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CITY OF MANCHESTER NEW HAMPSHIRE



New Gravel Wetland Cell at Nutt Pond 2016

Stormwater Management Program Annual Report

May 1, 2016 to April 30, 2017

Manchester's Stormwater Management Program Summary

BMP Task Listing and Current Status for 2016

BMP Task Listing and Current Status for 2016							
BMP#	Description	Develop	Implement	End Date	Priority	Completed	
1-1	Assign SW Coordinator	8/1/2003	5/17/2003	7/30/2004	Completed	5/17/2003	
1-2	Add SW Info to City's Website	10/1/2004	Ongoing	3/21/2004	Completed	10/7/2003	
1-3	Outreach with Local watershed groups	10/1/2004	Ongoing	7/30/2004	Completed	Ongoing	
1-4	Brochures available DPW & library	7/1/2004	Summer 2004	7/1/2006	Completed	Summer 2004/ Ongoing	
1-5	Signage @ Urban Ponds (Reposted as Needed)	9/1/2003		3/21/2004	Completed	9/25/2003	
1-6	Pet Waste Brochure & Signage	7/30/2004	Draft done 3/2004	7/1/2006	Completed	1/28/2005	
2-1	Comply with State Public Notice		Complied with Ordinance and Regulations Notices			City Protocol	
2-2	Annual Household Haz-waste Day		Yearly - Info provided by Recycling Coordinator		Completed	May 12 & Oct 13	
2-3	Collect Used Oil, batteries & tires		Yearly - Info provided by Recycling Coordinator		Completed	12/31/2014	
2-4	Urban Forestation "Green Street Program"	Mike Baer	Ongoing - 44 trees for year 2013		Completed	12/31/2014	
2-5	Stormwater & Combined Sewer Hotline	665-6899	9/1/2003	7/30/2004	Completed	8/26/2003	
3-1	Present Draft Storm Sewer Ordinance	Adpoted	12/1/2003	7/30/2005	7/30/2006	Completed	8/2/2006
3-2	Dry weather screening of outfalls 2X/5yrs		4/1/2004	Summer 2004	9/30/2005	Completed	Completed / Ongoing
3-3	Develop & Implement Illicit Discharge Protocol		1/1/2004	Ongoing	7/30/2008	Completed	8/1/2003
3-4	Map Outfalls & Receiving Waters		Ongoing updates of City's GIS		Completed	12/12/2005	
4-1	Ordinance - Erosion, Sediment & Construction Material		12/1/2003	Adopted Ordinance & Regulations		Completed	8/2/2006 - 12/5/2006
4-2	Develop Procedure for Public Comment		9/1/2003	Outline City Protocol for SWMP		Completed	8/1/2003
4-3	Check Erosion & Construction Material Onsite		(Developed winter of 2003) List used at inspections			Completed	In Use
5-1	Ordinance for Runoff Controls for Developments		12/1/2003	Adopted Ordinance & Regulations		Completed	8/2/2006 - 12/5/2006
5-2	Recommend BMP Manual for Planners & Developers		8/1/2003	Outlined in Regulations - 6(A), 1-4		Completed	12/5/2006
6-1	Install Silt Fence Around Snow Dump		9/30/2003	11/1/2005	Annually	Completed	11/14/2006
6-2	Track CB Cleaning Program, Priority Basins Annually		8/1/2003	9/15/2003	Ongoing	Completed	12/31/2014
6-3	Sweep Streets 3X Annually		9/1/2003	Before Phase II	Ongoing	Completed	Min 3X/yr.
6-4	SOPs for Disposal of CB and Street Sweeping Residuals		8/1/2003	Visit 6/26/2003	In Practice	Completed	Ongoing
6-5	Minimize Salt Usage, Maintain Cover Over Salt Storage		12/1/2003 (1)	11/1/2005	Ongoing	Completed	Ongoing
6-6	Program to Clean Pond Inlets and Trash Racks		8/15/2003	Tank Inspections	Annually	Completed	Ongoing
6-7	Develop/Implement Employee Education Program		9/1/2003		Ongoing	Completed	Ongoing
6-8	Design & Construct Pond Specific P2 Projects		8/31/2003	Nutt Pond / Tannery Brook	Ongoing	Completed	Completed / Ongoing
6-9	BMPs for Derryfield Country Club		12/31/2003	Spring / Summer 2004	7/30/2006	Completed	8/1/2004

(1) Although the City covers salt piles, calibrates sander/salt spreaders and provides snow fence around snow dumping areas, there is no formal salt reduction program. Salt is applied as needed and completely weather dependant. The City has done a pilot study in the Nutt Pond sub watershed to determine sand and salt application rates and what can be done to reduce this impact. A pollutant-load watershed model was developed for this watershed. The Nutt Pond Watershed Sediment Loading Reduction brochure was developed and was sent to all the commercial property owners to try and reduce the loadings to Nutt Pond. A follow-up survey was conducted to determine the effectiveness of the program. A one page informational brochure was developed to provide residents with additional information on how they can protect the pond. This informational brochure is posted at the kiosk.

City of Manchester, New Hampshire
Stormwater Management Program Annual Report
May 1, 2016 through April 30, 2017

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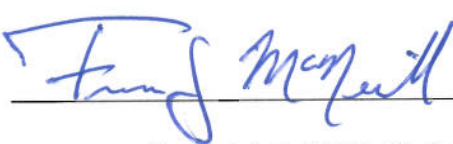
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Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Date: _____

4/27/17

Frederick J. McNeill, P.E.
Chief Engineer - EPD

BMP #1 Public Education and Outreach

1-1, Assign Stormwater Coordinator – (BMP Completed)

Current Status: The City of Manchester hired the stormwater coordinator on May 17, 2003. The title for this position is Environmental Permits Coordinator.

BMP Effectiveness Evaluation: The Coordinator position allows the City to review, implement and enforce requirements of the stormwater program effectively. The responsibility of the position meets, but in many cases exceeds the level of expectations of the regulatory agencies. The hiring of the Coordinator helped to fulfill all the requirements of the five-year program one year ahead of schedule.

Future Goals: To continue to carry out the requirements of the stormwater program. To expand the program through implementation of stormwater practices that go beyond the five-year program requirements and to meet the requirements of the next permit.

The Coordinator will continue the inter-departmental efforts between the Planning, Parks & Recreation, Health and Highway Departments to enhance the existing stormwater program.

To utilize the City's engineering inspection staff to a greater degree when they do construction site inspections related to infrastructure. Each year they learn more about the stormwater program and implementation of BMPs for erosion and sediment control. For this reporting period, EPD did not perform any formal training, but spent time out in the field with representatives from the Highway Division to help them understand more about our system and requirements of our program.

1-2, Add Stormwater Information to the City's Website – (BMP Completed)

Current Status: The City of Manchester uploaded the initial stormwater website on October 7, 2003 consisting of four pages. Since then the website has expanded considerably. The total number of pages accessible within the stormwater site is well over fifty, which includes outside pages, related to stormwater, and associated PDF files.

The Manchester Urban Pond Restoration Program website is a site linked and referenced throughout the stormwater website and vice versa. The information on the Urban Pond site demonstrates how stormwater controls can improve and enhance the quality of local ponds and lakes. The websites for stormwater and urban ponds were updated this reporting year.

BMP Effectiveness Evaluation: This BMP continues to be a highly effective means of providing stormwater information for public access. Several cities and towns within New Hampshire and New England have reviewed and commented on the extensiveness and material included in Manchester's website.

