the following: phosphorus, nitrogen, bacteria, or mercury. These were then combined into a Stormwater Impaired Waters layer (shapefile) through CT ECO for the use in a GIS system.

Utilizing the 2020 CT Stormwater Impaired Waters shapefile, Atlas was able to identify impaired waters that directly flow through the Town. Cherry Brook was identified with an impairment of TMDL- E.coli. Cherry Brook flows through four (4) catchments, which are listed in **Table 10**, below. **Figure 2** depicts the locations of Cherry Brook and associated catchments.

Table 10 –Catchments Containing Cherry Brook

Catchment ID	Basin Total Acreage (Ac.)	Town Impervious Acreage (AC)	Town Impervious Area Percentage (%)
Farmington River			
4300-00-4+R9	154.60	15.00	9.70
4300-00-4+R10	308.14	34.67	11.25
Cherry Brook			
4309-00-2-R5	1,038.65	36.69	3.53
4309-00-2-R4	318.16	11.08	3.48

Source: Created by Atlas (2021).

4.4 Catchment Priority Rankings

High Priority areas are focused mainly on the southern border of the Town, with two "fingers" of High Priority areas extending northwards. The High Priority areas in the Town consist primarily of residential, industrial, and/or commercialized areas. Most High Priority areas in the Town include several outfalls; however, not all discharge to impaired waterbodies. Multiple factors were taken into consideration into consideration when scoring each catchment, including but not limited to DCIA calculations, previous screening results, age of development/structures, density of generating sites, nearby sewer repairs, urbanized areas, and impaired waterbodies. Refer to **Table 11** below for a list of the Town's High and Problem catchments.* **Figure 3** depicts the location of the Town's High, Problem, and Low Priority Catchment Ranking.

Table 11 – High Priority and Problem Catchments

Catchment ID	Number of Outfalls Included	Priority Ranking *Low Priority: 0-5* *Problem: 6-9* *High Priority: ≥10*
4309-04-1	6	High Priority
4309-00-2-R4	2	High Priority
4300-15-1	20	High Priority
4312-01-1	23	High Priority
4309-00-2-R5	9	High Priority
4300-00-4+R10	13	High Priority
4300-18-1-L1	3	High Priority
4312-00-2-L2	14	High Priority
4300-17-1	3	High Priority
4300-00-4+R11	23	High Priority
4300-18-1	2	High Priority
4300-16-2-R1	None.	High Priority
4300-00-4+R12	9	High Priority
4319-11-1	None.	Problem
4309-01-1	None.	Problem
4309-00-2-R2	None.	Problem
4309-03-1	None.	Problem
4309-05-1	17	Problem
4318-04-1-L1	15	Problem
4300-14-1	16	Problem
4317-00-1	None.	Problem
4300-16-1	29	Problem
4312-00-1	4	Problem
4300-00-4+R9	None.	Problem
4310-00-3-L2	None.	Problem
4312-00-2-L1	None.	Problem
4317-01-1	None.	Problem
4312-02-1	2	Problem

Source: Created by Atlas Technical Consultants (2021)

Exempt and Low Priority Catchments are not included in this table. For a complete list of the Priority Catchment Rankings and factors applied in scoring, refer to **Appendix VI.*

5. RETROFIT PLANNING

According to the MS4 General Permit,

> *"By the end of this permit term, the permittee shall commence the implementation of the retrofit projects identified in subparagraph (b)…with a goal of disconnecting one percent (1%) per year of the permittee's DCIA for the fourth and fifth years of this general permit, or a total of 2%, to the MEP. The two percent (2%) goal may be achieved by compiling the total disconnected DCIA tracked…or the retrofit projects designated…or a combination of the two" (CTDEEP. 2017).*

If the two percent (2%) goal will not be met, then the MEP standard shall be utilized. The Town must make a serious attempt to comply with DCIA disconnects. However, based on attenuating factors, including MS4 size, the ability to finance, the capacity to perform operations and maintenance, and local conditions, the MEP may be less than a total of 2% disconnected for the Town of Canton (CTDEEP, 2017). Following the fifth year of the MS4 Permit, the Town will continue the Retrofit Program with a goal to disconnect one percent (1%) of DCIA each year thereafter (CTDEEP, 2017). *Section 5.1* details Town-owned facilities, as well as parks and conservation areas located through the Town. **Figure 4** depicts the location of the aforementioned locations.

5.1 Municipal Owned Facilities and Parks

Town owned or operated properties, parks, and other facilities are the recommended focus for the initial Retrofit Project planning. By controlling the point or non-point source pollutions at municipal-owned properties, the Town can implement control practices and pollution prevention, most of which are non-structural and require minimal or no land area. In addition, by implementing control practices and pollution prevention, the Town will contribute to public education and outreach (UCONN, 2004).

As specified in Section 6 (H)(ii) in the MS4 Permit, for impaired waters where bacteria is a POC, the Town shall develop, fund, implement, and prioritize a Retrofit Project to correct bacterial contribution to impaired waterbodies. Atlas will continue to investigate and develop recommendations for Retrofit Projects pertaining to dog parks, parks with open water, sites with failing septic systems, etc., that will contribute to source management of bacterial contribution.

Table 12 details Town-owned facilities, parks, and/or conservation areas owned by other investors. Locations shaded brown signify sites under investigation. As these sites are investigated, Atlas will submit addendums to the Town pertaining to the updated information.

Table 12 – Municipal Owned

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
Canton Town Hall	4 MARKET STREET	0.34	1900	Office Building, Commercial	Stormwater flows towards the northwest, towards Bridge St. and the parking lot located at 74 Main St. A small portion of stormwater may infiltrate grassy areas located northwest of this location.	Roof Gutters directly connected to MS4. Surrounded by buildings or impervious areas.
Parking lot for Town Hall	74 MAIN STREET	0.54	0	Parking lot, Commercial	Stormwater flows towards the northwest, towards Bridge St. A small portion of stormwater may infiltrate a grassy area located on the northern border of this parcel.	Impervious area. Some grassy areas on the northern end of this lot.
Wooded Lot	9 CROWN POINT	10.18	Not Applicable	Vacant, Residential	Stormwater flows east-northeast, towards Crown Pt. Residences located in Avon abut this lot, and it is likely that stormwater from these residences infiltrates near to or onto the lot.	None.
Wooded Lot	168 KINGSWOOD DRIVE	2.97	Not Applicable.	Vacant, Residential	Stormwater on the southwestern side of this lot flows towards the west-northwest, towards a wooded lot. Stormwater on the northern side of the lot flows towards the east-northeast, towards the Crown Pt. residential community. A Connecticut Water Company lot abuts this lot, and contains a 12,000-gallon water tank built in 1998.	None.
Wooded Lot	12 QUEENS PEAK ROAD	1.33	Not Applicable	Vacant, Commercial	Stormwater flows from Queens Peak Rd. onto this lot, flowing northwest to southeast, where it is infiltrated into the ground.	None.
Wooded Lot	13 BART DRIVE	1.59	Not Applicable	Vacant, Residential	This L-shaped lot flows in a northerly general direction from the south to the north, towards Pheasant Hill Rd. The northeastern	None.

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
					corner of this lot flows towards Atwater Rd. Surrounding residential housing stormwater is presumed to flow towards this lot.	
Wooded Lot	14 BART DRIVE	15.8	Not Applicable	Vacant, Residential	For purposes of analysis, this lot will be split into two (2) halves –eastern and western. The western half of this lot is generally flat, with a slope towards the north, towards Bart Dr. on the northern end, and a slope towards the northwest on the western side. The eastern half of this lot is slopes towards the west-northwest. Steep slopes are located along the western and northern sides of this lot, towards residential areas.	None.
Wooded Lot	54 BART DRIVE	0.31	Not Applicable	Vacant, Residential	Stormwater flows in a northwestern direction, towards Bart Dr. Some surrounding residential stormwater may infiltrate this lot.	None.
Bicentennial Park	2 RIVER ROAD	1.7	Not Applicable	Park, Commercial	This park is generally flat, and slopes west towards the Farmington River. The northeastern corner of this lot slopes to the northeast, towards a small Farmington River tributary.	None.
Wooded Lot	8 DARTMOUTH DRIVE	3	Not Applicable	Vacant, Residential	The lot slopes towards the northeast, infiltrating abutting residential properties located on the southern side of this lot.	None.
Wooded Lot	88 LOVELY STREET	14.39	Not Applicable	Vacant, Residential	This lot is steeply sloped to the east, infiltrating residences abutting the western border of this lot.	None.
Wooded Lot	63 ATWATER ROAD	0.57	Not Applicable	Vacant, Residential	Stormwater is presumed to flow in a west-northwesterly direction. Upgradient	None.

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
					sites remain undeveloped.	
Wooded Lot	43 ATWATER ROAD	2.23	Not Applicable	Vacant, Residential	Stormwater flows from the southeast to the northwest corner of this lot, beginning at Atwater Rd.	None.
Grassy Lot	110 CANTON SPRINGS ROAD	0.38	Not Applicable	Vacant, Residential	This lot abuts the corner of Dartmouth Dr. and Crown Pt. Stormwater from Crown Pt. is presumed to flow across this lot in a northeasterly direction.	None.
Wooded Lot	44 ATWATER ROAD	14.22	Not Applicable	Vacant, Residential	This lot slopes in a northerly direction, with surrounding residences to the southeast directly sloping in a northwesterly direction, towards the lot. Two (2) ponds and/or wetland areas are located in the northeastern corner of this lot. Based on aerial imagery, eutrophication is occurring.	None.
Wooded Lot	45 SECRET LAKE ROAD	0.3	Not Applicable	Vacant, Residential	The eastern half of this lot slopes towards the west, presumably infiltrating some of stormwater runoff from Secret Lake Rd. The western half then flattens, with a very mild slope towards the west.	None.
Wooded Lot	11 DARTMOUTH DRIVE	6.61	Not Applicable	Vacant, Residential	For purposes of analysis, this lot will be split into two (2) halves-eastern and western. The eastern half of this lot slopes towards the north-northeast, infiltrating stormwater runoff from residences and Ellsworth Lane. The western half of this lot slopes towards the north-northwest, infiltrating stormwater runoff from residences and Crown Pt.	None.
Wooded Lot	16 DARTMOUTH DRIVE	2.15	Not Applicable	Vacant, Residential	This lot slopes in a north-northeasterly	None.

