Town of Middlefield, Connecticut

2020 Annual Report

General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

Permit Number GSM000069

MS4 General Permit
Town of Middlefield 2020 Annual Report
Existing MS4 Permittee
Permit Number GSM 000069
January 01, 2020 - December 31, 2020

This report documents the Town of Middlefield's efforts to comply with the conditions of the MS4 General Permit to the maximum extent practicable (MEP) from January 01, 2020 to December 31, 2020.

Lee Vito, Sanitarian retired in 2019. The Town of Middlefield now contracts the Plainville-Southington Regional Health District for health services.

Robin Newton replaced Geoffrey Colegrove as the Town Planning Consultant in December 2019.

Jay Wickham replaced John Wyskiel as Road Foreman in December 2019.

Part I: Summary of Minimum Control Measure Activities

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

1.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
1-1 Implement Public Education and Outreach	To be Developed in early 2019	2017 through 2020 - None Before July 01, 2021 Clean Waters Starting in Your Home and Yard Fact Sheets prepared by a collaborative effort between the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System NEMO Program will be made available to the public on the town website	Improving	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2018	Before July 01, 2021	

		at: http://www.middlefieldct.org/					
1-2 Address Public Education and Outreach for Pollutants of Concern*	Developed in 2019	2017 through 2020 - None	See Below	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2018	Before July 01, 2019	
	Completed	2019 A Lake Beseck Living/LAKESMART Home Quick Link was added to the town website. The website link included the following: Outreach for an Improved Watershed Only Rain Down the Drain How to Make a Rain Barrel EPA Water Conservation Rain Barrel How You Can Help… New Legislation Limits Use of Phosphorus Lawn Fertilizers Eutrophication	Public access to water quality education.	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2018	2019	
	Completed	2019 A Coginchaug River Watershed Water Quality quick link was added to the town website. The website link included the following: Introduction Interesting Facts about the Coginchaug River Everything Drains Downstream Water Quality Improvement Efforts in the Coginchaug River 2019 Bacteria Data 2018 Bacteria Data 2017 Bacteria Data 2016 Bacteria Data	Public access to water quality education.	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2018	2019	

		2015 Bacteria Data 2014 Bacteria Data 2013 Bacteria Data 2012 Bacteria Data What can You do to help improve water quality? What can TOWNS do to help improve water quality? What can FARMS do to help improve water quality? Resource Links					
	Completed	Seven "Entering Lake Beseck Watershed" sign were installed on various roads to make residents aware of the watershed boundaries	Increase public awareness of the Lake Beseck watershed boundaries	Edward Bailey, First Selectman, Board of Selectmen	Not Applicable	Fall 2019	

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

It is anticipated that public education resources will be added to the Lake Beseck Living/LAKESMART Home and the Coginchaug River Watershed Water Quality Quick Links.

1.3 Details of activities implemented to educate the community on stormwater

Program Element/Activity	Audience (and number of people reached)	Topic(s) covered	Pollutant of Concern addressed (if applicable)	Responsible dept. or partner org.

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

2.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
2-1 Comply with public notice requirements for the Stormwater Management Plan	Completed	A pdf copy of the 2017 Stormwater Management Plan (SMP) was made available to the public for review and comment on the town website at: http://www.middlefieldct.org/	Complied with requirements	Edward Bailey, First Selectman, Board of Selectmen	April 03, 2017	The 2017 SMP was available to the public on April 20, 2017.	No public comments were received by the Office of the First Selectman
2-2 Comply with public notice requirements for Annual Reports	completed	A pdf of the Draft 2017 MS4 Annual Report was made available for public review and comment on the town website at: http://www.middlefieldct.org/	The 2017 MS4 Annual Report was made available to the public for review and comment.	Edward Bailey, First Selectman, Board of Selectmen	Feb 15, 2018	February 21, 2018	No public comments were received by the Office of the First Selectman
	Completed	A pdf of the Draft 2018 MS4 Annual Report was made available for public review and comment on the town website at: http://www.middlefieldct.org/	The 2018 MS4 Annual Report was made available to the public for review and comment.	Edward Bailey, First Selectman, Board of Selectmen	Feb 15, 2019	April 24, 2019	No public comments were received by the Office of the First Selectman
	Completed	A pdf of the Draft 2019 MS4 Annual Report was made available for public review and comment on the town website at: http://www.middlefieldct.org/	The 2019 MS4 Annual Report was made available to the public for review and comment.	Edward Bailey, First Selectman, Board of Selectmen	Feb 15, 2020	April 01, 2020	No public comments were received by the Office of the First Selectman
	Completed	A pdf of the Draft 2020 MS4 Annual Report was made available for public review	The 2020 MS4 Annual Report was	Edward Bailey, First Selectman,	Feb 15, 2021	February 25, 2021	Public review comments are to be directed to Wade

