

Municipality/Organization: City of Cambridge

EPA NPDES Permit Number: MAR041076

MaDEP Transmittal Number: W-040464

Annual Report Number
& Reporting Period: No. 11: March 13-March 14

NPDES PII Small MS4 General Permit Annual Report

Part I. General Information

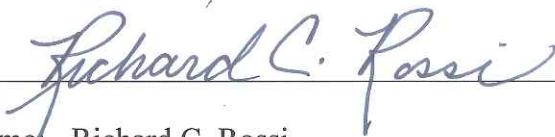
Contact Person: Owen O'Riordan Title: Commissioner, Dept. of Public Works

Telephone #: (617) 349-4845 Email: ooriordan@cambridgema.gov

Certification:

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.

Signature:



Printed Name: Richard C. Rossi

Title: City Manager

Date: May 1, 2014

Part II. Self-Assessment

The City of Cambridge has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions.

Part III. Summary of Minimum Control Measures (MCM)

MCM #1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities Permit Year 12
1.a	Develop Educational and Outreach Material for Residents and Businesses	Commissioner/DPW	(i)Develop 3 brochures or fact sheets (completed under year 1 activities) - Continue the development of relevant materials.	<p>Information was developed on the following and included in the following city publications:</p> <p><u>CityView (Spring/Summer 2013)</u></p> <ul style="list-style-type: none"> • Climate Change: Our Vulnerabilities and Plans to Prepare (p.3), informs the public of the City's climate change efforts and opportunities to get involved. www.cambridgema.gov/climateprep • Household Hazardous Waste Collection Events (p 6) announcement of collection dates. www.cambridgema.gov/recycle • Safely Dispose of Unused Medications, Needles and Syringes (p. 7) describes how residents can dispose of unwanted medications (etc) in a safe and environmentally-friendly manner. <p><u>CityView (Winter 2013-14)</u></p> <ul style="list-style-type: none"> • Alewife Reservation Constructed Wetland Opens (p. 1 and 8) announces the opening and stormwater benefits of the wetland <p><u>The Cambridge Life (2013-2014 Edition)</u></p> <ul style="list-style-type: none"> • Climate Change Preparedness Planning (p. 7) provides an overview of the City's process of identifying potential impacts and development of a preparedness plan. • City Projects Update (p.13) provides updates on the Western Ave Reconstruction Project and the Alewife Sewer Separation Project. <p><u>AccessLetter (August-September 2013)</u> a bimonthly newsletter produced by the Cambridge Commission for Persons with Disabilities</p> <ul style="list-style-type: none"> • Alewife Sewer Separation Project Update (p. 2) discusses the project's environmental goals and benefits and provides a construction update. <p><u>Government Engineering The Journal of Public Infrastructure (Jan-Feb 2014)</u></p> <ul style="list-style-type: none"> • Great Swamp Controls CSOs (Article Reprint) a feature cover story in the Government Engineering publication. Describes the history and benefits of the 	Continue to develop relevant information on stormwater management for residents and businesses.

Revised	<p>Expanded BMP element in Year 3</p> <p>sewer separation project in the Alewife watershed and the stormwater wetland.</p> <p>Copies of the above are provided in Appendix 1. Electronic copies of <i>CityView, The Cambridge Life, and AccessLetter</i> can be found on the following website: www.cambridgema.gov/citynewsandpublications/publications.aspx</p> <p>The DPW also distributes flyers and e-mails to residents near and adjacent to active and proposed construction sites which briefly describes the scope and purpose of these design and construction activities. An example of project that has a stormwater benefit includes:</p> <ul style="list-style-type: none"> • Western Avenue Construction Update (April 2013) • Western Ave Construction Update (June 2013) • Alewife Sewer Separation “Supporting Local Businesses During Construction (March 2014) • Alewife Sewer Separation: Huron A, Huron B and Concord Ave Open House (February 2014) <p>Copies of these notices are included in Appendix 1. Construction notices are also posted on the DPW website, www.cambridgema.gov/theworks/ourservices/engineering/cityconstructionprojects.aspx distributed through e-mail, and hand delivered to residents/businesses in project areas.</p> <p>The Cambridge Water Department (CWD) also provides information on its website regarding projects related to protection of Fresh Pond Reservoir. An example of a current project underway at Fresh Pond includes:</p> <ul style="list-style-type: none"> • Kingsley Park Improvements <p>Copies of the press release and website home page are included in Appendix 1 and can also be found at: www.cambridgema.gov/Water/freshpondreservation/kingsleyparkrestorationproject.aspx</p>	
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1.a cont.	Commissioner/ DPW	(ii) Post information on the web	<p>DPW continued to update its website and make information more readily accessible to the public.</p> <p>The NPDES Phase II Annual Report Year 10, Stormwater Management Program Phase II NPDES Public Meeting 2013 presentation, Joint Public Notice (April 2013) for the Alewife Brook CSO Progress Update, information on water quality and street sweeping were added/revised to the DPW/Stormwater web sites.</p> <p>For examples of some of the content updates made to the web page see Appendix 1 and on the Public Works website at: www.cambridgema/theworks and the Stormwater Management website at: www.cambridgema.gov/theworks/ourservices/stormwatermanagement.aspx</p> <p>DPW launched an official Facebook page during Year 9 and launched a Twitter account in 2012 in an effort to keep residents and other interested persons informed about programs, events, projects, and general updates. DPW continues to update its Facebook and Twitter pages.</p> <p>The DPW Facebook page can be viewed at: www.facebook.com/CambridgeDPW</p> <p>The DPW Twitter feed can be viewed at: https://twitter.com/CambridgeDPW</p>	Continue to update and expand information on our web site that is relevant to the implementation of our stormwater management program.
Revised	Commissioner/ DPW	<p>(iii) Distribute materials</p> <p>Expanded BMP element in Year 3</p>	<p>The <i>CityView</i> newsletter referenced in BMP 1.a (i) above is distributed to over 50,000 households in Cambridge actively receiving mail. <i>CityView</i> is a publication of the City of Cambridge. In addition, copies of <i>CityView</i> are available at various municipal buildings, on-line and are provided in Appendix 1, referenced above under BMP 1.a (i). The <i>Cambridge Life</i> also referenced in BMP 1.a (i) above is another publication of the City of Cambridge. This free magazine is distributed throughout Cambridge through 5 news boxes located in the major squares, and racks within City Hall and other municipal offices, and placed with other groups such as realtors, senior centers, university offices and others. Copies of all of these publications are available on-line and are provided in Appendix 1, referenced above under BMP 1.a (i). DPW also distributed stormwater management materials/brochures at the Rain Barrel distribution events May 23rd). DPW also distributes information electronically (e-mails, e-line, web site, Facebook and Twitter) and in hard copies, as well as, posting notices in local newspapers and hand deliveries to individual homes/businesses.</p>	Distribute information on Stormwater /Watersheds to every household actively receiving mail in Cambridge and/or through electronic media.

1.a cont.		Commissioner/ DPW	(iv) Assess local/regional mass media marketing campaigns Revised in Year 3– new BMP element	The Cambridge Science Festival is a multi-day public celebration offering a wide array of science and technology related activities including tours, displays, and hands-on experiments including water related events sponsored by the City of Cambridge, MIT and others.	Participate in the 2014 Cambridge Science Festival or other public event.
Revised					
1.b Revised	Develop Outreach Materials/Activities for Children	Commissioner/ DPW	Include school children in stormwater outreach activities Revised in Year 5 – [formerly 1.b (i) and (ii)]	<p>This activity was completed in Year 2. Outreach activities to children continue in general including the Cambridge Science Festival discussed in BMP 1.a (iv) above and:</p> <ul style="list-style-type: none"> • DPW Vehicle Road Show held on May 20, 2013 which featured activities explaining how DPW keeps Cambridge Clean, including an hands on demonstration using the EnviroScape model to explain how local waters can become polluted. Pictures from the DPW Road Show are attached in Appendix 1. • The Cambridge Water Department sponsors weeklong activities that highlight watershed protection, water treatment and other water related activities. A copy of the Fresh Pond Day June 8, 2013 flyer and activities schedule is attached in Appendix 1. • The Tobin Montessori School (elementary school): DPW did a presentation on May 2nd on the Alewife Sewer Separation Project and water quality. A copy of the presentation is in Appendix 1 • Vassal Lane Upper School (grades 6-8): DPW did a presentation on March 17th on the Alewife Sewer Separation Project and project benefits. A copy of the presentation is in Appendix 1 	Schoolchildren will be included in stormwater outreach activities in general.
1.c	Develop a Stormwater Web Page	Commissioner/ DPW	(i) Develop a stormwater web page	DPW's Stormwater Management web pages can be viewed at www.cambridgema.gov/theworksourservices/stormwatermanagement.aspx Also refer to BMP 1.a (ii) above.	Completed
		Commissioner/ DPW	(ii) Update stormwater web page	See 1.a. (ii) above.	This site will continue to be updated and expanded

