Town of Bolton, Connecticut

General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s)

Stormwater Management Plan

2016 Annual Report

Permit Number GSM000104

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Town of Bolton, Connecticut

Permit Number GSM000104

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A pdf of the Town of Bolton MS4 General Stormwater Permit Stormwater Management Plan is available for public inspection and printing on the Town of Bolton website to meet FOI requirements.

It is anticipated that a draft of the MS4 General Stormwater Permit 2016 Annual Report will be made available for public inspection for at least 30 days prior to submission to the CT DEEP to meet FOI requirements.

It is also anticipated that the Town of Bolton MS4 General Stormwater Permit Stormwater Management Plan for the modified MS4 General Stormwater Permit, Effective July 1, 2017 will be made available for public inspection and printing before April 1, 2017 to meet FOI requirements.

April 29, 2016 CT DEEP 2014 MS4 General Permit Compliance Review

Robert Morra, First Selectman, received a MS4 General Permit Compliance Review Letter dated April 29, 2016, from Kim Hudak, P.E. Assistant Director of the CTDEEP Water Permitting & Enforcement Division. The compliance review was based on the review of the 2014 Annual Report. Each of the six Minimum Control Measures (MCM) tasks received rankings from 1 denoting Poor to 5 denoting Excellent. The town received an average rating of 2.7 which is considered Fair/Good. No MCM task lacked a rating.

In review of the compliance review it is noted that once a MCM task is completed is should remain in the annual reports through the duration of the permit as the preparer assumed each annual report was reviewed and removed the MCM task from the annual report once completed.

This 2016 MS4 Annual Report addresses some of the compliance review comments.

2016 Minimum Control Measure Summary

The Town of Bolton continued several Qualifying Local Programs in most of the six Minimum Control Measures.

Minimum Control Measure No. 1 - Public Education and Outreach

In January 2007, the ten Salmon River watershed towns, assisted by The Nature Conservancy

(TNC), launched the Salmon River Watershed Partnership (SRWP) as a collaborative and integrated approach to watershed management. The SRWP includes the representatives of the following ten municipalities: Bolton, Colchester, Columbia, East Haddam, East Hampton, Glastonbury, Haddam, Hebron, Lebanon and Marlborough

In 2007 the SRWP developed a Conservation Action Plan through a series of regional Salmon River watershed stakeholders workshops. In January 2008 the chief elected officials of the ten municipalities voted to support the SRWP and to contribute financial and human resources subsequent to development of the plan. In May 2008 the watershed communities signed the Salmon River Conservation Compact which required each of the ten municipalities to develop a Salmon River stewardship program.

In 2009, on behalf of the SRWP, TNC retained the services of the Horsley Witten Group, Inc. to conduct a Salmon River Watershed Municipal Land Use Evaluation Project.

The SRWP conducts public education outreach and activities and public participation and involvement throughout the year in the watershed which is summarized as follows:

2010 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

The Horsley Witten Group, Inc. submitted the *Salmon River Watershed Municipal Land Use Evaluation Project, Assessment Report*, dated February 16, 2010, to the SRWP and TNC. The report summarized assessments of the land use regulations of all ten municipalities within the Salmon River watershed.

2012 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

During the fall of 2012 volunteers received training and participated in field assessments at nine stream sites to collect and identify benthic invertebrate using the CT DEEP protocol for conducting stream assessments to establish whether river segments are meeting the state water quality goals for support of aquatic life.

2013 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

In February 2013 the Annual Newsletter which describes town and partnership activities related to stormwater management and water quality monitoring among other topics. The newsletter is sent for general distribution to the ten Salmon River watershed towns and is also available to the general public at public education and outreach events. The Annual Newsletter is also posted on the SRWP website.

In March 2013 the SRWP set up a booth at the Hebron Maple Fest which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring. It was estimated that more than 100 members of the general public stopped at the booth.

In June 2013 the SRWP set up a booth at the East Hampton Strawberry Fest which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring. It was estimated that more than 100 members of the general public stopped at the booth.

From June to August 2013 the SRWP initiated water quality monitoring plan for eleven stations within the Salmon River Watershed to establish water quality baseline data for use in tracking water quality trends. Fifteen local citizen volunteers were trained to use hand held instruments to obtain weekly measurements of water temperature, pH, dissolved oxygen (DO), conductivity, total dissolved solids (TDS) and salinity

In August 2013 the SRWP set up a booth at the at the Haddam Neck Fair and which displayed SRWP activities and also encouraged volunteers to sign up for Salmon River watershed water quality monitoring. It was estimated that more than 100 members of the general public stopped at the booth.

From September to November 2013 eighty-five volunteers received training and participated in field assessments and to collect and identify benthic invertebrate using the CT DEEP protocol for conducting stream assessments to establish whether river segments are meeting the state water quality goals for support of aquatic life. The volunteers consisted of local citizens from Regional Hebron Andover Marlborough (RHAM) High School Science Aquatics Class, and Colchester Girl Scouts.

In November 2013 the SRWP, in cooperation with the Middlesex Land Trust, released a newsletter which described conducting river water quality assessments and potential impacts of stormwater runoff on stream water quality. It was estimated that hundreds of members of the general public read the newsletter.

In November 2013 the SRWP released a report entitled *Baseline Water Quality Monitoring in the Salmon River Watershed, Summer 2013* which summarized the purpose, equipment and parameters sampled, sampling points and sampling durations, sampling limitations, parameter summaries and parameter graphs of water temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity for review and use by all of the Salmon River watershed towns.

2014 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

In February 2014 the Annual Newsletter which describes town and partnership activities related to stormwater management and water quality monitoring among other topics. The newsletter is sent for general distribution to the ten Salmon River watershed towns and is also available to the general public at public education and outreach events. The Annual Newsletter is also posted on the SRWP website.

In March 2014 the SRWP set up a booth at the Hebron Maple Fest which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring to be conducted later in the year. It was estimated that more than 100 members of the general public stopped at the booth.

In May 2014 the SRWP set up a booth at the East Hampton Thank the Lake Day which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring to be conducted later in the year. It was estimated that more approximately 100 members of the general public stopped at the booth.

In May 2014 the SRWP set up a booth at the East Haddam Farmer's Market which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring to be conducted later in the year. It was estimated that approximately 100 members of the general public stopped at the booth.

In June 2014 the SRWP set up a booth at the East Haddam Shagbark Lumber & Farm Supply facility which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring to be conducted later in the year. It was estimated that more than 100 members of the general public stopped at the booth.

From June to August 2014 the SRWP continued water quality monitoring plan for eleven stations within the Salmon River Watershed to establish water quality baseline data for use in tracking water quality trends. Fifteen local citizen volunteers were trained to use hand held instruments to obtain weekly measurements of temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity. In November 2013 the data was used to create a graph report for review and use by all watershed towns.

In August 2014 the SRWP set up a booth at the Haddam Neck Fair displaying SRWP activities and a sign-up sheet for volunteers to participate in water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that greater than 100 members of the general public stopped at the booth.

From August to December 2014 the SRWP, in partnership with CT DEEP Fisheries, and watershed towns, continued the road culvert mapping utilizing five college student interns to collect culvert data including soil erosion, sedimentation, odor or other water quality impairment parameters. The field data was uploaded to the thirteen state North Atlantic Aquatic Connectivity Collaborative (NAACC) database.

From September to November 2014 ninety-five volunteers received training and participated in field assessment and to collect and identify benthic invertebrate using the CT DEEP protocol for conducting stream assessments to establish whether river segments are meeting the state water quality goals for support of aquatic life. The volunteers consisted of local citizens from Regional Hebron Andover Marlborough (RHAM) High School Science Aquatics Class, RHAM Middle School Honors Science Classes and Colchester Girl Scouts.

In December 2014 a working group of watershed Town Planners from all ten towns met to review and discuss proposed revisions to land use regulations in each municipality that would impact water quality and improve overall watershed health. The meeting was held as a follow up to the assessment report entitled *Salmon River Watershed Municipal Land Use Evaluation Project* released by the Horsley Witten Group, Inc. in 2010.

In 2014 the SRWP released a report entitled *Baseline Water Quality Monitoring in the Salmon*

River Watershed, Summer 2013 & Summer 2014 which summarized the purpose, equipment and parameters sampled, sampling points and sampling durations, sampling limitations, parameter summaries and parameter graphs of water temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity for review and use by all of the Salmon River watershed towns.

2015 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

In February 2015 the Annual Newsletter which describes town and partnership activities related to stormwater management and water quality monitoring among other topics. The newsletter is sent for general distribution to the ten Salmon River watershed towns and is also available to the general public at public education and outreach events. The Annual Newsletter is also posted on the SRWP website.