		and comment on the town website at: http://www.middlefieldct.org/	made available to the public for review and comment.	Board of Selectmen			Thomas of Nathan L. Jacobson & Associates, Inc.
2-3 Public Participation	Completed	The Connecticut River Coastal Conservation District, inc. has developed the Coginchaug River Watershed Water Quality Quick Link on the Town of Middlefield website.					
	2012	The Connecticut River Coastal Conservation District, Inc. recruited and trained fifteen volunteers from the community to collect biweekly water samples for bacteria testing from June 13th through October 17th (ten sample days) for twenty-one sample sites in the Coginchaug River Watershed. Samples were obtained from three sample sites located in Middlefield: Lyman Meadow Brook LMB030 Ellen Doyle Brook EDB005 Hans Brook HaB001					
	2013	The Connecticut River Coastal Conservation District, Inc. recruited and trained five volunteers from the community to collect weekly water samples for bacteria testing from July 17th to September 11th (nine sample days) for eleven sample sites in the upper part of the Coginchaug River Watershed.					

		Samples were obtained from one sample site located in Middlefield: Lyman Meadow Brook LMB030					
	2014	The Connecticut River Coastal Conservation District, Inc. recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from June 25th to August 20th (nine sample days) for twenty-four sample sites in the upper part of the Coginchaug River Watershed. Samples were obtained from two sample sites located in Middlefield: Lyman Meadow Brook LMB030 Coginchaug River CoR020					
	2015	The Connecticut River Coastal Conservation District, Inc. recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from June 17th to August 12th (nine sample days) for twelve sample sites in the upper part of the Coginchaug River Watershed. Samples were obtained from one sample site located in Middlefield: Lyman Meadow Brook LMB030					
	2016	The Connecticut River Coastal Conservation District, Inc.					

		recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from July 20th to September 14th (nine sample days) for seven sample sites in the upper part of the Coginchaug River Watershed. Samples were obtained from one sample site located in Middlefield: Lyman Meadow Brook LMB030					
	2017	The Connecticut River Coastal Conservation District, Inc. recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from July 12th to September 06th (nine sample days) for seven sample sites in the upper part of the Coginchaug River Watershed. Samples were obtained from one sample site located in Middlefield: Lyman Meadow Brook LMB030					
	2018	The Connecticut River Coastal Conservation District, Inc. recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from July 11th to September 05th (nine sample days) for seven sample sites in the upper part of the Coginchaug River Watershed.					

		Samples were obtained from one sample site located in Middlefield: Lyman Meadow Brook LMB030					
	2019	The Connecticut River Coastal Conservation District, Inc. recruited and trained volunteers from the community to collect weekly water samples for bacteria testing from July 10th to September 04th (nine sample days) for ten sample sites in the upper part of the Coginchaug River Watershed. Samples were obtained from one sample site located in Middlefield: Coginchaug River upstream of intake pipe at Wadsworth Falls State Park CoR025					

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

It is anticipated that the Connecticut River Coastal Conservation District will continue to recruit and train volunteers from the community to collect weekly water samples of the Coginchaug watershed during the Summer for bacteria testing in 2021.