1.d	Create a Catch Basin Curb Marker Program	Commissioner/DPW	(i) Install catch basin curb marker/plaques	DPW installed catch basin curb markers during sidewalk reconstruction projects and our remedial reconstruction projects. A total of 101 have been installed: 88 in the Charles (C), and 13 in the Alewife (A) watersheds under the following contracts: FY13 Misc Sidewalk: C (10) A (2) FY 12 Remedial: C (4) A (5) Chapter 90- Contract 15: C (9) Chapter 90 Contract 16: C (5) Broadway (Third-Ames: C (5) Broadway (Prospect-Portland: C (23) Fawcett St: A (4) Common Manhole #7: C (8) Frost/Forest: C (18) Myrtle/Magnolia: C (6) Contract 12 CambridgePk Dr Area Drainage (Wheeler St): A (2)	Continue to install catch basin curb markers during construction projects.
1.e	Reduce Stormwater Pollution from Automobiles	Assistant City Manager for Community Development/CDD	(i) Sponsor an event to promote alternative forms of transportation	The Community Development Department (CDD) sponsored and participated in many activities promoting alternative forms of transportation during 2013. The CitySmart program is available to all Cambridge residents and public employees. Activities included events for alternative forms of transportation, informational tables, giveaways to cyclists and pedestrians, participation in local bike events/tours/workshops. More information on CitySmart can be found at: www.cambridgema.gov/CDD/Transportation/CitySmart.aspx A sample of activities for City Employees can be viewed in calendar of events in Appendix 1	Alternative forms of transportation will be promoted through activities and events.

MCM #1. Additional Information

- The City of Cambridge's Community Development Department (CDD) monitors 36 currently active PTDM projects, 32 submitted complete monitoring reports in 2013, or 89%. 2013 monitoring reflects:
 - More than 8.6 million square feet of commercial development and 15.5 million square feet of institutional development are subject to annual PTDM monitoring, including Harvard University.
 - A total of 16,862 parking spaces come under the Ordinance, with facility sizes ranging between 3 and 4,576 parking spaces.
 - Approximately 27,825 employees, 9,026 graduate/middle school students, and 1,600 library patrons are covered by PTDM plans in Cambridge.
 - Nineteen of the 36 projects, or 53% met or surpassed their mode split.
 - Thirty-five of the projects, or 97%, submitting reports had a response rate of greater than 60%, giving results a very high degree of reliability.

New PTDM project approved in this period, but not yet implemented:

- Courthouse Redevelopment, 40 Thorndike (Large Project PTDM Plan)

- The City continues to provide a comprehensive City Employee Commuter Benefits to all of its employees. These benefits include subsidized T passes, a free shuttle service, Emergency Ride Home program, a regional car pool matching service, and discounted membership to Hubway. The City also supports bicycle use and walking through the respective city programs and provides an internal web site that provides information on commuter benefits and workshops.
- DPW also sponsored a rain barrel event during Year 11: May 23rd. Approximately 43 barrels were sold through this event. Stormwater management information on Healthy Household Habits, rain gardens, Household Hazardous Waste, etc was distributed with each rain barrel purchased. During our 2013 DPW partnered with GreenCambridge.org to provide assistance or advice on the installation of the rain barrels (see [Appendix 1](#) for copy of assistance letter).
- The Federal Emergency Management Agency issued new Flood Insurance Rate Maps for a portion of Cambridge in 2010. During Year 11 DPW continued to assist residents with these changes through e-mail, phone and help-desk requests for information. DPW has also been working with FEMA on a local Community Rating System (CRS) application that if approved will provide residents with a discount on their flood insurance premiums. It is expected that a full application will be submitted to FEMA in 2014.

MCM #2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 12
2.a	Participate in Public Meetings on Water Quality and Quantity	Commissioner/DPW	(i) Participate in/sponsor a public meeting on water quality/quantity and/or the stormwater management plan	A public meeting to discuss the accomplishments of Year 11 and to discuss potential issues/projects for Year 12 was held on March 25, 2014. A copy of the presentation and sign-in sheet is provided in Appendix 2 . See MCM 2 “Additional Information” at the end of this section for more information on public meetings and outreach efforts.	Public meeting will be hosted by DPW regarding the status of the stormwater management program and/or stormwater issues.
		Commissioner/DPW	(ii) Advertise meeting through various sources	The above meetings were advertised on the city’s web site on the citywide calendar and DPW homepage. In addition the NPDES meeting was posted in the Cambridge Chronicles and posted at the City Clerk’s office at City Hall. A copy of the NPDES meeting notice from the City calendar, DPW website and Cambridge Chronicle are provided in Appendix 2	Meeting will be publicly advertised in local newspapers, through the web site and/or other means.
2.b	Support Volunteer Efforts	Commissioner/DPW	(i) Provide clean-up assistance for one event annually	The City provided support to the Friends of Alewife Reservation for a large clean up at Alewife on April 27, 2013 as part of Park Serve Day.	Support/assistance will be provided for one clean-up event.

2.b cont.	Commissioner/ DPW	<p>(ii) Support educational efforts of local watershed groups as opportunities arise through talks and /or support of grant applications</p>	<p>The DPW gave two tours of the Alewife Stormwater Wetland on May 13, 2013 and November 18, 2013 to Friends of Alewife Reservation members. A copy of the sign in sheet from the May 13th tour and photos are attached in Appendix 2.</p> <p>The Cambridge Water Department supported the efforts of the Friends of Fresh Pond Reservation in their stewardship and educational projects. A copy of their “The Year in Review” for 2013 is attached in Appendix 2 and details the various activities supported by the Water Dept.</p> <p>DPW attended a Mystic River Watershed Association’s meeting on January 8, 2014 and presented a summary of the City’s sewer separation and stormwater management activities in the Alewife sub-watershed. A copy of the presentation is attached in Appendix 2.</p> <p>DPW provided two letters of support for grant application for the Mystic River Watershed Association for activities related to climate change adaptation/resilience planning, and development of a phosphorous TMDL for the Mystic River. Copies of these letters are attached in Appendix 2.</p> <p>See additional outreach and educational efforts listed under “MCM #2. Additional Information” at the end of this section.</p>	The City will continue to provide support to local watershed associations as opportunities permit.
	Commissioner/ DPW	<p>(iii) Seek permission to post links to local watershed groups’ web sites</p>	<p>The Stormwater Management web site was totally reorganized in November 2010. Hyperlinks were confirmed to be current. New information was added</p>	As new information is added to the stormwater management web pages new hyperlinks will be added and updated as needed.

				and where appropriate additional hyperlinks were made.	
2.c	Sponsor Recycling of Hazardous and Solid Waste	Commissioner/DPW	(i) Hold 4 Household Hazardous Waste Collection (HHW) days annually		
Revised		Commissioner/DPW	Hold 3 Household Hazardous Waste Collection days annually (Revised in Year 1)	Three Household Hazardous Waste (HHW) collection days were held this permit year on June 8, July 13 and October 19, 2013. The April 20 th event was cancelled and rescheduled for June 8 th due to lock down conditions associated with the Boston Marathon Bombing. Approximately 12,375 tons of materials have been recycled, including 28.9 tons of HHW.	4 HHW collection days will be held on May 3, June 7, August 23 and October 4, 2014.

2.c cont.		Commissioner/ DPW	(iii) Beginning in yr 2 provide information on illicit discharges and reporting	Information on proper disposal of household hazardous waste and reporting illicit discharge/dumping is provided in the Recycling and Trash Guidelines for Residents. The guidelines were last updated in the fall of 2010 and were mailed to every household. These guidelines were provided to residents when they picked up their 2013 rain barrels together with other stormwater management information. Information on illegal dumping is also provided on the Stormwater Management web page and under FAQ, see: www.cambridgema.gov/theworks/ourservices/stormwatermanagement/faq.aspx	DPW will continue to provide information on illicit discharges and reporting at Household Hazardous Waste events and/or in its meetings, through print materials and online.
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The following BMP was relocated from BMP 5.b and further revised in Year 3.

