

Municipality/Organization: City of Cambridge

EPA NPDES Permit Number: MAR041076

MaDEP Transmittal Number: W-040464

**Annual Report Number
& Reporting Period:**

No. 9: March 11-March 12

NPDES PII Small MS4 General Permit Annual Report

Part I. General Information

Contact Person: Lisa Peterson

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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: Robert W. Healy

Title: City Manager

Date: May 1, 2012

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, except for the following provision:

Part 11.F Did not submit Year 8 annual report on or before May 1, 2011, annual report was submitted on March 19, 2012.

1.a cont.		Commissioner/ DPW	(ii) Post information on the web	<p>DPW continued to update its revised website and make information more readily accessible to the public. During Year 9 DPW launched a Facebook page that is intended to provide information about programs, events, projects, and general updates.</p> <p>The DPW Facebook page can be viewed at: http://www.facebook.com/CambridgeDPW www.cambridgema.gov/theworks/ourservices/stormwatermanagement.aspx</p> <p>A copy of Year 8 annual report, annual meeting presentation, Joint Public Notice (April 2011) for the Alewife Brook CSO Progress Update was added to the Stormwater program site.</p> <p>Examples of some of the content updates made to the web page see Appendix 1.</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	(iii) Distribute materials Expanded BMP element in Year 3	<p>The <i>CityView</i> articles referenced in BMP 1.a(i) above are distributed to every household 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 and on-line. 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 event (May 19th). DPW also distributes information electronically (e-mails, e-line, web site and now Facebook) and in hard copies, as well as, posting notices in local newspapers.</p>	Distribute information on Stormwater /Watersheds to every household actively receiving mail in Cambridge and/or through electronic media.

1.a cont. Revised		Commissioner/ DPW	(iv) Assess local/regional mass media marketing campaigns Revised in Year 3– new BMP element	See BMP 1.e.(i) below for information for GoGreen Month 2011 activities.	Participate in the 2012 Cambridge Science Festival or other public event.
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)]	This activity was completed in Year 2. Outreach activities to children continue in general DPW also worked with Friends of Alewife Reservation’s Ecology Camp (July 25). Stormwater pollution and solutions were discussed via use of the EnviroScape model and airing of the “After the Rain” EPA video The Cambridge Water Department sponsors weeklong activities that highlight watershed protection, water treatment and other water related activities. A copy of the Water Week schedule and Fresh Pond Day May 7, 2011 flyer and event schedule is attached 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/theworks/ourservices/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 125 have been installed: 60 in the Charles (C) and 65 in the Alewife (A) watersheds under the following contracts: FY11/12 Misc Sidewalk: C (18) A (10) FY 11/12 Remedial: C (29) A (7) Chapter 90- Contract 12: A (45) Chapter 90 Contract 13: C (10) Central Square/Cambridge Highlands: C (1) Harvard Square (Contract 3): C (2) Concord Ave : A (3)	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 the May 2011 Go Green Month events. Activities included events for alternative forms of transportation, informational tables, giveaways to cyclists and pedestrians, participation in local bike week events/tours. A listing of Go Green Month events is provided in Appendix I .	Alternative forms of transportation will be promoted through activities and events.
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MCM #1. Additional Information

- The City of Cambridge’s Community Development Department (CDD) monitors 37 currently active PTDM projects, 34 submitted complete monitoring reports in 2011, or 92%. 2011 monitoring reflects:
 - More than 7.8 million square feet of commercial development and 886,134 square feet of institutional development are subject to annual PTDM monitoring.
 - A total of 16,728 parking spaces come under the Ordinance, with facility sizes ranging between 3 and 4,576 parking spaces.
 - Approximately 26,594 employees, 8,540 graduate/middle school students, and 1,450 library patrons are covered by PTDM plans in Cambridge.
 - Twenty-three of the 37 projects, or 62%, that completed monitoring in 2011 met or surpassed their mode split.
 - Thirty-two of the projects, or 94%, 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:

- EF Campus Expansion Project (Large Project PTDM Plan)
- In 2009 CDD began a pilot program in Cambridgeport to encourage and promote alternative modes of transportation entitled CitySmart: Fast, Flexible, Fun. CitySmart connects residents with the information and resources they need to get around without getting behind the wheel. Biking, walking and transit take you where you need to be. CitySmart is a pilot program to test the application of social marketing techniques on transportation choices. Based on successful implementation in Europe, Australia and the United States, the City hopes to achieve a shift of approximately 10% of single-occupant vehicle trips to more sustainable modes, such as walking, bicycling and transit. The CitySmart pilot began in the Cambridgeport neighborhood in 2009 and moved to North Cambridge neighborhood in 2010. For Year 9 (2011) the CitySmart program was available to residents in East Cambridge. See [Appendix 1](#) for a copy of the CitySmart Year Three: Final Report, Executive Summary (February 2011).
- 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, and an internal car pool matching service. The City also supports bicycle use and walking through the respective city programs and provides an internal web site that provides information on other regional ride matching and sharing programs.