In March 2015 the SRWP set up a booth at the Hebron Maple Fest which displayed SRWP activities and also encouraged interested individuals to sign up for Salmon River watershed water quality monitoring to be conducted later in the year. It was estimated that more than 100 members of the general public stopped at the booth.

In April 2015 fifteen volunteers assisted the CT DEEP in stocking Atlantic Salmon fry as part of the Genetic Legacy Program which focuses on the importance of a healthy watershed for Atlantic Salmon survival.

In May 2015 The SRWP issued a *Municipal Land Use Update* prepared by a working group, TNC and the CT DEEP Watershed Manager and was based upon outreach to all ten watershed towns in response to land use regulation modification recommendations contained in the *2010 Salmon River Watershed Municipal Land Use Evaluation Project, Assessment Report* prepared by the Horsley Witten Group, Inc. The update summarized the revisions to land use regulations and municipal practices which were organized into seven main topics as follows:

- Conservation Subdivision Development
- Roadway Design Requirements
- Stormwater Management
- Wetland/Watercourse Buffers and Associated Regulations
- Forestry Regulations
- Land Clearing and Soil Erosion and Sedimentation Control
- Parking Regulations

In May 2015 Watershed Town Leaders, Town Planners and SRWP Members met over a Town Leader Breakfast to share projects that support healthy watershed decision making.

In May 2015 the SRWP set up a booth at the CT DEEP Great Park Pursuit-Salmon River Forest Event, which displayed SRWP activities and also encouraged volunteers to sign up for Salmon River watershed water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that more than 100 members of the general public stopped at the booth.

In June 2015 the SRWP set up a booth and an observation tank at a Colchester Land Trust event to display SRWP activities and also encouraged volunteers to sign up for Salmon River watershed water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that more than 100 members of the general public stopped at the booth.

From June to August 2015 the SRWP, in partnership with CT DEEP Fisheries, and watershed towns, continued the road culvert mapping utilizing four college student interns to collect culvert data including soil erosion, sedimentation, odor or other water quality impairment parameters. The field data was uploaded to the thirteen state North Atlantic Aquatic Connectivity Collaborative (NAACC) database.

From June to August 2015 the SRWP continued the eleven station Salmon River Watershed water quality monitoring plan to establish water quality baseline data for use in tracking water quality trends. Fifteen local citizen volunteers were trained to use hand held instruments to obtain weekly measurements of temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity.

In August 2015 the SRWP set up a booth at the Haddam Neck Fair to display SRWP activities. An Enviroscape Non-Point Source Pollution Model was also displayed to demonstrate the impact of non-point source pollution on watershed water quality.

In August 2015 the SRWP, in partnership with GZA GeoEnvironmental, Inc, initiated continuous hourly data logging of water temperature and conductivity at three locations to monitor elevated levels of chloride. The data was periodically downloaded by GZA GeoEnvironmental , Inc. and shared with the CT DEEP and the United States Geological Survey. Six GZA GeoEnvironmental, Inc. Green Team Members provide training and assistance.

From September to November 2015 one hundred individuals volunteered to conduct field assessment and received training to collect and identify benthic invertebrate using the CT DEEP protocol for conducting stream assessments to establish whether river segments are meeting the state water quality goals for support of aquatic life. The volunteers consisted of local citizen volunteers from Regional Hebron Andover Marlborough (RHAM) High School Science Aquatics Class, RHAM Middle School Eight Grade Honors Science Class, Colchester Girl Scouts and the East Hampton High School Environmental Club.

On Sept 29, 2015 the SRWP in partnership with UConn Center for Land Use Education and Research (CLEAR) and the Connecticut Nonpoint Education for Municipal Officials (NEMO) conducted a workshop planning session in Marlborough which was attended by 25 individuals representing the ten watershed towns and two Soil & Water Conservation Districts. The workshop planning session emphasis was on installing Green Infrastructure (GI) to resolve stormwater issues with a goal to create a field trip to the UConn Storrs Campus to review GI BMPs and to address concerns by municipal engineers and public works personnel on the actual implementation and maintenance of various GI practices.

On November 17, 2015 the SRWP in partnership with UConn CLEAR/NEMO conducted a walking field workshop at the UCONN Storrs Campus to review Green Infrastructure practices

on campus, including bioretention, rain gardens, pervious bituminous concrete pavement, concrete brick pervious pavement, pervious concrete pavement, and green roofs. The walking field workshop was coordinated by Michael Dietz, Director of UConn CLEAR and NEMO) programs. Dave Lotreck, UConn Facilities Operations Manager discussed construction and operation and maintenance aspects of the GI measures and Katie Milardo, Analyst of the UConn Office of Environmental Policy presented construction and operations and maintenance costs of the GI measures. Twenty-two municipal employees and public works personnel attended the presentations.

In November 2015 the SRWP coordinated with the CT DEEP Watershed Manager, CT DEEP State Park Manager and the CT River Coastal Conservation District to prepare a grant request to address bacteria impairment of Gay City State Park/Blackledge River.

2016 Salmon River Watershed Partnership (SRWP) Outreach and Monitoring Activities Related to Stormwater and Water Quality

In January 2016 the SRWP conducted outreach activity to the Hebron Green Committee Environmental series which consisted of a presentation to 30 local residents on the results to date of the SRWP water quality monitoring activities. The SRWP also presented water quality activities which the presentation attendees could participate in.

In February 2016 the SRWP, in partnership with the New England Forestry Foundation and the Eightmile River Watershed Coordinating Committee conducted outreach activity which consisted of a presentation to 30 local residents on Preserving Forests as a Means to Protecting Habitats and Water Quality. The purpose of the presentation was to make attendees aware of the available resources to assist with forest management and preservation.

In February 20165 the SRWP released a report entitled *Baseline Water Quality Monitoring in the Salmon River Watershed, Summer 2013 - 2015* which summarized the purpose, equipment and parameters sampled, sampling points and sampling durations, sampling limitations, parameter summaries and parameter graphs of water temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity for review and use by all of the Salmon River watershed towns.

In February 2016 the SRWP released a report prepared by the Eightmile River Wild & Scenic Watershed Coordinating Committee entitled *Baseline Water Quality Monitoring in the Eightmile River Watershed, Summer 2014 & 2015* which summarized the purpose, equipment and parameters sampled, sampling points and sampling durations, sampling limitations, parameter summaries and parameter graphs of water temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity for review and use by all of the Salmon River and Eightmile River watershed towns.

In March 2016 the SRWP, in partnership with the Mystic Aquarium and the Eightmile River Watershed Coordinating Committee, conducted training for ninety volunteers from the Salmon River and Eightmile River watersheds using Frog Watch Protocol developed by the American Association of Zoos and Aquariums. The protocol trained volunteers to register sites in the watershed and upload information related to the type and intensity of vocal calls as a tool for determining impacts to habitat with a focus on changing water quality.

In March 2016 the 2016 Salmon River Watershed Annual Newsletter, which describes town and partnership activities related to stormwater management and water quality monitoring among other topics was released. The newsletter is sent for general distribution to the ten Salmon River watershed towns and is also available to the general public at public education and outreach events. The Annual Newsletter is also posted on the SRWP website.

In April 2016 the SRWP presented a stormwater runoff program to one-hundred and five 6th graders at the East Haddam Middle School which included a demonstration of the Enviroscape Non-Point Source Pollution Model.

In April 2016 the SRWP set up a booth at the Taste of East Haddam which displayed SRWP activities and also encouraged volunteers to sign up for Salmon River watershed water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that more than 100 members of the general public stopped at the booth.

From June to August 2016 the SRWP, in partnership with CT DEEP Fisheries, and watershed towns, continued the road culvert mapping utilizing four college student interns to collect culvert data including soil erosion, sedimentation, odor or other water quality impairment parameters. The field data was uploaded to the thirteen state North Atlantic Aquatic Connectivity Collaborative (NAACC) database.

From June to August 2016 the SRWP continued the eleven station Salmon River Watershed water quality monitoring plan to establish water quality baseline data for use in tracking water quality trends. Fifteen local citizen volunteers were trained to use hand held instruments to obtain weekly measurements of temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity.

From June to September 2016 the SRWP, in partnership with CT DEEP Park Staff and Chatham Health District two graduate student interns and ten volunteers coordinated bacteria sampling, field wildlife observations and land use evaluation to address the possible cause of bacteria impairment at Gay City State Park pond and outlet on the Blackledge River

In August 2016 the SRWP set up a booth at the Columbia Market Day displaying SRWP activities and a sign-up sheet for volunteers to participate in water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that approximately 100 members of the general public stopped at the booth.