2.d	Participate in Watershed and Planning Efforts	Assistant City Manager for Community Development/CDD and Commissioner/DPW	(i) Complete Phase I of Concord-Alewife study	Not applicable in Year 11, completed in Year 1. Information from this process can be viewed at http://www.cambridgema.gov/cdd/cp/zng/concalew/index.html	Completed.
		Assistant City Manager for Community Development/CDD and Commissioner/DPW	(ii) Complete Phase II if authorized	Not applicable in Year 11, completed in Year 3.	Completed.
		Assistant City Manager for Community Development/CDD and Commissioner/DPW	(iii) Forward study recommendations to the City Manager for consideration	Not applicable in Year 11, completed in Year 4. The Planning Board submitted the Concord-Alewife rezoning petition to the City Council on April 25, 2005. This petition was based on the zoning recommendations of the Concord-Alewife Planning Study Committee. The petition was resubmitted by the City Council on February 21, 2006. The Concord-Alewife Rezoning and Design Guidelines were adopted by the City Council on June 26, 2006. The changes have been incorporated into the Cambridge Zoning Ordinance and Zoning Map.	Completed

2.d cont.		Commissioner/ DPW	(iv) Discuss Concord-Alewife Stormwater Management strategies at a public meeting	Not applicable in Year 11, completed in Year 4. DPW participated in a City Council Ordinance Committee meeting on environmental and infrastructure issues with regard to the Concord/Alewife proposed zoning amendment on June 13, 2006. Issues on water quality/quantity in the Concord-Alewife area were discussed.	Completed.
		Commissioner/ DPW	(v) Publish LID guidelines	Not applicable in Year 11, completed in Year 4. DPW published the Concord-Alewife Stormwater Management Guidelines in May 2006. A copy can be found at: www.cambridgema.gov/theworks/ourservices/stormwatermanagement/stormwaterresources.aspx	Completed.
		Commissioner/ DPW	(vi) Place LID document on the Stormwater web site	Not applicable in Year 11, completed in Year 4 (see BMP 2.d.(v) above).	Completed
		Commissioner/ DPW	(vii) Execute the Environmental Joint Powers Agreement (EJPA)		
<i>revised</i>			Work with EOEA to advance the EJPA to a final document (Revised in Year 1)	Not applicable in Year 11. The final EJPA was fully executed on March 4, 2005 and forwarded to EOEA. (see 2.d (viii) below for update on the extension of the expired EJPA agreement).	Completed.

2.d cont.	Commissioner/ DPW	(viii) ABC Flooding Board to meet 4 times annually	The ABC Flooding Board did not meet during Year 11. The Environmental Joint Powers Agreement (JPA) that authorized the ABC Flooding Board had expired during Year 10 and State Senator William Brownsberger filed a bill to extend the JPA. In November 2013 the legislation was signed by the Governor and the City of Cambridge approved the extension on January 27, 2014. Within 30 days after the approval by the Cambridge city manager and the boards of selectmen of the towns of Arlington and Belmont, the Cambridge city manager and the boards of selectmen shall each submit the written notice of their approval to the Secretary of Energy and Environmental Affairs, who shall hold a public hearing within 60 days after receipt of all such notices. Within 30 days after the hearing, the secretary shall issue its decision of approval or disapproval to the office of the senate clerk. If approved by the secretary and submitted to the senate clerk, the 2005 environmental joint powers agreement shall be effective retroactively from the date of its expiration in 2010 until December 31, 2017. We are still awaiting notice of the public hearing by the Secretary of Energy and Environmental Affairs before resuming meetings. A copy of the City of Cambridge letter approving the extension of the ABC Flooding Board is attached in Appendix 2	Once reauthorized the ABC Flooding Board will resume meeting 4 times per year.
<i>revised</i>		Schedule Revised in Year 1		
	Commissioner/ DPW	(ix) Finalize Tri-Community Working Group's <u>Progress Report</u>	Not applicable in Year 11, this report was finalized in Year 3	Completed.
<i>revised</i>				
	Commissioner/ DPW	(x) Place Tri-Community Working Group's <u>Progress Report</u> on web site	Not applicable in Year 11. This report was placed on the web site in Year 4 see: <u>www.cambridgema.gov/theworksourservices/stormwatermanagement/stormwaterresources.aspx</u>	Completed.
<i>revised</i>				

MCM #2. Additional Information

- The Cambridge Department of Public Works (DPW) began the design of the 1st phase of the Alewife Sewer Separation Project, Huron A, during Year 8. This project is a three phase program that is a part of the Massachusetts Water Resources Authority's Long Term CSO Control Plan for the Alewife Brook: Huron A, Huron B and Concord Avenue Neighborhood. In total the Alewife Sewer Separation Project will separate combined sewers in an area of approximately 220 acres. Huron A began construction in October 2012, Huron B (Phase 2) began construction in September 2013, and Concord Avenue Neighborhood

(Phase 3) began construction in January. When sewer separation is completed in the three project areas (December 2015) separated stormwater will discharge to the newly constructed stormwater wetland. During Year 11 there were ten (10) community meetings to discuss these sewer separation projects. Community design discussions have centered on the environmental goals of this project to separate the combined sewer system, how to best treat the newly separated stormwater, ways to manage/infiltrate the stormwater through the design of the street restoration project and private inflow removal benefits. In addition to community meetings/presentations efforts to reach the broader community included open houses, neighborhood BBQs and tree walks. Detailed information regarding these projects and the meeting presentations can be found on the City Projects website at: www.cambridgema.gov/theworks/cityprojects.aspx under Huron A Improvements, Huron B Improvements and Concord Avenue Neighborhood respectively.

- The Cambridge Water Department began a design process for the restoration of Kingsley Park within the Fresh Pond Reservation during Year 10. Restoration will include improvements to water quality and accessibility, ecological health, erosion impacts and compaction impacts due to invasive species. The multi-phased improvement project will commence with Phase I during Year 11. More information on the Kingsley Park restoration can be found at:
<http://www.cambridgema.gov/water/freshpondreservation/kingsleyparkrestorationproject.aspx> . Copies of the Press Release and website project page are attached in Appendix 1 above.
- The tri-community working group (ABC Flooding Board) worked with the USGS on a cooperative watershed effort to install a flow gage along the Alewife Brook to obtain and share important hydraulic information. The gage became functional in August 2005. Arlington, Belmont and Cambridge are continuing to participate on an equal financial and resource basis for the gauging station's installation and maintenance. This will ensure that this gage will not be affected by Massachusetts funding cuts and Federal Sequestration. The real time flow measurements can be observed at
<http://waterdata.usgs.gov/ma/nwis/uv?01103025> .
- DPW began the construction of the CambridgePark Drive Area Drainage Improvements Project and Stormwater Wetland Project during Year 10 and was completed and open to the public on October 15, 2013. This project is a key component of the Alewife Sewer Separation program to reduce Combined Sewer Overflows to the Alewife brook. See the project website for more information:
www.cambridgema.gov/theworks/cityprojects/detail.aspx?path=%2fsitecore%2fcontent%2fhome%2ftheworks%2fcityprojects%2f2011%2fcambridgeparkdrivewetlands . An extensive outreach program has surrounded this construction activity. Nine (9) tours of the stormwater wetland were conducted to discuss the stormwater wetland and its benefits and construction process:
 - Harvard Graduate School of Design: April 22, 2013
 - Friends of Alewife Reservation: May 13, 2013
 - Committee on Public Planting: July 10, 2013
 - Community Development Department's Transportation Committee: July 11, 2013
 - Team GreenSense: July 23, 2013

- DPW Division Heads: September 17, 2013
 - Alewife Reservation Constructed Stormwater Wetland: October 15, 2013 (see [Appendix 2](#) for program)
 - Friends of Alewife Reservation: November 18, 2013
 - Brandeis University: December 4, 2013