Future Goals: To update the websites for changes to the stormwater program based on the newest MS4 permit requirements. More pages will be added to inform the public of the status of the required tasks as outlined in the program.

1-3, Conduct Outreach with Local Watershed Organizations – (BMP Implemented & Ongoing)

Current Status: The City has provided funds for kiosk maintenance supplies for 10 kiosks, equipment, and water analyses for the two watershed organizations (Crystal Lake Preservation Association – CLPA and the Pine Island Pond Environmental Society – PIPES) and the part-time acting coordinator of the Manchester Urban Ponds Restoration Program (Jen Drociak). This commitment will continue through the Stormwater Program.

The formal, full-time City-funded Urban Pond Restoration Program Coordinator position was terminated in February of 2005 and was carried within the Planning Department through December 2005 when it was subsequently eliminated. There is no longer anyone assigned to coordinate these activities.

Without a formal full-time Urban Pond Restoration Program Coordinator, outreach has continued through the Environmental Permits Coordinator and also the acting coordinator, who works on a seasonal, part-time basis with funding through the Environmental Protection Division.

The acting coordinator performs website and outreach material updates, annual kiosk maintenance at 10 kiosks, coordinates pond cleanups once per year at multiple pond sites, and monitors water quality at four ponds three times during the summer. Please see the below link for the cleanup events this year.

<http://www.manchesternh.gov/Departments/Environmental-Protection/SEPP/Pond-Restoration/Clean-Up-Events>

The City has budgeted for total phosphorus analysis, while all other sampling is performed in the field and/or analyzed at no cost at the NHDES Limnology Center under the umbrella of the NH Volunteer Lake Assessment Program (VLAP). The level of sampling and analysis that was done when the Urban Pond Coordinator was with the City has remained the same. This work is being completed by members of the watershed organizations along with the Environmental Permits Coordinator and the Urban Ponds Restoration Program acting coordinator.

The acting coordinator updates the Urban Pond Restoration Program website and posts the results of the sampling on the City's website for the public to view. Please see below link for more information.

http://www.manchesternh.gov/Portals/2/Departments/environ_protect/ponds_new/AllPondsWaterQualityTable.pdf

The City of Manchester has worked with the New Hampshire Rivers Council as a project partner along with other organizations on the McQuesten Brook Watershed Management Plan and implementation efforts. According to the New Hampshire Rivers Council, who managed the project, four dams were removed in 2016.

BMP Effectiveness Evaluation: The outreach was highly effective. The City's Environmental Permits Coordinator and the acting coordinator of the Urban Ponds Program will continue various aspects of the Program in the absence of the Urban Pond Coordinator.

The Manchester Urban Ponds Restoration Program received an Environmental Merit Award from the EPA on May 11, 2011. It was an honor to have that award bestowed on our program, a program that is supported by both our volunteers and our staff.

Future Goals: To continue the support for the watershed organizations and the acting coordinator, as well as support the sampling and analysis efforts, and continue to update the website.

1-4, Make Brochures Available at the DPW and Public Libraries – (BMP Completed)

Current Status: The City has a limited number of previously developed brochures that are still available. These will be used for the continued education of the public. These brochures will be targeted toward individuals/groups that would best benefit from this information.

The City has developed and printed brochures explaining the "Wastewater Treatment Process" (provided in the first stormwater report), when visiting classrooms to teach students. These will continue to be given during classroom educational sessions.

In 2016, the City received septic system brochures from the NHDES stormwater outreach coordinator. These were made available for residents and businesses.

BMP Effectiveness Evaluation: There have been no surveys or feedback forms developed to gauge the effectiveness of this BMP. The department has received limited feedback from its citizens.

Future Goals: To continue the outreach to the students. The City will continue to provide tours of the WWTP and training with students on wastewater and stormwater. This program, which was started in 2007, continues to be an integral part of the City's Stormwater Program. During this reporting period, the City has provided tours to local public middle schools and high schools, as well as local colleges. The EPD will look at expanding our target audience to include elementary students. In addition to the school tours, representatives of EPD actively participate in Science Fair judging that is hosted by Manchester Water Works annually.

To develop and provide informational brochures that can be mailed with the customer accounts. The mailer will advertise the website, stormwater hotline, and places where information can be obtained.

In addition to the items noted above, in 2016, the Environmental Protection Division entered into an informal partnership with the New Hampshire Institute of Art's Sustainability Class to have them design catch basin markers to be painted by the students in environmentally sensitive areas of the City. It is expected that these stencils will be painted sometime in the spring of 2017.

1-5, Develop, Install & Maintain Signage at Urban Ponds – (BMP Completed)

Current Status: The signage information that was presented in the first report is still applicable. There are issues with vandalism, but these signs are repaired in the spring when the Parks & Recreation Department begins to prepare the Urban Pond areas for public usage. During the 2008 spring and summer seasons the signs at the ponds were replaced and some new informational signs were added. The Plexiglas was replaced with some new Lexan which is more durable and will stand up to vandalism better. The kiosks are repainted on a regular basis as needed. Outdated information was replaced with current information in April of 2017. An inspection of each kiosk is done in the spring to see what repairs and repainting efforts are needed.

BMP Effectiveness Evaluation: It is difficult to gauge the effectiveness of this BMP. The signs are only effective if read. The kiosks are at the popular entrance areas of each pond and are easily accessible. The individuals who frequent the area most will probably retain more of the sign's information through subconscious familiarity. The kiosks are kept up to date and are more effective at getting the message across.

Future Goals: The goal is to maintain these signs in serviceable and readable condition. The kiosks will be updated, repaired, and painted as needed to help get information to the residents that are using the ponds. They are inspected in the spring to see what repairs and repainting efforts are needed. To help curb a growing vandalism problem, EPD investigated whether installing and maintaining surveillance cameras is viable in these areas. Due to logistical issues, this was determined not to be a feasible alternative at this time.

1-6, Distribute Pet Waste Brochures with Dog Licenses & Increase Signage at Parks – (BMP Completed)

Current Status: There are signs for "No Fouling By Pet Waste" erected at the entrances of the urban ponds and also at City Parks. These signs reference the City ordinance that enforces this law.

In 2005, 10,500 brochures were mailed to registered dog owners within the City of Manchester. The City Clerk has additional brochures that are given to the owners of all

newly registered dogs, although residents who are renewing their dog licenses do not receive the brochure.

There is also signage at the ponds that indicate it is improper to feed ducks. This will help prevent geese and birds from fouling the shores of the ponds that the residents frequent.

BMP Effectiveness Evaluation: Studies have been undertaken in several metropolitan areas to determine the effectiveness of “Pet Waste” brochures. It has been determined that approximately sixty-five (65) percent of the dog owners will clean up after their pets regardless of whether or not they have been informed via a brochure. Twenty (20) percent of dog owners can be encouraged to pick up after their pets where they didn’t previously through the encouragement of informational brochures. There will always be fifteen (15) percent of dog owners who will continue to ignore the law even if provide information on a continuing basis.

Manchester is hoping that the original brochures encouraged the uninformed twenty (20) percent (approximately 2,000 dog owners) to clean up after their pets where they hadn’t before.

Our department continues to be encouraged and hopeful that dog owners are responding as there has been little evidence of animal waste during our shoreline surveys for illicit discharges and the pond cleanups.

Future Goals: To keep residents informed in regards to their obligations handling their pet waste. Resupply the City Clerk’s office with brochures when requested.

Continue visual field observations for problem areas when higher amounts of pet waste are noted. Review kennels and animal shelters for compliance with pet waste disposal practices.