In August 2016 the SRWP also set up a booth at Marlborough Day at the Lake at Lake Terramugus displaying SRWP activities with an interactive Enviroscape Non-Point Source Model to demonstrate the effect of non-point source discharge cause and effects on water quality and the impacts on macroinvertebrates. It was estimated that greater than 100 members of the general public stopped at the booth.

In August 2016 the SRWP also set up a booth at the Haddam Neck Fair displaying SRWP activities and a sign-up sheet for volunteers to participate in water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that greater than 100 members of the general public stopped at the booth.

From September to November 2016 one hundred fifteen individuals received training and volunteered to conduct field assessment and to collect and identify benthic invertebrate using the CT DEEP protocol for conducting stream assessments to establish whether river segments are meeting the state water quality goals for support of aquatic life. Thirteen streams were assessed. The volunteers consisted of local citizens, Regional Hebron Andover Marlborough (RHAM) High School Science Aquatics Class, RHAM Middle School Eight Grade Honors Science Class, Colchester Girl Scouts and the East Hampton High School Environmental Club.

In October 2016 the SRWP set up a booth at the Eightmile RiverFest at Devil's Hopyard State Park in East Haddam displaying SRWP activities and a sign-up sheet for volunteers to participate in water quality monitoring with a special focus on impacts of water quality on macroinvertebrates. It was estimated that more than 100 members of the general public stopped at the booth.

In November 2016, Pat Young, Watershed Coordinator of the Salmon River Watershed Partnership, appeared on the CT Outdoors Program on radio talk show station WLIS/WMRD to discuss macroinvertebrate assessments and water quality and stormwater water quality impacts on surface waters from deicing materials.

Throughout 2016 the SRWP, in partnership with GZA GeoEnvironmental, Inc, continued with continuous data logger hourly sampling and recording of water temperature and conductivity. This was the second year that 3 loggers were in place to monitor elevated levels of chloride. The data logger data is periodically downloaded by GZA GeoEnvironmental, Inc. and shared with the CT DEEP and the United States Geological Survey. Six GZA GeoEnviromental, Inc. Green Team Members provide training and assistance.

In December 2016 the SRWP released a report entitled *Baseline Water Quality Monitoring in the Salmon River Watershed, Summer 2013 - 2016* which summarized the purpose, equipment and parameters sampled, sampling points and sampling durations, sampling limitations, parameter summaries and parameter graphs of water temperature, pH, dissolved oxygen, conductivity, total dissolved solids and salinity for review and use by all of the Salmon River watershed towns.

SRWP Facebook Page

Information pertaining to watershed monitoring efforts, opportunities for the public to participate and actions that citizens can do on a personal level that will help protect the water quality of the watershed are posted.

SRWP Website

The SRWP website www.salmonriverct.org posts reports on water quality and water monitoring results and also offers information and web links to Best Management Practices (BMPs).

The following are listed under the Protecting the Watershed, Partnership Activities tab on the main page:

Partnership Activities
How Are We Protecting the Watershed?

Establishing a Salmon River Watershed Partnership

In 2007 the watershed towns assisted by The Nature Conservancy launched the Salmon River Watershed Partnership.

Signing a Conservation Compact

In 2008 the leaders of the watershed towns signed The Salmon River Watershed Conservation Compact which solidified the intent of the watershed communities to work together to protect the resources if the Salmon River watershed.

Addressing Impact of Development

In 2008 the Horsley Witten Group, Inc. was contracted by The Nature Conservancy to assess municipal land use practices in the watershed towns. With input of the watershed town planners and the SRWP an Assessment Report entitled Salmon River Watershed Municipal Land Use Evaluation Project was produced in 2010. The report provided guidance and recommendations to each of the watershed towns which included riparian setbacks, stormwater management, road design options, forest management, open space acquisition and development review standards.

Monitoring Water Quality

River Bioassessments:

Salmon River Watershed - Rapid Bioassessment Survey Report - 2008

2008 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2009 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2010 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2011 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2012 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2013 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers
2014 CTDEEP Rapid Bioassessment in Wadeable Streams and Rivers by Volunteers

2015 CTDEEP Riffle Bioassessment by Volunteers

Rapid Bioassessment for Volunteers (PowerPoint Presentation)

Baseline Water Quality Monitoring Report
- 2013 Baseline Water Quality Monitoring Report
- 2014 Baseline Water Quality Monitoring Report
- 2015 Baseline Water Quality Monitoring Report

Other Reports
- 2013 Annual Newsletter
- 2014 Annual Newsletter
- 2015 Annual Newsletter
- 2016 Annual Newsletter

The following are listed under the Protecting the Watershed, Homeowners tab on the main page:

What Can Homeowners Do?
Design a Low Maintenance Lawn (with 5 website links)
Think Rain Barrels (with 2 website links)
Use Native Plants When Landscaping (with 2 website links)
Reduce Your Impervious Footprint (with 3 website links)
Create a Rain Garden (with 2 website links)
Compost for Healthy Soil and Plants (with 2 website links)
Mulching (with 2 website links)

The following are listed under the Protecting the Watershed, Business Owners tab on the main page:

Going Green is Good for Business!
Won't Going Green Cost Me an Arm and a Leg? (with 3 website links)
Green Cleaning (with one website link)
Pump That Pool (with a Connecticut Department of Public Health website link)
Tips to Maintain a Healthy Septic System (with 1 website link)
Are You Putting Poison Down the Drain?! (with 2 website links)
Get Planting! (with 2 website links)
Go Native! (with 2 website links)

The following are listed under the Protecting the Watershed, Animal Owners tab on the main page:

What Can Animal Owners Do?
Check Your Local Regulations:
Follow Recommended Best Management Practices:
- Recommended Ordinances for Livestock
- Good Horse Keeping

Maintain Those Buffers:
- What's in the Poop Anyway?
- Wells and Water Resources

Information on the Household Hazardous Waste, Recycling, Bulky Waste and the Electronics Collection Program was available on the Town website.

Minimum Control Measure No. 2 - Public Participation/Involvement

Refer to the Minimum Control Measure No. 1 - Public Education and Outreach for Public Participation and Involvement activities.

The Town of Bolton continued to involve town residents in the Household Hazardous Waste Program, the Electronics Collection Program, the Recycling Program and the Bulky Waste Program.

Minimum Control Measure No. 3 - Illicit Discharge Detection and Elimination

The process of enacting an Illicit Discharge Detection and Elimination (IDDE) Ordinance was begun by provision of the IDDE Ordinance and IDDE Citation Hearing Procedure enacted by the Town Durham. The IDDE Ordinances will be reviewed by the Board of Selectmen and the Town Legal Counsel. It is anticipated that the IDDE Ordinance may be enacted in calendar year 2017.

The process of MS4 stormwater outfall mapping town wide began with field work in August 2007 by locating all MS4 stormwater outfalls 12" or greater town wide utilizing a map grade Global Positioning System (GPS) Unit. The data was imported to ARCGIS and a layer with all outfall attributes was created for interfacing with the Town GIS Database. 128 town owned stormwater outfalls were mapped and a GIS layer was created for integration into the town GIS mapping.

Holly Hood, R.S. of the Eastern Highlands Health District handles implementation of the Connecticut Public Health Code in the Town of Bolton and has been in that position since 2004.

In 2015 Holly Hood, R.S. and Lance Dimock, Road Foreman indicated that one incidence of an illicit discharge existed in the Llynwood Drive storm drainage improvement project which was constructed in 2015. A residence on Llynwood Drive was discharging greywater form the washing machine the town storm drainage system. Lance Dimock, Road Foreman, made the owner aware of the situation and the homeowner had a licensed plumber connect the washing machine discharge to the subsurface sewage disposal system.

Holly Hood, R.S. was made aware of the modified MS4 General Permit which will become effective on July 1, 2017 and the increased annual reporting requirements that the modified permit will entail.

No illicit discharges were detected in 2016

Dry weather MS4 outfall monitoring may be conducted during seasonal low groundwater conditions in the fall of 2017 in the Bolton Lake area. Unusual discharge characteristics will be noted for possible outfall sampling to determine if the base flow is due in part to an illicit discharge. If an illicit discharge is detected the source will be determined.

Minimum Control Measure No. 4 - Construction Site Runoff Control

Continued to make applicants aware of the need to register for the CT DEEP *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* when the total land disturbance is one or more acres of land, regardless of project phasing, and the project is not subject to local land use review, or where the total land disturbance is greater than five acres of land, regardless of project phasing, and the project is subject to local land use review.

Continued to make recommendations to the land use commissions in land use engineering review letters that proof of registration for the CT DEEP *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* be made a Condition of Approval, where applicable.