 - Climate Change, Resilience and Adaptation: The City of Cambridge continued work on the climate change vulnerability assessment. A number of analyses are being performed to inform the assessment and a significant amount of public outreach and engagement is being conducted. The City is aiming to complete the vulnerability assessment in the fall of 2014 and then begin soon after on the climate change preparedness plan.
- Over the course of the past year, the project has:
- Completed downscaling of global climate change models to generate future ranges of temperature, dewpoint, and precipitation.
 - Through the U.S. Army Corps of Engineers, completed an urban forest vulnerability assessment, which evaluates about 60 tree species common the City's street and park tree inventory for their sensitivity to increased temperatures and flooding.
 - Coordinated with the Massachusetts Department of Transportation and their consultants to set up the ADCIRC model analysis of coastal storm surge flooding and harmonize model inputs and assumptions. Cambridge has also coordinated similarly with the Boston Water and Sewer Commission since they are developing a long term facilities plan that takes climate change into account.
 - Refined hydrologic modeling of the Charles River through the City's consultant, MWH.
 - Developed modeling capacity to assess the risks of more extreme precipitation to the city.
 - Prepared modeling of Alewife Brook under future storm conditions and storm surges on the Mystic River.
 - Refined protocols for the public health and economic impact analyses.
 - Met with the Expert Advisory Panel to review technical protocols and methodologies and met with the Technical Advisory Committee to refine the vulnerability assessment methodology.
 - Held a public meeting attended by approximately 80 people to present an overview of the vulnerability assessment project and solicit input on social vulnerability using a table top exercise.
 - Made presentations to about 40 community organizations, such as neighborhood and business associations, to raise awareness of the vulnerability assessment and collect early input. A survey was also distributed at the meetings and online. Approximately 900 people have heard the presentations and about 350 survey responses have been received.

 - The Cambridge Water Department sponsored “*Monday Nights at Fresh Pond*”. A series of Fresh pond watershed activities providing information on volunteer opportunities and training, tours of the water treatment facility, workshops on plant identification, tours of recently restored, ongoing and future restoration areas and discussion of how these projects achieve the

Fresh Pond Master Plan goals of accessibility, water quality and ecological sustainability. See a description and schedule of the Year 10 activities in [Appendix 2](#).

MCM #3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 12
3.a	Update Stormwater Drainage System, Outfalls and Receiving Waters in GIS	Commissioner/DPW	(i) Map Fresh Pond outfalls	Not applicable in Year 11	Completed.
		Commissioner/DPW	(ii) Migrate existing GIS database to a new format	Completed in Year 3.	DPW staff will primarily be responsible to maintain the GIS database. As-built information will be added to keep the system up to date.
		Commissioner/DPW	(iii) Track private structural controls in a database	Private structural controls are tracked in a database (see Appendix 3). Approximately 97 projects underwent DPW site plan review (see Appendix 3).	DPW will continue to track private structural controls through our site plan review and inspection process.
		Commissioner/DPW	(iv) Catalogue record drawings	Cataloguing of record drawings was not necessary. The contract to update the GIS database included scanning record drawings and has been completed in Year 3. A catalogue of updated information is available to query.	Record drawings and as-built information will continue to be added on an ongoing basis.
		Commissioner/DPW	(v) Train engineering staff on new GIS software	Not applicable in Year 11 this was completed in Year 3.	Completed.
		Commissioner/DPW	(vi) Begin updating GIS information with as-built/record drawings	As-built and record drawings are updated on an ongoing basis.	Record drawings will be linked as they become available.

3.b	Detect and Eliminate Illicit Discharges	Commissioner/DPW	(i) Perform routine water quality sampling	<ul style="list-style-type: none"> In the Charles River watershed twenty-five (25) outfalls were inspected/ sampled for dry weather flow: eight (8) were sampled/inspected once, twelve (12) were inspected/sampled twice, and five (5) were inspected/sampled three times. Of the above outfalls, three (3) outfalls (River, Brewer and JFK east) were inspected, but not sampled due to the lack of dry weather flow. In the Alewife Brook watershed sixteen (16) outfalls were sampled: five (5) were sampled/inspected once, one (1) was sampled/inspected two times, nine (9) were sampled/inspected three times, and one (1) was sampled/inspected four times. Of the above outfalls, six (6) outfalls (Russell Field (5) and Blanchard Road) were inspected, but not sampled due to the lack of dry weather flow <p>See Appendix 3 and Part IV of this report for sampling locations.</p>	Water quality samples will continue in each watershed for all known City of Cambridge outfalls.
		Commissioner/DPW	(ii) Test one location in each watershed for oil and grease annually	.	One location in each watershed will be tested for oil and grease.
Revised			(Revised for Year 2 only)	Four (4) oil & grease samples were done during Year 11: two (2) samples in the Charles and two (21) in Alewife. (See Appendix 3).	
		Commissioner/DPW	(iii) Perform additional water quality testing and field investigations as necessary	Additional water quality testing was performed to isolate the location of illicit discharges and to confirm their successful removal.	We will perform additional water quality testing and field investigations as necessary.
Revised			Revised in Year 3 Expand Water Quality testing in both watersheds	See 3.b (i) above	All known Cambridge Outfalls will be sampled in the Charles and Alewife watersheds.

3.b cont.		Commissioner/ DPW	(iv) Identify and remove illicit discharges	Two (2) Illicit discharge/connection were discovered and two (2) were removed as follows:: <ul style="list-style-type: none">• Amherst Alley (Common Manhole 7 contract)• Volpe Center (Common Manhole 7 contract)	We will continue to monitor for and remove illicit discharges.
		Commissioner/ DPW	(v) Perform water quality sampling at a Fresh Pond outfall annually	Twelve (12) water quality samples were taken from three ponds that surround Fresh Pond including: Little Fresh Pond, Black's Nook, and North Pond (see Appendix 3 for sampling data). In addition samples/profiles were collected for Fresh Pond Reservoir at 3 different locations several times during the year.	Water quality sample will be taken at Fresh Pond Reservation annually.
		Commissioner/ DPW	(vi) Purchase sampling equipment as recommended by EPA's Lower Charles IDDE Protocol	Not applicable in Year 11. Sampling equipment was purchased in Year 4.	Supplies will be purchased as needed.

3.b cont.		Commissioner/ DPW	(vii) Investigate Sparks Street drainage area	<p>Investigation of the Sparks Street drainage area using the Charles River IDDE Protocol began in the Summer of 2006. Approximately 85% of this investigation is complete. The following items need to be addressed before this investigation can be completed:</p> <ul style="list-style-type: none"> • A few pipes were found to be in disrepair and required rehabilitation before additional testing could resume in this area due to the influence these pipe have on the downstream system. The pipe lining contract for Year 11 was delayed, but will proceed in Year 12. • Two (2) Common Manholes (CMH) were discovered in a sewer easement on private property between Fernald Drive and Linnaean Street within the catchment. These CMHs were scheduled to be separated under the CMH #7 contract, but legal issues regarding construction access has delayed their separation.. 	<p>Investigation into the Sparks Street drainage area will continue following the repair of cracked pipes in this system and CMH separation.</p> <p>The cracked pipes will be lined during Year 12 under a pipe lining contract.</p> <p>Pending resolution of the access issues separation of the 2 common manholes will be separated in Year 12.</p>
		Commissioner/ DPW	(viii) Investigate Lechmere Canal drainage area.	<p>Completed as far as possible due to influence of Charles River.</p> <p>Investigation of the Lechmere Canal drainage area using the Charles River IDDE Protocol was begun in Year 5. Approximately 75% of the manholes have been checked. The remaining manholes are influenced by back flow from the Charles River and are extremely difficult to isolate.</p>	Completed.

