



Town of Middlefield, Connecticut

2019 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 2019 Annual Report
Existing MS4 Permittee
Permit Number GSM 000069
January 01, 2019 - December 31, 2019

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, 2019 to December 31, 2019.

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 | None in 2017 Before July 01, 2018 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, 2019 | |

| | | | | | | | |
|--|-------------------|--|---|--|---------------|----------------------|--|
| | | at: http://www.middlefieldct.org/ | | | | | |
| 1-2 Address Public Education and Outreach for Pollutants of Concern* | Developed in 2019 | 2017 - None 2018 - 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 2018 Bacteria Data 2017 Bacteria Data 2016 Bacteria Data 2015 Bacteria Data | Public access to water quality education. | Edward Bailey, First Selectman, Board of Selectmen | July 01, 2018 | 2019 | |

| | | | | | | | |
|--|-----------|--|---|--|----------------|-----------|--|
| | | 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 Cuginchaug 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 hard copy of the Draft 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 | 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 | |
| | Will be completed | 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 | |
| | Will be completed | 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 | March 11, 2020 | |

| | | | | | | | |
|--------------------------|-----------|---|--|--|--|--|--|
| 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 | <p>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.</p> <p>Samples were obtained from three sample sites located in Middlefield:</p> <p>Lyman Meadow Brook LMB030 Ellen Doyle Brook EDB005 Hans Brook HaB001</p> | | | | | |
| | 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 17 th to September 11 th (nine sample days) for eleven sample sites in the upper part of the | | | | | |

| | | | | | | | |
|--|------|--|--|--|--|--|--|
| | | <p>Coginchaug River Watershed.</p> <p>Samples were obtained from one sample site located in Middlefield:</p> <p>Lyman Meadow Brook LMB030</p> | | | | | |
| | 2014 | <p>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.</p> <p>Samples were obtained from two sample sites located in Middlefield:</p> <p>Lyman Meadow Brook LMB030 Coginchaug River CoR020</p> | | | | | |
| | 2015 | <p>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.</p> | | | | | |

| | | | | | | | |
|--|------|--|--|--|--|--|--|
| | | <p>Samples were obtained from one sample site located in Middlefield:</p> <p>Lyman Meadow Brook LMB030</p> | | | | | |
| | 2016 | <p>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.</p> <p>Samples were obtained from one sample site located in Middlefield:</p> <p>Lyman Meadow Brook LMB030</p> | | | | | |
| | 2017 | <p>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.</p> <p>Samples were obtained from one sample site located in Middlefield:</p> <p>Lyman Meadow Brook LMB030</p> | | | | | |

| | | | | | | | |
|--|------|--|--|--|--|--|--|
| | 2018 | <p>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.</p> <p>Samples were obtained from one sample site located in Middlefield:</p> <p>Lyman Meadow Brook LMB030</p> | | | | | |
| | | | | | | | |

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 for bacteria testing.

2.3 Public Involvement/Participation reporting metrics

| Metrics | Implemented | Date | Posted |
|---|-------------|------------|--------------|
| Availability of the 2017 Stormwater Management Plan announced to public | Yes | 03/28/2017 | Town Website |
| Availability of 2017 Annual Report announced to public | Yes | 02/28/2018 | Town Website |
| Availability of 2018 Annual Report announced to public | Yes | 04/24/2019 | Town Website |
| Availability of 2019 Annual Report announced to public | Yes | 03/11/2020 | 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, 2020. | 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 | <p>MS4 stormwater outfall mapping was conducted from November 2009 to April 2010.</p> <p>The stormwater outfall mapping was compiled on a ESRI GIS layer.</p> <p>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</p> | Developed an ESRI GIS map layer with MS4 stormwater outfalls. | Nathan L. Jacobson & Associates, Inc., Town Engineer | July 01, 2019 | July 01, 2019. | |

| | | | | | | | |
|--|-----------------|--|---|--|---------------|---|--|
| | | stormwater outfalls in the impaired waters will be identified. The MS4 stormwater outfall mapping will be completed town wide in 2018. | | | | | |
| 3-3 Implement citizen reporting program | In Progress | 2017 - None 2018 - None 2019 - 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, 2020. | 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 - None 2018 - 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, 2020. | To be implemented by Randy Bernotas, Inland Wetland Agent. |
| 3-6 Address IDDE in areas with pollutants of concern | To Be Developed | 2017 - None 2018 - None 2019 - None | Moving to compliance | Nathan L. Jacobson & Associates, Inc., Town Engineer | July 01, 2018 | Anticipate completing by July 01, 2020. | |

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 |

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 2020.

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 |

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 | | |
| 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 Wetlands Officer, | July 01, 2017 | Ongoing | |

| | | | | | | | |
|---|---------|--|--|---|---------------|---------|--|
| | | implementation and maintenance of soil erosion and sediment control measures. | | 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 2019 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 | | |

| | | | | | | | |
|---|-----------|---|---|---|---------------|--|--|
| | | | <p>binder was created of all stormwater management facilities.</p> <p>A GIS Map Layer will be created after the inventory. Part of the inventory process will be facility operation and maintenance.</p> | | | | |
| 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 be implemented in 2020.