- DPW also sponsored a rain barrel event during Year 9: May 19th. Approximately 65 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.
- The Federal Emergency Management Agency issued new Flood Insurance Rate Maps for a portion of Cambridge. During Year 9 DPW continued to assist residents with these changes through e-mail, phone and help-desk requests for information.
- DPW met with the Green Cambridge community group to discuss floodplain development in the Alewife area (February 2, 2012).

MCM #2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 9 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 10
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 9 and to discuss potential issues/projects for Year 10 was held on March 29, 2012. 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’ on-line edition and posted at the City Clerk’s office at City Hall. A copy of the NPDES meeting notice from the 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 16, 2011 as part of Park Serve Day.	Support/assistance will be provided for one clean-up event.

<p>2.b cont.</p>		<p>Commissioner/ DPW</p>	<p>(ii) Support educational efforts of local watershed groups as opportunities arise through talks and /or support of grant applications</p>	<p>The DPW participated in the Friends of Alewife Reservation’s (FAR) Summer Ecology Camp (see 1.b above) and gave a presentation at their annual meeting on the Alewife Stormwater Wetland Improvements. A copy of the this presentation 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 2011 is attached in Appendix 2 and details the various activities supported by the Water Dept.</p> <p>See additional outreach and educational efforts listed under “MCM #2. Additional Information” at the end of this section.</p>	<p>The City will continue to provide support to local watershed associations as opportunities permit.</p>
		<p>Commissioner/ DPW</p>	<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 and where appropriate additional hyperlinks were made.</p>	<p>As new information is added to the stormwater management web pages new hyperlinks will be added and updated as needed.</p>
<p>2.c</p>	<p>Sponsor Recycling of Hazardous and Solid Waste</p>	<p>Commissioner/ DPW</p>	<p>(i) Hold 4 Household Hazardous Waste Collection (HHW) days annually</p>		
<p>Revised</p>		<p>Commissioner/ DPW</p>	<p>Hold 3 Household Hazardous Waste Collection days annually (Revised in Year 1)</p>	<p>Three Household Hazardous Waste (HHW) collection days were held this permit year on April 9, June 4 and October 1, 2011. Approximately 13,438 tons of materials have been recycled, including .17 tons of HHW.</p>	<p>HHW collection will be held on April 21, July 21, and October 20, 2012.</p>

2.c cont.		Commissioner/ DPW	(ii) Accept recycling materials at a drop off center on a regular basis	During 2011 DPW continued to operate a recycling drop-off center at the DPW yard on Tuesdays and Thursdays from 4 – 7:30 p.m. and Saturdays form 9 a.m. – 4 p.m. More information about the Cambridge Recycling Center can be found at: www.cambridgema.gov/theworks/ourservices/recyclingandtrash.aspx	DPW will continue to operate a recycling drop-off center.
2.c		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. See: www.cambridgema.gov/theworks/ourservices/recyclingandtrash/aboutrecycling.aspx	DPW will continue to provide information on illicit discharges and reporting at Household Hazardous Waste events and/or in its meetings and through print materials.

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 9, 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 9, completed in Year 3.	Completed.

2.d cont.		Assistant City Manager for Community Development/CDD and Commissioner/DPW	(iii) Forward study recommendations to the City Manager for consideration	Not applicable in Year 9, 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 refilled 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
		Commissioner/DPW	(iv) Discuss Concord-Alewife Stormwater Management strategies at a public meeting	Not applicable in Year 9, 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 9, 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 9, 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 EOEА to advance the EJPA to a final document (Revised in Year 1)	Not applicable in Year 9. The final EJPA was fully executed on March 4, 2005 and forwarded to EOEА.	Completed.
		Commissioner/DPW	(viii) ABC Flooding Board to meet 4 times annually	The ABC Flooding Board met approximately 6 times during Year 9. 4 times in 2011 (May 10, July 12, September 13, and November 8) and 2 times in 2012 (January 10 and March 13). Discussion topics included, MWRA's North System Hydraulic Study and future CSO Improvements. Legislative news for Alewife Brook, water quality data for Alewife Brook, and Cambridge's CSO control project, and Alewife Brook Stormwater Wetland.	The ABC Flooding Board will meet 4 times.
<i>revised</i>			Schedule Revised in Year 1		