3.b cont.		Commissioner/ DPW	(ix) Separate Common Manholes (CMH).	<p>Twenty-seven (27) CMHs were separated during Year 11 in the follows contracts:</p> <ul style="list-style-type: none"> • CMH Contract #7 (22) <ul style="list-style-type: none"> ◦ Main Street (2) ◦ Amherst Alley (1) ◦ Bay Street (1) ◦ Decatur St (2) ◦ Valentine St (1) ◦ Emily St (1) ◦ Speridakis (2) ◦ Tudor St (1) ◦ Franklin St (2) ◦ Hamilton St (1) ◦ Anglim (1) ◦ Wadsworth (2) ◦ Murray Hill Road (3) ◦ Volpe (2) • Huron A (5) <ul style="list-style-type: none"> ◦ Grozier Rd (3) ◦ Lexington Ave (1) ◦ Larch Rd (1) 	<p>The number of Common Manholes separated in separated drainage areas will be counted.</p> <p>CMH #7 contract was estimated to have 34 CMHs. During construction it was found that there were only 31 CMHs of which six CMHs had previously been separated, twenty-two were separated under CMH #7 and three were unable to be separated due to structural and legal access issues. During Year 12 DPW will work to resolve these issues and seek to separate the remaining three CMHs in CMH Contract #7 .</p>
		Commissioner/ DPW	(X) Perform wet weather water quality sampling at 2 outfalls annually	Cambridge began a wet weather sampling program in Year 5 by sampling 2 outfalls in catchment areas not influenced by common manholes, one catchment in the Alewife watershed (Normandy Terrace) and one in the Charles River watershed (Sparks Street). Two (2) samples were taken at each of these locations during Year 11. Sample results are provided in Appendix 3 .	Cambridge will continue to take wet weather samples at the same 2 outfalls (Sparks Street and Normandy Terrace) and monitor sampling results.
3.c	Conduct Illicit Discharge Education Program	Commissioner/ DPW	(i) Advertise illicit discharge hotline number and information on illicit discharges	The hotline number was not added to any new material during Year 11. Hotline information was included in the <i>Recycling and Trash Guidelines for Residents</i> updated Fall 2010. The recycling guidelines are posted on the DPW website and are available in Spanish, Portuguese, Creole, Chinese and Ethiopian.	The Stormwater Hotline number for illicit discharges will be incorporated in public information where appropriate/applicable.

3.d	Develop Regulations Prohibiting Illegal Dumping of Non-Stormwater into the MS4	Commissioner/DPW	(i) Develop a working draft	Not applicable in Year 11, completed in Year 1.	Complete.
		Commissioner/DPW	(ii) Provide opportunity for peer and legal review of draft	Not applicable in Year 11, completed.	Completed.
		Commissioner/DPW	(iii) Revise draft as necessary	Not applicable in Year 11, completed in Year 5.	Completed.
		Commissioner/DPW	(iv) Present regulations/ordinance to City Council for consideration for adoption	Not applicable in Year 11, completed in Year 5. A copy of the Wastewater and Stormwater Drainage System ordinance can be viewed on line at www.cambridgema.gov/theworks/ourservices/stormwatermanagement/ordinanceandregulations.aspx	Completed.

MCM #3. Additional Information

- CMHs are underground structures that allow people to access both sewer and storm drainpipes through a single structure. Typically, the drainage system runs above the sanitary system, separated by a steel plate. Over time the steel plate deteriorates causing sewerage to mix with stormwater. This can lead to two problems during storm events. First it can cause stormwater to enter and overwhelm the sanitary system causing sewerage to overflow and back-up on to the street or into basements. Second, untreated sewerage can enter the storm drain system and be released into either the Charles River or Alewife Brook. See [Appendix 3](#) for a map of the common manholes that have been separated throughout Cambridge. Approximately 315 common manholes have been separated through March 1, 2013 in separated catchment areas.
- During Year 11 Cambridge completed the separation of 27 CMHs in the City. See above for more information.
- Effective January 1, 2010 the City enacted a new Ordinance governing the maintenance and operation of dumpsters of all new and existing dumpsters, including construction dumpsters. The ordinance requires that no dumpster be placed so that any liquid or runoff from the dumpster shall enter any catch basin or storm drain. In Year 11 the city issued 869 dumpster licenses

under the new ordinance. Of these licenses 211 are temporary and are for construction or property clean out activities.

- Additional Sampling by others: The Mystic River Watershed Association (MyRWA) performs hot spot wet weather sampling for monitoring purposes in the Mystic River Watershed which includes Wellington Brook in Belmont and Cambridge and the Little River in Arlington, Belmont and Cambridge. MyRWA shares this data with the local communities, DEP and EPA. Cambridge reviews these results and discusses exceedances with MyRWA. Copies of MyRWA's hot spot sampling report for Alewife Brook, Little River and Spy Pond Survey, dated September 16, 2013, and Malden River, Little Creek, Malden Canal and Spot Pond Brook Survey dated November 14, 2013 are attached in [Appendix 3](#).

MCM #4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 12
4.a	Develop Program for Construction Site Runoff Control	Commissioner/DPW	(i) Review existing planning and construction procedures	Not applicable in Year 11, completed.	Complete
		Commissioner/DPW	(ii) Clarify needed regulatory mechanism	Not applicable in Year 11, completed.	Complete
		Commissioner/DPW	(iii) Develop draft regulatory mechanism, procedures and guidelines	Not applicable in Year 11, completed during Year 5. Land Disturbance Regulations were finalized following the adoption of the revisions to Cambridge Municipal Code Chapter 13.16 Wastewater and Stormwater Drainage System. http://www.cambridgema.gov/theworks/our/services/stormwatermanagement/ordinanceandregulations.aspx	Completed.
		Commissioner/DPW	(iv) Present draft to City Manager, City Council and the community for review	Not applicable in Year 11. On October 29, 2007 the City Manager submitted a comprehensive revision to Chapter 13.16 of the Cambridge Municipal Code “Sewer System Regulations” to ensure this ordinance fully complies with the NPDES Phase II requirements for stormwater management as it relates to construction site runoff. On January 28, 2008 the City Council ordained the Wastewater and Stormwater Drainage System ordinance by a vote of 9-0-0. This ordinance authorized the Commissioner of DPW to promulgate regulations to enforce the ordinance. A copy is posted on the DPW stormwater website. http://www.cambridgema.gov/theworks/our/services/stormwatermanagement/ordinanceandregulations.aspx	Completed.

4.a Cont.		Commissioner/ DPW	(v) Amend draft as necessary and submit for consideration for adoption	Not applicable in Year 11, completed in Year 5.	Completed.
		Commissioner/ DPW	(vi) Record number of required Stormwater Management Permits submitted	<p>Fourteen (14) Stormwater Control Permits (formerly Land Disturbance Permits) were submitted for the following projects:</p> <ul style="list-style-type: none"> • 240 Sidney Street • 300 Massachusetts Ave • 75 New Street • 262 McGrath O'Brien Highway • 125 CambridgePark Drive • 21 Wendell Street • 165 CambridgePark Drive • 114 Mt. Auburn Street • 215 McGrath O'Brien Highway • 219 Vasser Street • 1924 Massachusetts Ave • 1801 Massachusetts Ave • 100 Putnam Ave • 33 Cottage Pk Dr. 	The number of Stormwater Control Permit applications will be tracked.
		Commissioner/ DPW	(vii) Provide stormwater management guidance materials or references	No additional guidance materials or BMP fact sheets were developed during Year 11.	Continue to maintain and revise guidelines as necessary.
		Commissioner/ DPW	(viii) Adopt procedures for inspections during construction activities.	A peer review of inspection was completed. Inspection procedures are incorporated into the Land Disturbance Regulations (Article VII) and will be further clarified in the guidance documents as necessary.	Incorporate inspection procedure information in the guidance document as necessary.
		Commissioner/ DPW	(ix) Adopt procedures for enforcement and penalties for violations.	<p>Compliance and enforcement procedures are included in the Land Disturbance Regulations (Article X).</p> <p>In Year 8 DPW developed a "WARNING" ticket to be used for stormwater violations. Implementation of the ticketing program began Year 9 (see BMP 4 (a) (ix) below).</p>	Complete.