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
					direction. Aerial imagery indicates a wetlands area located in the central portion of this lot.	
Wooded Lot	61 ATWATER ROAD	24.39	Not Applicable	Vacant, Residential	Stormwater on this steeply sloped lot is presumed to flow towards the west-northwest, infiltrating stormwater from residences located along the eastern border.	None.
Wooded Lot	78 BART DRIVE	2.6	Not Applicable	Vacant, Residential	This lot slopes towards the north-northwest, potentially infiltrating runoff from Cobb Rd. cul-de-sac.	None.
Storage	9 DYER AVENUE	0.0	1925	Storage Building (Farms/Barns)	The northwestern corner of this lot is flat, while the southeastern corner of this lot slopes towards the southeast. Stormwater runoff from the storage building is presumed to infiltrate into the ground.	None.
Highway Maintenance Garage, Wastewater Treatment Facility	50 OLD RIVER ROAD	6.64	2018	Commercial Garage, Wastewater Treatment, portion of Bicentennial Park.		Retention basin, infiltrators.
Canton Volunteer Fire & EMS (Collinsville Station)	51 RIVER ROAD	5				
	45 River Road					
	14 DYER AVENUE	1.6				
	13 ALLEN PLACE	3				
	3 ALLEN PLACE	5.5				
	53 RIVER ROAD	0.13				
	5 SUNRISE DRIVE	1.45				
	17 ATWATER ROAD	1.5				
	125 COMMERCE DRIVE	17.4				
	50 COMMERCE DRIVE	6.3				

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
	44 GILDERSLEEVE AVENUE	1.5				
	50 GILDERSLEEVE AVENUE	0.82				
	40 DYER AVENUE	7.71				
	3 FREEDOM DRIVE	0.37				
	39 DYER AVENUE	12.47				
	70 MAPLE AVENUE	1.62				
	178 ALBANY TURNPIKE	0.52				
	88 SIMONDS AVENUE	3.7				
	100 SIMONDS AVENUE	4.69				
	72 SIMONDS AVENUE	4.93				
	76 SIMONDS AVENUE	28.04				
	10 EAST HILL ROAD	40.54				
	55 LAWTON ROAD	21.3				
	124 POWDER MILL ROAD	2.57				
	52 WILDERS PASS	5.66				
	540 ALBANY TURNPIKE	1.24				
	110 BAHRE CORNER ROAD	3.33				
	50 WILDERS PASS	5.06				
	599 ALBANY TURNPIKE	1.6				
	13 THOMPSON HILL ROAD	5.84				
	2 INDIAN HILL ROAD	1.3				
	22 SPAULDING ROAD	22.4				
	5 BARBOURTOWN ROAD	2.3				
	4 BARBOURTOWN ROAD	14				
	2 WOODCHUCK HILL ROAD	1.24				

Title	Location	Acres	Year Built	Utilization or Land Class	Stormwater Flow[1]	Infrastructures
	51 WOODCHUCK HILL ROAD	1.03				
	100 WOODCHUCK HILL ROAD (REAR)	6.55				
	7 WESTWOOD DRIVE	7.39				
	6 WESTWOOD DRIVE	4.28				
	25 HIGH VALLEY DRIVE	9.87				
	30 HIGH VALLEY DRIVE	7.31				
	44 PINNACLE RIDGE	2.53				
	10 HIGH VALLEY DRIVE	18.84				
	155 ROBIN DRIVE	6.86				
	156 ROBIN DRIVE	2.86				
	158 ROBIN DRIVE	1.27				
	540 CHERRY BROOK ROAD	5.77				
	546 CHERRY BROOK ROAD	155.3				
	680 CHERRY BROOK ROAD	0				
	710 CHERRY BROOK ROAD	2.8				
	105 CASE STREET	35.38				
Garage	15 FRONT STREET	0.1	Not Applicable	Presumed storage, Industrial		None.

Source: Created by Atlas Technical Consultants (2021)

5.2 Non-Municipal Retrofitting

Retrofit Projects can be applied to non-municipal facilities, parks, communities, or other developments, and be counted towards the Town's disconnect percentage. Atlas recommends applying ordinances, post-construction maintenance plans, or other legal regulations associated with the construction, upgrade, and/or rehabilitation of non-Town owned properties to achieve retrofitting.

Specific criteria was utilized in defining priority areas for the implementation of non-municipal Retrofit Projects. The criteria utilized in defining priority areas of non-municipal Retrofit Projects included High or Problem catchment priority rankings, catchments containing an impaired

waterbody, and catchments identified with an urbanized area. Utilizing ArcGIS, Atlas extracted catchments where two (2) or more of the aforementioned criteria were found. **Table 13** details these catchments, and may act as a guide for the Town to focus non-municipal retrofitting efforts. **Figure 5** depicts the location of the extracted catchments prioritized for non-municipal Retrofit Projects.

Table 13 – Non-Municipal Retrofitting

Catchment ID	Total Acres (Ac.)	Priority Ranking	Impaired Waterbody	Urbanized Area Percentage (%)
Farmington River				
4300-00-4+R10	308.14	High	Yes	79.21
4300-00-4+R11	485.18	High	No	97.65
4300-00-4+R12	373.29	High	No	98.61
4300-00-4+R9	154.60	Problem	No	43.38
4300-14-1	810.68	Problem	No	8.68
4300-16-1	1089.79	Problem	No	21.03
4300-16-2-R1	201.66	High	No	100.00
4300-17-1	559.19	High	No	71.65
4300-18-1	41.61	High	No	100.00
4300-18-1-L1	285.10	High	No	98.58
Cherry Brook				
4309-00-2-R4	318.16	High	Yes	None.
4309-00-2-R5	1038.65	High	Yes	18.29
Nepaug River				
4310-00-3-L2	442.22	Problem	No	12.37
Roaring Brook				
4312-00-1	156.69	Problem	No	100.00
4312-00-2-L1	91.44	Problem	No	2.31
4312-00-2-L2	756.73	High	No	86.14
4312-01-1	833.93	High	No	46.26
4312-02-1	18.87	Problem	No	100.00
Nod Brook				
4317-00-1	299.99	Problem	No	99.6
4317-01-1	38.39	Problem	No	99.4
Hop Brook				
4318-04-1	649.33	Problem	No	100.00
4318-04-1-L1	649.33	Problem	No	25.70

Source: Created by Atlas Technical Consultants (2021)

5.3 Retrofit Planning

The following Retrofit Projects are recommended for implementation by the Town. This Program is ongoing, and is dependent on available information, costs, installation periods, and town-wide discussions. As Retrofit Projects are implemented, the Town should update the Impervious Cover Tracking Spreadsheet, located in **Appendix V**. Atlas will continue to assess and recommend Retrofit Projects for the Town's municipal sites. As these sites are assessed, addendums to **Table 14** will be submitted to the Town.

Table 14 – Retrofit Planning

Title	Location(s)	Retrofit(s) Recommended	Projected Disconnected Area (Ac.)[1]	Cost Analysis	Projected Implementation Date
Canton Department of Public Works	50 Old River Road	Collect roof runoff, and reuse for baseball field irrigation.	0.33	Refer to *Section 3.2.*	2022-2025
		Remove curbing or slot on eastern side of parking lot and smaller grassed areas, and replace with riprap or gravel-like material for infiltration.	0.69	Refer to *Section 3.5.1.*	2022-2025
Canton Volunteer Fire & EMS (Collinsville Station)	51 River Road	Remove curbing or slot from grassed areas to allow for infiltration during typical storms. Regrade parking lot to slope towards grassed areas, and reduce slope towards CT-179 and/or associated catch basins.	0.33	Refer to *Section 3.5.1.*	2022-2025
		Collect roof runoff from storage shed, and reuse for grassy area irrigation.	0.01	Refer to *Section 3.2.*	2022-2025
Storage Garage	15 Front Street	Replace gutters, and collect roof runoff. Reuse for grassy area irrigation.	0.04	Refer to *Section 3.2.*	2022-2025
Canton Town Hall	74 Main Street (Parking Lot)	Remove curbing or slot from grassed areas to allow for infiltration during typical storms. Regrade parking lot to slope towards grassed areas.	0.27	Refer to *Section 3.5.1.*	2022-2025
Wooded Lot and Canton	50 Gildersleeve Ave., 44 Gildersleeve	Collect roof runoff, and reuse for athletic fields irrigation.	0.96	Refer to *Section 3.2.*	2022-2025

Title	Location(s)	Retrofit(s) Recommended	Projected Disconnected Area (Ac.)[1]	Cost Analysis	Projected Implementation Date
Intermediate School	Ave., 39 Dyer Ave	Remove curbing or slot around parking lot to infiltrate into athletic fields and grassy areas.	1.32	Refer to *Section 3.5.1.*	2022-2025
Canton Public Library, Canton Elementary School	40 Dyer Ave.	Collect roof runoff, and reuse for athletic fields irrigation.	0.74	Refer to *Section 3.2.*	2022-2025
		Remove parking lot curbing or slot and allow for infiltration into grassy areas.	1.76	Refer to *Section 3.5.1.*	2022-2025
Canton High School	76 Simmonds Avenue	Slot curbing in parking lot to allow stormwater flow access athletic fields and/or wooded areas.	3.60	Refer to *Section 3.5.1.*	2022-2025
		Collect roof runoff and reuse for athletic fields or rain garden irrigation. A green roof is also recommended.	1.82	Refer to *Section 3.2.*	2022-2025

Source: Created by Atlas 2021.

APPENDIX I
REFERENCES

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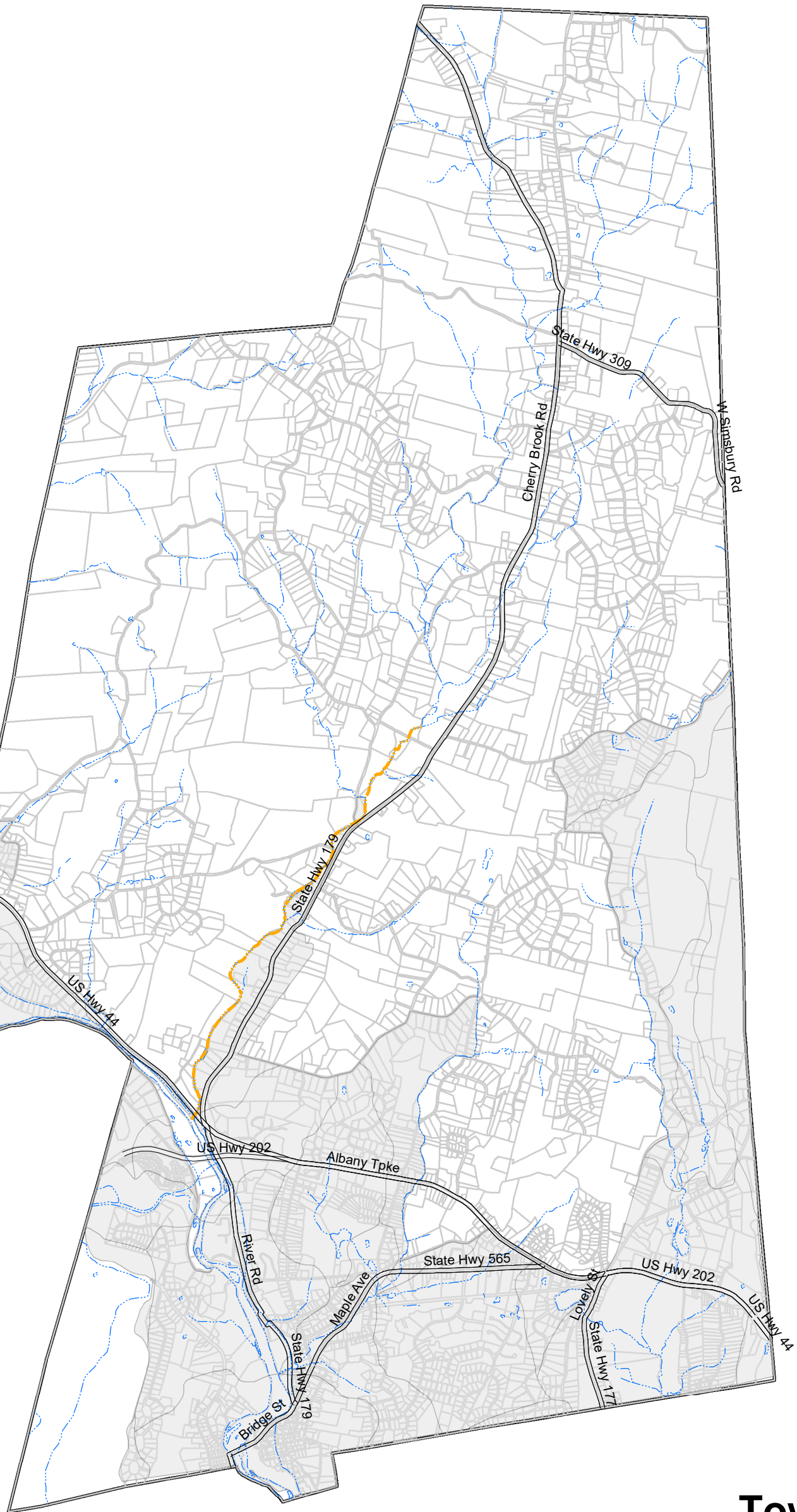
APPENDIX II
FIGURES