2.d cont.		Commissioner/ DPW	(ix) Finalize Tri- Community Working Group's <i>Progress Report</i>	Not applicable in Year 9, this report was finalized in Year 3	Completed.
<i>revised</i>					
		Commissioner/ DPW	(x) Place Tri- Community Working Group's <i>Progress Report</i> on web site	Not applicable in Year 9. This report was placed on the web site in Year 4 see: www.cambridgema.gov/theworks/ourservices/stormwatermanagement/stormwaterresources.aspx	Completed.
<i>revised</i>					

MCM #2. Additional Information

- The Cambridge Department of Public Works (DPW) began the design 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. In total the Alewife Sewer Separation Project will separate combined sewers in an area of approximately 335 acres. The design of the 1st phase of this program began in December 2010 with a kick off meeting with the community on December 9, 2010. Additional meeting were held on this project with the City Council Roundtable on January 3, 2011 and again with the community on March 1, 2011. Community discussions have centered on the environmental goals of this project to separate the combined sewer system, how to best treat the newly separated stormwater and ways to manage/infiltrate the stormwater through the design of the street restoration project. Detailed information regarding this project can be found on the City Projects website at: www.cambridgema.gov/theworks/cityprojects.aspx under "Alewife Sewer Separation Project". During Year 9 five additional meetings were held with the community to further discuss design and stormwater improvements (May 17 & 24 and December 6 & 8 2011, and February 2, 2012). A copy of the December 9, 2010 community meeting presentation is provided in [Appendix 2](#).
- The Cambridge Water Department began a site restoration project at Black's Nook at the Fresh Pond Reservation. This project is listed as a high priority in the Fresh Pond Reservation Master Plan. This restoration project was completed during Year 9 and aims to increase wildlife habitat value and water quality, and will allow for this area to be used as a natural study area for children. A summary of the restoration project and a graphic of the Restoration Plantings are provided in [Appendix 2](#).
- The City of Cambridge recognizes businesses and organization that are taking environmental action through the GoGreen Awards. This is the third year that the City included an award category for Stormwater Management in order to recognize local property owners/developers that are undertaking important stormwater management elements in their redevelopment projects and/or property maintenance practices. Other award categories include waste reduction, transportation, energy, climate leader,

and community sustainability. The third Stormwater Management awards were awarded on May 26, 2011 recognizing the Bulfinch Companies for their transformation of a parking lot into a natural vegetative buffer to reduce peak stormwater discharge, increase groundwater infiltration and provide plant materials to support natural habitat; and, Cascap Inc. for their incorporation of an infiltration systems to reduce stormwater runoff, increase groundwater recharge and reduce stormwater flowing to the combined sewer system. Information on the awardees and GoGreen Awards are provided in [Appendix 2](#).

- DPW and city representatives attended and participated in EPA meetings and conference calls regarding the Mystic River Watershed Initiative during Year 9 including the Steering Committee meetings and Water Quality Subcommittee. In addition, DPW gave a slide presentation on the Alewife Stormwater Wetland Project on March 7, 2012. A copy of the presentation is provided in [Appendix 2](#)
- The tri-community working group 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. The real time flow measurements can be observed at <http://waterdata.usgs.gov/ma/nwis/uv?01103025> .
- The Cambridge Water Department maintains a strong Volunteer Stewards Program that introduces volunteers to urban plants and watershed protection, and provides volunteers with opportunities to assist with natural resources monitoring and restoration. For a sampling and summary of their programs see [Appendix 2](#).
- DPW gave a presentation at the Fresh Pond Ecology Center entitled “Watersheds Within Watersheds”. A copy of the presentation is provided in [Appendix 2](#).
- DPW began the construction of the CambridgePark Drive Area Drainage Improvements Project and Stormwater Wetland Project during Year 9. See the project website for more information: <http://www.cambridgema.gov/theworks/cityprojects.aspx?Category=Current+Construction> . An extensive outreach program has surrounded this construction activity. Nine (9) meetings were held to discuss the stormwater wetland and its benefits and construction process:
 - Abt brown bag presentation – May 12, 2011
 - Mystic River Watershed Association – September 6, 2011
 - Community Meeting – September 7, 2011 (see [Appendix 2](#) for a copy of the agenda and presentation)
 - Tri-Community Meeting – September 13, 2011
 - FAR Annual Meeting – November 10, 2011
 - Reservoir Lofts – December 12, 2011
 - Massachusetts Water Resources Authority Board of Directors - January 18, 2012
 - Tenants of 150/125 CambridgePark Drive – March 1, 2012
 - Mystic River Initiative Steering Committee – March 7, 2012