2.3 Public Involvement/Participation reporting metrics

Metrics	Implemented	Date	Posted
2017 - Availability of the 2017 Stormwater Management Plan announced to the public	Yes	03/28/2017	Town Website
2018 - Availability of 2017 Annual Report announced to the public	Yes	02/28/2018	Town Website
2019 - Availability of 2018 Annual Report announced to the public	Yes	04/24/2019	Town Website
2020 - Availability of 2019 Annual Report announced to the public	Yes	04/01/2020	Town Website
2021 - Availability of 2020 Annual Report announced to the public	Yes	02/*05*/2021	Town Website

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

3.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
3-1 Develop written IDDE program	In Progress	A written IDDE program using the IDDE program template available from the CT DEEP is being developed.	Develop written IDDE program	Board of Selectmen and Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2018	Anticipate completing by July 01, 2021.	Randy Bernotas, Inland Wetland Agent will be the listed contact.
3-2 Develop list and maps of all MS4 stormwater outfalls in priority areas	Completed	MS4 stormwater outfall mapping was conducted from November 2009 to April 2010. The stormwater outfall mapping was compiled on a ESRI GIS layer. The MS4 stormwater outfall mapping will be updated to include impaired waters as contained in the State of Connecticut, Department of Energy and Environmental Protection 2018 Integrated Water Quality Report. The stormwater outfalls in the impaired waters will be identified. The MS4	Developed an ESRI GIS map layer with MS4 stormwater outfalls.	Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2019	July 01, 2019.	

		stormwater outfall mapping will be completed town wide in 2018.					
3-3 Implement citizen reporting program	In Progress	2017 through 2020 - None A program to allow the general public to report suspected illicit discharges is in the process of being set up.	Moving to compliance	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2017	Anticipate completing by July 01, 2021.	Randy Bernotas, Inland Wetland Agent will be the listed contact.
3-4 Establish legal authority to prohibit illicit discharges	In Progress	An Illicit Discharge Detection and Elimination Ordinance and Citation Hearing Procedure was enacted at a Town Meeting on September 10, 2011.	IDDE Ordinance and Citation Hearing Procedure Enacted	Edward Bailey, First Selectman, Board of Selectmen	July 01, 2018	October 04, 2010	
3-5 Develop record keeping system for IDDE tracking	To Be Developed	2017 through 2020 – None It is anticipated that a tracking system will be developed using a Microsoft Excel spreadsheet.	Moving to compliance	Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2018	Anticipate completing by July 01, 2021.	To be implemented by Randy Bernotas, Inland Wetland Agent.
3-6 Address IDDE in areas with pollutants of concern	To Be Developed	2017 through 2020 - None	Moving to compliance	Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2018	Anticipate completing by July 01, 2021.	

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

The written IDDE Program will be posted on the town website and a link listed in each Annual Report. The town will update the written IDDE program as needed throughout the permit term.

Jay Wickham, Highway Foreman or the Plainville-Southington Regional Health District will maintain the master IDDE tracking spreadsheet.

3.3 List of citizen reports of suspected illicit discharges received during this reporting period.

Date of Report	Location / suspected source	Response taken
2017 - Lee Vito, Sanitarian and Health Official reported no illicit discharges to the Town of Middlefield MS4 system were reported or detected.	Not Applicable	Not Required
2018 - Lee Vito, Sanitarian and Health Official reported no illicit discharges to the Town of Middlefield MS4 system were reported or detected.	Not Applicable	Not Required
2019 - The Plainville-Southington Regional Health District reported no illicit discharges to the Town of Middlefield MS4 system were reported or detected.	Not Applicable	Not required
2020 - Scott Cook and Shane Lockwood of the Plainville-Southington Regional Health District reported no illicit discharges to the Town of Middlefield MS4 system were reported or detected.	Not Applicable	Not required

3.4 Provide a record of illicit discharges occurring during the reporting period and SSOs occurring July 2012 through end of reporting period using the following table. The Town of Middlefield has had no SSOs

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)

3.5 Briefly describe the method used to track illicit discharge reports, responses to those reports, and who was responsible for tracking this information.

It is anticipated that the Illicit Discharge Report Tracking Program will be developed and implemented in 2021.