Town Of Canton

Stormwater Retrofit Program

Urbanized Areas by Catchment

Legend

- Main Road
- Impaired Waterbody
- Surface Water
- Urbanized Areas
- Parcel
- Canton Town Line

Fig No.
1

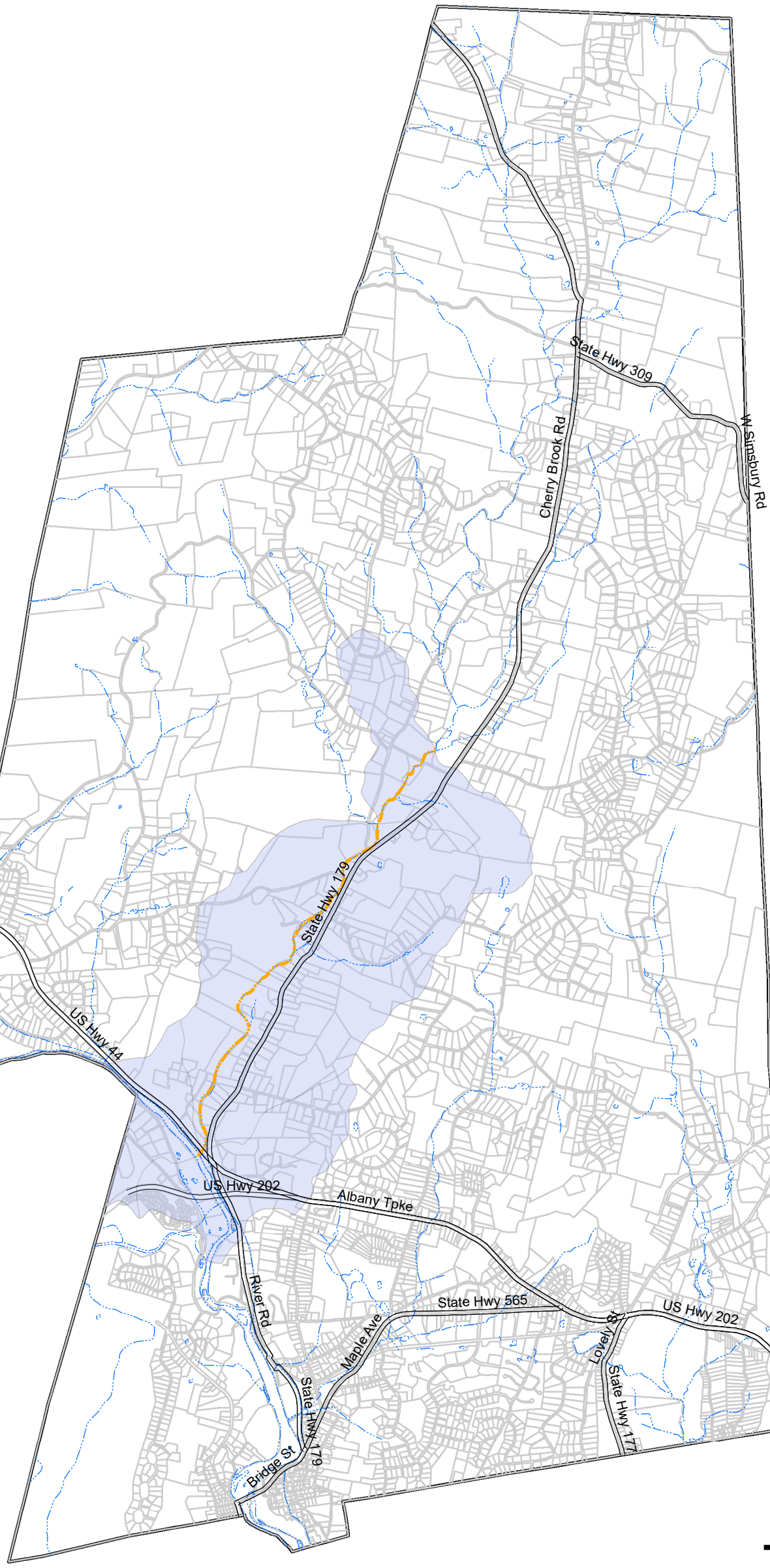
Drawn By: KLL

Checked by: LRW

Date: 2021

ATLAS

290 Roberts Street Suite 301
East Hartford,CT 06108



Town Of Canton

Stormwater Retrofit Program

Impaired Waterbodies by Catchment

Legend

- Main Road
- Impaired Waterbody
- Surface Water
- Catchments Associated with Impaired Waterbodies
- Parcel
- Canton Town Line

Fig No.
2

Drawn By: KLL

Checked by: LRW

Date: 2021

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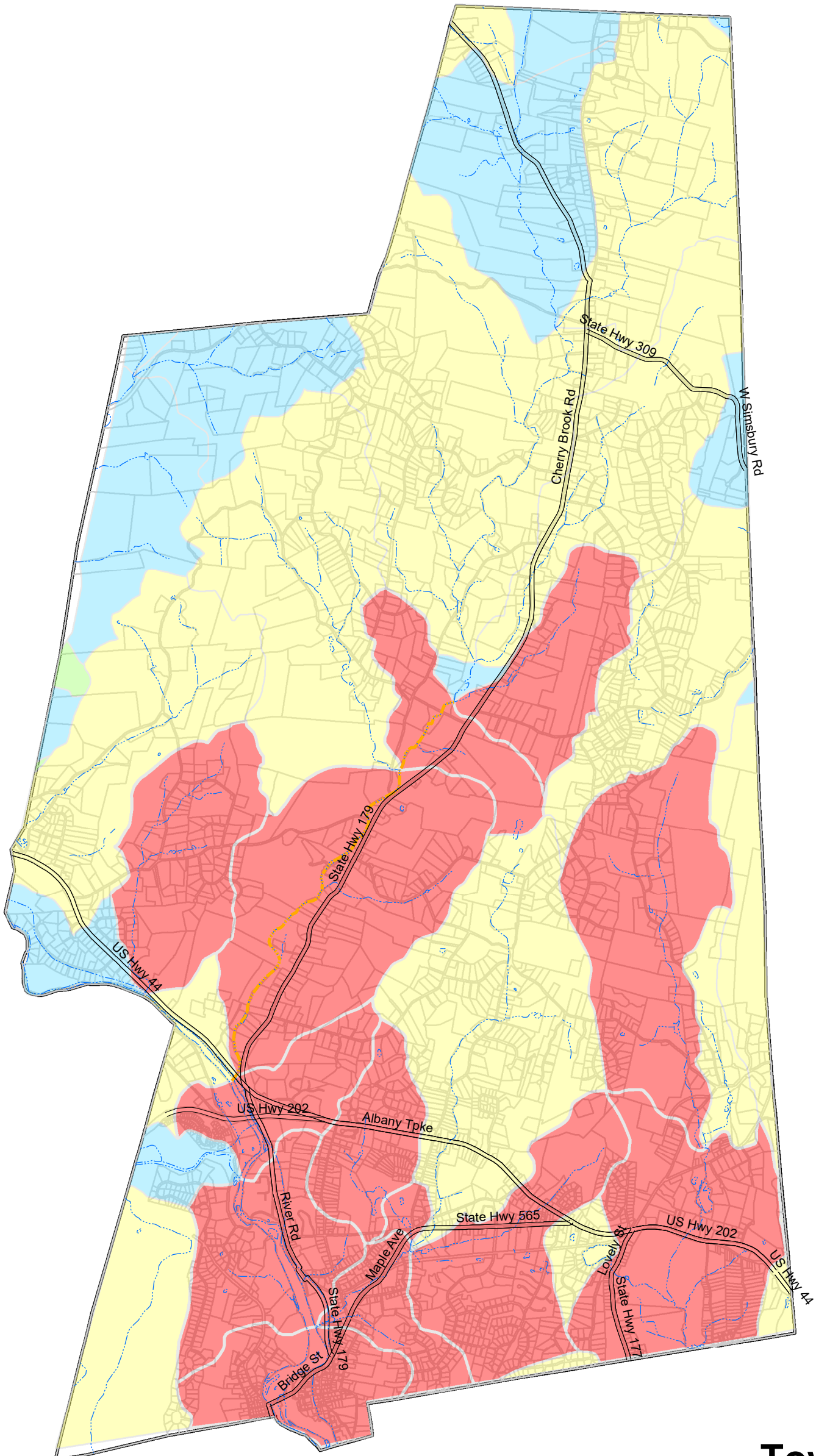
East Hartford,CT 06108



Town Of Canton

Stormwater Retrofit Program

Catchment Rankings

Legend

- Exempt
- Low Priority
- Problem Priority
- High Priority
- Main Road
- Impaired Waterbody
- Surface Water
- Parcel
- Canton Town Line

Fig No.
3

Drawn By: KLL

Checked by: LRW

Date: 2021

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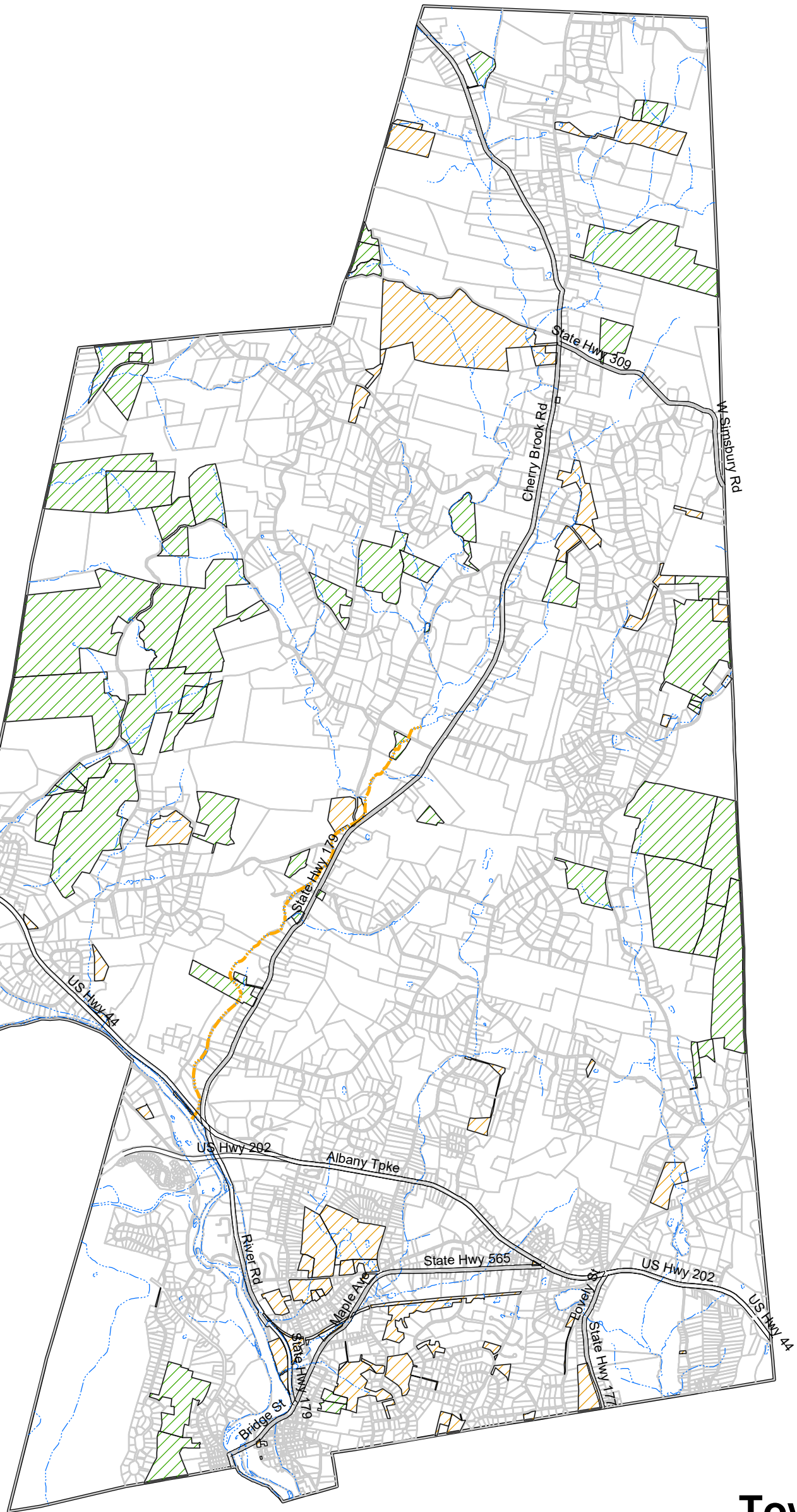
East Hartford,CT 06108