The EPD will investigate the potential for installation of displays at the entrance to ponds that will also include pet waste bags.

BMP #2 Public Participation

2-1, Comply with State Public Notification Laws – (BMP Implemented & Ongoing)

Current Status: The City of Manchester continues to comply with all Public Notification Laws regarding the Stormwater Management Program process. The meetings that EPD scheduled in the early stages of ordinance development, with the Planning Board, and the Highway Commission, were announced on the weekly agenda for those perspective meetings, posted at City Hall, the Highway Department, and posted on the City's website.

Examples of public announcements announced in the local newspaper were included in previous year's reports.

Manchester went beyond the newspaper public notice and mailed agendas and draft documents to developers, contractors and engineering firms that usually do business within the City. The City incorporated many of the comments into the draft Ordinance and the Regulations.

In addition to the Public Notification Law, the City of Manchester has a guide that all departments, boards, committees and the Mayor and Aldermen must abide by. It references the rules on Meetings, the Formation of Committees, and Rules for Ordinances, Resolutions and Orders, Access to Public Records and Meetings, and Minutes and Records Available for Public Inspection. These Rules comply with the State of New Hampshire Public Notification Laws as outlined in RSA 47:6, and RSA 91-A:1 through RSA 91-A:6. This guidebook is available in all departments for reference should questions arise in regards to the implementation of Public Notice Law regulations.

Future Goals: To continue the public notification policy whenever any changes are made to the ordinance, or when substantial changes are made to the Regulations.

2-2, Hold Annual Household Hazardous Waste Day – (BMP Implemented & Ongoing)

Current Status: The City of Manchester held two Household Hazardous Waste Days in Manchester during 2016. These dates have always fallen on the second Saturday of May and the second Saturday of October. The first collection was held on May 14, 2016 and the second was held on October 8, 2016. The date of collection is mentioned on the City's website, announced on flyers at the Highway Department, various other kiosks throughout the City, and also announced in the newspaper the week of the collection. Also, sewer customers in the City are provided with a residential waste brochure that contains this information. On the City's website is an alternative household products list. This list was included in the 2009 Annual Report.

The City also sends out residential yard waste curbside collection schedules via sewer and water billing, which was combined in 2015. It is also posted on the City's website. This helps prevent residents from disposing of their yard wastes in brooks, streams and wetlands. The City also provides information on yard waste and composting on the City's website. This information was included in the 2011 Annual Report.

The following amounts of wastes were collected during 2016:

Waste Description	Quantity Collected
Universal Waste (TVs, CRTs, and computer peripherals)	199 Tons
Scrap Metal	319 Tons
Refrigerators	363 Units
Air Conditioning/De-Humidifier Units	774 Units

Spring HHW Collection: Hazardous materials consisting of the following components:

Waste Description	Quantity Collected (Pounds)
Waste Paint	7,800
Waste Aerosols	875
Waste Pesticides Liquid	975
Waste Oxidizing Liquid	20
Waste Pesticides Solid	400
Waste Corrosive Liquids	350
Waste Ammonia Solutions	100
Waste Mercury	20
Universal Waste (CFL)	150
Non DOT Regulated Material (Fluorescent Light Bulbs)	200
Waste Flammable Liquids	5,600
Total	16,490

Fall HHW Collection: Hazardous materials consisting of the following components:

Waste Description	Quantity Collected (Pounds)
Waste Paint	9,000
Waste Aerosols	400
Waste Pesticides Liquid	800
Waste Pesticides Solid	900
Waste Corrosive Liquid, Acidic, Organic	100
Waste Corrosive Liquids	100
Waste Ammonia Solutions	200
Waste Mercury	3
Universal Waste (CFL)	100
Non DOT Regulated Material (Fluorescent Light Bulbs)	500
Waste Flammable Liquids	3,500
Total	15,603

BMP Effectiveness Evaluation: The household hazardous waste collection is possibly the most successful environmental program conducted semi-annually throughout Manchester. This program recovers a huge waste stream that could potentially be dumped in off road areas near brooks and ponds.

The City notifies all residents who receive a sewer bill regarding yard waste pick-up. It is also posted on the City's website. This notification should help in the prevention of people dumping leaves and grass-clippings along roadsides and brooks, which help reduce nutrients that move into the Merrimack River from the tributary streams.

Future Goals: Manchester will hold two hazardous waste collection days during the 2017 calendar year. The first will be held on May 9th and the second on October 10th.

2-3, Continue Regular Used Oil, Battery and Tire Collection – (BMP Ongoing)

Current Status: The City of Manchester continues to collect used oil, batteries, and tires. These are collected during normal business hours. These wastes are not reserved for the Household Hazardous Waste Days. The amount of wastes that were collected and shipped is listed in the next table.

The City collected the following amounts of wastes during 2016:

Waste Description	Quantity Collected
Tires	65 Tons
Used Motor Oil	1,150 Gallons
Lead Acid Batteries	5,900 Pounds
Rechargeable Batteries	100 Pounds

Future Goals: Continue the same level of accessibility and collection hours as currently established.

2-4, Continue Urban Forestation through “Green Streets” Program – (BMP Ongoing)

Current Status: The “Green Streets” Program was not funded in 2016. However, as part of the City's North Chestnut Street Sewer Separation Project – Contract #2, a vegetated bioretention system was constructed along three (3) medians in the Hartnett Parking Lot in downtown Manchester. The parking lot is utilized by many people who work in this urban, highly visible location. These improvements will allow recharge to groundwater and reduce the flow to the closed drainage system in the area during rainfall events with one inch or less total rainfall. Construction of this was completed in 2016.

A Green Roof was installed in September of 2007 on the roof at City Hall using the GreenGrid system. The plants were sampled for heavy metals as a baseline to help determine uptake. The only metal that was detected was zinc. This is thought to be due to the zinc orthophosphate in the drinking water used for corrosion control. The plants were

sampled on October 19, 2016 for heavy metals. There were four metals that were detected during this sampling event, as shown on the following table. In 2015 there were seven metals that were detected.

GREEN ROOF SAMPLING RESULTS

Parameter	2013 Results in ug/g	2014 Results in ug/g	2015 Results in ug/g	2016 Results in ug/g	4 Year Averages
Antimony	0.6	1.6	BDL	BDL	0.55
Arsenic	BDL	BDL	BDL	BDL	BDL
Beryllium	BDL	BDL	BDL	BDL	BDL
Cadmium	BDL	BDL	0.45	BDL	0.11
Chromium	BDL	BDL	0.96	BDL	0.24
Copper	BDL	BDL	12	6.91	4.73
Lead	1.7	13	58	1.33	18.51
Mercury	BDL	BDL	0.027	BDL	0.01
Nickel	BDL	BDL	1.3	7.36	2.17
Selenium	BDL	BDL	BDL	BDL	BDL
Silver	BDL	BDL	BDL	BDL	BDL
Thallium	BDL	BDL	BDL	BDL	BDL
Zinc	5	38	104	30.2	44.3

BDL = Below Detectable Limits (assumed 0 for averages)

Future Goals: To reinstate the “Green Streets” Program as previously established provided the funding is available. Assure the public is aware of the availability of this service through the City of Manchester.

The City will continue to sample the plants on the Green Roof for metal uptake on an annual basis.

Establishment of a “Green Initiative Program” under the City’s Phase II CSO project, scheduled to begin in 2017. These types of improvements will be investigated during future Phase II CSO separation designs.