The following is excerpted from the Town of Bolton Zoning Regulations, Section 3A8, Issuance of Zoning Permits and Building Permits, Revised to February 1, 2016:

3A8.d A narrative description of any required Erosion and Sediment Control Plan describing:

1. The construction project;

2. the schedule for grading and construction activities u=including start and completion dates, sequence of grading and construction activities, sequence for installation and/or application of soil erosion and sediment control measures, and sequence for final stabilization of the project site.

The following is excerpted from the Town of Bolton Zoning Regulations, Section 3A9, Erosion and Sediment Control, Revised to February 1, 2016:

3A9 EROSION AND SEDIMENT CONTROL

3A9.a. Removal of vegetation: No vegetation shall be stripped, or earth removed in anticipation of construction until a building permit has been issued except when it is otherwise authorized by a certified Erosion and Sediment Control Plan approved by the appropriate town authorities.

3.A.9.b. Erosion and Sediment Control: When the disturbed area of a building or work site exceeds one-half (1/2) acre, has a grade in excess of ten (10) percent or is part of a subdivision approved before July 1, 1985, the builder shall file an Erosion ad Sediment Control Plan which shall be certified by the Zoning Enforcement Officer or the Tolland County Soil Conservation District as complying with the requirements of PA 83-388 as delineated in "Connecticut Guidelines for Soil Erosion and Sediment Control" (1985) as amended. Such plan shall include but not be limited to a map and narrative. For subdivision approved after July 1, 1985, the Erosion and Sediment Control Plan may be wholly or partially available from the subdivision plan.

3.A.9.c. Bonding:

1. Bond Required. If a certified Erosion and Sediment Control Plan ("Plan") is required under Section 3A.9.b of these regulations, no building permit shall be approved by the Planning & Zoning Commission or its agent until a cash bond has been furnished to the Planning & Zoning Commission securing the actual implementation and maintenance of the Plan.

2. Form of Bond. All cash bonds shall be submitted in the form of a check payable to the "Town of Bolton". Each bond shall be deposited in a separate escrow account. Interest shall be paid in accordance with prevailing rates comparable to other town accounts. The Town shall not guarantee a minimum interest rate to be paid on cash bonds.

3. Amount of Bond. The amount of the bond shall be equal to the greater of:

    a. one hundred forty percent (140%) of the cost, as estimated by a qualified engineer and approved by the commission or its agent, of all erosion and sedimentation controls required by the Plan, or

    b. five dollars per linear foot of control barrier called for by the Plan.

4. Posting of Bond; release of Funds. The bond shall be posted, and yhose measures in the Plan that are scheduled for installation prior to development must be implemented, before any site work or disturbance whatsoever is begun on the lot that is the subject of the Plan. No portion of the bond shall be released until the commission or its agent shall determine that no further Town supervision of the Plan or its maintenance is required, at which time the bond shall be returned, with interest; provided, however, that the Commission may, at its option, retain up to ten percent (10%) of the bond for a period of up to one year following completion of implementation of the Plan, to secure continued maintenance of the Plan. Any interest accrued on the bond shall be deemed part of the bond and shall be available to the Town for implementation and maintenance of the Plan.

5. Inspections and Increase in Bond Amount. The Commission or its agent may make inspections during development to ensure that the Plan is being adequately implemented and maintained. If the Commission should determine that further erosion and sediment control measures are required, and the amount of the bond is therefore insufficient, the Commission may require an additional sum to be deposited as part of the bond.

6. Draw on Bond. If the Commission or its agent shall determine that unforeseen developments or emergencies require immediate remedial action, or the Plan is not being properly and adequately implemented and maintained, the Town may, after due notice to the owner (or developer, if the bond if furnished by the developer), to the extent allowed by law, draw on the bond to defray the costs of

any measures undertaken by the Town or any employee, agent or contractor hired by the Town, to address such emergency or to implement or maintain the Plan. The owner and developer of any lot subject to a bond pursuant to this section shall be deemed to have granted permission to any Town employee or agent or any contractor hired by the Town to enter such lot for the purpose of taking and any all measures deemed necessary by the Commission to address such an emergency or to implement and maintain the Plan. The Town shall not be liable for any damage to real or personal property while undertaking to implement or maintain the Plan.

7. Exemptions. Applicants for building permits for single family homes on lots that are not part of a subdivision are exempt from the bond requirements of Section 2A9.c of these regulations

The following is excerpted from the Town of Bolton Subdivision Regulations, Section 14 - Erosion and Sedimentation Control Plan, Revised to January 1, 2011:

SECTION 14 – SOIL EROSION AND SEDIMENTATION CONTROL PLAN

THE PURPOSE of a Soil Erosion and Sedimentation Control Plan is to minimize soil erosion and sedimentation that is caused by construction activity. The intent of such a plan is that water run-off, erosion and sedimentation shall not cause problems on the developed property or on downstream properties.

The Commission shall require an Erosion and Sedimentation Control Plan when any of the following conditions exist:

1) Construction of a road.

2) One or more new building lots are created.

3) The disturbed area of the subdivision is cumulatively more than one-half acre.

4) Construction activities that disturb or would likely disturb soil are located within 100 feet of any wetlands or on slopes exceeding 8 percent.

To be eligible for certification, a Soil Erosion and Sedimentation Control Plan shall contain proper provisions to adequately control storm water runoff on the proposed site based on the best available technology. Such principles, methods and practices necessary for certification are found in the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended. Alternative principles, methods and practices may be used with approval of the Commission.

The Erosion and Sedimentation Control Plan shall contain, but not limited to:

A. A narrative describing:

1) The development;

2) The schedule for grading and construction activities including:

a) Start and completion dates;

b) Sequence of grading and construction activities;

c) Sequence for installation and/or application of soil erosion and sediment control measures;

d) Sequence for final stabilization of the project site.

3) The design criteria for proposed soil erosion and sediment control measures and storm water management facilities.

4) The construction details for proposed soil erosion and sediment control measures and storm water management facilities.

5) The installation and/or application procedures for proposed soil erosion and sediment control measures and storm water management facilities.

6) The operations and maintenance program for proposed soil erosion and sediment control measures and storm water management facilities.

7) Contact information of the responsible design professional.

B. A site plan map at a sufficient scale to show:

1) The location of the proposed development and adjacent properties;

2) The existing and proposed topography including soil types, wetlands, watercourses and water bodies;

3) The existing structures on the project site, if any;

4) The proposed area alterations including cleared, excavated, filled or graded areas and proposed structure, utilities, roads and, if applicable, new property lines;

5) The location of and design details for all proposed soil erosion and sediment control measures and storm water management facilities;

6) The sequence of grading and construction activities;

7) The sequence for installation and/or application of soil erosions and sediment control measures;

8) The sequence for final stabilization of the development site.

C. Any other information deemed necessary and appropriate by the applicant or requested by the Commission or its designated agent. For example, the Commission may require testing such as surface water quality sampling and analysis before, during and after construction to assure protection of existing watercourses. The costs for such additional information or services shall be borne by the subdivision owner.

The Commission may require that plans for soil erosion and sediment control be developed in accordance with these regulations using the principles as outlined in Chapters 3 and 4 of the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*, as amended. Soil erosion and sediment control plans shall result in a development that minimizes erosion and sedimentation during construction; is stabilized and protected from erosion when completed; and does not cause off-site erosion and/or sedimentation.

The minimum standards for individual measures are those in the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* as amended. The Commission may grant exceptions when requested by the applicant if technically sound reasons are presented.

The Soil Erosion and Sedimentation Control Plan shall be prepared by a Professional Engineer licensed in the State of Connecticut.

The Commission shall certify that the Soil Erosion and Sedimentation Control Plan complies with the requirements and objectives of these regulations or deny certification when the development proposal does not comply with these regulations. The Commission may accept the Tolland County Soil and Water Conservation District's certification of the Erosion and Sedimentation Control Plan as its own certification. The Commission's approval of the Subdivision Plan shall constitute the certification of the Erosion and Sedimentation Control Plan attached to it, subject to any conditions or modification required by the Commission.

Nothing in these regulations shall be construed as extending time limits for the approval of any application under Chapters 124, 124A or 126 of the General Statutes.

Prior to the Commission's approval and certification of the Erosion and Sedimentation Control Plan, the plan may be referred to the Bolton Inland Wetlands Commission, The Town Engineer, the Tolland Country Soil and Water Conservation District and/or other review agency or consultant for review and comment. The Erosion and Sedimentation Control Plan, when approved by the Commission shall be considered an integral part of the Subdivision Plan, and shall be filed in the Town Hall at the time the Subdivision is filed.

The subdivision owner's engineer shall provide a cost estimate of the measures to control soil erosion and sedimentation for review and approval by the Commission. The approved estimated costs of measures required to control soil erosion and sedimentation, as specified in the certified plan, may be covered in a separate performance bond or other assurance acceptable to the Commission in accordance with the provisions specified under Section 15 of these regulations.