Town Of Canton

Stormwater Retrofit Program

Municipal Owned Facilities and Parks

Legend

- Main Road
- Impaired Waterbody
- Surface Water
- Canton Land Conservation Trust
- Municipal Owned
- Parcel
- Canton Town Line

Fig No.
4

Drawn By: KLL

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Date: 2021

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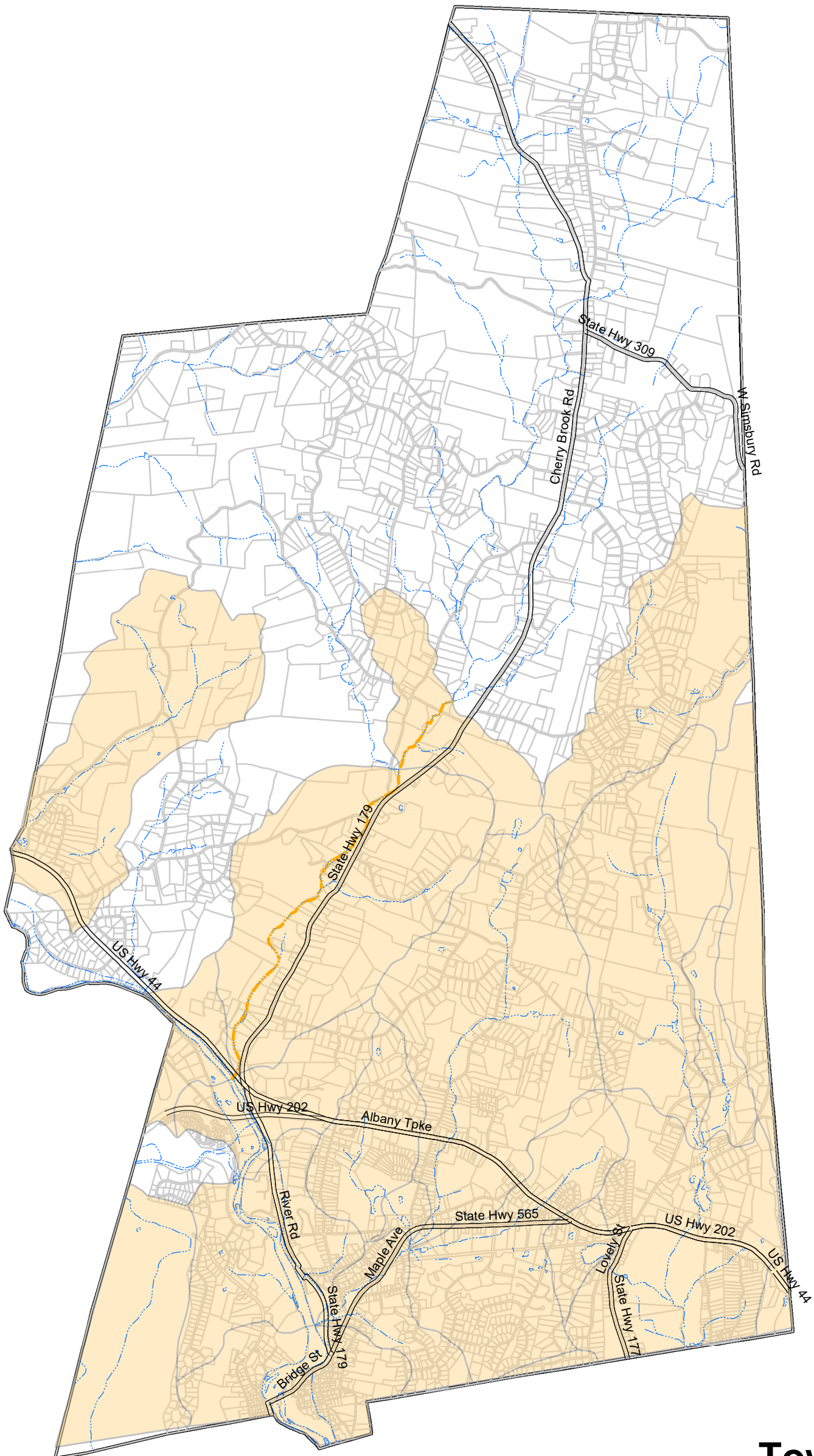
East Hartford,CT 06108



N

0 1,700 3,400 6,800 Feet

1 in = 3,400 ft

Town Of Canton

Stormwater Retrofit Program

Non-Municipal Retrofitting by Catchment

Legend

- Main Road
- Impaired Waterbody
- Surface Water
- Prioritized Non-Municipal Retrofit by Catchment
- Parcel
- Canton Town Line

Fig No.
5

Drawn By: KLL

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Date: 2021

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290 Roberts Street Suite 301
East Hartford,CT 06108

APPENDIX III
BUFFER ORDIANCE TEMPLATE

Aquatic Buffer Model Ordinance

☞ *This ordinance focuses primarily on stream buffers. Communities creating coastal buffers may wish to incorporate additional features. For an example of a coastal buffer ordinance, see the Rhode Island ordinance.*

Section I. Background

Buffers adjacent to stream systems and coastal areas provide numerous environmental protection and resource management benefits that can include the following:

1) Restoring and maintaining the chemical, physical, and biological integrity of the water resources
2) Removing pollutants delivered from urban stormwater
3) Reducing erosion and sediment entering the stream
4) Stabilizing stream banks
5) Providing infiltration of stormwater runoff
6) Maintaining base flow of streams
7) Contributing the organic matter that is a source of food and energy for the aquatic ecosystem
8) Providing tree canopy to shade streams and promote desirable aquatic organisms

☞ *This benefit applies primarily to forested buffer systems. In some communities, such as prairie settings, the native vegetation may not be forest. See the example ordinance from Omaha, Nebraska, for an example.*

9) Providing riparian wildlife habitat
10) Furnishing scenic value and recreational opportunity

It is the desire of the _____(*Natural Resources or Planning Agency*) to protect and maintain the native vegetation in riparian and wetland areas by implementing specifications for the establishment, protection, and maintenance of vegetation along all stream systems and/or coastal zones within our jurisdictional authority.

Section II. Intent

The purpose of this ordinance is to establish minimal acceptable requirements for the design of buffers to protect the streams, wetlands, and floodplains of _____ (*jurisdiction*); to protect the water quality of watercourses, reservoirs, lakes, and other significant water resources within _____(*jurisdiction*); to protect _____'s (Jurisdiction's) riparian and aquatic ecosystems; and to provide for the environmentally sound use of _____'s (*jurisdiction's*) land resources.

Section III. Definitions

Active Channel	The area of the stream channel that is subject to frequent flows (approximately once per one and a half years) and that includes the portion of the channel below the floodplain.
Best Management Practices (BMPs)	Conservation practices or management measures that control soil loss and reduce water quality degradation caused by nutrients, animal wastes, toxics, sediment, and runoff.

Buffer — A vegetated area, including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake, reservoir, or coastal estuarine area. Alteration of this natural area is strictly limited.

Development

1) The improvement of property for any purpose involving building
2) Subdivision or the division of a tract or parcel of land into two or more parcels
3) The combination of any two or more lots, tracts, or parcels of property for any purpose
4) The preparation of land for any of the above purposes

Nontidal Wetlands — Those areas not influenced by tidal fluctuations that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

☞ *The definition of "nontidal wetland" here is adapted from the definition of "wetland" used by the USEPA and the US Army Corps of Engineers.*

Nonpoint Source Pollution — Pollution that is generated by various land use activities rather than from an identifiable or discrete source and is conveyed to waterways through natural processes, such as rainfall, stormwater runoff, or groundwater seepage rather than direct discharges.

One Hundred-Year Floodplain — The area of land adjacent to a stream that is subject to inundation during a storm event that has a recurrence interval of 100 years.

Pollution — Any contamination or alteration of the physical, chemical, or biological properties of any waters that will render the waters harmful or detrimental to

1) Public health, safety, or welfare
2) Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses
3) Livestock, wild animals, or birds
4) Fish or other aquatic life

Stream Channel — Part of a watercourse either naturally or artificially created that contains an intermittent or perennial base flow of groundwater origin. Base flows of groundwater origin can be distinguished by any of the following physical indicators:

1) Hydrophytic vegetation, hydric soil, or other hydrologic indicators in the area(s) where groundwater enters the stream channel in the vicinity of the stream headwaters, channel bed, or channel banks
2) Flowing water not directly related to a storm event
3) Historical records of a local high groundwater table, such as well and stream gauge records.

Stream Order — A classification system for streams based on stream hierarchy. The smaller the stream, the lower its numerical classification. For example, a first-order stream

does not have tributaries and normally originates from springs and/or seeps. (See Figure 1.)

Stream System — A stream channel together with one or both of the following:
1) 100-year floodplain
2) Hydrologically related nontidal wetland

Streams — Perennial and intermittent watercourses identified through site inspection and US Geological Survey (USGS) maps. Perennial streams are those which are depicted on a USGS map with a solid blue line. Intermittent streams are those which are depicted on a USGS map with a dotted blue line.

☞ *Defining the term "stream" is perhaps the most contentious issue in the definition of stream buffers. This term determines the origin and the length of the stream buffer. Although some jurisdictions restrict the buffer to perennial or "blue line" streams, others include both perennial and intermittent streams in the stream buffer program. Some communities do not rely on USGS maps and instead prepare local maps of all stream systems that require a buffer.*

Water Pollution Hazard — A land use or activity that causes a relatively high risk of potential water pollution.

Section IV. Applications

A) This ordinance shall apply to all proposed development except for that development which meets waiver or variance criteria as outlined in Section IX of this regulation.
B) This ordinance shall apply to all timber harvesting activities, except those timber harvesting operations which are implementing a forest management plan that has been deemed to be in compliance with the regulations of the buffer ordinance and has received approval from _____(*state forestry agency*).
C) This ordinance shall apply to surface mining operations except that the design standards shall not apply to active surface mining operations that are operating in compliance with an approved _____(*state or federal agency*) surface mining permit.
D) The ordinance shall not apply to agricultural operations that are covered by an approved Natural Resources Conservation Service (NRCS) conservation plan that includes the application of BMPs.