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

Location and nature of structure with failing septic systems	**Actions taken to respond to and address the failures**	**Impacted waterbody or watershed, if known**
2017 - Lee Vito, Sanitarian and Health Official reported no subsurface sewage disposal systems were a source of illicit discharges to the Town of Middlefield MS4.	None required	None
2018 - Lee Vito, Sanitarian and Health Official reported no subsurface sewage disposal systems were a source of illicit discharges to the Town of Middlefield MS4.	None required	None
2019 - The Plainville-Southington Regional Health District reported no subsurface sewage disposal systems were a source of illicit discharges to the Town of Middlefield MS4.	None required	None
2020 - Scott Cook and Shane Lockwood of the Plainville-Southington Regional Health District reported no subsurface sewage disposal systems were a source of illicit discharges to the Town of Middlefield MS4.	None required	None

3.7 IDDE reporting metrics

Metrics	
Estimated or actual number of MS4 outfalls	235 Field Located
Estimated or actual number of interconnections	To Be Determined
Outfall mapping complete	90%
Interconnection mapping complete	0%
System-wide mapping complete (detailed MS4 infrastructure)	40%
Outfall assessment and priority ranking	0%
Dry weather screening of all High and Low priority outfalls complete	0%
Catchment investigations complete	0%
Estimated percentage of MS4 catchment area investigated	0%

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

The Highway Department was provided with a copy of the publication entitled *Illicit Discharge Detection and Elimination Manual, A Handbook for Municipalities*, Published January 2003, by the New England Interstate Water Pollution Control Commission.

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

4.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
4-1 Implement, upgrade, and enforce land use regulations or other legal authority to meet requirements of MS4 General Permit	To be Initiated in 2020	Not Applicable	Not Applicable The requirements contained in Minimum Control Measure No. 4 - Construction Site Runoff Control will be forwarded to the Town Planning Consultant.	Planning and Zoning Commission and Robin Newton, Town Planner.	July 01, 2019	Ongoing	
4-2 Develop/Implement plan for interdepartmental coordination in site plan review and approval	Ongoing	Nathan L. Jacobson & Associates, Inc., Town Engineer, prepares land use review letters for most applications to the Inland Wetlands and Watercourses Agency and Planning & Zoning Commission.	Interdepartmental Coordination	Planning and Zoning Commission and Robin Newton, Town Planner	July 01, 2017	Ongoing	
4-3 Review site plans for stormwater quality concerns	Ongoing	Nathan L. Jacobson & Associates, Inc., Town Engineer, encourages the use of LID BMPs as contained in the 2004 Connecticut Stormwater Quality Manual.	Compliance	Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2017	Ongoing	
4-4 Conduct site inspections	Ongoing	The town conducts construction site inspections for proper	Compliance with Approved Plans	Randy Bernotas, Inland	July 01, 2017	Ongoing	

		implementation and maintenance of soil erosion and sediment control measures.		Wetlands Officer, and Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.			
4-5 Implement procedure to allow public comment on site development	Ongoing	The land use application process allows for public comment on land use applications which are submitted to the Inland Wetlands and Watercourses Agency and the Planning & Zoning Commission during the Public Hearing Process when applicable.		Planning and Zoning Commission and Robin Newton, Town Planner	July 01, 2017	Ongoing	
4-6 Implement procedure to notify developers about the CT DEEP Construction Stormwater General Permit	Ongoing	Since the inception of the MS4 program Nathan L. Jacobson & Associates, Inc., Town Engineer, has made developer's engineers aware of the need to register for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities in engineering review letters which are typically prepared as part of the land use application process.	Awareness of the need to register for the General permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities	Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2017	Ongoing	

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

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

5.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
5-1 Establish and/or update legal authority and guidelines regarding LID and runoff reduction in site development planning	Will Be Developed	The land use regulations will be revised to incorporate the requirements contained in Minimum Control Measure No. 5 - Post-Construction Runoff Control.	None The requirements contained in Minimum Control Measure No. 5 - Post-Construction Runoff Control will be forwarded to the Town Planning Consultant.	Planning and Zoning Commission and Robin Newton, Town Planner	July 01, 2021	July 01, 2021	It is anticipated that UConn CLEAR or a Regional Planning Agency will develop template guidelines for use by all MS4 municipalities.
5-2 Enforce LID/runoff reduction requirements for development and redevelopment projects	Continuing		Recommend utilization of Stormwater BMPs and LID Practices during land use reviews.	Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2019		2017 through 2020 No significant land use applications were received.
5-3 Identify retention and detention ponds in priority areas	Continuing	None	All Detention Basins, Retention Basins, Sediment Basins, Hydrodynamic Separators and Sediment Tanks were inventoried in 2015 and a three-ring	Jay Wickham, Road Foreman, Highway Department and Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2019		