MCM #3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 9 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 10
3.a	Update Stormwater Drainage System, Outfalls and Receiving Waters in GIS	Commissioner/ DPW	(i) Map Fresh Pond outfalls	Not applicable in Year 9	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 81 projects underwent DPW site plan review (see Appendix 3). DPW reviewed 10 projects under our Land Disturbance Regulations.	DPW will continue to track private structural controls through our site plan review and inspection process.
3.a cont.		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 9 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-two (22) outfalls were inspected/ sampled for Dry weather flow: ten (10) were sampled once, and twelve (12) were inspected/sampled twice. 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 nine (9) outfalls were sampled: six (6) were sampled four times, two (2) were sampled one times, and One (1) was sampled three times. See Appendix 3 and Part IV of this report for sampling locations. 	Water quality samples will continue in each watershed for all known City of Cambridge outfalls.
			Revised in Year 3 to include all Cambridge owned outfalls		
Revised		Commissioner/ DPW	(ii) Test one location in each watershed for oil and grease annually (Revised for Year 2 only)	. <ul style="list-style-type: none"> Two (2) oil & grease samples were done during Year 9: one (1) sample in the Charles and one (1) in Alewife. (See Appendix 3). 	One location in each watershed will be tested for oil and grease.
Revised		Commissioner/ DPW	(iii) Perform additional water quality testing and field investigations as necessary Revised in Year 3 Expand Water Quality testing in both watersheds	Additional water quality testing was performed to isolate the location of illicit discharges and to confirm their successful removal. See 3.b (i) above	We will perform additional water quality testing and field investigations as necessary. All known Cambridge Outfalls will be sampled in the Charles and Alewife watersheds.
		Commissioner/ DPW	(iv) Identify and remove illicit discharges	One (1) Illicit discharge/connection was discovered and two (2) were removed as follows:: <ul style="list-style-type: none"> 62 Whittemore Ave (Central Square/Cambridge Highlands contract) discovered and removed 	We will continue to monitor for and remove illicit discharges. Remove the 2 Pearl Street illicit connections

				<ul style="list-style-type: none"> Another illicit connection was discovered at 12 Emily in 2007, but since the drain discharged to a combined system it was not prioritized for removal. Recent improvements in the area to separate common manholes prioritized correction of this connection and it was removed during Year 9. <p>The following illicit connections were identified during Year 8. Since these discharge to a combined system they have not yet been removed. These will be removed during Year 10:</p> <ul style="list-style-type: none"> Pearl Street (2) 	
3.b cont.		Commissioner/ DPW	(v) Perform water quality sampling at a Fresh Pond outfall annually	Six (6) 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 summary report).	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 9. Sampling equipment was purchased in Year 4.	Supplies will be purchased as needed.

		Commissioner/ DPW	(vii) Investigate Sparks Street drainage area	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. 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. Several illicit connections were identified and removed in previous years. In addition two (2) common manholes were discovered in a sewer easement on private property between Fernald Drive and Linnaean Street within the catchment. These CMHs will be separated during out CMH #7 contract. Investigations are expected to begin for CMH #7 during 2011. All 34 remaining CMHs in separated areas will be put in the CMH #7 contract and put out to bid in 2012.	Investigation into the Sparks Street drainage area will continue following the repair of cracked pipes in this system. These pipes will be lined during Year 10 under a pipe lining contract. The separation of these 2 common manholes is included in CMH contract #7 that will be put out to bid during Year 10. CMH contract #7 must be completed by December 2013.
3.b cont.		Commissioner/ DPW	(viii) Investigate Lechmere Canal drainage area.	Completed as far as possible due to influence of Charles River. 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.	Completed.