☞ *Communities should carefully consider whether exempt agricultural operations from the buffer ordinance because buffer regulations may take land out of production and impose a financial burden on family farms. Many communities exempt agricultural operations if they have an approved NRCS conservation plan. In some regions, agricultural buffers may be funded through the Conservation Reserve Program (CRP). For further information, consult the Conservation Technology Information Center (CTIC) at www.ctic.perdue.edu.*

☞ *Livestock operations near and around streams may be regulated by communities. Livestock can significantly degrade the stream system and accelerate streambank erosion. The King County Livestock Management Ordinance is one example of a local livestock ordinance. For more information, contact the King County Department of Development and Environmental Services at (206) 296-6602.*

E) Except as provided in Section IX, this ordinance shall apply to all parcels of land, structures, and activities that are causing or contributing to

1) Pollution, including nonpoint source pollution, of the waters of the jurisdiction adopting this ordinance
2) Erosion or sedimentation of stream channels
3) Degradation of aquatic or riparian habitat

Section V. Plan Requirements

A) In accordance with Section IV of this ordinance, a plan approved by the appropriate agency is required for all development, forest harvesting operations, surface mining operations, and agricultural operations.
B) The plan shall set forth an informative, conceptual, and schematic representation of the proposed activity by means of maps, graphs, charts, or other written or drawn documents so as to enable the agency an opportunity to make a reasonably informed decision regarding the proposed activity.
C) The plan shall contain the following information:

☞ *The ordinance can identify the scale of maps to be included with the analyses in items 2) through 7). A 1"=50' to 1"=100' scale will generally provide sufficient detail.*

1) A location or vicinity map
2) Field-delineated and surveyed streams, springs, seeps, bodies of water, and wetlands (include a minimum of 200 feet into adjacent properties)
3) Field delineated and surveyed forest buffers
4) Limits of the ultimate 100-year floodplain

☞ *The limits of the ultimate floodplain (i.e., the floodplain under "built-out" conditions) might not be available in all locations.*

5) Hydric soils mapped in accordance with the NRCS soil survey of the site area
6) Steep slopes greater than 15 percent for areas adjacent to and within 200 feet of streams, wetlands, or other waterbodies

☞ *The ordinance may also explicitly define how slopes are measured. For example, the buffer may be divided into sections of a specific width (e.g., 25 feet) and the slope for each segment reported. Alternatively, slopes can be reported in segments divided by breaks in slope.*

7) A narrative of the species and distribution of existing vegetation within the buffer

D) The buffer plan shall be submitted in conjunction with the required grading plan for any development,and the forest buffer should be clearly delineated on the final grading plan.
E) Permanent boundary markers, in the form of signage approved by _____(*natural resources or planning agency*), shall be installed prior to final approval of the required clearing and grading plan. Signs shall be placed at the edge of the middle zone (See Section VI.I).

Section VI. Design Standards for Forest Buffers

A) A forest buffer for a stream system shall consist of a forested strip of land extending along both sides of a stream and its adjacent wetlands, floodplains, or slopes. The forest buffer width shall be adjusted to include contiguous sensitive areas, such as steep slopes or erodible soils, where development or disturbance may adversely affect water quality, streams, wetlands, or other waterbodies.

B) The forest buffer shall begin at the edge of the stream bank of the active channel.
C) The required width for all forest buffers (i.e., the base width) shall be a minimum of 100 feet, with the requirement to expand the buffer depending on
   1) Stream order
   2) Percent slope
   3) 100-year floodplain
   4) Wetlands or critical areas

☞ *The width of the stream buffer varies from 20 feet to 200 feet in ordinances throughout the United States (Heraty, 1993). The width chosen by a jurisdiction will depend on the sensitivity and characteristics of the resource being protected and the political realities in the community.*

B) In third-order and higher streams, 25 feet shall be added to the base width of the forest buffer.
C) The forest buffer width shall be modified if steep slopes are within close proximity to the stream and drain into the stream system. In those cases, the forest buffer width may be adjusted.

☞ *Several methods may be used to adjust buffer width for steep slopes. Two examples ifollow:*

Method A

Percent	Width of Buffer
15%-17%	add 10 feet
18%-20%	add 30 feet
21%-23%	add 50 feet
24%-25%	add 60 feet

Method B

	Type of Stream Use	
Percent Slope	Water Contact Recreational Use	Sensitive Stream Habitat
0% to 14%	no change	add 50 feet
15% to 25%	add 25 feet	add 75 feet
Greater than 25%	add 50 feet	add 100 feet

D) Forest buffers shall be extended to encompass the entire 100-year floodplain and a zone with a minimum width of 25 feet beyond the edge of the floodplain.
E) When wetland or critical areas extend beyond the edge of the required buffer width, the buffer shall be adjusted so that the buffer consists of the extent of the wetland plus a 25-foot zone extending beyond the wetland edge.

H) Water Pollution Hazards
The following land uses and/or activities are designated as potential water pollution hazards

and must be set back from any stream or waterbody by the distance indicated below:

1) Storage of hazardous substances—(150 feet)
2) Aboveground or underground petroleum storage facilities—(150 feet)
3) Drainfields from onsite sewage disposal and treatment systems (i.e., septic systems)—(100 feet)
4) Raised septic systems—(250 feet)
5) Solid waste landfills or junkyards—(300 feet)
6) Confined animal feedlot operations—(250 feet)
7) Subsurface discharges from a wastewater treatment plant—(100 feet)
8) Land application of biosolids—(100 feet)

☞ *For surface water supplies, the setbacks should be doubled.*

☞ *A community should carefully consider which activities or land uses should be designated as potential water pollution hazards. The list of potential hazards shown above is not exhaustive, and others may need to be added depending on the major pollutants of concern and the uses of water.*

I) The forest buffer shall be composed of three distinct zones, with each zone having its own set of allowable uses and vegetative targets as specified in this ordinance. (See Figure 2.)

☞ *Although a three-zone buffer system is highly recommended, the widths and specific uses allowed in each zone may vary between jurisdictions.*

I) Zone 1, Streamside Zone
   a) Protects the physical and ecological integrity of the stream ecosystem.
   b) Begins at the edge of the stream bank of the active channel and extends a minimum of 25 feet from the top of the bank.
   c) Allowable uses within this zone are highly restricted to
      i) Flood control structures
      ii) Utility right of ways
      iii) Footpaths
      iv) Road crossings, where permitted
   d) Target for the streamside zone is undisturbed native vegetation.

☞ *This ordinance assumes that the native vegetation in the stream corridor is forest. In some regions of the United States, other vegetation such as prairie may be native. See the Omaha, Nebraska, buffer ordinance for an example of a stream buffer ordinance that protects nonforested systems.*

2) Zone 2, Middle Zone
   a) Protects key components of the stream and provides distance between upland development and the streamside zone.
   b) Begins at the outer edge of the streamside zone and extends a minimum of 50 feet plus any additional buffer width as specified in this section.
   c) Allowable uses within the middle zone are restricted to
      i) Biking or hiking paths
      ii) Stormwater management facilities, with the approval of _____ *(local agency responsible for stormwater*).

iii) Recreational uses as approved by _____ (*planning agency*).
iv) Limited tree clearing with approval from _____ (*forestry agency or planning agency*).

d) Targets mature native vegetation adapted to the region.

3) Zone 3, Outer Zone
   a) Prevents encroachment into the forest buffer and filters runoff from residential and commercial development.
   b) Begins at the outward edge of the middle zone and provide a minimum width of 25 feet between Zone 2 and the nearest permanent structure.
   c) Restricts septic systems, permanent structures, or impervious cover, with the exception of paths.
   d) Encourages the planting of native vegetation to increase the total width of the buffer.

Section VII. <u>Buffer Management and Maintenance</u>

A) The forest buffer, including wetlands and floodplains, shall be managed to enhance and maximize the unique value of these resources. Management includes specific limitations on alteration of the natural conditions of these resources. The following practices and activities are restricted within Zones 1 and 2 of the forest buffer, except with approval by _____ _____ (*forestry, planning or natural resources agency*)
   1) Clearing of existing vegetation
   2) Soil disturbance by grading, stripping, or other practices
   3) Filling or dumping
   4) Drainage by ditching, underdrains, or other systems
   5) Use, storage, or application of pesticides, except for spot spraying of noxious weeds or non-native species consistent with recommendations of _____(*forestry agency*)
   6) Housing, grazing, or other maintenance of livestock
   7) Storage or operation of motorized vehicles, except for maintenance and emergency use approved by _____(*forestry, planning, or natural resources agency*)

B) The following structures, practices, and activities are permitted in the forest buffer, with specific design or maintenance features, subject to the review of _____ (*forestry, planning, or natural resources agency)*:
   1) Roads, bridges, paths, and utilities:
      a) An analysis needs to be conducted to ensure that no economically feasible alternative is available.
      b) The right-of-way should be the minimum width needed to allow for maintenance access and installation.
      c) The angle of the crossing shall be perpendicular to the stream or buffer to minimize clearing requirements
      d) The minimum number of road crossings should be used within each subdivision, and no more than one fairway crossing is allowed for every 1,000 feet of buffer.
   2) Stormwater management:
      e) An analysis needs to be conducted to ensure that no economically feasible alternative is available and that the project either is necessary for flood control or significantly improves the water quality or habitat in the stream.
      f) In new developments, onsite and nonstructural alternatives will be preferred over larger facilities within the stream buffer.

g) When constructing stormwater management facilities (i.e., BMPs), the area cleared will be limited to the area required for construction and adequate maintenance access as outlined in the most recent edition of _____ (*refer to stormwater manual*).

☞ *Rather than placing specific stormwater BMP design criteria in an ordinance, it is often preferable to reference a manual. With this approach, specific design information can be changed over time without going through the formal process needed to change ordinance language.*

☞ *The* Maryland Stormwater Design Manual *is one example of an up-to-date stormwater design manual. For more information, go to www.mde.state.md.us. Under topics, choose "Stormwater Design Manual."*

h) Material dredged or otherwise removed from a BMP shall be stored outside the buffer.

3) Stream restoration projects, facilities, and activities approved by _____ (*forestry, planning, or natural resources agency*) are permitted within the forest buffer.
4) Water quality monitoring and stream gauging are permitted within the forest buffer, as approved by _____(*forestry, planning or natural resources agency*):.
5) Individual trees within the forest buffer that are in danger of falling, causing damage to dwellings or other structures, or causing blockage of the stream may be removed.
6) Other timber cutting techniques approved by the agency may be undertaken within the forest buffer under the advice and guidance of _____ (*state or federal forestry agency*) if necessary to preserve the forest from extensive pest infestation, disease infestation, or threat from fire.

C) All plans prepared for recording and all right-of-way plans shall clearly
1) Show the extent of any forest buffer on the subject property
2) Label the forest buffer
3) Provide a note to reference any forest buffer stating: “There shall be no clearing, grading, construction or disturbance of vegetation except as permitted by the agency.”
4) Provide a note to reference any protective covenants governing all forest buffer areas stating: “Any forest buffer shown hereon is subject to protective covenants that may be found in the land records and that restrict disturbance and use of these areas.”

D) All forest buffer areas shall be maintained through a declaration of protective covenant, which is required to be submitted for approval by _____ (*planning board or agency*). The covenant shall be recorded in the land records and shall run with the land and continue in perpetuity.

☞ *This protective covenant can be kept either by the local government agency responsible for management of environmental resources or by an approved nonprofit organization. An example conservation easement is included later in this section.*

E) All lease agreements must contain a notation regarding the presence and location of protective covenants for forest buffer areas and shall contain information on the management and maintenance requirements for the new property owner.

F) An offer of dedication of a forest buffer area to the agency shall not be interpreted to mean that this automatically conveys to the general public the right of access to this area.

G) _____ (*responsible individual or group*) shall inspect the buffer annually and immediately following severe storms for evidence of sediment deposition, erosion, or concentrated flow channels and corrective actions taken to ensure the integrity and functions

of the forest buffer.

A local ordinance will need to designate the individual or group responsible for buffer maintenance. Often, the responsible party will be identified in protective covenants associated with the property.

H) Forest buffer areas may be allowed to grow into their vegetative target state naturally, but methods to enhance the successional process such as active reforestation may be used when deemed necessary by _____ (*natural resources or forestry agency*) to ensure the preservation and propagation of the buffer area. Forest buffer areas may also be enhanced through reforestation or other growth techniques as a form of mitigation for achieving buffer preservation requirements.

Explicit forestry management criteria are often included in a forestry or natural resources conservation ordinance. An example forest conservation ordinance from Frederick County, Maryland is included in the miscellaneous ordinances section of this site.