2-5, Publicize & Maintain Stormwater & Combined Sewer Hotline – (BMP Ongoing)

Current Status: The City established the Stormwater / CSO Hotline on August 26, 2003. The phone number is (603) 665-6899. The City previously sent envelope stuffers with the 24,000 bills (residential, commercial and industrial customers) informing these users of the storm water hotline and how it can be used to address environmental concerns. Information on the hotline will be provided anytime a stormwater flyer is mailed with the residential billing. The hotline number is also provided on the City’s stormwater website and on the Environmental Permits Coordinator’s business cards. The hotline is the Environmental Permits Coordinator’s main phone number.

BMP Effectiveness Evaluation: This BMP is effective after the residents receive a flyer in the mail. The impact of the flyer drops significantly a few weeks after receipt. Staff that answer the phones provides the stormwater hotline phone number or a direct transfer when a concern is received by any citizen. By having the hotline number as the Environmental Permits Coordinator's main phone number this should help with the overall effectiveness of the hotline.

Future Goals: To continue using the website, flyers, brochures and other methods to inform the public of the stormwater hotline.

BMP #3 Illicit Discharge Detection and Elimination

3-1, Develop & Present Draft Storm Sewer Ordinance – (BMP Completed)

Current Status: The presentation of the Stormwater Ordinance was done October 4, 2005. Comments were received, reviewed and where appropriate, incorporated. The Ordinance was approved by the Board of Mayor and Aldermen on August 1, 2006.

BMP Effectiveness Evaluation: The adoption of the ordinance and regulations has given the City the ability to cite codified references for enforcement actions.

Future Goals: To continue to make full use of the Ordinance and Regulations to assure that the Stormwater Program is being enforced and managed properly. To review and update the ordinance when the stormwater utility is implemented and for changes made to EPA and DES regulations.

3-2, Continue Dry Weather Screening of Outfalls – (BMP Completed)

Current Status: The requirement of two inspections during the five-year program was completed.

The ponds were sampled for phosphorous, alkalinity, conductivity, pH, turbidity, temperature, dissolved oxygen, and zooplankton/phytoplankton as part of the Volunteer Lake Assessment Program (VLAP).

The ponds and sections of the rivers are sampled each week during the summer months by the City of Manchester Health Department for recreational purposes. When the water results are greater than 88 E-Coli per 100 milliliters of water the area is usually posted and it may get closed for swimming depending on the location in accordance with NH RSA 485-A, Class B waters.

The Merrimack River was sampled for aluminum four times a month for a year. The sampling program was completed. A wet weather increase for the aluminum concentration has been observed. The EPA and NHDES determined that there were no water quality concerns in the Merrimack River upstream and downstream from the WWTP's outfall. Aluminum was removed from the previous permit.

The outfalls at the Wastewater Treatment Facility and at the Drop-Off Facility have been monitored according to the Multi Sector General Permit (MSGP).

BMP Effectiveness Evaluation: The City has catalogued observable outfalls along the Merrimack and Piscataquog River along with the ponds. The City has collected samples from outfalls that run in dry weather (usually the result of small streams), has tested them and has found that only background levels of bacteria are present. During the rare occasion of elevated bacteria counts follow-up sampling and investigations were conducted.

The urban ponds, being more environmentally sensitive, have several pollutants tested during the course of the summer. Please refer to the list of pollutants above.

Future Goals: The City will conduct dry weather screening per the requirements in the next permit. The new numbering system for our collection system as outlined in BMP # 3-4 will be used for the outfall identification when conducting the screening.

Continue sampling the urban ponds during the course of the summer for the pollutants listed above. Sample the outfalls at the Wastewater Treatment Facility and the Drop-Off Facility according to the MSGP.

3-3, Develop and Implement System for Detection & Elimination of Illicit Discharges – (BMP Completed)

Current Status: This program was developed and submitted with the first year's report. The program has been a good baseline document for detecting illicit discharges. The New Hampshire Seacoast Coalition developed a document entitled "Guidelines and Standard Operating Procedures" for IDDE. Manchester did review this manual and included some of the procedures and suggestions into our developed Illicit Discharge Program.

BMP Effectiveness Evaluation: This BMP is effective in providing guidance when trying to determine the source of an illicit discharge that proves to be a difficult source to locate.

Future Goals: Our goal is to continue to aggressively respond to illicit discharges as they are found. The City will conduct illicit discharge investigation and monitor the outfalls per the requirements in the next permit.

3-4, Map Outfalls and Receiving Waters – (BMP Completed)

Current Status: The City's engineer mapped the outfalls from earlier engineering studies in 2001. An extensive GIS mapping system was developed for the City to include both sewage and drainage systems. This mapping has been extended to include tax maps, City assessing information and the water department's infrastructure.

The City's engineering department inputs all the new growth and sewer extension updates into the GIS to assure it is a dynamic mapping system rather than a dated static system. The City's engineering department and our CMOM consultant both perform periodic updates of the GIS from work that has been completed by City crews, City projects, and our CMOM program.

Errors to the developed GIS system continue to be found in the field. The discrepancies are noted and brought to the City's engineering staff so the GIS information can be updated and corrected.

A new numbering system for the collection system features was instituted. The new numbering system links to the old numbering system.

In 2016, the EPD purchased a tablet that links to our GIS system. This has proven to facilitate changes to the GIS based on field observations.

BMP Effectiveness Evaluation: This tool has proven invaluable to our Stormwater Management Program. It is being used to track cleaning of lines, location of baffle tanks, sectioning off catch basin cleaning areas, and for review to determine potential locations for illicit discharges.

Future Goals: The department is taking advantage of more of the capabilities available with the GIS system. The GIS system is being populated by our consultant with information from system maintenance, system inspections, and other vital information. An Asset Management system is used by other divisions within the City, and is expected to be implemented at EPD in the near future as part of our CMOM program. This system will be used to track the condition and maintenance of the system. Our new catch basin cleaning program will utilize tablets and will update any GIS drainage discrepancies based on actual field conditions.

BMP #4 Construction Site Runoff Controls

4-1, Develop & Present Ordinance to Require Erosion & Sediment Control Plan (to include construction material management plan and plan review for sites disturbing more than one acre) – (BMP Completed)

Current Status: The Ordinance was drafted, reviewed, modified and adopted on August 1, 2006. The Board of Mayor and Aldermen authorized the Director of Public Works to develop a set of Regulations to expand upon and detail the content of the Ordinance. These Regulations were adopted by the Director of Public Works with approval by the Highway Commission on December 5, 2006.

BMP Effectiveness Evaluation: Manchester was possibly the first City in New England, and certainly New Hampshire that adopted a specific Stormwater Ordinance and supporting Regulations. These documents will promote compliance at construction sites with subsequent enforcement capability should the contractor neglect Stormwater Pollution Prevention Plan requirements.

Future Goals: The same goal would apply here as that outlined in BMP # 3-1.

4-2, Develop Procedure for Receipt and Consideration of Public Comment – (BMP Completed)

Current Status: The attachments outlined in BMP # 2-1 illustrate how the City processes public comment. All comments are taken seriously, the citizens are contacted, the issues discussed and if the suggestion is sound, incorporated into the stormwater management program.

Manchester will continue to receive suggestions via the website, phoned comments, statements made at hearings, and by letter.

BMP Effectiveness Evaluation: The process used during the public hearing regarding the Stormwater Ordinance was well received and most of the comments were incorporated into the adopted Ordinance (August 1, 2006). This process is working well.

Future Goals: The goal is to continue following the City's protocol with any future changes to the adopted Stormwater Ordinance or the approved Regulations.