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 to July 01, 2017 - To Be Determined 2017 - 0 Acres 2018 - 0 Acres 2019 - 0 Acres |
| Retrofits completed | Since 2012 - To Be Determined 2017 - 0 2018 - 0 |

| | |
|---|--|
| | 2019 - 0 |
| % DCIA disconnected | 2012 to July 01, 2017- To Be Determined 2017 - 0% 2018 - 0% 2019 - 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 - None 2018 - None 2019 - None | None | Jay Wickham, Road Foreman, Highway Department and Nathan L. Jacobson & Associates, Inc., Town Engineer | July 01, 2017 | July 01, 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 | | |

| | | | | | | | |
|---|---------|---|---|---|---------------|--|--|
| | | 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 | | |
| 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 | | |
| | | | | | | | |

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

The road sweeping and 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 | <p>DPW employees are encouraged to attend training offered by the Connecticut Technology Transfer Center and Connecticut Interlocal Risk Management Agency (CIRMA).</p> <p>2017 - None 2018 - None 2019 - None</p> <p>It is anticipated that DPW employee training will be obtained in 2020.</p> |
| Street sweeping | |
| Lane miles swept | <p>2017 - 69.50 (34.75 Miles) Town roads located within the Lake Beseck watershed are swept twice per year.</p> <p>2018 - 69.50 (34.75 Miles) Town roads located within the Lake Beseck watershed are swept twice per year.</p> <p>2019 - 69.50 (34.75 Miles) Town roads located within the Lake Beseck watershed are swept twice per year.</p> |
| Volume (or mass) of material collected | <p>2017 - 30± C.Y. 2018 - 20± C.Y. to 30± C.Y. 2019 - 200± C.Y. to 250± C.Y.</p> <p>Due to the fact that no sand is used in the road deicing mix the road sweepings volume is minimal.</p> |
| Catch basin cleaning | |
| Total catch basins in priority areas | To Be Determined |
| Total catch basins in MS4 | 950-1,000 |
| Catch basins inspected | <p>2017 - 950-1,000 2018 - 950-1,000 2019 - 950-1,000</p> |
| Catch basins cleaned | <p>2017 - 950-1,000 2018 - 950-1,000 2019 - 950-1,000</p> |
| Volume (or mass) of material removed from all catch basins | <p>2017 - 40± C.Y. 2018 - 30± C.Y. to 40± C.Y. 2019 - 40± C.Y. to 60± C.Y.</p> |

| | |
|---|--|
| | 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 - Not Known 2018 - Not Known 2019 - Not Known Due to the fact that no sand is used in deicing the catch basin cleaning volume is minimal. |
| 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 |
| Type(s) of deicing equipment used | Five Large Snow Plows/Spreaders One is ground speed controlled and four are manually controlled The deicing application rate ranges from 100 pounds per lane mile to 900 pounds per lane mile with an average application rate of 150 pounds to 300 pounds per lane mile. The deicing application rate being storm dependent. |
| Lane-miles treated | 2017 - 69.50 (34.75 Miles) 2018 - 69.50 (34.75 Miles) 2019 - 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 - No training provided 2018 - No training provided 2019 - No Training Provided It is anticipated that DPW employee training will be obtained. |
| 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 from 950 to 1,000 catch basins in the Town of Middlefield.

2017 - All catch basins were cleaned.

2018 - All catch basins were cleaned.

2019 - 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.

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 - No stormwater outfall sampling to Impaired Waters was conducted.

2018 - No stormwater outfall sampling to Impaired Waters was conducted.

It was anticipated to conduct dry weather screening and sampling during the Fall of 2018. However, unseasonably high precipitation precluded dry weather screening and sampling.

It was anticipated that dry weather screening and sampling would be conducted in the Fall of 2019.

2019 - No stormwater outfall sampling to Impaired Waters was conducted.

It was anticipated to conduct dry weather screening and sampling during the Fall of 2019. However, unseasonably high precipitation precluded dry weather screening and sampling.

It is anticipated that dry weather screening and sampling would be conducted in the Fall of 2020.

It is anticipated that dry weather screening stormwater sampling of at least half of the stormwater outfalls which discharge directly to impaired water Coginchaug River and Lake Beseck will be completed in the late Spring and early Summer of 2020.

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 - No sampling was conducted. | | | | | |
| 2018 - No sampling was conducted. | | | | | |
| 2019 - No sampling was conducted. | | | | | |

Dry weather screening was scheduled for the Fall of 2018 but the unseasonably high precipitation, and resulting high groundwater conditions, precluded dry weather screening.

It was anticipated that dry weather screening will be conducted in 2019.

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

It is anticipated that dry weather screening will be conducted late Spring and early Summer 2020.

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) |
|---------|-------------|--------------|---------|------------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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 |

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 than 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 than poor owner maintenance).

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 XX , 2020 | Signature / Date: April XX , 2020 |