Section VIII. <u>Enforcement Procedures</u>

A) _____ (*director of responsible agency)* or his/her designee is authorized and empowered to enforce the requirements of this ordinance in accordance with the procedures of this section.

B) If, upon inspection or investigation, the director or his/her designee is of the opinion that any person has violated any provision of this ordinance, he/she shall with reasonable promptness issue a correction notice to the person. Each such notice shall be in writing and shall describe the nature of the violation, including a reference to the provision within this ordinance that has been violated. In addition, the notice shall set a reasonable time for the abatement and correction of the violation.

C) If it is determined that the violation or violations continue after the time fixed for abatement and correction has expired, the director shall issue a citation by certified mail to the person who is in violation. Each such notice shall be in writing and shall describe the nature of the violation, including a reference to the provision within this ordinance that has been violated and what penalty, if any, is proposed to be assessed. The person charged has 30 days within which to contest the citation or proposed assessment of penalty and to file a request for a hearing with the director or his/her designee. At the conclusion of this hearing, the director or his/her designee will issue a final order, subject to appeal to the appropriate authority. If, within 30 days from the receipt of the citation issued by the director, the person fails to contest the citation or proposed assessment of penalty, the citation or proposed assessment of penalty shall be deemed the final order of the director.

B) Any person who violates any provision of this ordinance may be liable for any cost or expenses incurred as a result thereof by the agency.

C) Penalties that may be assessed for those deemed to be in violation may include the following:

1) A civil penalty not to exceed $1,000.00 for each violation. Every day that such violation(s) continue will be considered a separate offense.
2) A criminal penalty in the form of a fine of not more than $1,000.00 for each violation, imprisonment for not more than 90 days, or both. Every day that such violation(s) continue will be considered a separate offense.
3) Anyone who knowingly makes any false statements in any application, record, or plan required by this ordinance shall upon conviction be punished by a fine of not more than $1,000.00 for each violation, imprisonment for not more than 30 days, or both.

☞ *Specific penalties will vary between communities, and should reflect realistically enforceable penalties given the political realities of a jurisdictin.*

F) In addition to any other sanctions listed in this ordinance, a person who fails to comply with the provisions of this buffer ordinance shall be liable to the agency in a civil action for damages in an amount equal to twice the cost of restoring the buffer. Damages that are recovered in accordance with this action shall be used for the restoration of buffer systems or for the administration of programs for the protection and restoration of water quality, streams, wetlands, and floodplains.

Section IX. **Waivers/Variances**

A) This ordinance shall apply to all proposed development except for activities that were completed prior to the effective date of this ordinance and had received the following:
   1) A valid, unexpired permit in accordance with development regulations
   2) A current, executed public works agreement
   3) A valid, unexpired building permit
   4) A waiver in accordance with current development regulations.

B) The director of the agency may grant a variance for the following:
   1) Those projects or activities for which it can be demonstrated that strict compliance with the ordinance would result in a practical difficulty or financial hardship
   2) Those projects or activities serving a public need where no feasible alternative is available
   3) The repair and maintenance of public improvements where avoidance and minimization of adverse impacts to nontidal wetlands and associated aquatic ecosystems have been addressed
   4) Those developments which have had buffers applied in conformance with previously issued requirements

C) Waivers for development may also be granted in two additional forms, if deemed appropriate by the director:
   1) The buffer width made be reduced at some points as long as the average width of the buffer meets the minimum requirement. This averaging of the buffer may be used to allow for the presence of an existing structure or to recover a lost lot, as long as the streamside zone (Zone I) is not disturbed by the reduction and no new structures are built within the 100-year floodplain.
   2) _____ (*planning agency*) may offer credit for additional density elsewhere on the site in compensation for the loss of developable land due to the requirements of this ordinance. This compensation may increase the total number of dwelling units on the site up to the amount permitted under the base zoning.

D) The applicant shall submit a written request for a variance to the director of the agency. The application shall include specific reasons justifying the variance and any other information necessary to evaluate the proposed variance request. The agency may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal impact will occur as a result of the project or development.

E) In granting a request for a variance, the director of the agency may require site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse impacts on water quality, streams, wetlands, and floodplains.

Section X. **Conflict With Other Regulations**

Where the standards and management requirements of this buffer ordinance are in conflict with other laws, regulations, and policies regarding streams, steep slopes, erodible soils, wetlands, floodplains, timber harvesting, land disturbance activities, or other environmental protective measures, the more restrictive shall apply.

Figure 1: Stream Order (Source: Schueler, 1995)

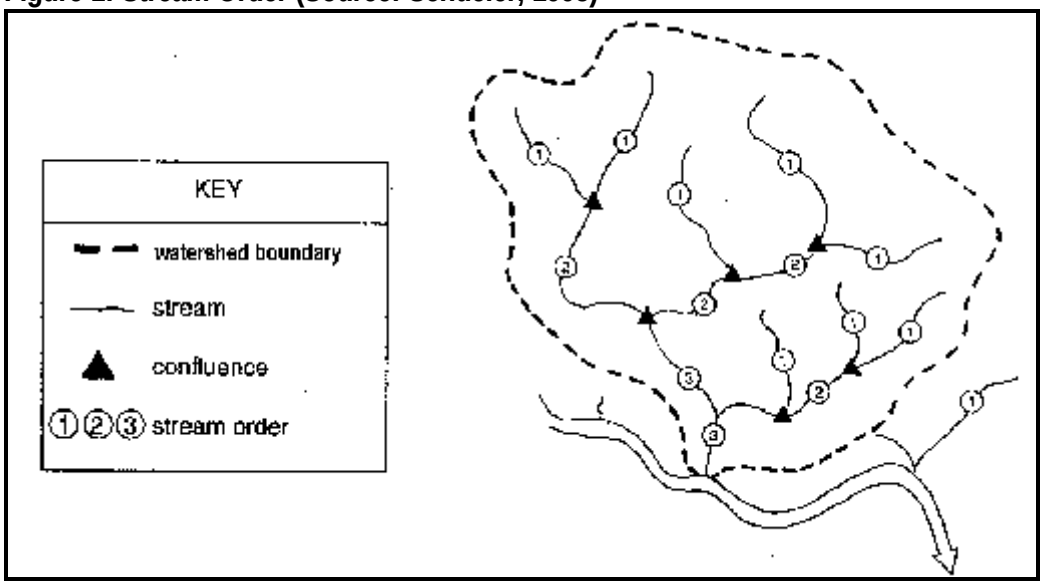
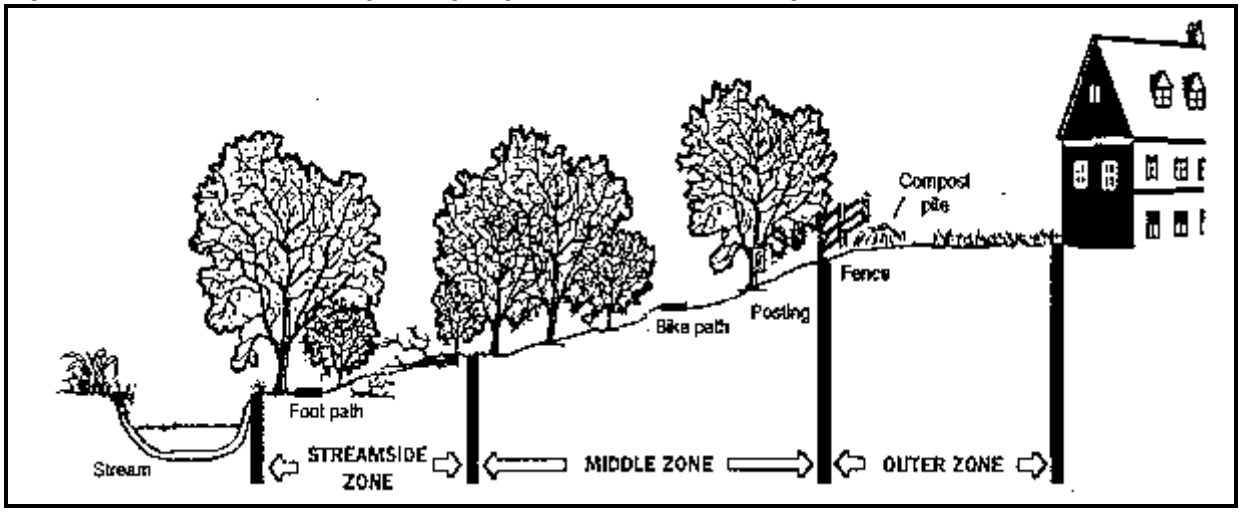


Figure 2: Three Zone Buffer System (Adapted from Welsch, 1991)



References

Heraty, M. 1993. Riparian buffer programs: a guide to developing and implementing a riparian buffer program as an urban best management practice. Metropolitan Washington Council of Governments, USEPA Office of Wetlands, Oceans and Watersheds. Washington, DC.

Schueler, T. 1995. Site planning for urban stream protection. Metropolitan Washington Council of Governments, USEPA Office of Wetlands, Oceans and Watersheds. Washington, DC.

Welsch, D. 1991. Riparian forest buffers. FS Pub. No. NA-PR-07-91. US Department of Agriculture, Forest Service. Forest Resources Management, Radnor, PA.

APPENDIX IV
DCIA CALCULATIONS

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

											CT ECO				CT ECO
				Total					Basin		State		Town	Town	Town
	Drainage			Basin					Imp.		Road		Imp.	Imp.	Road
Town Area	Sub-Basin		Drainage	Area	Town Impervious Area (Ac)				Area		Area		Area	Area	Area
Acres	No.		Sub-Basin No.	Ac.	Buildings	Roads	Other	Total	%		Ac.		Ac.	%	Ac.
	Uconn CLEAR Website				**300.05**	**388.38**	**447.78**	**1,136.21**							
	NEMO Website														
5,043.28	**4300**		**Farmington River**												
Manual Check			4300-14-1	810.68	5.28	12.07	7.89	25.24	3.11		3.10		22.14	2.73	8.97
			4300-15-1	531.77	5.58	9.53	9.56	24.67	4.64		0.78		23.89	4.49	8.75
			4300-16-1	1,089.79	21.80	26.18	37.30	85.27	7.82		5.16		80.11	7.35	21.02
			4300-16-2-R1	201.66	8.09	9.71	9.54	27.33	13.55		2.90		24.43	12.11	6.80
			4300-17-1	559.19	23.16	22.54	32.06	77.77	13.91		4.46		73.31	13.11	18.08
			4300-18-1	41.61	1.23	2.27	4.59	9.09	21.85		0.47		8.62	20.72	1.80
			4300-18-1-L1	285.10	11.50	9.69	16.80	37.99	13.33		2.98		35.01	12.28	6.71
			4300-00-4+R6	32.78	0.14	0.00	0.39	0.53	1.62		0.00		0.53	1.62	0.00
			4300-00-4+R7	1.63	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
			4300-00-4+R8	167.86	3.93	5.53	4.61	14.07	8.38		1.71		12.36	7.36	3.82
			4300-00-4+R9	154.60	2.14	6.68	10.68	19.50	12.61		4.50		15.00	9.70	2.18
			4300-00-4+R10	308.14	9.01	18.94	19.92	47.86	15.53		13.19		34.67	11.25	5.75
			4300-00-4+R11	485.18	16.19	18.39	30.93	65.52	13.50		4.59		60.93	12.56	13.81
			4300-00-4+R12	373.29	17.04	19.46	18.59	55.09	14.76		4.60		50.49	13.53	14.86
831.18	**4308**		**East Branch Farmington River**												
Manual Check			4308-00-2-R1	23.86	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
			4308-18-1	359.52	1.59	3.45	5.12	10.16	2.83		0.00		10.16	2.83	3.45
			4308-18-2-R1	424.46	0.13	0.13	0.71	0.98	0.23		0.00		0.98	0.23	0.13
			4308-19-2-R1	23.34	0.09	0.00	0.13	0.22	0.94		0.00		0.22	0.94	0.00
44,393.00	*Last Revised Date*														