			binder was created of all stormwater management facilities. A GIS Map Layer will be created after the inventory. Part of the inventory process will be facility operation and maintenance.				
5-4 Implement long-term maintenance plan for stormwater basins and treatment structures	Completed	A Post-Construction Stormwater Management Facility Operation & Maintenance Plan Manual was prepared.	Implementation of the Post-Construction Stormwater Management Facility Operation & Maintenance Plan Manual.	Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2019	Completed with an Effective Date of July 01, 2019.	The manual will be revised as new BMP technologies become available.
5-5 DCIA mapping	Completed	Completed the process of DCIA Mapping from base mapping prepared by UConn CLEAR. Subsequent to completion of the determination of 2012 DCIA Baseline Conditions, revised UConn CLEAR mapping separated town road impervious area from state road impervious area.	The DCIA to MS4 stormwater outfalls discharging to waters identified as impaired in the 2016 Integrated Water Quality Report and in watersheds with a DCIA of greater than 11 percent will start in 2018.	Board of Selectmen and Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2020	February 2019	

5-6 Address post-construction issues in areas with pollutants of concern			Stormwater outfalls discharging to waters identified as impaired in the 2016 Integrated Water Quality Report (Coginchaug River and Lake Beseck) and in watersheds with a DCIA of greater than 11 percent will be subject to enhanced stormwater quality management practices.	Board of Selectmen/ Nathan L. Jacobson & Associates, Inc., Town Engineer	Not specified		

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

Procedures outlined in the Post-Construction Stormwater Management Facility Operation & Maintenance Plan Manual will continue to be implemented in 2021.

5.3 Post-Construction Stormwater Management reporting metrics

Metrics	
Baseline (2012) Directly Connected Impervious Area (DCIA)	10.62 Acres
DCIA disconnected (redevelopment plus retrofits)	2012 through July 01, 2017 - To Be Determined 2017 through 2020 - 0 Acres
Retrofits completed	Since 2012 - To Be Determined 2017 through 2020 - 0
% DCIA disconnected	2012 to July 01, 2017- To Be Determined 2017 through 2020 - 0%

Estimated cost of retrofits	$0
Detention or retention ponds identified	2015 Inventory Four Stormwater Detention Ponds Two Undergrounds Detention Facilities Four Sedimentation Basins Three Sediment Basins/Level Spreaders Two Sediment Basins/Biofilters One Sedimentation Tank/Level Spreaders One Stilling Basin/Level Spreader Four Vortechs Hydrodynamic Separators on Lake Beseck One Model 7000 Vortechs Hydrodynamic Separator on a Town Road One Sedimentation Tank

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

Based on information contained in the Factsheet: *Town of Middlefield Water Quality and Stormwater Summary,* prepared by the CT DEEP, 901.70 acres of the town has an impervious area exceeding 12% which is approximately 10.73% of the town. 319.54 acres have an impervious cover ranging from 12% to 25%, 432.92 acres have an impervious cover ranging from 26% to 50%, 125.89 acres have an impervious cover ranging from 51% to 75% and 23.35 acres have an impervious cover ranging from 76% to 100%.

Based on information contained in the MS4 mapping tab of Connecticut Environmental Conditions Online The impervious surface area consists of 115.64 acres of buildings, 173.89 acres of roads and 243.06 acres of other impervious surfaces for a total impervious surface area of 532.59 acres. Of the 173.89 acres of road impervious area 114.45 acres are town roads and 59.44 acres are state roads. The state roads constitute approximately 34.2% of the total road impervious area.

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 reports entitled *2016 Integrated Water Quality Report*, dated April 2017, and *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 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 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 State. 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). No major 2012 Baseline DCIA computation discrepancies were noted.

Land use files will be reviewed to determine disconnection of DCIA since July 01, 2012 for utilization in reaching the CT DEEP goal of 2% disconnection of DCIA by June 30, 2022.