4.a cont.		Commissioner/ DPW	(x) Record the number of enforcement actions taken and reported	<p>When DPW finds a site without proper erosion control in place we work with them to bring it into compliance. There were 11 Erosion and Sedimentation Control WARNING tickets issued for stormwater related violations at the following locations:</p> <ul style="list-style-type: none"> • 215 McGrath O'Brien Highway • 1801 Massachusetts Ave (2) • 76 Sparks Street • 603 Concord Ave • 671 Concord Ave • Myrtle/Magnolia • 355 Fresh Pond Pkwy • 159 First St • 12-14 Avon Pl • Waterhouse @ Concord Ave <p>These Warnings are tracked in a database rather than using the Cambridge Request System (CRS).</p>	The number of enforcement action taken and reported will be tracked in a database. The new "Warning" ticket will be used to track stormwater violations.
4.b	Educate Contractors and Residents about the Construction Site Runoff Control Program	Commissioner/ DPW	(i) Make materials available on erosion and sediment control practices available through city web site and/or other means	<p>Completed.</p> <p>See BMPs for Construction Controls: http://www.cambridgema.gov/theworks/our/services/engineering/Resources/contractorresources.aspx</p>	Post erosion & sediment control information as it becomes available.
		Commissioner/ DPW	(ii) Discuss erosion and sediment control practices and problems at 3 construction coordination meetings annually	<p>DPW holds weekly meetings with large contractors during April – November. Erosion and sediment control practices and problems with permitted contractors working in the City are discussed during these meetings. Erosion and sedimentation control was discussed at the following meetings including: May 13, 2013, July 15, 2013 and March 24, 2014. Copies of sign-in sheets and meeting notes are provided in Appendix 4.</p> <p>In addition, DPW held a mandatory information session on March 10, 2013 for contractors regarding DPW expectations</p>	The City Engineer will discuss erosion and sediment control practices and problems with contractors at 3 construction coordination meetings.

4.b cont.				before, during and after construction. One topic covered at this meeting was erosion and sediment control. A copy of the meeting invitation, sign-in sheet and presentation are provided in Appendix 4 .	
New		Commissioner/ DPW	(iii) Record the number of guidance materials or reference materials provided.	No additional fact sheets were developed during Year 11. See BMP 4.b (i) above for a link to the current fact sheets.	Develop and/or revise specification, fact sheets or other guidance documents, as necessary.
		DPW	(iv) Create a list of resources, which provides BMP suggestions for the targeted pollutants of concern.	Completed. See BMP 4.b (i) above for a link to the current fact sheets.	Completed.
		Commissioner/ DPW	(v) Record the number of workshops or meetings with City departments to discuss implementation of plan requirements	No meetings were held in Year 11.	Meetings will be held to discuss new ordinances and regulations as necessary.

MCM #4. Additional Information

- The City's Wastewater (Stormwater) Compliance Officer completed two hundred and twenty seven (227) inspections:
 - 208 stormwater erosion and sediment control site inspections,
 - 8 sewer use compliance inspections, and
 - 11 violation sites for erosion and sediment control.

MCM #5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 12
5.a	Revise Sewer Use Regulations and Guidance	Commissioner/DPW	(i) Complete a working draft	Not applicable in Year 11, this activity was completed in Year 4.	Completed.
Revised	Develop Program for Post Construction Site Runoff Control		(Revised in Year 3)		
		Commissioner/DPW	(ii) Undertake and complete peer review and legal review of draft	Not applicable in Year 11, completed in Year 5. The Regulations and Ordinance can also be viewed on-line at: http://www.cambridgema.gov/theworks/ourservices/stormwatermanagement/ordinanceandregulations.aspx	Completed.
		Commissioner/DPW	(iii) Develop draft guidelines on BMPs	No new fact sheets were developed in Year 11.	Stormwater management guidance will continue to be revised.
		Commissioner/DPW	(iv) Discuss final draft and guidance with City Manager, City Council and the community	Not applicable in Year 11, complete in Year 5. On October 29, 2007 the City Manager submitted a comprehensive revision to Chapter 13.16 of the Cambridge Municipal Code “Sewer System Regulations” to ensure this ordinance fully complies with the NPDES Phase II requirements for stormwater management as it relates to construction site runoff. On January 28, 2008 the City Council ordained the Wastewater and Stormwater Drainage System ordinance by a vote of 9-0-0. This ordinance authorized the Commissioner of DPW to promulgate regulations and guidance documents to enforce the ordinance. A copy of the Ordinance and Regulations can be viewed on the DPW Stormwater website: http://www.cambridgema.gov/theworks/ourservices/stormwatermanagement/ordinanceandregulations.aspx	Completed.

5.a Cont.	Commissioner/ DPW	(v) Present final regulation, guidance and monitoring program for consideration and adoption	<p>Not applicable in Year 11, completed in Year 5. The Commissioner of Public Works promulgated Land Disturbance Regulations and Wastewater and Stormwater Drainage Use Regulations.</p> <ul style="list-style-type: none"> <input type="checkbox"/> The Wastewater and Stormwater Drainage Use Regulations are intended to protect the public health, safety and welfare and the environment and to ensure proper and safe operation of the City's Sanitary Sewers, Combined Sewers and Stormwater Drains by regulating the direct and indirect discharge of Waste, stormwater and pollutants to the City's Wastewater and Stormwater Drainage system. These Regulations are also intended to prohibit and remove illicit connections and unauthorized discharges to the City's Stormwater Drainage system. This includes the legal authority to carry out all inspection, surveillance and monitoring procedures necessary to comply with this Regulation. <input type="checkbox"/> The Land Disturbance Regulations are intended to reduce pollutants in stormwater runoff from construction activities and to address post construction stormwater runoff from new development and redevelopment projects. These Regulations include procedures for inspection and enforcement. <p>A copy of the Ordinance and Regulations can be viewed on the DPW Stormwater website (see MCM 5.a (ii) above).</p> <p>Staff continued to review Regulations for revisions. These changes are still draft and have not yet been advertised.</p>	Guidance documents will continue to be revised. Land Disturbance Regulations (now Stormwater Control Regulations) will be revised to reflect new permits and permit names.
	Commissioner/ DPW	(vi) Record the number of meetings held by the City for the regulatory process	The regulatory process is complete. No further regulatory meetings are planned.	Complete.
	Commissioner/ DPW	(vii) Administer stormwater management permit requirements	<p>Administration of the Stormwater management permit [Stormwater Control Permit (SCP)] requirements is ongoing. A database was developed to track SCPs to facilitate reviews, construction inspections and post-construction inspections. There were 14 Stormwater Control Permits submitted in Year 11.</p> <p>Refer to summary attached in Appendix 5.</p>	Track Stormwater Control Permits in a database.

5.a cont.		Commissioner/ DPW	(viii) Administer procedures for enforcement and penalties for violations	Not applicable in Year 11, completed in Year 6.	Completed.
		Commissioner/ DPW	(ix) Adopt procedures for post construction inspections	<p>Completed.</p> <p>Procedures for Post-Construction inspections are incorporated in the Draft guidance documents and were included in the Land Disturbance Regulations in Year 5. On June 11, 2009 the City hired a full time Wastewater (Stormwater) Compliance Officer whose job responsibilities include performing post-construction inspections.</p> <p>The compliance officer created and maintains a private BMP database for use in post construction inspections. A copy of the Private Property BMPs installed during Year 11 is attached in Appendix 3. Twenty-seven (27) post-construction inspections were performed during Year 11, seventeen (17) of these properties have Stormwater Control Permits. See more information in the "Additional Information" section below.</p>	A data base for projects with private BMPs regulated under the Land Disturbance Regulations will be maintained. Track the number of Post-Construction inspections performed.
		Commissioner/ DPW	(x) Discuss alternatives to ensure adequate long-term operation and maintenance of BMPs	<p>Completed.</p> <p>Owner's are required to perform long-term operation and maintenance of BMPs as follows:</p> <ul style="list-style-type: none"> • Owner is responsible for ongoing maintenance, inspections, recordkeeping and reporting. • Owner is required to maintain log and update plan. New owner must submit a new plan. • Applicant is responsible for adhering to design standards. Plan requirements and guidance will be provided in the guidance documents • The Plan and Logs are required to be made available for inspection upon request by any public entity with administrative, health, environmental, or safety authority over the site. <p>It is expected that the Wastewater Compliance Officer will work with property owners to ensure that their BMPs are being maintained.</p>	DPW will continue to work with property owners by performing inspections on properties with Stormwater Control Permits. Stormwater Compliance officer will check his data base for inspection dates and will perform inspection following the sites long term O&M plan.