4-3, Check Erosion Control Measures and Construction Material Management, Onsite Inspection – (BMP Implemented and Ongoing)

Current Status: The City developed an inspection checklist for site visits. This inspection sheet has proven to be a comprehensive document when referring back to conditions that existed at a particular time during project development.

The inspection sheet includes information regarding the site, weather conditions since the last inspection, and the conditions of BMPs.

The inspection of BMPs is gauged against the Erosion and Sediment Control Plan and SWPPP that was submitted by the developer during the site plan approval process. Any deviance from the plan is noted and a clean typed copy is made from the field inspection notes. The clean copy is signed by the inspector and delivered to the contractor for action. Pictures taken at the site are referenced by link on the sheet and can be easily retrieved in the computer to evaluate the current findings with those from previous reports. An example of a completed site inspection form was included in the 2011 Annual Report.

Since the adoption of the Ordinance, the City has developed a two-part "Notice of Violation" that can be used in the enforcement process. An example of this report was included in the 2007 Annual Report. The inspection report serves as the first notice to the contractor that they need to come in compliance with their Stormwater Pollution Prevention Plan or Best Management Practices for site disturbances. A time frame for correction is outlined in the inspection report.

If the non-compliance has not been corrected at the time of the second inspection, a "Notice of Violation" is prepared and sent via certified mail, return receipt requested. A copy of the notice is presented to the site superintendent. More stringent time limitations are included for compliance.

If upon reinspection, the site non-compliance has not been corrected, the enforcement actions proceed, with associated fines and penalties, as outlined in the Ordinance.

BMP Effectiveness Evaluation: The field inspection checklist, "Notice of Violation," Regulations and Ordinance provide the City with all the tools needed for compliance and enforcement regarding the Stormwater Program. The compliance at the construction sites has been well above average.

Contractors and developers have been quick to correct issues found. If they are present during the inspection, the violations are pointed out so that they can correct them in a timely manner.

Future Goals: The future goal is to make use of the tools available for inspection and enforcement. Also, to follow up on minor enforcement actions to assure that these issues are corrected. Without follow up, the process of escalating enforcement would not be possible. The sites will be inspected each month during the year. We are finding that with the climate changes that more sites are active year round. This requires inspection during the winter months that were traditionally non-active months.

BMP #5 Post-Construction Stormwater Management in New Development & Redevelopment

5-1, Develop Ordinance to Require Runoff Controls for New & Re-Development for Projects Disturbing > One Acre – (BMP Completed)

Current Status: This requirement is incorporated in the approved Ordinance and adopted Regulations.

Post construction consists of maintaining BMPs and structures that have been installed within a development after the contractor has left. The City spent many hours reviewing documents that required long-term maintenance for installed BMPs.

The department developed a “Long-Term Maintenance Agreement” to be signed by any new developments that are completed within the City. This will assure that the structures that are installed are maintained. The maintenance of structures after the construction was completed has always been the achilles heel throughout the country. Manchester will register this document with the Hillsboro County Registry of Deeds to be part of an Associations’ covenants that will assure that these structures are being maintained. An example of a Long-Term Maintenance Agreement was included in the 2009 Annual Report.

BMP Effectiveness: It is early to determine the effectiveness of this document. If it is signed, registered, and carried by the Association it should prove to be a highly effective means of assuring maintenance of BMPs long after the development is completed.

Future Goals: To assure that this agreement is signed by the owner and registered by the City before issuing the final certificate of occupancy for all future developments within the City of Manchester. The Coordinator will follow up on the agreements to ensure the maintenance is being performed. This will include an annual report to the City documenting that the maintenance was done, followed up by an inspection by City staff to verify that the maintenance was done.

5-2, Recommend BMP Manual for Use by Planners and Developers – (BMP Completed)

Current Status: The suggested manuals referenced are outlined in the approved Regulations. These manuals are:

- New Hampshire Department of Environmental Services Sediment and Erosion Control Manual, (Rockingham County “Stormwater Management and Erosion Control Handbook for Urban and Developing Areas”);

- Manchester's "Standard Specifications for Road, Drain & Sewer Construction";
- Innovative Stormwater Treatment Technologies BMP Manual, NHDES, May 2003;
- New Hampshire DOT Guidelines for Temporary Erosion and Sediment Control and Stormwater Management – NHDOT Bureau of Construction.

Other reference manuals and materials are mentioned on the website. These have not been incorporated into the Regulations, but warrant a mention on the website. The listing of references mentioned on the website is listed below:

- [EPA's BMPs for Stormwater Phase II](#)
- [State of New Hampshire BMPs](#)
- [International Stormwater BMP Database](#)
- [California Stormwater Quality Associations' Handbook for Construction Site BMPs](#)
- [U.S. DOT Guide to BMPs](#)
- [EPA Guide to Developing a SWPPP](#)
- [Overview of Minnesota's Construction Stormwater Permit](#)
- [National Resource Defense Council Stormwater Fact Sheet](#)

BMP Effectiveness: These references are voluntary guidance. The manuals can be an effective approach as most New Hampshire contractors are familiar with the contents of these manuals and refer to these guidelines when developing their sediment and erosion control plans.

Future Goals: Continue to review other manuals to determine if these would be suitable for reference within the Stormwater Regulations. Due to the new MS4 permit issuance in January 2017, the City is in the process of determining what changes will be necessary.

BMP #6 Pollution Prevention / Good Housekeeping for Municipal Operations

6-1, Install Silt Fence Around Snow Dump Area – (BMP Ongoing)

Current Status: Silt fences continue to be erected around the snow dumping areas in Manchester. The erection of these fences is verified during the month of November and early December.

In the spring after the snow has melted, any accumulated trash, debris and the silt fence is removed from the site until the next season.

During the previous years the City used a snow-melter to reduce the congestion caused by accumulating snow. This practice helped in reducing the spring peak runoff as the snow was melted during the colder days.

BMP Effectiveness: The silt fence keeps the trash and sand that is collected with the plowed snow from entering the waterways.

Future Goals: Continue with the existing program and assure silt fence is erected in areas where first time snow dump areas are set up.

6-2, Catch Basin Cleaning Program, Including Priority Catch Basins – (BMP Ongoing)

Current Status: The City contracts annually to have catch basins cleaned by a private company. The amount of funding dedicated to catch basin cleaning during Fiscal Year 2017 was \$30,800, which allowed for cleaning of 1,100 catch basins. City crews cleaned approximately 400 additional catch basins, for a grand total of around 1,500 catch basins cleaned. At an estimated 0.4 cubic yards of material per basin, about 600 cubic yards of material was removed in 2016. The listing of streets where catch basins were cleaned this past year is included as Attachment A.

There is a listing of priority catch basins adjacent to the Urban Ponds in the City that must be inspected annually or semi-annually if the condition warrants. City personnel inspect these in the spring and City forces clean these at least once during the reporting year. If additional cleaning is needed, a City crew is dispatched to clean these basins more frequently. These were all cleaned at least once during 2016 by City of Manchester personnel or by the CB cleaning contractor. The priority status for these basins assures that a significantly reduced pollutant load enters the ponds. The Urban Pond Priority CB Inspection and the Urban Pond Priority CB Cleaning List are included as Attachments B and C, respectively. The catch basins surrounding the urban ponds receive top priority.

Sewer calls are tracked to determine if roots, grease or other maintenance issues are the cause of the blockages.

In the fall of 2017, the catch basin cleaning program was revised to better address City needs and regulatory requirements. The new program is set up to clean the 14,000+ catch basins in the City within a 6-year time period. The amount of catch basins cleaned on an annual basis by a private contractor will be increased from 1,100 to 3,000 starting in the spring of 2017. The contract was bid in April 2017 and will continue indefinitely.