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

6.1 BMP Summary

BMP	Status	Activities in current reporting period	Measurable goal	Responsible Person and Department	Due	Date completed or projected completion date	Additional details
6-1 Develop/implement formal employee training program	Under Development	2017 through 2019- None 2020 - Refer to Section 6.3	None	Jay Wickham, Road Foreman, Highway Department and Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2017	September and October 2020	
6-2 Implement MS4 property and operations maintenance	Ongoing	Ongoing	Continuing	Jay Wickham, Road Foreman, Highway Department	July 01, 2018	July 01, 2017	
6-3 Implement coordination with interconnected MS4s	Ongoing	The Town of Middlefield continued to coordinate MS4 responsibilities with the City of Middletown, Town of Durham, Town of Wallingford and the City of Meriden as well as Conn DOT.	Continuing	Jay Wickham, Road Foreman, Highway Department	July 01, 2017	July 01, 2017	
6-4 Develop/implement program to control other sources of pollutants to the MS4	To Be Developed	None		Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2017		

6-5 Evaluate additional measures for discharges to impaired waters*	To Be Developed	None		Brian C. Curtis, P.E., Town Engineer, Nathan L. Jacobson & Associates, Inc.	July 01, 2017		
6-6 Track projects that disconnect DCIA	To Be Developed	None	Continuing	Nathan L. Jacobson & Associates, Inc., Town Engineer	Jul 1, 2017		
6-7 Implement infrastructure repair/rehab program	Continuing	Stormwater quality improvements continue to be made at Lake Beseck, an impaired waterbody.		Jay Wickham, Road Foreman, Highway Department and Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2021		
6-8 Develop/implement plan to identify/prioritize retrofit projects	To Be Developed	Stormwater quality improvements continue to be made at Lake Beseck, an impaired waterbody.		Nathan L. Jacobson & Associates, Inc., Town Engineer and Jay Wickham, Road Foreman, Highway Department	July 01, 2020		
6-9 Implement retrofit projects to disconnect 2% of DCIA	To Be Developed	None		Jay Wickham, Road Foreman, Highway Department and Nathan L. Jacobson & Associates, Inc., Town Engineer	July 01, 2022		
6-10 Develop/implement street sweeping program	Ongoing	The Town of Middlefield currently implements a road sweeping program whereby all town roads are swept at	Continuing	Jay Wickham, Road Foreman, Highway Department	July 01, 2017	July 01, 2017	

		least one time per year.					
6-11 Develop/implement catch basin cleaning program	Ongoing	The Town of Middlefield currently implements a catch basin cleaning program whereby all of the catch basins are cleaned every year.	Continuing	Jay Wickham, Road Foreman, Highway Department	July 01, 2020	July 01, 2017	
6-12 Develop/implement snow management practices	Ongoing	Continued the use of a straight NaCl deicing mix started in 2015-2016. The utilization of straight NaCl deicing mix which has markedly reduced the volume of road sweepings as well as the catch basin cleanings	The switch to straight sodium chloride salt with no sand has markedly reduced the road sweepings volume and the catch basin cleanings volume.	Jay Wickham, Road Foreman, Highway Department	July 01, 2018	July 01, 2017	

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

The road sweeping ad catch basin cleaning will continue with all roads being swept and all catch basins being cleaned in 2020.

6.3 Pollution Prevention/ Good Housekeeping reporting metrics

Metrics	
Employee training provided for key staff	DPW employees are encouraged to attend training offered by the Connecticut Technology Transfer Center (T2) and/or Connecticut Interlocal Risk Management Agency (CIRMA). 2017 through 2019 - None 2020 - Connecticut Technology Transfer Center Snow Management