Site development shall not begin unless the soil Erosion and Sediment Control Plan is certified and those control measures and facilities in the plan scheduled for installation prior to site development are installed and functional.

Planned soil erosion and sediment control measures and facilities shall be installed as scheduled according to the certified plan.

All control measures and facilities shall be maintained in effective condition to ensure the compliance of the certified plan. Inspections shall be made by the Commission or its designated agent during development to ensure compliance with the certified plan and that control measures and facilities are properly performed or installed and maintained. The Commission may require the subdivision owner to verify through progress reports that soil erosion and sediment control measures and facilities have been performed or installed according to the certified plan and are being operated and maintained. The Commission may require that such progress reports be prepared by a professional engineer, a certified soil scientist or other qualified professional, as approved by the Commission, and at the expense of the subdivision owner.

If during development the Commission's agent determines that the erosion and sedimentation control plan is deficient, because of unforeseen site conditions, the subdivision owner shall make any corrective changes to control measures as directed by the Commission's agent.

The following is excerpted from the Town of Bolton Subdivision Regulations, Section 15.3, Erosion and Sedimentation Control Bond, Revised to January 1, 2011:

15.3 EROSION AND SEDIMENTATION CONTROL BOND

Before any construction of public improvements begins, the subdivision owner shall provide a cash erosion and sedimentation control bond acceptable to the Commission to ensure that erosion and sedimentation controls are adequate, except as may be otherwise approved by the Commission.

The erosion and sedimentation control bond shall remain in effect until the completion of all public improvements as approved and accepted by the town.

The amount of the bond shall be equal to the greater of (1) one hundred forty percent (140%) of the cost, as estimated by the developer's qualified engineer and approved by the Commission or its agent, of installing the silt fence and all erosion and sedimentation controls required by the Plan.

The Commission may accept a bank deposit or a certified check for an erosion and sedimentation control bond. The interest accrued on such an account shall belong to the subdivision owner if funds from the account are returned to the subdivision owner. The erosion and sedimentation control bond shall be in such an amount, in such form and contain such conditions as the Commission shall require.

Nathan L. Jacobson & Associates, Inc. was retained as Town Engineer to review Subdivision Plans, Site Development Plans and Soil Erosion and Sediment Control Plans for larger subdivisions and site developments.

Nathan L. Jacobson & Associates, Inc. also conducts periodic construction inspection during road construction for subdivisions and site developments.

The Town of Bolton continued to conduct construction site inspections of approved subdivision road construction and site development construction to ensure implementation of appropriate erosion and sediment control best management practices as contained in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and as experience dictates.

Minimum Control Measure No. 5 - Post-Construction Site Runoff Control

The following is excerpted from the Town of Bolton Subdivision Regulations, Section 12, Drainage, Revised to January 1, 2011:

SECTION 12 - DRAINAGE

12.1 DRAINAGE GENERAL REQUIREMENTS

The protection of life and property of area residents, the traveling public, environment and the Town shall be of paramount importance in the design, location, construction and operation of drainage facilities.

All calculations, drawing, details, specifications and reports shall conform to the Connecticut Department of Transportation's latest Drainage Design Manual. All calculations, shall be reviewed, signed and sealed by a Professional Engineer licensed in the State of Connecticut.

A comprehensive drainage report shall be prepared and submitted to the Commission as part of the application process. The report shall conform in all respects to the Connecticut Department of Transportation Drainage Manual, unless specified otherwise in the Bolton Subdivision Regulations or by the Bolton Zoning Regulations

The following design storm frequencies shall be utilized:

Roadway drainage systems	10-year storm
Roadway basins located in sag condition	25-year storm
Cross culverts with no established watercourse	25-year storm
Cross culverts with established watercourse or intermittent watercourse or as directed by the Commission.	ConnDOT design criteria (see Table 8-4 of the CTDOT Drainage Manual)

Bridges or areas with established floodplains	100-year and 500-year

Drainage systems shall be designed to conform to the latest practices and techniques as outlined in the Connecticut Department of Environmental Protection *2004 Connecticut Stormwater Quality Manual* or the most current revision. Increased runoff from the development shall not be permitted. Retention and/or detention of the increase flows is/are explicitly required.

12.2 ROADWAY DRAINAGE

Roadway drainage shall be designed by a Professional Engineer to adequately collect or control stormwater runoff and convey it in a manner to minimize the potential for roadway flooding and erosion to areas adjacent to the pavement and to neighboring properties. Roadway pavement, shoulders, gutters, swales and other systems shall also be designed to minimize snowmelt from plowed snow from draining across the paved portion of the roadway. Gutter flow analysis shall be performed to determine if all the drainage water within a street is being intercepted by the catch basins and to determine the need for double catch basins. Under no circumstances shall the water spread in the gutter exceed the width of the shoulder plus ½ the travel lane width.

Hydraulic grade line computations shall be performed by the Professional Engineer and included in the report. In addition, hydraulic grade line profiles shall be included in the drainage report. The hydraulic grade line elevation shall be at least 1 foot below the gutter line elevation. All energy losses within the system shall be incorporated into the calculations. This shall include but not be limited to, entrance, exit, bend, friction, structure, pipe diameter, flow depth, and other losses as necessary to accurately reflect the proposed design.

Drainage swales, ditches and channels shall be designed to convey the maximum flows computed without erosion or overtopping.

Outlet protection calculations shall be performed to assure adequate protection of the outlet and downstream properties. A field investigation of all proposed outlet locations or existing outlets to be used in a drainage design of a proposed project shall be conducted to determine the erosion resistance of the soils at the outlet, the character of the downstream flow path, and any other site constraints that must be addressed by the proposed design.

Stormwater which is transported through closed conveyance systems at design capacity generally reaches a velocity that exceeds the permissible or erosion resistant velocity of the receiving channel or overland area. To prevent scour at stormwater system outlets, a flow transition structure shall be used to absorb the initial impact of the flow and reduce the flow velocity to a level which will not erode the receiving channel or overland area.

Recognizing that design and site conditions can vary significantly depending on the project or location on a particular project, it is the responsibility of the Engineer to ensure that the design is suitable to the site and will adequately protect the outlet area from scour and erosion. These situations shall be documented in the drainage design report. For all

drainage designs the minimum size pipe shall have a 15-inch diameter. The minimum roughness coefficient (n) shall be 0.015 for concrete pipe, 0.024 for corrugated pipe and 0.012 for smooth plastic pipe.

The pipe slope shall not be less than one percent and shall not exceed ten percent for pipes up to 24 inches in diameter. Pipe slopes less than one percent may be used for pipes greater than 24 inches in diameter only as approved by the Commission.

At exposed inlets, such as headwalls and flared ends, when the headwater depth divided by the diameter of the inlet pipe exceeds 1.2, the limits of flooding shall be shown on the Site Plan.

Detention and retention basins shall be designed so that the peak discharges do not exceed the peak discharges prior to development for the 1, 2, 5, 10, 25, 50 and 100 year storm frequencies.

The procedure for computing the outflow from basins shall include the development of storm hydrographs and the routing of these hydrographs through the basins. The method developed by the Soil Conservation Service, United States Department of Agriculture, for developing synthetic hydrographs and routing these hydrographs through reservoirs is a satisfactory method. Other more advanced methods may be required by the Commission.

Detention basins may be any of the following types:

1) Dry basin that may be multi-purpose with recreational or other uses during dry periods. The basin should be designed to empty within 72 hours after a design storm.

2) Permanent pond with detention provided above the normal water level. The pond should be designed as a silting basin for use both during and after construction. Extreme care shall be taken in the design to minimize the creation of mosquito problems. A qualified biologist shall provide expertise in the design. Provisions shall be made for periodic removal of sediments, overgrowth of vegetation and inspection purposes.

Retention basins, basins that store water over a relatively lengthy time and allow the water to percolate slowly into the ground, shall only be permitted by expressed approval of the Commission.

Basins shall be designed and constructed in accordance with the 2004 Stormwater Quality Manual published by the Connecticut Department of Environmental Protection or most current version with the following additional requirements:

1) Each basin shall have access from a public town road for maintenance, on a driveway that provides exclusive access to the detention basin, the outlet and the emergency spillway. The driveway shall be at least ten feet wide with gravel at least ten inches thick and have a maximum slope of twelve percent. The basin and its access driveway

shall be on a separate parcel of land deeded to the town, or be within a permanent easement deeded to the Town for the inspection, repair and maintenance of the basin.

2) Basins may be constructed by excavation or berming. When a berm is to be used it shall be designed and constructed as a dam.