BMP Effectiveness: This process continues to work well. The current schedule of CB cleaning is helping to minimize the pollutants getting to the ponds. The ongoing development of the problem areas listing sheet allows the City to trend areas that need more attention and response.

The sewer problem areas are noted and inspected on a minimum of an annual basis and sometimes more frequently, depending on the type and/or frequency of the problem. Approximately 50 percent of the City's sewer system is combined. Heavy rains will cause sewer problems beyond maintenance issues.

The City continues to inspect our sewer manholes in the combined areas through our CMOM program. We are also inspecting combined sewer lines using CCTV and zoom camera technologies. The City is still in negotiations with the EPA on our CSO Long Term Control Plan; this plan outlines our future separation efforts. The first portion of the of the Phase II program as proposed by Manchester will cost \$165 million over 20 years and remove 70 percent of the CSO quantity from the system.

Future Goals: To continue designation of the urban pond catch basins as a priority for cleaning. To implement the new catch basin cleaning program and focus the City vector crews on priority CB areas annually.

6-3, Sweep Streets Three Times Annually – (BMP Ongoing)

Current Status: The City continues to follow a schedule of street sweeping presented in the first year's report. This year's winter was a typical winter with little sweeping performed during this season. The City has two vacuum and three mechanical sweepers.

Most of the sand found on City streets comes from winter sanding and some small amounts of sediment from erosion on residential lawns. Sand is applied to sidewalks and schoolyards during snowstorms. Salt is applied to the highways during snowstorms. A sand / salt mix is used during icing conditions or ice storms.

The amount of sand applied varies yearly. It is all weather dependent. The sweepers will pick up aluminum cans, cigarette butts, leaves, paper cups, plastics, and articles of discarded clothes, footwear, and a host of material that is not sand related. When sand is mostly absent from the streets these items make up the bulk of the material collected by the sweeper. When sand is present it may make up the bulk of the material.

Most of the sand is collected off the streets during the first few neighborhood runs immediately after the winter storm season. Otherwise, most of the material collected is

what is listed above. Therefore, it would be difficult to determine the amount of sand collected.

BMP Effectiveness: This BMP continues to be quite effective as some sections of the inner City business district are swept three times per week and others are swept twice a week. Some other sections of the City are swept once a month. The current sweeping schedule is structured so that all City streets are swept three times annually. A copy of the schedule was included in the 2009 Annual Report.

Future Goals: To continue the street sweeping program at its current rate.

6-4, Continue to Follow SOPs for Disposal of Catch Basin Cleaning and Street Sweeping Residuals – (BMP Ongoing)

Current Status: The City continues to place street sweeping debris and catch basin debris up in the rear lot of the recycling facility. The street sweepings are placed on a concrete pad with three-sided cement block walls. These sweepings are dried out, mixed with the gravel / asphalt pile and eventually ground up to make road base for streets and sidewalks.

The catch basin waste is piled across from the street sweeping debris in a compacted depression. This catch basin waste is allowed to evaporate to a certain extent then it is also mixed with the gravel / asphalt pile and eventually ground up to also make road base for streets and sidewalks.

During 2016 the catch basin cleanings were tested for RCRA 8 Metals, Poly Aromatic Hydrocarbons (PAHs), and Volatile Organic Carbons (VOCs) according to NHDES Management of Street Wastes fact sheet WMD –SW–32. The material met the requirements to be reused as road subbase as all of the parameters met the RCMP S-3 Soil Standards.

BMP Effectiveness: This BMP is effective as designed and provides a reuse for the material collected that would otherwise be sent to landfill.

Future Goals: Monitor the catch basin disposal area for evidence of pollution to the surrounding area. Take any BMP measures necessary to assure pollution is contained. Continue annual testing of the catch basin cleanings as required by WMD –SW–32.

6-5, Minimize Salt Usage and Maintain Cover over Salt Storage Area – (BMP Ongoing)

Current Status: The salt the City uses for highway treatment in the winter is kept under cover at the Department of Public Works in the salt shed.

All salting trucks are calibrated once annually before the winter sand / salt application season begins to assure the greatest efficiency and minimal salt use during spreading.

The amount of salt added in any season is dependent to the number of snowstorms, the amount of freezing rain received and the nightly refreeze conditions of early spring.

The City of Manchester pretreats roads with brine. The brine is made at the Department of Public Works and is applied 8 hours before a storm. It will take a few seasons to determine the amount of salt we were able to reduce.

The State of New Hampshire is working with communities along the Interstate 93 corridor to reduce the use of salt. They signed salt reduction agreements with these communities. In addition to signing salt reduction resolutions, Salem, Derry, Londonderry, and Windham all have individual Salt Reduction Plans in effect. NHDES has also prepared separate Chloride Reduction Implementation Plans for Beaver Brook, Dinsmore Brook, and Policy Brook.

The State of New Hampshire in 2013 created the statutory authority, RSA 489-C Salt Applicator Certification Option. Env-Wq 2200 Voluntary Certified Applicator Program was developed under RSA 489-C:3.

This rule provides road salt applicators with some BMPs to follow. It also reduces their liability if they become certified, follow the BMPs and they would have to track what is being applied. This rule can help us with our MS4 permit requirements. The applicators need to be certified through the Green SnowPro certification program to be eligible for coverage under RSA 508:22.

Training for certification is provided by the UNH Technology Transfer program (similar to their Road Scholars program), and certification is managed by the NHDES. UNH has trained over 850 salt applicators through the Green SnowPro certification program, and 476 of them have been certified by NHDES to date, according to the website. The program includes BMPs for deicing operations and a tracking tool to track salt usage. Although certification is voluntary, the City of Manchester and other communities will promote this by highlighting cost savings through reduction of salt use, and emphasizing that limited liability also applied to parking lot owners who hire certified salt applicators. The City of Manchester has certified a number of Highway Division salt applicators through this program.

The postings for the trainings will be at: <http://t2.unh.edu/green-snowpro-certification>

Manchester undertook a sub-watershed review around the Nutt Pond area for salting and sanding reduction. This pilot study used a model to see what improvements can be made to reduce the sand and salt application in this area and quantify the success. A sand reduction program was developed and distributed to the commercial property owners in the watershed.

BMP Effectiveness: Salt usage is weather dependent and it is hard to gauge effectiveness. Manchester can compare the current chloride analyses taken at the urban ponds and compare those to past years to determine if there is a reduction. The unknown

factor is the number of homes around any pond that have water-softening units, which contribute chlorides to the water table.

A survey was conducted to gauge the effectiveness of the sand reduction program around Nutt Pond. Of the 50 commercial property owners that received copies of the sand reduction program and were asked to complete an online survey, only 2.5 surveys were completed. One facility only completed half of the survey.

The Nutt Pond Watershed Restoration Plan and modeling was completed in January, 2010. A copy of the plan was included in the 2010 Annual Report.

Future Goals: Implement recommendations in the Nutt Pond Watershed Restoration Plan. See #6-6 below for update.

6-6, Develop / Implement Program for Cleaning Pond Inlets & Trash Racks – (BMP Ongoing)

Current Status: As part of the first phase of watershed restoration, a project was completed at Nutts Pond in 2007. The new structures were added to the maintenance logs. The modification to the structure at the North Inlet allows the isolation of the structure from the pond by using the installed gates. This allows removal of sediment from the structure. During the retrofit 20 cubic yards were removed from this structure. A repair was made in 2010 in the wetlands at the East Inlet. One of the channels had some erosion. The channel was repaired and seeded. It has been inspected since and the repair has held.