	September - Jason Wickham October - 4 of 5 DPW employees. It is anticipated that DPW employee training will be obtained in 2021 if the COVID-19 pandemic allows.
Street sweeping	
Lane miles swept	2017 through 2020 - 69.50 (34.75 Miles) Town roads located within the Lake Beseck watershed are swept twice per year.
Volume (or mass) of material collected	2017 - 30± C.Y. 2018 - 20± C.Y. to 30± C.Y. 2019 - 200± C.Y. to 250± C.Y. 2020 - 200± C.Y. to 250± C.Y. Due to the fact that no sand is used in the road deicing mix the road sweepings volume is minimal.
Catch basin cleaning	
Total catch basins in priority areas	To Be Determined
Total catch basins in MS4	1,000±
Catch basins inspected	2017 through 2019 - 950-1,000 2020 - 1,000±
Catch basins cleaned	2017 through 2019- 950-1,000 2020 - 1,000±
Volume (or mass) of material removed from all catch basins	2017 - 40± C.Y. 2018 - 30± C.Y. to 40± C.Y. 2019 - 40± C.Y. to 60± C.Y. 2020 - 50± C.Y. Due to the fact that no sand is used in the road deicing mix the catch basin cleanings volume is minimal.
Volume removed from catch basins to impaired waters (if known)	2017 through 2020 - Not Known Due to the fact that no sand is used in road deicing the catch basin cleaning volume has been significantly reduced.
Snow management	
Type(s) of deicing material used	Deicing Mix - Straight NaCl
Total amount of deicing material applied	Winter 2017 to 2018 - 500± Tons Winter 2018 to 2019 - 600± Tons Winter 2019 to 2020 - 700 to 790± Tons Winter 2020 to 2021 - 810± Tons (estimated)
Type(s) of deicing equipment used	Five Large Snow Plows/Spreaders Two are ground speed controlled and three are manually controlled Road deicing application rate ranges from 100 pounds per lane mile to 900 pounds per lane mile with an average application rate of 550 pounds to 600 pounds per road mile.

	The deicing application rate is storm dependent.
Lane-miles treated	2017 through 2020 - 69.50 (34.75 Miles)
Snow disposal location	All snow was plowed to the side of the road
Staff training provided on application methods & equipment	2017 through 2019 - None 2020 - Connecticut Technology Transfer Center Snow Management September - Jason Wickham October - 4 of 5 DPW employees. It is anticipated that DPW employee training will be obtained in 2021 if the COVID-19 pandemic allows.
Municipal turf management program actions (for permittee properties in basins with N/P impairments)	
Reduction in application of fertilizers (since start of permit)	All turf management is subcontracted out by the town. Fertilizer reduction will be tracked in 2020.
Reduction in turf area (since start of permit)	0 acres
Lands with high potential to contribute bacteria (dog parks, parks with open water, & sites with failing septic systems)	
Cost of mitigation actions/retrofits	$0 Plastic dog waste dispensers continued to be available at the Dog Park located within King Park and a Peckham Park. Dog owners are required to clean up after their pets and take the bags home for disposal

6.4 Catch Basin Cleaning Program

Briefly describe the method used to optimize your catch basin inspection and cleaning schedule.
It is estimated that there are 1,000± catch basins in the Town of Middlefield. 2017 through 2020 - All catch basins were cleaned. Currently no optimization methods are required as all catch basins are cleaned annually.

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.
Storm Drainage Retrofit prioritization will be given to stormwater outfalls that are known to result in soil erosion and sedimentation. Prioritization will be given to the outfalls within the impaired water drainage basins with particular emphasis placed on stormwater outfalls which are located on fine grained glacial till soils. The retrofit program will be prioritized based on setback distance from watercourse and/or waterbodies.

Describe plans for continuing the Retrofit program and how to achieve a goal of 1% DCIA disconnection in future years.
The 2012 Baseline DCIA for the town was computed to be 10.62 acres. To obtain the 2% DCIA disconnection goal will require a DCIA disconnection of 0.212 acres by July 01, 2022. Land use files will be reviewed to determine disconnection of DCIA since July 01, 2012 for utilization in reaching the CT DEEP goal of 2% disconnection of DCIA by June 30, 2022.

Describe plans for continuing the Retrofit program beyond this permit term with the goal to disconnect 1% DCIA annually over the next 5 years.
Redevelopment projects in town will be required to implement LID practices whenever possible to meet or exceed the CT DEEP DCIA disconnection goal.

Part II: Impaired waters investigation and monitoring

1. Impaired waters investigation and monitoring program

The Connecticut River Coastal Conservation District, Inc., Connecticut River Watch Program, Coginchaug River Watershed Water Quality program is a study to improve water quality of the river by monitoring bacteria concentrations in the Coginchaug River and tributaries under both dry weather and wet weather conditions. The program started in 2012 and is ongoing. No sampling was conducted in 2020.