3) All embankments shall be stabilized to resist seepage and erosion.

4) Basins shall be designed so that the maximum depth will not exceed 5 feet including the one foot of freeboard. All side slopes on the wetted side shall not be steeper than 4H:1V. The maximum depth may be exceeded by express approval by the Commission if so required to control mosquitoes and shall be protected from access by the public.

5) Sediment collection shall be facilitated by a trap or stilling area, with clean-up provided for.

6) An emergency spillway/overflow structure shall be provided to safely channel flows downstream in the event that the design storm is exceeded or the outlet blocked. The emergency spillway shall be designed to pass the post-development discharge from a 100-year storm frequency, with the crest of the flow at least one foot below any other portion of the basin perimeter.

7) The basin bottom for a dry basin should have a one percent slope towards the low flow bypass channel. This will prevent standing water and allow the basin to completely drain for park use during dry periods.

8) The bottom and side slopes and all adjoining disturbed areas shall be covered with at least 4 inches of loam and planted with grass.

9) A buffer zone of a minimum of 20 feet between the top of the inside slope of the detention basin and adjacent property is required. This requirement shall be increased to 100 feet if subsurface septic systems and/or wells are located down slope of the basin. The Commission may waive the 100-foot requirement if placements of wells or septic systems are restricted from this 100-foot area.

10) The design and construction shall be as approved by the Town Engineer.

The submission for the design of basins should include the following:

1) Plan with a scale of not less than 1" = 40' showing proposed contours with a maximum 2 foot interval.

2) Profile of the basin from at least 50 feet upstream of the inlet to at least 50 feet downstream of the outlet. The profile shall be drawn at a horizontal scale of 1"=40' with the vertical scale exaggerated by a multiple of ten.

3) Material and construction method specifications shall be provided.

4) Details of the outlet, embankment and emergency spillway.

5) Design calculations and graphs to substantiate the basin dimensions and operating characteristics.

The proposed drainage facilities shall accommodate all drainage water that flows to it from the upstream watershed, regardless of property lines.

The drainage facilities shall not result in the flooding of adjacent properties unless a formal written easement to do so is obtained from the affected property owner (s) as approved by the Commission. The drainage facilities shall not lower the water level of water bodies on adjacent properties unless the affected property owner (s) provides written permission to do so. The drainage facilities shall not divert drainage flows away from downstream water courses and water bodies on adjacent properties without written permission from affected property owner(s).

A significantly increased peak flow for the purposes of these regulations is considered to be a peak after-development flow that is more than zero percent greater than the before-development flow for the same storm frequency.

A Professional Engineer shall provide a comprehensive report of the design of all proposed drainage facilities. The drainage report shall address before and after development conditions, particularly for the drainage flows affecting adjacent properties. The report shall include the before and after development drainage calculations and drainage area maps and the engineer's conclusions. These report requirements are the minimum requirements. The Commission may require additional information.

The following is excerpted from the Town of Bolton Zoning Regulations, Section 16A.2.l, Stormwater Management, Revised to February 1, 2016:

16A.2.l. Stormwater Management

1. Purpose

Stormwater management requirements and controls are hereby established to protect and safeguard the quality of the ground and surface water resources of Bolton, and to reduce adverse impacts associated with increases in peak rates of stormwater runoff.

2. Stormwater Management Objectives:

- To incorporate decentralized stormwater management systems in any new development designs;
- To minimize the increases in peak rates of stormwater runoff from any development in order to reduce flooding, siltation and stream bank erosion, and to maintain the integrity of stream channels and downstream drainage structures;

- To minimize the increase in non-point source pollution caused by stormwater runoff from development which would otherwise degrade local ground and surface water quality;
- To minimize the total volume of surface water runoff which flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable;
- To reduce stormwater runoff rates and volumes, soil erosion and nonpoint source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and designed to minimize potential threats to public safety.

3. Design and Performance Criteria

In order to prevent the adverse impacts of stormwater runoff, the Commission has developed a set of performance standards that must be addressed in the design of any new site development plan or modification to an existing site development plan that disturbs five thousand (5,000) square feet or more of area.

a. All stormwater run-off generated from new development shall not discharge stormwater run-off directly into natural wetland systems, waterbody, municipal drainage system, or abutting property without adequate pretreatment;

b. A vegetative separation shall be maintained to provide a disconnection between impervious surfaces and the natural wetland systems of the site and abutting sites;

c. All stormwater Best Management Practices (BMPs)shall be designed to minimize the need for maintenance, while maintaining water quality discharge treatment standards;

d. All site development plans shall be designed to minimize the need for stream bank/channel protection for the receiving natural system, but when required, shall include provisions to prevent erosion and scouring of the stream bank/channel;

e. The design of all stormwater BMPs shall convey stormwater runoff in a manner to allow for the maximum removal of pollutants and reduction in flow velocities;

f. Stormwater discharges from land uses or activities with a higher potential pollutant loading may require the use of specific pretreatment structural methods and pollution prevention practices;

g. All site development plans shall include the design of stormwater detention or retention facilities to attenuate the increase in peak rates of stormwater runoff for the 2, 5, 10, 25 and 100 year 24-hour duration storm events to provide for a zero post development increase whenever practical.

h. Drainage Report. A storm drainage study and runoff computations for design of storm drainage systems for the 1, 2, 10, 50 and 100 year frequency storms. Such study shall conform to the current Connecticut Department of Transportation requirements with appropriate calculations, maps, graphics, hydraulics, assumptions, erosion controls, drainage paths, storm water renovation methods, and Best Management Practices specified by the Connecticut Department of Environmental Protection.

4. Sensitive Waters & Wetlands: Enhanced Criteria

Stormwater discharges to critical areas with sensitive resources such as the Blackledge River, Railroad Brook, Hop River, Lower Bolton Lake, Risley Reservoir, and their contiguous wetlands, the Bolton Aquifer Protection Area, and the Town of Manchester's Lydall water supply watershed may be subject to additional performance criteria, or may need to utilize or restrict certain stormwater management practices. Within the Aquifer Protection Area and the Lydall Watershed, the Commission may require pretreatment of runoff from paved areas as recommended in the *2004 Connecticut Stormwater Quality Manua*l, as amended, concerning stormwater management practices in water supply watersheds. Land development that discharges to sensitive waters and wetlands as noted above shall meet enhanced criteria. These may include, but are not limited to:

a) Nutrient Sensitive Waters: Enhanced control of nutrients and sediment removal for stormwater discharges shall be required.

b) Cold Water Fisheries: Techniques to control temperature increases from stormwater discharges into these streams and water bodies shall be required.

c) Groundwater: Enhanced recharge and pretreatment of stormwater discharges shall be required to protect groundwater supplies.

d) Wetlands: Controls to minimize impacts to the natural or predevelopment wetland hydrology, including limiting adverse fluctuations in surface and groundwater elevations.

In these cases the Commission may require additional storage capacity, treatment, filtering, infiltration, or other mitigation techniques. The use of non-structural practices shall be used to the maximum extent practical to meet enhanced criteria. In making its determination to apply enhanced criteria the Commission shall consider the cumulative impacts of the site development plan.

5. Stormwater Management Plan Requirements

All stormwater management plans shall include measures to capture and treat stormwater runoff in accordance with the guidelines outlined in the most recent version of the CT DEP *2004 Stormwater Quality Manual* and to incorporate low impact development design elements to the extent that is practical. No application

involving any site development plan will be approved by the Commission unless it includes a stormwater management plan detailing how the stormwater runoff and associated water quality impacts resulting from the development will be controlled and managed during and after construction. The plan must be prepared by an appropriate design professional. The Commission may also require a storm drainage study and runoff computations for design of storm drainage systems for the 1, 2, 10, 50 and 100 year frequency storms, conforming to the current Connecticut Department of Transportation requirements with appropriate calculations, maps, graphics, hydraulics, assumptions, erosion controls, drainage paths, storm water renovation methods, and Best Management Practices specified in this section.