5.a cont.		Commissioner/ DPW	(xi) Provide legal mechanism to require annual compliance for the operation and maintenance of BMPs	Not applicable in Year 11, completed in Year 5. The Land Disturbance Regulations provide for Post-Construction inspection and enforcement of provisions in the Regulations.	Completed.
5.b	Undertake Tree Protection Activities	Commissioner/ DPW	(i) Provide one community outreach and education activity annually on the care, importance and protection of trees and their role in climate protection	The City Arborist participates in varied outreach activities each year. During Year 11 activities included: <ul style="list-style-type: none"> • May Fair in Harvard Square – How to use a gator bag display • Arbor Day – Planted 6 bare root trees with a local Girl Scout troop at the Cambridge Cemetery • Continued our Water by Bike/Tree Ambassador, Tree Inventory, and Junior Forester Programs The arborist also works closely with the Public Planting Committee and administers Tree hearings for the removal of trees from the public way.	DPW will continue outreach efforts on the importance and protection of trees.

MCM #5. Additional Information

- DPW's arborist has monthly meetings with the Committee on Public Planting regarding the benefits of green space and trees.
- The City's Wastewater (Stormwater) Compliance Officer conducted twenty-seven (27) post construction inspections. Seventeen (17) of these properties have Stormwater Control Permits (SCP) and post-construction O&M Plans as follows:
 - 87 New Street - SCP
 - 95-97 Pine St - SCP
 - 200-300 Acorn Park Dr - SCP
 - 517 Concord Ave - SCP
 - 61-69 Bolton Street - SCP
 - 265/281 Albany St - SCP
 - 61 Moulton St/665 Concord Ave - SCP
 - 277 Broadway - SCP
 - 1066 Cambridge Street - SCP
 - 259 Harvard Street – SCP
 - 625 Putnam Ave – SCP
 - 430 Windsor St – SCP
 - 150 Second Street – SCP
 - 1-7 Brattle Circle - SCP
 - 7 Cameron Ave - SCP
 - 50 Rogers Street - SCP
 - 25 Francis St - SCP
 - 92 Gore St
 - 72 Alpine St
 - 180 Fawcett St
 - 126 Charles St
 - 66-72 Hamilton Street
 - 298 Harvard St
 - 54 Garden St
 - 1 Follen Lane
 - 66 Thorndike St
 - 45 Highland St

MCM #6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 11 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 12
6.a	Educate Municipal Employees about Pollution Prevention	Commissioner/DPW	(i) Provide stormwater training for municipal employees annually	<p>During Year 10 DPW purchased <i>RAINcheck Stormwater Pollution Prevention for MS4s</i> from Excal Visual as a training aid for employees. During Year 11 seventy-one(71) municipal employees were trained as follows:</p> <ul style="list-style-type: none"> • DPW Building Maintenance (4) • DPW Cemetery (7) • DPW Vehicle Maintenance (5) • DPW Operations (10) • DPW Parks (27) • Human Services Russell Field and Golf Course (5) • DPW Street & Sewer <p>Attached in Appendix 6 is a copy of the sign-in sheets.</p>	Conduct training annually. Use the <i>RAINcheck Stormwater Pollution Prevention for MS4s</i> to train individual division personnel.
		Commissioner/DPW	(ii) Work with managers to identify operations personnel with stormwater responsibilities	<p>A list of responsible operations personnel with stormwater responsibilities is maintained. During Year 11 DPW trained six (6) DPW divisions and personnel from the Human Services Department on proper municipal Operation & Maintenance practices through the use of the <i>RAINcheck Stormwater Pollution Prevention for MS4s</i> (see BMP 6.a(i) above).</p>	DPW will continue to work with facility managers to ensure Good Housekeeping inspections are done properly.

6.a Cont.		Commissioner/ DPW	(iii) Develop and implement training protocols that are applicable to operations	Not applicable in Year 11, completed in Year 5.	Completed.
		Commissioner/ DPW	(iv) Record number of municipal facilities inspected on an annual basis	147 facility inspection reports have been completed and returned to DPW (see summary sheet in Appendix 6). This represents 92% of the facilities in separated areas and 98% of the facilities in combined sewer areas.	Number of good housekeeping inspections completed by facility personnel on an annual basis will be recorded.
		Commissioner/ DPW	(v) Record number of facilities that have initial good housekeeping inspections conducted	Not Applicable in Year 11, completed in Year 8. All municipal facilities have had an initial inspection.	Completed.
		Commissioner/ DPW	(vi) Record the number of municipal facility site plans updated, including structural controls based upon initial site visits.	The site plan for Black's Nook within the Fresh Pond Reservation was updated to reflect the improvements made during the Black's Nook Restoration Project. A copy of the revised site plan is in Appendix 6	Municipal facility site plans will be updated based upon revised information from the initial site inspections.
6.b	Maintain Strong Operations & Maintenance Program to Reduce Pollutants from Operations	Commissioner/ DPW	(i) Review operations and maintenance programs	There were no new activities identified in Year 11.	New activities at facilities should be noted and applicable BMPs implemented.
		Commissioner/ DPW	(ii) Identify municipal facilities in separated areas and identify structural controls	Completed. 156 municipal facility sites were mapped in GIS according to location in separated or combined sewer areas. 93 facilities lie within a combined sewer area and 63 lie within a separated stormwater area.	Continue to incorporate facility inspection drainage findings into the City's GIS system. Continue to develop updated facility maps as necessary for staff (refer to 6.a. (vi) above.

6.b cont.		Commissioner/ DPW	(iii) Document inspections procedures and maintenance schedules in a procedures manual	Not applicable in Year 11, Good Housekeeping Inspection Manuals have already been developed for municipal facilities.	Completed. Update as necessary.
		Commissioner/ DPW	(iv) Develop inspections procedures and maintenance schedules for long term structural controls	Over 4,092 work orders were tracked for catch basin and drainage system inspection, repairs, maintenance, clean, clear in the Cambridge Request System. A summary of all work orders submitted relative to the stormwater drainage system is in Appendix 6 .	The DPW will keep track of the number and type of drainage system work orders completed, as recorded in the Cambridge Request System.
		Commissioner/ DPW	(v) Record percentage of City catch basins cleaned	2291 catch basins cleaned [approximately 38% (6,000 total)]	Keep record of City catch basins cleaned annually.
		Commissioner/ DPW	(vi) Record tons of street sweepings collected	1,480 tons	Keep record of tons of street sweepings collected annually.
		Commissioner/ DPW	(vii) Record tons of waste/recycling collected	12,375 tons	Keep record of tons of waste and recycling collected annually.
		Commissioner/ DPW	(viii) Record number of new trees planted	443 trees were planted by the forestry division. See Appendix 6 for location of trees planted. New tree plantings are now mapped in GIS.	Keep record of new trees planted.
		Commissioner/ DPW	(ix) Record number of public structural controls constructed/repaired.	Refer to information provided below under "Additional Information"	Keep record of public structural controls constructed or repaired.

MCM #6. Additional information

- The Street Cleaning Division is responsible for maintaining clean public ways through a contractual street sweeping operation,

which runs from April through December each year. Two contract sweepers are used to clean both residential streets and major City squares. The City squares are cleaned very early in the morning (between 4:00 AM and 8:00 AM) 7 days per week. Residential streets are swept city wide on a monthly basis, resulting in approximately 11,000 street miles being cleaned each year.

Additionally, beginning in 2006 the city started a pilot program which utilized two vacuum sweepers to supplement the mechanical sweepers during the months of April and November. Through these months the two vacuum sweepers were sent out behind the mechanical sweepers on a daily basis in an effort to further remove fine material that was being left on the roadway after mechanical sweepers had made a first pass. Because of the success of this pilot, the city has continued using these two additional sweepers twice a year as part of our standard operations. A new street sweeping contract was approved for 2012 (Year 10). This new contract provides for a third vacuum sweeping of all municipal streets at the City's discretion.

- In public construction projects the following stormwater best management practices (BMPs) were constructed:
 - Number of new catch basins with deep sumps and hoods: 190
 - Number of deep sump drain manholes (grit pits): 29
 - Infiltrating Catch Basins/dry wells: 22
 - Bending Weirs: 3
 - Isolation Gate Structures: 2
 - 3.5 acre Stormwater Wetland: 1
- Additional maintenance activities were performed on stormwater drainage systems including:
 - Pump Inspections & Maintenance = 129 (Pump Inspections Maintenance Contract)
 - Storm drain cleaned and televised = 9,560 LF (TV and Cleaning Contract)

Part IV. Summary of Information Collected and Analyzed

- See Appendix 3 for the results of water quality sampling at Alewife Brook, Charles River and Fresh Pond from April 2012 through March 2013 and their associated summary of results.
 - Alewife Brook samples: June April 2013 – August 2013 and August 2013 – November 2013.
 - Alewife Brook wet weather sample: June 7, 2013 and November 22, 2013
 - Charles River dry weather samples: November 2012 – July 2013 and July 2013 – November 2013.
 - Charles River wet weather sample: June 7, 2013 and November 22, 2013.
 - Little Fresh Pond, North Pond and Black's Nook samples: April, June, September and October 2013.
 - Alewife Brook Oil and Grease samples April 4, 2013 and August 13, 2013.
 - Charles River Oil and Grease sample from July 13, 2013 and November 6, 2013.