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.
2017 through 2019 - It was anticipated that impaired waters investigations and monitoring would be conducted during the Fall. However, unseasonably high precipitation precluded dry weather screening and sampling. 2020 - No impaired waters investigations and monitoring was conducted. It is anticipated that impaired waters investigations and monitoring will be conducted in the late Spring and Summer of 2021. It is anticipated that dry weather screening stormwater sampling of at least half of the stormwater outfalls which discharge directly to impaired waters (Coginchaug River and Lake Beseck) will be completed in the late Spring and early Summer of 2021.

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

2.1 Screening data collected under 2017 permit

Complete the table below for any outfalls screened during the reporting period. Each Annual Report will add on to the previous year's screening data showing a cumulative list of outfall screening data.

Outfall ID	**Sample date**	**Parameter** (Nitrogen, Phosphorus, Bacteria, or Other pollutant of concern)	**Results**	**Name of Laboratory (if used)**	**Follow-up required?**
2017 through 2020 - No sampling was conducted.					

2017 through 2019 - Dry weather screening was scheduled for the Fall but the unseasonably high precipitation, and resulting high groundwater conditions, precluded dry weather screening.

2020 - No dry weather screening was conducted.

It is anticipated that dry weather screening will be conducted late Spring and early Summer 2021.

2.2 Credit for screening data collected under 2004 permit

If any outfalls to impaired waters were sampled under the 2004 MS4 permit, that data can count towards the monitoring requirements under the modified 2017 MS4 permit. Complete the table below to record sampling data for any outfalls to impaired waters under the 2004 MS4 permit.

Outfall	**Sample date**	**Parameter** (Nitrogen, Phosphorus, Bacteria, or Other pollutant of concern)	**Results**	**Name of Laboratory (if used)**	**Follow-up required?**

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

Provide the following information for outfalls exceeding the pollutant threshold.

Outfall	Status of drainage area investigation	Control measure implementation to address impairment

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

Once outfall screening 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 01, 2020.

Outfall	Sample Date	Parameter(s)	Results	Name of Laboratory (if used)

It is anticipated that priority outfall monitoring will be conducted in 2021.

Part III: Additional IDDE Program Data [This section required beginning with 2018 Annual Report]

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
4607-00-3-L2 16.78% Impervious	Bacteria	1
4607-00-3-R7 13.76% Impervious	Bacteria	2
4607-10-1 12.9% Impervious	Bacteria	3
4607-10-1-L7 5.10% Impervious Lake Beseck	Chlorophyll-a Excess Algal Growth Phosphorus (Total)	4

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

Provide sample data for outfalls where flow is observed. Only include Pollutant of concern data for outfalls that discharge into stormwater impaired waterbodies.

Outfall / Interconnection ID	Screening / sample date	Ammonia	Chlorine	Conductivity	Salinity	E. coli	Surfactants	Water Temp	Pollutant of concern	If required, follow-up actions taken

2017 through 2019 - Dry weather screening was scheduled for the Fall but the unseasonably high precipitation, and resulting high groundwater conditions, precluded dry weather screening.

2020 - No dry weather screening was conducted.

It is anticipated that dry weather screening will be conducted late Spring and early Summer 2021.

2.2 Wet weather sample and inspection data

Provide sample data for outfalls and key junction manholes of any catchment area with at least one System Vulnerability Factor.

Outfall / Interconnection ID	Sample date	Ammonia	Chlorine	Conductivity	Salinity	E. coli	Surfactants	Water Temp	Pollutant of concern

No wet weather sampling or inspections were conducted in 2020. It is anticipated that wet weather sampling and inspection will be conducted in 2021.

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

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

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

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

2017 through 2019 - Dry weather screening was scheduled for the Fall but the unseasonably high precipitation, and resulting high groundwater conditions, precluded dry weather screening.

2020 - No dry weather screening was conducted.

It is anticipated that dry weather screening will be conducted late Spring and early Summer 2021.

3.3 Wet weather investigation outfall sampling data

Outfall ID	Sample date	Ammonia	Chlorine	Surfactants

No wet weather sampling or inspections were conducted in 2020. It is anticipated that wet weather sampling and inspection will be conducted in 2021.

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: Edward P. Bailey, First Selectman	Print Name: Wade M. Thomas, CPMSM
Signature: Date: April , 2021	Signature: Date: April , 2021