The City of Manchester completed another project in the Nutt Pond watershed in 2010. The project was referred to as the Woodgate Court Drainage Project. It was named this because the project starts at the end of Woodgate Court. A section of Tannery Brook at the end of Woodgate Court upstream of Nutt Pond was dredged and stabilized using natural vegetation, erosion control fabric, biologs, rock cross vanes, and natural seed mixes. Approximately 4,500 cubic yards of sediment were dredged from this channel. To protect this area from silting up again in the future a deep sump catch basin and a ten foot diameter deep sump drain manhole were installed. These two structures were added to the inspection list. They are inspected twice per year and cleaned at least once per year.

The dredging and stabilization of this channel helps to reduce the loadings to the Nutt Pond East Inlet Forebay. The majority of the sediment that has been dredged from this forebay in the past originated from this channel and not from winter sanding operations.

In 2016, the second phase of Nutt Pond watershed restoration was completed. This project included a sediment forebay and two gravel wetland cells at the west inlet to Nutt Pond. At Precourt Park on the north inlet side, two tree box filters, a stabilized precast concrete boat ramp, a rain garden, and porous pavement parking area were all installed. The intent of this project is to assist with treatment of TSS, phosphorous, nitrogen, and bacteria.

The three, three-chamber baffle tanks at Dorrs Pond, the one, three-chamber baffle tank at Crystal Lake, the Vortech swirl concentrator at Douglas street, and the Hooksett Plaza swirl concentrator are all inspected bi-annually and maintained as necessary.

The City continues to use the checklist for the spring and fall inspections of these units to assure they are cleaned when they begin to get filled with sediment.

There is a StormTreat™ System at Crystal Lake that the City is currently operating. It was restarted in May of 2005. The City cleaned the lines, retrofitted the baffle tank and has the unit on the semi-annual inspection checklist.

The work that was done at Crystal Lake was recognized by the EPA as a Nonpoint Source Program Success Story. Crystal Lake and Crystal Lake Beach are no longer listed as impaired for primary or secondary contact recreation for sedimentation / siltation. A copy of this article was included in the 2009 Annual Report.

To keep track of the sediment that is removed from the BMPs. A Structural BMPs Sediment Removals Log was developed. This log has all the sediment removal data since 2005 or when the BMP was constructed. A copy of the log is included as Attachment D.

BMP Effectiveness: The amounts of sediment that are removed from the various structures indicate that the program is highly effective.

Future Goals: To assure that the structures continue to be checked on a semi-annual basis and they are cleaned when they are partially full.

6-7, Develop / Implement Employee Education Program – (BMP Ongoing)

Current Status: The City continues to provide training to the staff who are involved with any aspect of stormwater management. This year, the EPD focused on informal field O&M training for the crews that are responsible for maintenance of these systems.

In the fall of 2013, the New England Water Environment Association (NEWEA), New England Water Works Association (NEWWA), and the New England Chapter – American Public Works Association (NEAPWA) formed the New England Stormwater Collaborative. The group was formed to identify and determine New England wide stormwater educational and informational needs. Based on these needs the group would determine the best ways to effectively educate, advocate, and respond to stormwater issues affecting the region. The collaborative has ten Steering Board Members and nine Working Committee Members representing the three organizations. On the Working Committee are three members from each organization, and a Chairperson from each organization from this committee were voted to serve as a Tri-Chair. Robert Robinson of the City of Manchester serves as a tri-chair representing the New England Chapter of the American Public Works Association (APWA).

The first order of business was to gather information on the educational needs of the members from the three organizations. A survey was developed and the group had over 400 respondents.

The next step was to create an awards program to solicit good stormwater ideas. The STORMYS were created. This awards program continues to be a success.

The group is in the process of determining the next steps to provide educational support to the members.

The SEPP funding has ended for the Merrimack River “MATTERS” Program. Our department will continue to make presentations at the schools in spite of the reduced program activity that results from the cutbacks. The Amoskeag Fishways also greatly reduced their involvement with the “MATTERS” Program.

To continue the outreach to the students, the City will continue to provide tours of the WWTP and training with students on wastewater and stormwater. This program, which was started in 2007, continues to be an integral part of the City’s Stormwater Program. During this reporting period, the City has provided tours to local public middle schools, both public and private high schools, as well as local colleges. The EPD will look at expanding our target audience to include elementary students.

We have also participated in the Science Fair judging with the Manchester Water Works. The amount of funding dedicated to student outreach to promote the successful SEPP programs during Fiscal Year 2017 was \$7,800.

The Manchester Area Stormwater Coalition has been having collaborative sessions with the Nashua Area Stormwater Coalition over the past year. This provides an opportunity for members of both coalitions to exchange ideas and collaborate. The latest meeting was held on February 16, 2017.

BMP Effectiveness: This BMP continues to grow, and with previous experience, is more effective with each passing year. The only area that will see a decrease in training is the work with the middle school students. The high school students are now receiving training. Employees who work in the field and inspect construction sites are more familiar with the requirements of the Manchester’s Stormwater Program.

Future Goals: To continue the outreach to the students and provide training on wastewater and stormwater. Participate in the Science Fair judging with the Manchester Water Works.

Continue the training of City staff regarding the stormwater program. Continue hosting the Manchester Regional Stormwater Coalition meetings. Continue attending and taking part in stormwater workshops and meetings. Continue to have a representative serve as a Chairperson in the New England Stormwater Collaborative.

Work with the Student Conservation Association (SCA) or other student groups to complete more environmental projects around the urban ponds.

6-8, Design & Construct Pond Specific Pollution Prevention Projects – (BMP Completed)

Current Status: All pond specific pollution projects have been designed in accordance with the five-year program and the Supplemental Environmental Projects Programs requirements. This is a completed task.

BMP Effectiveness: Many of the benefits of these pond specific projects are outlined in BMP # 6-6. These structures have removed several hundred cubic yards of material from the river and ponds that would have otherwise entered these water bodies.

Future Goals: Continue the upkeep and inspections of these structures. Please refer to BMP # 6-6.

6-9, Best Management Practices for Derryfield Country Club – (BMP Completed)

Current Status: This BMP was completed. The asphalt cart path has held up well and has almost eliminated erosion in a location that was previously heavily eroded.

BMP Effectiveness: This BMP reduces the amount of sediment contributed from the second hole at the Country Club. Each year approximately 10 to 15 cubic yards of fill was brought in to repair the erosion caused by the winter snowmelt in this area. Since the installation of the asphalt cart path this has not been necessary.

Future Goals: There are no future goals regarding this BMP.

Stormwater Catch Basin Cleaning Program

Program year May 2016 through April 2017

In accordance with the City of Manchester's Stormwater Management Program, the City is required, under BMP # 6-2, to track the catch basins that are cleaned. This is a listing of the streets where catch basins have been cleaned throughout the City. During this reporting year approximately 1,500 catch basins (600 cubic yards of material) were cleaned in the below listed streets by the private contractor and by the City of Manchester personnel. Manchester is using .4 cubic yards as an estimate for each basin cleaned for material removed. Additional basins are being cleaned this spring and will be included in next year's report.

It is important to note that not all catch basins on the named streets may have been cleaned. If a vehicle is parked over a catch basin that particular catch basin is skipped. An outside contractor cleaned most of the catch basins on the listed streets below. City of Manchester personnel cleaned all the catch basins around the ponds and additional basins in certain areas in the City.