Part V. Program Outputs & Accomplishments (OPTIONAL)

(Since beginning of permit coverage unless specified otherwise by a **, which indicates response is for period covering April 1, 2011 through March 31, 2012)

Programmatic

	(Preferred Units)	Response
Stormwater management position created/staffed	(y/n)	Y ⁺
Annual program budget/expenditures **	(\$)	
Total program expenditures since beginning of permit coverage	(\$)	
Funding mechanism(s) (General Fund, Enterprise, Utility, etc)		

⁺ New Stormwater compliance officer was hired during Year 7.

Education, Involvement, and Training

Estimated number of property owners reached by education program(s)	(# or %)	100% residents
Stormwater management committee established	(y/n)	N
Stream teams established or supported	(# or y/n)	1
Shoreline clean-up participation or quantity of shoreline miles cleaned **	(y/n or mi.)	Y
Shoreline cleaned since beginning of permit coverage	(mi.)	
Household Hazardous Waste Collection Days		
▪ days sponsored **	(#)	3
▪ community participation **	(# or %)	792 vehicles
▪ material collected **	(tons or gal)	29 tons ⁺
School curricula implemented	(y/n)	

⁺ A total of 29 tons were collected including at local DPW drop-off center

Legal/Regulatory

	In Place Prior to Phase II	Reviewing Existing Authorities	Drafted	Draft in Review	Adopted
Regulatory Mechanism Status (indicate with “X”)					
▪ Illicit Discharge Detection & Elimination					X
▪ Erosion & Sediment Control					X
▪ Post-Development Stormwater Management					X
Accompanying Regulation Status (indicate with “X”)					
▪ Illicit Discharge Detection & Elimination					X
▪ Erosion & Sediment Control					X
▪ Post-Development Stormwater Management					X

Mapping and Illicit Discharges

	(Preferred Units)	Response
Outfall mapping complete	(%)	100%
Estimated or actual number of outfalls	(#)	44
System-Wide mapping complete (complete storm sewer infrastructure)	(%)	99%
Mapping method(s)		
▪ Paper/Mylar	(%)	
▪ CADD	(%)	100%
▪ GIS	(%)	100%
Outfalls inspected/screened **	(# or %)	100%
Outfalls inspected/screened (Since beginning of permit coverage)	(# or %)	100%
Illicit discharges identified **	(#)	2
Illicit discharges identified (Since beginning of permit coverage)	(#)	39
Illicit connections removed **	(#); and (est. gpd)	2
Illicit connections removed (Since beginning of permit coverage)	(#); and (est. gpd)	39
% of population on sewer	(%)	99.9%
% of population on septic systems	(%)	.1%

Construction

(Preferred Units) Response

Number of construction starts (>1-acre) **	(#)	8 ⁺
Estimated percentage of construction starts adequately regulated for erosion and sediment control **	(%)	100%
Site inspections completed **	(# or %)	100%
Tickets/Stop work orders issued **	(# or %)	11 tickets
Fines collected **	(# and \$)	0
Complaints/concerns received from public **	(#)	4

⁺ 240 Sidney Street, 300 Massachusetts Avenue, 262 McGrath O'Brien Highway, 125 CambridgePark Drive, 114 Mt. Auburn Street, 215 McGrath O'Brien Highway, 1801 Massachusetts Avenue, 100 Putnam Avenue.

Post-Development Stormwater Management

Estimated percentage of development/redevelopment projects adequately regulated for post-construction stormwater control	(%)	100%
Site inspections (for proper BMP installation & operation) completed **	(# or %)	100%
BMP maintenance required through covenants, escrow, deed restrictions, etc.	(y/n)	Y
Low-impact development (LID) practices permitted and encouraged	(y/n)	Y

Operations and Maintenance

Average frequency of catch basin cleaning (non-commercial/non-arterial streets) **	(times/yr)	
Average frequency of catch basin cleaning (commercial/arterial or other critical streets) **	(times/yr)	
Qty of structures cleaned **	(#)	2,291
Qty. of storm drain cleaned **	(%, LF or mi.)	9,560 LF
Qty. of screenings/debris removed from storm sewer infrastructure **	(lbs. or tons)	
Disposal or use of screenings (landfill, POTW, compost, beneficial use, etc.) **	(location)	Landfill
Basin Cleaning Costs		
• Annual budget/expenditure (labor & equipment)**	(\\$)	\$200,000

• Hourly or per basin contract rate **	(\$/hr or \$ per basin)	\$74/basin
• Disposal cost**	(\$)	\$136/ton
Cleaning Equipment		
• Clam shell truck(s) owned/leased	(#)	2
• Vacuum truck(s) owned/leased	(#)	2
• Vacuum trucks specified in contracts	(y/n)	Y ⁺
• % Structures cleaned with clam shells **	(%)	80%
• % Structures cleaned with vactor **	(%)	20%

⁺ Storm drain pipe maintenance TV and Cleaning Contract

	(Preferred Units)	Response
Average frequency of street sweeping (non-commercial/non-arterial streets) **	(times/yr)	10 times/yr
Average frequency of street sweeping (commercial/arterial or other critical streets) **	(times/yr)	Approximately daily
Qty. of sand/debris collected by sweeping **	(lbs. or tons)	1,480 tons
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.) **	(location)	Landfill & transfer station
Annual Sweeping Costs		
• Annual budget/expenditure (labor & equipment)**	(\$)	\$337,000 (contract only)
• Hourly or lane mile contract rate **	(\$/hr. or ln mi.)	\$80.00/hr/rotary sweeper \$30.00/hr/vacuum sweeper
• Disposal cost**	(\$)	\$28.00-34.98/ton
Sweeping Equipment		
• Rotary brush street sweepers owned/leased	(#)	2
• Vacuum street sweepers owned/leased	(#)	2
• Vacuum street sweepers specified in contracts	(y/n)	Y (3x/yr) ⁺
• % Roads swept with rotary brush sweepers **	%	100
• % Roads swept with vacuum sweepers **	%	100

⁺ New street Sweeping contract provides for a 3rd vacuum sweeping, to be determined when needed by the City in addition to Spring and Fall.

Reduction (since beginning of permit coverage) in application on public land of: ("N/A" = never used; "100%" = elimination)			
▪ Fertilizers	(lbs. or %)	IPM followed – only organic fertilizers used	
▪ Herbicides	(lbs. or %)	NA	
▪ Pesticides	(lbs. or %)	NA	
Integrated Pest Management (IPM) Practices Implemented	(y/n)	Y	

	(Preferred Units)	Response
Average Ratio of Anti-/De-Icing products used ** (also identify chemicals and ratios used in specific areas, e.g., water supply protection areas)	% NaCl % CaCl ₂ % MgCl ₂ % CMA % Kac % KCl % Sand	80% 0 20% 0 0 0 0
Pre-wetting techniques utilized **	(y/n or %)	Y
Manual control spreaders used **	(y/n or %)	Y (75%)
Zero velocity spreaders used ** Automatic – control spreader	(y/n or %)	N (25%)
Estimated net reduction or increase in typical year salt/chemical application rate	(±lbs/ln mi. or %)	N/A
Estimated net reduction or increase in typical year sand application rate **	(±lbs/ln mi. or %)	100% reduction
% of salt/chemical pile(s) covered in storage shed(s)	(%)	100%
Storage shed(s) in design or under construction	(y/n or #)	N
100% of salt/chemical pile(s) covered in storage shed(s) by May 2008	(y/n)	Y

Water Supply Protection

Storm water outfalls to public water supplies eliminated or relocated	# or y/n	0
Installed or planned treatment BMPs for public drinking water supplies and their protection areas	# or y/n	Y
• Treatment units induce infiltration within 500-feet of a wellhead protection area	# or y/n	