		Commissioner/ DPW	(ix) Separate Common Manholes (CMH).	Three (3) CMHs were separated during Year 9 in the follows contracts: <ul style="list-style-type: none"> • Central Square/Cambridge Highlands <ul style="list-style-type: none"> ○ Pearl/Erie (2) ○ 150 Erie (1) 	The number of Common Manholes separated in separated drainage areas will be counted. Also, the contract for the removal of the remaining 34 Common Manholes in separated areas of the city will begin construction in 2012 through the CMH #7 contract. Construction of CMH #7 must be completed by December 2013..
3.b cont.		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). These results are provided in Appendix 3 under Water Quality Samples, Reports and Maps.	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 9. 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 and Chinese.	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 9, completed in Year 1.	Complete.
		Commissioner/ DPW	(ii) Provide opportunity for peer and legal review of draft	Not applicable in Year 9, completed.	Completed.
		Commissioner/ DPW	(iii) Revise draft as necessary	Not applicable in Year 9, completed in Year 5.	Completed.

		Commissioner/ DPW	(iv) Present regulations/ordinance to City Council for consideration for adoption	Not applicable in Year 9, completed in Year 5. A copy of the Wastewater and Stormwater Drainage System ordinance can be viewed on line at DPW stormwater website.	Completed.
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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 281 common manholes have been separated through March 31, 2012 in separated catchment areas.
- ❑ During Year 9 Cambridge completed the separation of 3 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 8 the city issued 723 dumpster licenses under the new ordinance.

MCM #4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 9 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 10
4.a	Develop Program for Construction Site Runoff Control	Commissioner/ DPW	(i) Review existing planning and construction procedures	Not applicable in Year 9, completed.	Complete
		Commissioner/ DPW	(ii) Clarify needed regulatory mechanism	Not applicable in Year 9, completed.	Complete
		Commissioner/ DPW	(iii) Develop draft regulatory mechanism, procedures and guidelines	Not applicable in Year 9, 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.	Completed.
		Commissioner/ DPW	(iv) Present draft to City Manager, City Council and the community for review	Not applicable in Year 9. 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.	Completed.
		Commissioner/ DPW	(v) Amend draft as necessary and submit for consideration for adoption	Not applicable in Year 9, completed in Year 5.	Completed.

4.a Cont.		Commissioner/ DPW	(vi) Record number of required Stormwater Management Permits submitted	Eleven (11) Stormwater Control Permits (formerly Land Disturbance Permits) were submitted for the following projects: <ul style="list-style-type: none"> • 1-7 Brattle Circle • 181 Massachusetts Ave • 300 Binney • 610 Main Street • 225 Binney • 75 Ames Street • 430 Windsor St • 80 Fawcett Street • 150 Second Street • 106 Vassar Street • 223 Concord Turnpike 	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 9.	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.	Compliance and enforcement procedures are included in the Land Disturbance Regulations (Article X). In Year 8 DPW developed a “WARNING” ticket to be used for stormwater violations. This ticket will be used in Year 9 (see BMP 4 (a) (ix) below).	Complete.
		Commissioner/ DPW	(x) Record the number of enforcement actions taken and reported	When DPW finds a site without proper erosion control in place we work with them to bring it into compliance. There were 14	The number of enforcement action taken and reported will be tracked in a database. The new Warning” ticket will

4.a cont.				<p>Erosion and Sedimentation Control WARNING tickets issued for stormwater related violations at the following locations:</p> <ul style="list-style-type: none"> • 223 Concooord Turnpike • 32 Whittemore Ave • 8 Blanchard Road • 167 Elm Street • 80 Gerrys Landing Road • Field Street @ Chilton • 700 Concord Avenue • 43 Cedar Street • 254 Harvard Street • 150 Second Street • 75 Ames Street • 184 Walden Street • 61 Molton/665 Concord • 35 Sacramento Street <p>It was decided to track these Warnings in a database rather than using the Cambridge Request System (CRS).</p>	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: www.cambridgema.gov/theworks/ourservices/engineering/Rsources/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 during at least 8 of these meetings including: April 4, 2011, May 16 and May 23, 2011, June 13, 2011, July 18, 2011, November 14, 2011, and March 19 and 26 2012. Copies of the sign-in sheets are provided in Appendix 4.</p>	The City Engineer will discuss erosion and sediment control practices and problems with contractors at 3 construction coordination meetings.