The Commission may impose additional requirements deemed reasonable and necessary to control the volume, timing, rate, and/or quality of run-off if the hydrologic, geologic, topographic, or land use conditions warrant greater control than provided by the applicant. Further the Commission may restrict the use of certain BMPs , and may require pretreatment to exceed the minimum standards established in the most recent version of the CT DEP *2004 Stormwater Quality Manual*.

a) Compliance with Federal & State Regulations

All stormwater facilities and conveyance systems shall be designed in compliance with all applicable Town, State and Federal Laws and Regulations. It shall be the applicant's sole responsibility to identify and obtain all required permits prior to the start of any construction.

b) Protection of Public Health, Safety, & General Welfare

The design of stormwater BMP's shall consider public health, safety, and general welfare. These considerations shall include, but not limited to: preventing flooding of buildings, structures, & travelways; preventing long term standing water in and near drainage facilities; minimize the creation of mosquitoes breeding pools; preventing attractive nuisance conditions and dangerous conditions due to stormwater depth or velocity and/or access to drainage structures, including inlet and outlet openings. In addition, designs shall not result in the creation of aesthetic nuisances due to excessive slopes, cuts & fills, lack of suitable native landscaping and other similar conditions that would detract from the appearance of the surrounding environment.

c) Natural Resource Inventory

Stormwater management designs shall include an inventory of important natural resources features on the site, and these features shall be shown on the stormwater management plan. Protection and/or conservation of the site natural features shall be a part of the stormwater management plan. The plan shall identify important natural features identified through a natural resource inventory that includes, but not be limited to the following: natural drainage features, riparian buffers, wetlands, steep slopes, soils with high infiltration

capacity, significant forest cover, significant trees and natural communities including the presence of any threatened and /or endangered species.

d) Site Design Feasibility Report

Stormwater management practices for a site shall be selected on the basis of the physical characteristics of the site. The design professional shall submit a report outlining the stormwater practices options including low impact alternatives that were considered and those that were chosen for the design based on the evaluation and analysis of site opportunities and constraints. Among the factors that should be considered:

- Depth to Ground Water/Ledge
- Hydrologic Functions
- Contributing Drainage Area
- Site Vegetation
- Soil Characteristics
- Topography
- Location in relation to environmentally sensitive features

A soils report based on on-site boring logs or soil test pit data shall be submitted with all designs. The number and location of soil borings/test pits and associated soil testing shall be that which is necessary to determine the suitability and distribution of soil types present at the location of the proposed stormwater measures as shown on the site development plan.

e) Infiltration

All stormwater designs shall include infiltration for any new site development unless the Site Design Feasibility Report and associated Soils Report demonstrate that the physical characteristics of the site are not suitable. Low impact design elements utilized for infiltration discharge into a natural system shall utilize native plant species.

f) Overland Flood Routes

Overland flood routing paths shall be provided to safely convey stormwater run-off from the 100 year, 24 hour duration storm event to receiving water resource or stormwater BMP with adequate hydraulic capacity, such that the run-off is contained within a drainage easement for the flood routing path that does not cause flooding of buildings and abutting properties. There shall be an allowance in all designs for a minimum of one (1) foot of free board for all flood conveyance systems and flood control structures.

g) Stormwater Conveyance

Stormwater conveyance systems shall be designed to:

- Maximize the flow path from inflow to outflow points;
- Include protection of inlet and outlet structures;
- Provide for the elimination of or protection from erosive velocities; and,
- Utilize infiltration systems where applicable.

h) Velocity Dissipation

Devices and techniques to reduce stormwater velocities and prevent erosion shall be placed at discharge outlet locations and along or within the full length of any outlet channels to convey and discharge peak design flows in a manner that will not result in scouring or surface erosion, including receiving streams or channels or wetlands so that the natural physical and biological characteristics and functions of the receiving waters are maintained and protected.

i) Landscaping/Planting Plan

All stormwater management designs shall include have a detailed Landscaping Plan that identifies the types (both common and botanical names), locations, sizes and total number of all proposed plantings. Planting notes and details shall also be provided, as well as a Maintenance and Management Plan to ensure the long term viability of all plantings. In addition the landscaping plan shall include a stabilization schedule for the re-vegetation of all disturbed areas of the site. Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be seeded with temporary vegetation within seven (7) days after the suspension of grading work is expected to last a period of thirty (30) days or more. Permanent vegetation shall be fully established by the date of substantial completion of construction. Following the first year after the establishment of permanent vegetation and the completion of all landscaping plantings, an inspection shall be conducted by the Town to confirm their health and survival. Should any permanent vegetation or plantings be determined to be dead or dying following one (1) year period, then they shall be re-vegetated or replaced. A second inspection shall then be conducted by the Town one (1) year from any subsequent revegetation or replanting.

j) Non-Structural Stormwater Practices

To the extent that they are feasible the use of non-structural stormwater treatment practices are required and shall be selected and designed using the appropriate criteria from the most recent version of the CT DEP *2004 Stormwater Quality Manual* or other appropriate design low impact design manuals acceptable to the Commission.

k) Structural Stormwater Practices

All structural stormwater management facilities shall be selected and designed using the appropriate criteria from the most recent version of the CT DEP *2004 Connecticut Stormwater Quality Manual*. For other structural stormwater controls not included in the CT DEP *2004 Connecticut Stormwater Quality Manual*, or for which pollutant removal rates have not been provided, the effectiveness and pollutant removal of the structural control must be documented through prior studies, literature reviews, or other means acceptable to the Commission, before approval of any design utilizing such structural stormwater controls.

l) Discharge to Municipal Stormwater System

If any stormwater run-off from a new or modifies site development plan is discharged to a Municipal Separate Storm Sewer System (MS4) or other publicly municipally or privately owned storm sewer system the applicant must demonstrate that the existing storm sewer system has adequate excess hydraulic capacity to convey both increases in peak discharge flow rates and runoff volumes. In addition, all such discharges shall conform to all the requirements contained in the applicable *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activit*ies, the *General Permit for the Discharge of Stormwater Associated with Industrial Activity*, or, the *General Permit for the Discharge of Stormwater Associated with Commercial Activity*, as originally issued and reissued.

m) Operation, Inspection and Maintenance Plan Agreement & Schedule

An enforceable Operation, Inspection and Maintenance Plan Agreement and Schedule shall be executed to ensure that the Stormwater Management Plan facilities functions as designed and approved. The agreement shall designate the responsible party for the long term maintenance of the approved stormwater management facilities and include a provision passing the responsibility for such maintenance to successors in title. This agreement shall include easements to the Town allowing access to all Stormwater Management Plan facilities at reasonable times for periodic inspection by the Town and/or their agent to ensure that the facilities are being properly maintained and in good working order. Said easements shall be executed and recorded on the Bolton Land Records with filing of the final endorsed plan.

The design and planning of all Stormwater Management Plan facilities shall include detailed inspection procedures and frequencies, maintenance plans and schedules, as well as, repair procedures to ensure their continued long term function. These items shall identify the components of the stormwater management system that need to be inspected and maintained, provide a maintenance schedule for each facility, and the equipment necessary to perform that maintenance. Provisions for the periodic review and evaluation of the

effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.

All stormwater management facilities must undergo, at a minimum, an annual inspection to document maintenance and repair needs and to ensure compliance with the requirements of the CT DEP 2004 *Stormwater Quality Manual* and any additional conditions assigned by the Commission. Any maintenance and/or repair needs found must be addressed in a timely manner by the owner and a re-inspection made confirming the completion of the identified items. The owner shall submit to the Commission annually a copy of the inspection report and if necessary any re-inspection reports. If the responsible party fails or refuses to fully address all items identified in an inspection report after thirty (30) days notice from the Commission of such failure to comply, the Commission shall commence enforcement action to achieve compliance.

n) Substantive Changes to Plan

No changes shall be made to an approved Stormwater Management Plan without review and written approval by Town Staff, or if any such changes are determined to be substantive by the Commission. Additional data may be requested to allow for a complete review and evaluation of proposed changes to ensure compliance with the required discharge standards.

o) Drainage Report.

A storm drainage study and runoff computations for design of storm drainage systems for the 1, 2, 10, 50 and 100 year frequency storms. Such study shall conform to the current Connecticut Department of Transportation requirements with appropriate calculations, maps, graphics, hydraulics, assumptions, erosion controls, drainage paths, storm water renovation methods, and Best Management Practices specified by the Connecticut Department of Environmental Protection.

p) Stormwater Management Requirements for Single-Family Lot Development.

All building permits for new single family homes, or additions to such homes of 500 s. f. or more, taken cumulatively from the date of adoption of these regulations , or the construction of accessory structures exceeding a building coverage of 500 s.f. shall comply with the Design and Performance Criteria set down in Section 16A.2.l.3.a through f., but shall not otherwise be subject to the requirements of this section. Any practices approved by the ZEO under this section shall be maintained, and any deviation from an approved plan shall be deemed a zoning violation. The ZEO may require a covenant or other appropriate legal mechanism to ensure perpetual maintenance of the stormwater improvements.