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

	Town		Town	Town	High Connectivity			Average Connectivity			Partial Connectivity			Slight Connectivity			
Drainage	Basin		Imp.	Imp.	DCIA% = 0.4*(IA%)^1.2			DCIA% = 0.1*(IA%)^1.5			DCIA% = 0.04*(IA%)^1.7			DCIA% = 0.01*(IA%)^2.0			Total
Sub-Basin	Area	Drainage	Area	Area	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	DCIA
No.	Acres	Sub-Basin No.	Ac.	IA%	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.
					HDR			MDR	Comm.	Ind.	LDR			Forest	Ag.		
								Urban Public/Institutional									
								Open Land									
4300		**Farmington River**															
	810.68	4300-14-1	22.14	**2.73**	0.00	0.00	0.00	0.00	0.00	0.00	22.14	0.22	0.05	0.00	0.00	0.00	**0.05**
	531.77	4300-15-1	23.89	**4.49**	0.00	0.00	0.00	0.00	0.00	0.00	23.89	0.51	0.12	0.00	0.00	0.00	**0.12**
	1,089.79	4300-16-1	80.11	**7.35**	0.00	0.00	0.00	40.06	1.99	0.80	40.06	1.19	0.48	0.00	0.00	0.00	**1.27**
	201.66	4300-16-2-R4	24.43	**12.11**	12.22	7.98	0.97	12.22	4.22	0.52	0.00	0.00	0.00	0.00	0.00	0.00	**1.49**
	559.19	4300-17-1	73.31	**13.11**	36.66	8.77	3.22	36.66	4.75	1.74	0.00	0.00	0.00	0.00	0.00	0.00	**4.96**
	41.61	4300-18-1	8.62	**20.72**	8.62	15.19	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.31**
	285.10	4300-18-1-L1	35.01	**12.28**	17.51	8.11	1.42	17.51	4.30	0.75	0.00	0.00	0.00	0.00	0.00	0.00	**2.17**
	32.78	4300-00-4+R6	0.53	**1.62**	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.09	0.00	0.00	0.00	0.00	**0.00**
	1.63	4300-00-4+R7	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	167.86	4300-00-4+R8	12.36	**7.36**	0.00	0.00	0.00	6.18	2.00	0.12	6.18	1.19	0.07	0.00	0.00	0.00	**0.20**
	154.60	4300-00-4+R9	15.00	**9.70**	0.00	0.00	0.00	7.50	3.02	0.23	7.50	1.90	0.14	0.00	0.00	0.00	**0.37**
	308.14	4300-00-4+R10	34.67	**11.25**	0.00	0.00	0.00	17.34	3.77	0.65	17.34	2.45	0.42	0.00	0.00	0.00	**1.08**
	485.18	4300-00-4+R11	60.93	**12.56**	30.47	8.33	2.54	30.47	4.45	1.36	0.00	0.00	0.00	0.00	0.00	0.00	**3.89**
	373.29	4300-00-4+R12	50.49	**13.53**	25.25	9.11	2.30	25.25	4.97	1.26	0.00	0.00	0.00	0.00	0.00	0.00	**3.56**
																	NLJA No. 1208-0002
4308		**East Branch Farmington River**															
	23.86	4308-00-2-R1	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	359.52	4308-18-1	10.16	**2.83**	0.00	0.00	0.00	0.00	0.00	0.00	10.16	0.23	0.02	0.00	0.00	0.00	**0.02**
	424.46	4308-18-2-R1	0.98	**0.23**	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	**0.00**
	23.34	4308-19-2-R1	0.22	**0.94**	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.00	0.00	0.00	**0.00**
07/16/21	*Last Revised Date*																

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

Town Area Acres	Drainage Sub-Basin No.		Drainage Sub-Basin No.	Total Basin Area Ac.	Town Impervious Area (Ac) Buildings	Roads	Other	Total	Basin Imp. Area %		CT ECO State Road Area Ac.		Town Imp. Area Ac.	Town Imp. Area %	CT ECO Town Road Area Ac.
6,622.54	**4309**		**Cherry Brook**												
Manual Check			4309-00-1	107.66	0.13	0.97	0.21	1.32	1.23		*0.00*		1.32	1.23	0.97
			4309-00-2-R1	684.65	4.66	6.65	10.69	22.00	3.21		*4.36*		17.64	2.58	2.29
			4309-00-2-R2	1,352.78	12.02	17.28	23.91	53.21	3.93		2.65		50.56	3.74	14.63
			4309-00-2-R3	33.19	0.16	0.34	0.41	0.90	2.71		0.34		0.56	1.69	0.00
			4309-00-2-R4	318.16	2.55	5.65	4.20	12.40	3.90		1.32		11.08	3.48	4.33
			4309-00-2-R5	1,038.65	9.52	15.68	18.86	44.06	4.24		7.37		36.69	3.53	8.31
			4309-01-1	81.98	0.70	0.97	1.60	3.27	3.99		0.97		2.30	2.81	0.00
			4309-02-1	785.18	3.46	7.20	7.27	17.93	2.28		1.23		16.70	2.13	5.97
			4309-03-1	769.55	9.02	13.82	16.41	39.25	5.10		6.07		33.18	4.31	7.74
			4309-04-1	396.54	3.43	4.42	6.84	14.70	3.71		1.56		13.14	3.31	2.87
			4309-05-1	1,054.20	5.50	9.62	10.21	25.33	2.40		0.00		25.33	2.40	9.62
557.84	**4310**		**Nepaug River**												
Manual Check			4310-00-3-L2	442.22	0.90	4.40	0.50	5.79	1.31		0.00		5.79	1.31	4.40
			4310-00-3-R5	115.62	1.73	3.13	2.04	6.91	5.98		0.38		6.53	5.65	2.75
1,857.66	**4312**		**Roaring Brook**												
Manual Check			4312-00-1	156.69	1.27	2.87	1.92	6.06	3.87		0.00		6.06	3.87	2.87
			4312-00-2-L1	91.44	5.20	4.18	11.87	21.24	23.23		2.06		19.18	20.98	2.11
			4312-00-2-L2	756.73	26.95	25.42	57.01	109.39	14.46		10.01		99.38	13.13	15.41
			4312-01-1	833.93	7.57	15.08	11.85	34.51	4.14		0.00		34.51	4.14	15.08
			4312-02-1	18.87	1.24	1.63	0.91	3.78	20.03		0.00		3.78	20.03	1.63
07/16/21	*Last Revised Date*														

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

	Town		Town	Town	High Connectivity			Average Connectivity			Partial Connectivity			Slight Connectivity			
Drainage	Basin		Imp.	Imp.	DCIA% = 0.4*(IA%)^1.2			DCIA% = 0.1*(IA%)^1.5			DCIA% = 0.04*(IA%)^1.7			DCIA% = 0.01*(IA%)^2.0			Total
Sub-Basin	Area	Drainage	Area	Area	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	DCIA
No.	Acres	Sub-Basin No.	Ac.	IA%	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.
4309		**Cherry Brook**															
	107.66	4309-00-1	1.32	**1.23**	0.00	0.00	0.00	0.00	0.00	0.00	1.32	0.06	0.00	0.00	0.00	0.00	**0.00**
	684.65	4309-00-2-R1	17.64	**2.58**	0.00	0.00	0.00	0.00	0.00	0.00	17.64	0.20	0.04	0.00	0.00	0.00	**0.04**
	1,352.78	4309-00-2-R2	50.56	**3.74**	0.00	0.00	0.00	0.00	0.00	0.00	50.56	0.38	0.19	0.00	0.00	0.00	**0.19**
	33.19	4309-00-2-R3	0.56	**1.69**	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.10	0.00	0.00	0.00	0.00	**0.00**
	318.16	4309-00-2-R4	11.08	**3.48**	0.00	0.00	0.00	0.00	0.00	0.00	11.08	0.33	0.04	0.00	0.00	0.00	**0.04**
	1,038.65	4309-00-2-R5	36.69	**3.53**	0.00	0.00	0.00	0.00	0.00	0.00	36.69	0.34	0.13	0.00	0.00	0.00	**0.13**
	81.98	4309-01-1	2.30	**2.81**	0.00	0.00	0.00	0.00	0.00	0.00	2.30	0.23	0.01	0.00	0.00	0.00	**0.01**
	785.18	4309-02-1	16.70	**2.13**	0.00	0.00	0.00	0.00	0.00	0.00	16.70	0.14	0.02	0.00	0.00	0.00	**0.02**
	769.55	4309-03-1	33.18	**4.31**	0.00	0.00	0.00	0.00	0.00	0.00	33.18	0.48	0.16	0.00	0.00	0.00	**0.16**
	396.54	4309-04-1	13.14	**3.31**	0.00	0.00	0.00	0.00	0.00	0.00	13.14	0.31	0.04	0.00	0.00	0.00	**0.04**
	1,054.20	4309-05-1	25.33	**2.40**	0.00	0.00	0.00	0.00	0.00	0.00	25.33	0.18	0.04	0.00	0.00	0.00	**0.04**
	442.22		5.79	**1.31**	0.00	0.00	0.00	0.00	0.00	0.00	5.79	0.06	0.00	0.00	0.00	0.00	**0.00**
	115.62		6.53	**5.65**	0.00	0.00	0.00	0.00	0.00	0.00	6.53	0.76	0.05	0.00	0.00	0.00	**0.05**
																	NLJA No. 1208-0002
4312		**Roaring Brook**															
	156.69	4312-00-1	6.06	**3.87**	0.00	0.00	0.00	0.00	0.00	0.00	6.06	0.40	0.02	0.00	0.00	0.00	**0.02**
	91.44	4312-00-2-L1	19.18	**20.98**	19.18	15.42	2.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.96**
	756.73	4312-00-2-L2	99.38	**13.13**	49.69	8.79	4.37	49.69	4.76	2.36	0.00	0.00	0.00	0.00	0.00	0.00	**6.73**
	833.93	4312-01-1	34.51	**4.14**	0.00	0.00	0.00	0.00	0.00	0.00	34.51	0.45	0.15	0.00	0.00	0.00	**0.15**
	18.87	4312-01-1	3.78	**20.03**	3.78	14.59	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.55**
7/16/2021	*Last Revised Date*																

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

											CT ECO				CT ECO
				Total					Basin		State		Town	Town	Town
	Drainage			Basin					Imp.		Road		Imp.	Imp.	Road
Town Area	Sub-Basin		Drainage	Area	Town Impervious Area (Ac)				Area		Area		Area	Area	Area
Acres	No.		Sub-Basin No.	Ac.	Buildings	Roads	Other	Total	%		Ac.		Ac.	%	Ac.
338.39	**4317**		**Nod Brook**												
Manual Check			4317-00-1	300.00	0.88	2.21	1.81	4.81	1.60		0.00		4.81	1.60	2.12
			4317-01-1	38.39	0.47	1.67	1.36	3.51	9.14		1.21		2.30	5.99	0.46
761.69	**4318**		**Hop Brook**												
Manual Check			4318-00-1	107.59	0.59	1.59	1.83	4.02	3.74		1.21		2.81	2.61	0.38
			4318-04-1	4.77	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
			4318-04-1-L1	649.33	11.03	13.54	15.37	39.94	6.15		0.00		39.94	6.15	13.54
5.76	**4319**		**West Branch Salmon Brook**												
Manual Check			4319-11-1	5.76	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
16,018.34	Total Area (Ac)														
07/16/21	*Last Revised Date*														

CT DEEP MS4 General Permit

Drainage Basin Areas, Drainage Sub-Basin Areas and Impervious Area (IA) Tabulations and Directly Connected Impervious Area (DCIA) Computations