New 4.b cont.		Commissioner/ DPW	(iii) Record the number of guidance materials or reference materials provided.	No additional fact sheets were developed during Year 9. 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	Meetings were held between DPW and the Inspectional Services Department (ISD) to improve inter-departmental review of building permits. Improvements were made to the ISD checklist for “Triggers for Site Plan Reviews by the DPW of Building Permit Applications”. In March 2012 a contract was awarded to Energov for implementation of new permitting software for ISD that will facilitate electronic inter-departmental reviews. See Appendix 4 for a copy of the draft “Trigger” checklist.	Meetings will be held to discuss new ordinances and regulations as necessary.

MCM #4. Additional Information

- Two construction coordination meetings were held during Year 9; one prior to the 2011 construction season (April 4, 2011) and one prior to the 2012 construction season (March 19, 2012) inviting representatives from private utility companies, large contractors, MIT, Harvard, and city departments (Water Dept., Police, DPW, and Traffic Parking & Transportation). These meetings discuss upcoming construction season expectations and requirements for construction activities in the city (including stormwater management). The second Copies of the invitation letters and sign-in sheets are provided in [Appendix 4](#).
- The City’s Wastewater (Stormwater) Compliance Officer completed sixty-three (63) inspections:
 - 31 stormwater erosion and sediment control site inspections,
 - 18 sewer use compliance inspections, and
 - 14 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 9 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 10
5.a	Revise Sewer Use Regulations and Guidance	Commissioner/ DPW	(i) Complete a working draft	Not applicable in Year 9, 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 9, completed in Year 5. The Regulations and Ordinance can also be viewed on-line at: http://www.cambridgema.gov/TheWorks/stormwater/index.html	Completed.
		Commissioner/ DPW	(iii) Develop draft guidelines on BMPs	Three fact sheets were updated during Year 9 including: <ul style="list-style-type: none"> • Green Roofs • Pervious Pavement • Bio-Retention Areas See Appendix 5 for copies of these fact sheets.	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 9, 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 (see MCM 5.a (ii) above).	Completed.

<p>5.a Cont.</p>		<p>Commissioner/ DPW</p>	<p>(v) Present final regulation, guidance and monitoring program for consideration and adoption</p>	<p>Not applicable in Year 9, 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"> ❑ 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. ❑ 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 met three times during Year 9 to review and revised the current Regulations. These changes are still draft and have not yet been advertised.</p>	<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.</p>
		<p>Commissioner/ DPW</p>	<p>(vi) Record the number of meetings held by the City for the regulatory process</p>	<p>The regulatory process is complete. No further regulatory meetings are planned.</p>	<p>Complete.</p>
		<p>Commissioner/ DPW</p>	<p>(vii) Administer stormwater management permit requirements</p>	<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.</p>	<p>Track Stormwater Control Permits in a database.</p>

5.a cont.		Commissioner/ DPW	(viii) Administer procedures for enforcement and penalties for violations	Not applicable in Year 9, completed in Year 6.	Completed.
		Commissioner/ DPW	(ix) Adopt procedures for post construction inspections	<p>Completed. 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 9 is attached in Appendix 3. Four (4) post-construction inspections were performed during Year 9.</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. 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.
		Commissioner/ DPW	(xi) Provide legal mechanism to require annual compliance for the operation and maintenance of BMPs	Not applicable in Year 9, 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	<p>The City Arborist participates in varied outreach activities each year. During Year 9 activities included:</p> <ul style="list-style-type: none"> • A meeting to discuss street trees and how they mitigate climate change and what city's can do – April 19, 2011 • Three (3) tree walks for residents to better understand the Urban Forest: East Cambridge (June 20, 2011), Mid-Cambridge (June 29, 2011), and North Cambridge (July 27, 2011). • Initiated the Jr. Forester Program which enlisted 40 local youth in the care and maintenance of trees in the urban forest (see BMP 1.a.(i) above. • Water by Bike Program. (Tree Ambassador) to inspect, water, and maintain newly planted trees in the city. The program is an environmentally responsible way to reach/water trees, facilitates a conversation about tree care, tree well maintenance, and the value of trees in Cambridge with residents and business owners alike. • Tree Well Weeding: two (2) presentations to local groups to weed tree wells citywide (trained? 50+ volunteers to weed tree wells citywide) Presentation were made to Microsoft employees and Harvard Law Graduate students. <p>The arborist also works closely with the Public Planting Committee and administers Tree hearings for the removal of trees from the public way.</p>	DPW will continue outreach efforts on the importance and protection of trees.
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MCM #5. Additional Information