The streets that were cleaned during the contract period of April 1, 2016 through December 31, 2016 are listed on Page 2 of this attachment.

Catch Basin Cleaning Areas

Allen St	Crestview Rd	Lake Ave	Poor St
Amherst St	Crickett Rd	Lamonte St	Poplar St
Ann Ave	Crosbie St	Lancelot Ave	Ray St
Applehill Ct	Cypress St	Laurel St	Readey St
Arah St	Day St	Ledgewood Rd	Ridge Rd
Arlington St	East High St	Leo Ln	River Rd
Ashland St	Elliot Way	Lexington St	Riverview Pl
Auburn St	Fairfield St	Lincoln St	Robie St
Barrett St	Goodwin St	Lowell St	Shady Ln
BayberryLn	Grand Ave	Magnolia Rd	Spruce St
Beacon St	Grant St	Malvern St	Steimetz Dr
Beech St	Greenfield St	Mammoth Rd	Tarrytown Rd
Belmont St	Hall St	Massabesic St	Thorp St
Blevens Dr	Hamel Dr	Master St	Union St
Boynton St	Hanover St	Mayflower Dr	Valley St
Braeburn Dr	Kearney Cir	McLane Ln	Vassar St
Bridge St	Heather St	McQueston Dr	Victoria St
Campbell St	Highcrest Rd	Merrimack St	Walnut St
Canton St	Highland St	Merrow St	Walnut Hill Ave
Cass St	Hill St	Nashua St	Wellesley St
Castle Dr	Hillsboro St	Nelson St	Wentworth St
Cedar St	Hubbard St	North Acres Rd	Weston St
Central St	Huntington Ave	North Adams St	Whitford St
Chad Rd	Imelda Ave	North Bend Dr	Willard St
Chase Way	Irwin Dr	North Gate Rd	William Gannon Rd
Chestnut St	Jane St	North Russell St	Wilson St
Colonial St	Jones St	Oakland Ave	Woodman St
Concord St	Juniper St	Paquette Ave	
Coral Ave	Kenney St	Park Ave	
Cox St	Kristen Ln	Pickering St	

The following is a listing of streets, the were determined to be priority streets in the Phase I Malcolm-Pirnie study, around the City of Manchester's Urban Ponds. City personnel inspect these in the spring and City equipment cleans these at least once during the reporting year. If additional cleaning is needed, a City crew is dispatched to clean these basins more frequently. These were all cleaned at least once during 2015 by City of Manchester personnel.

Stevens Pond

- Pennsylvania Avenue
- Delaware Avenue
- Beaver Street (to Bridge Street)
- Maplehurst Street (to Bridge Street)
- Ohio Avenue

Maxwell Pond (Black Brook)

- English Village Road
- Garden Road
- Greeley Street (CB 3950 to CB 3948)

Dorrs Pond

- Apple Court
- Hooksett Road (CB 1277 to 1272)
- Poplar Street
- Juniper Street
- Shady Lane
- Campbell Street (Shady Lane to Poplar Street)
- Bicentennial Drive (CB 1289 to CB 1284)
- Crosbie Street (Pickering Street to Hooksett Road)
- Day Street (Fairfield Street to Hooksett Road)
- Pickering Street (Barrett Street to Crosbie)
- Livingston Park / Pool lots

McQuestan Pond

- South Main Street (Intersection of Second Street to Oneida Street)
- South Main Street (Newgate Circle to Balch Ave.)
- Erie Street

Nutt Pond

- Driving Park Road
- Leclerc Circle
- March Avenue (from Gold Street to John E. Devine Drive)
- John E. Devine (From South Willow Street)
- McGrail Circle
- Bradley Street
- Beech Hill Ave. (Beech Hill Street to Bradley Street)
- Beech Hill Drive (To Bradley Street)

- Titus Ave. (east from South Beech Street)
- Mystic Street (From Ruggles Street to Fowler Street)
- Ruggles Street
- Fowler Street

Pine Island Pond

- Goffs Falls Road (Gosselin Road to Pond Drive)
- Pond Drive
- Kennedy Street

Crystal Lake

- Corning Road (CB 3053 to 3049)
- Corning Road (Intersection of Bryant Road up toward Bodwell Road)
- West Shore Avenue

Urban Pond Priority CB Inspection

Nutts Pond - Map 4G March Avenue - 11 CBs Driving Park Road - 8 CBs John E. Devine - 8 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
Crystal Lake - Map 6H Corning Road - 9 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
Dorrs Pond - Map - 4C Juniper Street - 7 CBs Poplar Street - 14 CBs Arah Street - 20 CBs Bicentennial Drive - 6 CBs Day Street - 8 CBs Crosbie Street - 6 CBs Hooksett Road - 6 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
Pine Island Pond - Map 4I Goffs Falls Road - 11 CBs Kennedy Street - 2 CBs Pond Drive - 10 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
Maxwell Pond - Map 2D (Black Brook) Garden Drive - 9 CBs English Village Road - 11 CBs Greeley Street - 2 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
McQuesten Pond - Map 2G Erie Street - 10 CBs South Main Street - 18 CBs (Newgate to Ann Ave) South Main Street - 10 CBs (Second to Oneida)	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.
Stevens Pond - Map 5E & 6E Maplehurst Avenue - 5 CBs Beaver Street - 3 CBs Bridge Street - 4 CBs Pennsylvania Avenue - 5 CBs Delaware Avenue - 5 CBs	<u>April, 2016</u> Name of Crew: _____	Date Work Completed Inspected, clean in the fall.

ATTACHMENT C

Urban Pond Priority CB Cleaning List

Nutts Pond - Map 4G	<u>December, 2016</u>	Date Work Completed
March Avenue - 11 CBs		
Driving Park Road - 8 CBs	Name of Crew:	<u>V-701</u>
John E. Devine - 8 CBs		

Crystal Lake - Map 6H	<u>November, 2016</u>	Date Work Completed
Corning Road - 9 CBs		
	Name of Crew:	<u>V-701</u>

Dorrs Pond - Map - 4C	<u>November, 2016</u>	Date Work Completed
Juniper Street - 7 CBs		
Poplar Street - 14 CBs	Name of Crew:	<u>V-701</u>
Arah Street - 20 CBs		
Bicentennial Drive - 6 CBs		
Day Street - 8 CBs		
Crosbie Street - 6 CBs		
Hooksett Road - 6 CBs		

Pine Island Pond - Map 4I	<u>November, 2016</u>	Date Work Completed
Goffs Falls Road - 11 CBs		
Kennedy Street - 2 CBs	Name of Crew:	<u>V-701</u>
Pond Drive - 10 CBs		

Maxwell Pond - Map 2D	<u>November, 2016</u>	Date Work Completed
(Black Brook)		
Garden Drive - 9 CBs		
English Village Road - 11 CBs	Name of Crew:	<u>V-701</u>
Greeley Street - 2 CBs		

McQuesten Pond - Map 2G	<u>December, 2016</u>	Date Work Completed
Erie Street - 10 CBs		
South Main Street - 18 CBs (Newgate to Ann Ave)	Name of Crew:	<u>V-701</u>
South Main Street - 10 CBs (Second to Oneida)		

Stevens Pond - Map 5E & 6E	<u>October, 2016</u>	Date Work Completed
Maplehurst Avenue - 5 CBs		
Beaver Street - 3 CBs	Name of Crew:	<u>V-701</u>
Bridge Street - 4 CBs		
Pennsylvania Avenue - 5 CBs		
Deleware Avenue - 5 CBs		