Canton (23) - GSM000091

	Town		Town	Town	High Connectivity			Average Connectivity			Partial Connectivity			Slight Connectivity			
Drainage	Basin		Imp.	Imp.	DCIA% = 0.4*(IA%)^1.2			DCIA% = 0.1*(IA%)^1.5			DCIA% = 0.04*(IA%)^1.7			DCIA% = 0.01*(IA%)^2.0			Total
Sub-Basin	Area	Drainage	Area	Area	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	Imp.	DCIA	DCIA	DCIA
No.	Acres	Sub-Basin No.	Ac.	IA%	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.	%	Ac.	Ac.
4317		**Nod Brook**															
	300.00	4317-00-1	4.81	**1.60**	0.00	0.00	0.00	0.00	0.00	0.00	4.81	0.09	0.00	0.00	0.00	0.00	**0.00**
	38.39	4317-01-1	2.30	**5.99**	0.00	0.00	0.00	0.00	0.00	0.00	2.30	0.84	0.02	0.00	0.00	0.00	**0.02**
4318		**Hop Brook**															
	107.59	4318-00-1-L1	2.81	**2.61**	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.20	0.01	0.00	0.00	0.00	**0.01**
	4.77	4318-04-1	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	649.33	4318-04-1-L1	39.94	**6.15**	0.00	0.00	0.00	19.97	1.53	0.30	19.97	0.88	0.18	0.00	0.00	0.00	**0.48**
4319		**West Branch Salmon Brook**															
	5.76	4319-11-1	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
																Total DCIA (Ac) =	32.14

07/16/21 *Last Revised Date* *NLJA No. 1208-0002*

APPENDIX V
IMPERVIOUS COVER TRACKING SPREADSHEET

Impervious Cover Tracking Spreadsheet

Town Canton
Town area (ac): 16,018.3 *Based off of 2020 DCIA Calculations

PROJECT INFORMATION				NEW DEVELOPMENT		REDEVELOPMENT		RETROFITS	CHANGE			CUMULATIVE TOTALS				NOTES & REFERENCES
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
date	practice #	project	practice	Total IC added (ac)	Connected IC added (ac)	Total IC added or subtracted (ac)	Connected IC added or subtracted (ac)	IC disconnected (ac)	Change in Total IC (ac)	Change in Connected IC (ac)	Net change (ac)	TOWN TOTAL IC (ac)	TOWN TOTAL IC (%)	TOWN CONNECTED IC (ac)	TOWN CONNECTED IC (%)	Notes & References
Townwide BASELINE												**1772.88**	**11.07%**	**10.09**	**0.06%**	
21-Jul-15	15-1-A	Town Hall parking rennovation	porous asphalt					(6.0)	0.0	(6.0)	(6.0)	1772.9	**11.07%**	4.09	**0.03%**	(Example: replaced old asphalt lot, see file for plans and photos)
											(6.0)					

NET	**(6.0)**	**acres disconnected**
%	59.5	**% disconnected**

NEMO Project
Center for Land Use Education and Research (CLEAR)
University of Connecticut
clear@uconn.edu

OVERALL NOTES

1 *This is just our take on it. Feel free to change and tailor as you see fit.*
2 Area unit used is acres but could be anything

COLUMNS

1 date of completion
2 any identifying system will do
3 overall description of project
4 overview of LID practices used
5 for new development, total acres of IC added
6 acres of #5 above that are connected
7 for redevelopment projects: total ic after project minus total ic before project
8 for redevelopment projects: connected ic after project minus connected ic before project
9 for retrofits of exisiting development, total acres IC disconnected (from plans and observation)
10 change in total IC after project completion
11 change in connected IC after project completion
12 cumulative total of IC in town, acres
13 cumulative total of IC in town, %
14 cumulative total of connected IC in town, acres
15 cumulative total of connected IC in town, %
16 notes, referrals to other files, plans, photos, folders, etc.

APPENDIX VI
CATCHMENT RANKINGS

Town of Canton
Catchment Assessment
and
Priority Ranking Matrix

Catchment ID	Number of Outfalls Included	Receiving Water(s)	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Sewer Repair Nearby?	Urbanized Area	DCIA >11% [9]	Impaired Waterbody	Score	Priority Ranking *Low Priority: 0-5* *Problem: 6-9* *High Priority: ≥10*
Information Source			Catchment inspections and sample results	GIS Maps	Municipal Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Municipal Staff, GIS Maps	Land Use, Municipal Staff	GIS and Storm System Maps	Other	Municipal Staff, GIS Maps	CLEAR	CLEAR	CLEAR		
Scoring Criteria			Yes = 3 (Problem Catchment) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	Description	Yes=2 No=0	Yes =1 No = 0	Yes =1 No = 0	Yes =1 No = 0		
4309-00-1	None	Cherry Brook	0	0		0	1	3	0		0	Cleared Agricultural farmland with some residential housing		0	0	0	4	Low Priority
4319-11-1	None	Unnamed stream	0	3		0	0	1	0		0	Wooded		0	0	0	4	Low Priority
4309-01-1	None	Cherry Brook, unnamed streams	0	0		0	1	3	0		3	Cleared agricultural land, some wooded areas with light residential		0	0	0	7	Problem
4309-02-1	None	Cherry Brook, Titan's Pond	0	3		0	1	1	0		3	Wooded with light residential housing		0	0	0	8	Problem
4309-00-2-R1	None	Cherry Brook,unnamed streams	0	0		0	1	1	0		3	Wooded with residential housing		0	0	0	5	Low Priority
4309-00-2-R2	None	Cherry Brook, unnamed streams	0	0		0	2	1	0		3	Mainly residential housing with wooded areas.		0	0	0	6	Problem
4308-19-2-R1	None	Unnamed stream	0	0		0	1	1	0		0	Wooded area with light residential housing		0	0	0	2	Low Priority
4308-18-1	None	Spruce Brook, unnamed streams	0	0		0	1	1	0		3	Wooded with light residential housing		0	0	0	5	Low Priority
4309-03-1	None	Unnamed streams	0	0		0	2	1	0		3	Residential housing with light cleared agricultural farmland and lightly wooded areas		0	0	0	6	Problem
4318-00-1	None	Towards Hop Brook River in Simsbury	0	0		0	3	1	0		0	Mainly residential housing with wooded areas.		0	0	0	4	Low Priority
4308-18-2-R1	None	Spruce Brook, unnamed streams	0	0		0	0	1	0		0	Wooded area with Ski mountain		0	0	0	1	Low Priority
4309-05-1	17	Barbour Brook	0	0		0	2	1	0		3	Residential housing with light cleared agricultural farmland and lightly wooded areas		0	0	0	6	Problem
4318-04-1-L1	15	Unnamed streams	0	0		0	3	2	0		3	Mainly residential housing with lightly wooded areas		1	0	0	9	Problem
4309-04-1	6	Unnamed streams	3	0		0	3	2	0		3	Mainly residential housing with lightly wooded areas		0	0	0	11	High Priority
4300-14-1	16	Unnamed streams	0	0		0	2	1	0		3	A mixture of cleared agriculutural farmland and residential housing, as well as lightly wooded areas		1	0	0	7	Problem
4309-00-2-R4	2	Cherry Brook, unnamed streams	3	0		3	1	1	0		3	Mainly cleared agricultural farmland with light residential housing and wooded areas		0	0	3	14	High Priority

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4318-04-1	None	Towards Od Reservoir in Simsbury	0	0		0	0	0	0		0	Wooded		1	0	0	1	Low Priority
4308-00-2-R1	None	Towards Hallman Pond	0	0		0	0	0	0		0	Wooded		0	0	0	0	Exempt
4309-00-2-R3	None	Cherry Brook, unnamed streams	3	0		0	1	0	0		0	Cleared agricultural farmland		0	0	0	4	Low Priority
4300-00-4+R6	None	Towards Chase Pond	0	0		0	1	1	0		0	Wooded with light residential housing		0	0	0	2	Low Priority
4317-00-1	None	Towards Jim Brook	0	3		0	1	1	0		0	Wooded with light residential housing		1	0	0	6	Problem
4300-15-1	20	Cherry Brook, Humphrey Pond	0	3		0	3	3	0		3	Mainly residential housing with lightly wooded areas		0	0	0	12	High Priority
4312-01-1	23	Jim Brook	0	3		0	2	1	0		3	A mixture of residential housing and lightly wooded areas		1	0	0	10	High Priority
4300-00-4+R7	None	Chase Pond	0	0		0	0	0	0		0	Wooded		0	0	0	0	Exempt
4309-00-2-R5	9	Cherry Brook	3	0		3	2	1	0		3	Mainly residential with wooded areas		1	0	3	16	High Priority
4300-16-1	29	Cherry Brook, Bahre Pond	0	0		0	2	2	0		3	Mainly residential with wooded and cleared agricultural farmland areas		1	0	0	8	Problem
4300-00-4+R8	5	Chase Pond	0	0		0	2	2	0		0	Mainly residental housing with wooded areas and lightly cleared agricultural farmland		1	0	0	5	Low Priority
4312-00-1	4	Werner Woods Dam, Burke Pond	0	3		0	2	2	0		3	Mainly residential housing with wooded areas.		1	0	0	11	Problem
4300-00-4+R9	None	Farmington River	0	0		0	3	2	0		0	Cleared agriculutral farmland and/or industrial/commercial sites		1	1	0	7	Problem
4300-00-4+R10	13	Nepaug River, Holkfelder Pond	0	0		0	3	2	0		3	Cleared agricultural farmland and/or industrial/commercial sites		1	1	0	10	High Priority
4300-18-1-L1	3	Unnamed Stream, Upper Mills Pond	0	3		0	3	3	0		3	Residential housing with lightly wooded areas, as well industrial/commercial sites		1	1	0	14	High Priority
4310-00-3-L2	None	Nepaug Reservoir	0	3		0	3	2	0		0	Residential with wooded areas, as well as a reservoir		1	0	0	9	Problem
4310-00-3-R5	7	Nepaug River, Holkfelder Pond	0	0		0	2	1	0		0	Residential housing with wooded areas		1	0	0	4	Low Priority

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4312-00-2-L2	14	Cooper Pond, Roaring Brook	0	3		0	3	3	0		3	A mixture of residential housing and industrial/commercial sites, as well as wooded areas		1	1	0	14	High Priority
4300-17-1	3	Unnamed streams	0	3		0	2	1	0		3	Mainly residential housing with wooded areas.		1	1	0	11	High Priority
4300-00-4+R11	23	Rattlesnake Hill Brook, Farmington River	0	3		0	3	3	0		3	A mixture of resiential housing and industrial/commercial sites		1	1	0	14	High Priority
4300-18-1	2	Unnamed Streams, Lower Mills Pond	0	3		0	1	1	0		3	Mainly open parks with light residential housing		1	1	0	10	High Priority
4312-00-2-L1	None	Bond Pond	0	3		0	1	1	0		0	Residential housing with lightly wooded areas		1	1	0	7	Problem
4317-01-1	None	Unnamed Pond	0	0		0	3	3	0		0	Industrial/commercial site(s) with wooded areas		1	0	0	7	Problem
4300-16-2-R1	None	Unnamed Stream, Rattlesnake Hill Brook	0	3		0	2	2	0		3	Residential housing with wooded areas		1	1	0	12	High Priority
4300-00-4+R12	9	Spring Brook	0	0		0	3	3	0		3	Highly populated area with residential housing		1	1	0	11	High Priority
4312-02-1	2	Towards Secret lake and Cherry Park Pond in Avon	0	0		0	3	3	0		0	Residential housing		1	1	0	8	Problem

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

[2] Catchments that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of State of Connecticut Integrated Water Quality Report.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age of development and infrastructure:

- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Aging septic systems are septic systems 30 years or older in residential areas.

[8] Any river or stream that is culverted for distance greater than a simple roadway crossing.

[9] Based off of CT NEMO DCIA Calculations

Pending investigation