- ❑ DPW 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 four (4) post-construction BMPs inspections of projects with a Stormwater Control Permit post-construction O&M Plan:
 - 1066 Cambridge Street
 - 221-321 Alewife Brook Parkway
 - 87 New Street
 - 200-300 Acorn Park Drive

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 9 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 10
6.a	Educate Municipal Employees about Pollution Prevention	Commissioner/ DPW	(i) Provide stormwater training for municipal employees annually	During Year 9 one outside vendors (Todd Wacome) gave a presentation to staff on “High Flow Inverted Cone Filtration” to address phosphorous and particulates through catch basin retrofits using an inverted cone filter.	Conduct training annually.
		Commissioner/ DPW	(ii) Work with managers to identify operations personnel with stormwater responsibilities	A list of responsible operations personnel with stormwater responsibilities is maintained. No formal training was held during Year 9	DPW will continue to work with facility managers to ensure Good Housekeeping inspections are done properly.
		Commissioner/ DPW	(iii) Develop and implement training protocols that are applicable to operations	Not applicable in Year 9, completed in Year 5.	Completed.
		Commissioner/ DPW	(iv) Record number of municipal facilities inspected on an annual basis	84 facility inspection reports have been completed and returned to DPW (see summary sheet in Appendix 6). This represents 63% of the facilities in separated areas and 50% 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 9, completed in Year 8. All municipal facilities have had an initial inspection.	Completed.

6.a cont.		Commissioner/ DPW	(vi) Record the number of municipal facility site plans updated, including structural controls based upon initial site visits.	Seven (7) facility site plans were updated during Year 9: <ul style="list-style-type: none"> • Cambridge Hospital • King Open School • Morse School • Windsor Street Health Center • Rain Garden @ DPW • Robert W. Healy Public Safety Building • Cambridge Main Library (garage) 	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	Fact sheets were drafted for rain gardens, green roof systems and porous pavement, but not finalized.	New activities at facilities should be noted and applicable BMPs implemented. Finalize the fact sheets for rain gardens, green roof systems and porous pavement.
		Commissioner/ DPW	(ii) Identify municipal facilities in separated areas and identify structural controls	Completed. 151 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 58 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).
		Commissioner/ DPW	(iii) Document inspections procedures and maintenance schedules in a procedures manual	Not applicable in Year 9, Good Housekeeping Inspection Manuals have already been developed for municipal facilities.	Completed. Update as necessary.
6.b cont.		Commissioner/ DPW	(iv) Develop inspections procedures and maintenance schedules for long term structural controls	Over 3,108 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	2558 catch basins cleaned [approximately 43% (6,000 total)]	Keep record of City catch basins cleaned annually.

6.a cont.		Commissioner/ DPW	(vi) Record tons of street sweepings collected	2,170 tons	Keep record of tons of street sweepings collected annually.
		Commissioner/ DPW	(vii) Record tons of waste/recycling collected	13,438 tons	Keep record of tons of waste and recycling collected annually.
		Commissioner/ DPW	(viii) Record number of new trees planted	470 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 addition to our regular street sweeping program the City had worked in close collaboration with the U.S. Geological Survey (USGS), EPA, and DEP on a vacuum sweeping study. The goal of the study was to better quantify the effectiveness of high efficiency (HE) street sweeping activities on phosphorous, metals and polycyclic aromatic hydrocarbons (PAHs) that are removed by two types of street sweeping technologies from a well-defined urban area representing a single land-use category during monthly street sweeping periods. A Total Maximum Daily Load (TMDL) for total phosphorus has been established for

the Lower Charles River basin. Urban areas are highly impervious, meaning water ‘runs off’ its surfaces rather than infiltrating. To meet the total phosphorus criteria in the TMDL, the City of Cambridge is implementing a 65 percent reduction in total phosphorus load. A portion of this reduction is expected from the management of non-point source runoff, or water ‘running off’ urban surfaces. The effectiveness of a high-efficiency street cleaning program at reducing the City’s phosphorus loads to the Lower Charles River is not known.

During Year 7 the City worked with USGS to develop a scope for a grant to fund the study. A grant application was submitted to DEP in May 2009. The grant scope included both sweeping and sampling protocols and required that the City designate a single High Efficiency vacuum sweeper over a two day period in a designated established sweeping area and work with USGS to obtain samples from sweepers and separate vacuum sweepings at the yard where samples can be weighed independently of other sweeping loads. DEP approved the grant application in November 2009. A final study scope was approved by DEP in December 2009.