Staff Professional Training

On September 29, 2015 Patrice Carson, Director of Community Development, attended a Public Works Breakfast Planning Meeting which was a workshop that was organized and funded by Patricia Young, Watershed Coordinator of the Salmon River Watershed Partnership and Program Director for the Eightmile River Wild & Scenic Watershed and Michael Dietz, University of Connecticut, Water Resources Educator, Center for Land Use Education and Research (CLEAR). The emphasis of the planning workshop was on the integration of municipal Green Infrastructure (GI) to reduce stormwater impacts and to determine which types of GI were of specific interest to municipalities and what topics related to the GI would be most helpful (i.e. maintenance concerns and costs, cost effectiveness, infrastructure response during extreme weather and the need for special equipment). The workshop was targeted for Municipal Engineers and Department of Public Works personnel. Based on input from municipal representatives it was the consensus of the participants that a GI field walk and maintenance cost presentation at the University of Connecticut would expose the participants to the widest array of GI practices.

On November 17, 2015 Patrice Carson, Director of Community Development, attended the Real Cost of Going Green Workshop which included a GI field review of rain gardens, bioswales, tree box filters, pervious concrete brick pavers, pervious bituminous concrete pavement, pervious concrete pavement, roof gardens and other GI installations. After the field walk participants were given a presentation on the maintenance costs associated with the GI practices by Katie Milardo of the UCONN Office of Environmental Policy.

Subsequent to the field walk and maintenance cost presentation, participants were provided with the following website links on December 2, 2015:

1. *Guidance Document on LID Operation and Maintenance* that UCONN has used to begin to assign maintenance costs to existing infrastructure. The document contains descriptions of various treatments, maintenance considerations, key operations to preserve function, equipment needed and checklist for common LID/GI measures:

   http://www.ecy.wa.gov/programs/wq/stormwater/municipal/LID/TRAINING/LIDO&MGuidanceDocument.pdf

2. UCONN campus Green Infrastructure on-line tour :

   http://uconnclear.maps.arcgis.com/apps/MapTour/index.html?appid=990a5036bb604c47af25dcd082e01ca9

3. Link to an EPA website that has a number of topics and also includes links for *Cost-Benefit of Traditional vs. Green Infrastructure* and *Funding Options*.

   http://www2.epa.gov/green-infrastructure

4. Mark Branse is updating an *Overview of the Legal Concerns Related to Inheriting and Managing Stormwater Treatment Measures* which will be forward to workshop attendees when it is completed.

Joyce Stille, Administrative Officer, attended the Council of Small Towns (COST) Stormwater Management Conference on October 19, 2016 which focused almost exclusively on the modified MS4 Stormwater General Permit.

Minimum Control Measure No. 6 - Pollution Prevention/Good Housekeeping

Lance Dimock, Road Foreman, estimates that the town has approximately 43.3 miles of town roads.

The Town of Bolton conducted sweeping of all town roads in 2016. The town contracted Capitol Sweeping Services of South Windsor for the sweeping of town roads. The sweeping of town roads was completed with one sweeper and took approximately one and one-half to two weeks to complete.

Lance Dimock, Highway Foreman, estimates that the town has approximately 800 - 850 catch basins and storm manholes located on town roads.

The town subcontracted American Pipe and Catch Basin Cleaning, LLC of Manchester, Connecticut for the cleaning of approximately 400 - 450 catch basins and storm manholes. The drainage structure cleaning commenced after the road sweeping operations were completed. All catch basins and storm manholes are done at least once every two years. Approximately 100 to 150 catch basins and storm drainage structures located at the bottom of hills, and other structures needing cleaning on a more regular basis, are vactored every year. Approximately 50 catch basins, which drain to Bolton Lake, are also vactored every year. Lance Dimock, Highway Foreman checks that the contractor has vactored the basins by choosing random catch basins that were known to have been vactored and checking the sump with a probe fabricated from small diameter PVC electric conduit pipe.

Storm drainage structure sump sediment accumulation of all drainage structures is checked every year and catch basins that consistently fill with sediment and debris are cleaned once per year. Those catch basins that have minimal sediment and debris accumulation are cleaned every other year.

The town continued to utilize the 1 part sand to 1 part sodium chloride salt road deicing mix which was originally implemented in the winter of 2010 - 2011. Straight salt from Morton Salt is utilized. This pavement deicing modification has further reduced the amount of sand applied to the roads for pavement deicing operations on an annual basis. This has consequently reduced the road sand sweeping volume and the catch basin cleaning volume.

The road deicing mixture is applied by manual methods as ground speed controlled automated methods are not felt to work given the highly variable conditions of storms, road age and sunlight exposure. A road deicing mixture application rate of 200 pounds per lane mile is the standard application rate. The four single axle trucks all have manually controlled road deicing mixture applicators. The configuration is preferred due to the varying deicing condition needs with resultant deicing mixture application rates (i.e. shaded roads versus road open to sunshine).

The frequency of swale and channel cleaning is felt to have dropped significantly due to the

utilization of the one part salt to one part sand mixture as opposed to the old road deicing mixture comprised of 7 parts sand to 2 parts salt.

In 2015 the storm drainage system of Llynwood Drive was reconstructed. Llynwood Drive is located within an aging small residential lot lakeside development constructed in the 1940s and 1950s and is located on the easterly side of Bolton Lake was reconstructed. The original Llynwood Drive storm drainage system consisted of a combination of conveyances including a mix of pipe, tanks and other conveyance measures and catch basins that were constructed without bases. All of the catch basins were replaced with new precast concrete catch basins and sumps where utility conflicts allowed. All of the pipe was replaced with corrugated polyethylene pipe with silt-tight fittings. The subdivision was at one time served by individual onsite septic systems and wells but is now served by public sewer and water.

As in previous years, the Town of Bolton conducted stormwater drainage improvements throughout town in areas prone to flooding and/or erosion damage. When such improvements are made catch basins with sumps are provided if possible.

Stormwater Sampling

One (1) round of six (6) MS4 stormwater outfall samples was obtained on November 15, 2016 to fulfill the stormwater sampling requirements for calendar year 2016. The MS4 stormwater outfall samples were obtained from two commercial zone MS4 outfalls, two industrial zone outfalls and two residential zone MS4 outfalls.

The samples were obtained from the following locations:

C-1 Commercial Zone N41.78147 W -72.42340
South of Easterly Johnson Road and Connecticut Route 6 Intersection
Drainage Basin No. 3108 - Hop River

C-2 Commercial Zone N 41.79520 W -72.41671
Old Coventry Road
Drainage Basin No. 3108 - Hop River

I-1 Industrial Zone N 41.79639 W -72.42835
SW of South Road and Connecticut Route 44 Intersection
Drainage Basin No. 3108 - Hop River

I-2 Industrial Zone N 41.79216 W -72.47093
SE of Goodwin Road and Brookfield Road Intersection
Drainage Basin No. 4500 - Hockanum Regional Basin

R-1 Residential Zone N 41.73344 W -72.41654
Daria Drive Cul-de-Sac
Drainage Basin No. 3107 - Burnap Brook

R-2 Residential Zone N 41.75369 W -72.44435
Deming Road N Detention Basin Inlet East of Blackledge River
Drainage Basin No. 4707 - Blackledge River

Rainfall from the November 15, 2016 precipitation event was reported to range from 0.25" to 0.56" at the six state NOAA weather stations.

The previous rainfall event of 0.10" or greater occurred on October 30, 2016.

The Stormwater Monitoring Report Forms from the November 15, 2016 MS4 stormwater outfall sampling event were forwarded to Joyce Stille, Administrative Officer, on December 06, 2016 with a written request to return the original signed and dated Stormwater Monitoring Report Forms to the office of Nathan L. Jacobson & Associates, Inc. so that the forms could be scanned and electronically forwarded to the CT DEEP.

The pdfs of the original forms were forwarded electronically to Chris Stone, P.E. CT DEEP MS4 Stormwater Permit Coordinator on December 20, 2016.

Following is a MS4 stormwater sampling chronology:

Permit Year	Sampling Date
2004	12/01/06
2005	08/21/07
2006	09/11/07
2007	01/11/08
2008	06/04/08
2009	06/09/09
2010	05/12/10
2011	09/23/11
2012	10/19/12
2013	11/01/13
2014	10/26/14
2015	08/11/15
2016	11/15/16

The stormwater sampling program is currently in full compliance with the MS4 General Permit. two commercial zone MS4 outfalls and two industrial zone.

Electronic Annual Report Certification Form

The 2015 Electronic Annual Report Certification Forms was forwarded to the CT DEEP on December 21, 2016 as a pdf of the signed and dated form.

It is anticipated that the 2016 MS4 Annual Report Transmittal Form, a hard copy of the 2016 MS4 Annual Report and the $187.50 Annual Report Review Fee will be forwarded to the CT DEEP Central Permit Processing Unit in March 2017 subsequent to meeting FOI requirements.

An electronic copy of the 2016 MS4 Annual Report will also be forwarded to the CT DEEP Central Permit Processing Unit in March 2017 subsequent to meeting FOI requirements.