During Year 8 a Joint Funding Agreement was executed between USGS and the City. The study collected sweeping samples from May 2010 through December 2010; and USGS continued sampling, processing and analyzing the samples and data into Year 9. A draft report was release in Year 9. A copy is attached in [Appendix 6](#).

- In public construction projects the following storm water best management practices (BMPs) were constructed:
 - Number of new catch basins with deep sumps and hoods:122
 - Number of deep sumped drain manholes (grit pits): 15

- Additional maintenance activities were performed on stormwater drainage systems including:
 - Pump Inspections & Maintenance = 99 (FY11 and FY12 Pump Inspections Maintenance)
 - Storm drain cleaned and televised = 12,013 LF (cleaned) and 13,347 LF (TV’d) (FY11 and FY12 TV & Cleaning),

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 2011 through March 2012 and their associated summary of results.
 - Alewife Brook samples from March 2011, May 2011, November, 2011 and February 2012.
 - Alewife Brook wet weather sample January 14, 2012.
 - Charles River dry weather samples from May/August/November 2011.
 - Charles River wet weather sample from January 12, 2012.
 - Little Fresh Pond, North Pond and Black's Nook samples June 2011 and November 2011.
 - Alewife Brook Oil and Grease samples September 14, 2011.
 - Charles River Oil and Grease sample from November 15, 2011.

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 %)	855 vehicles
▪ material collected **	(tons or gal)	17 tons ⁺
School curricula implemented	(y/n)	

⁺ A total of 17 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	(#)	35
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)	(#)	35
Illicit connections removed **	(#); and (est. gpd)	2
Illicit connections removed (Since beginning of permit coverage)	(#); and (est. gpd)	33
% of population on sewer	(%)	99.9%
% of population on septic systems	(%)	.1%

Construction

	(Preferred Units)	Response
Number of construction starts (>1-acre) **	(#)	5+
Estimated percentage of construction starts adequately regulated for erosion and sediment control **	(%)	100%
Site inspections completed **	(# or %)	100%
Tickets/Stop work orders issued **	(# or %)	14 tickets
Fines collected **	(# and \$)	0
Complaints/concerns received from public **	(#)	6

+ 181 Massachusetts Ave, 610 Main Street, 300 Binney, 80 Fawcett and 106 Vassar Street

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 **	(#)	2,558
Qty. of storm drain cleaned **	(%, LF or mi.)	12,013 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		
<ul style="list-style-type: none"> Annual budget/expenditure (labor & equipment)** 	(\$)	\$200,000

• Hourly or per basin contract rate **	(\$/hr or \$ per basin)	\$72/basin
• Disposal cost**	(\$)	\$123/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 vector **	(%)	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)	2,170 tons
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.) **	(location)	Landfill & transfer station
Annual Sweeping Costs		
• Annual budget/expenditure (labor & equipment)**	(\$)	\$303,000 (contract only)
• Hourly or lane mile contract rate **	(\$/hr. or ln mi.)	\$73.50/hr/rotary sweeper \$29.50/hr/vacuum sweeper
• Disposal cost**	(\$)	\$24.00/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/l _n mi. or %)	N/A
Estimated net reduction or increase in typical year sand application rate **	(±lbs/l _n 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	

List of Appendices

Appendix 1 - Public Education and Outreach

- *CityView* - Spring/Summer 2011: Get Your Yard Ready for Spring (p.3) and Safely Dispose of Unwanted Medications (p. 7)
- *Cambridge Life* - Spring 2011 - Spring 2012: What's New in the Department of Public Works (p. 10) and Calling All Young Tree Lovers (p. 11)
- Construction/Design Notice examples:
 - Alewife Reservation Stormwater Wetland (flyer)
 - Western Ave Final Design (flyer)
- Examples of website updates:
 - Street Cleaning and Yard Waste Collection have Resumed (3/26/12)
 - Protect Your Home or Business from Potential Flooding (8/26/11)
 - Alewife Brook Combined Sewer Overflows (CSO) Progress Update (4/15/11)
- Brochure - *Working Together: A healthy urban forest needs help from all of us*
- Water Week and Fresh Pond Day flyer and event schedule (May 2011)
- GoGreen Month, May 2011 calendar and events
- CitySmart Fast.Flexible.Fun. program Year 3 Report Executive Summary

Appendix 2 - Public Involvement and Participation

- NPDES Phase II public meeting information: Presentation and sign-in sheet (March 29, 2012)
- Public Meeting on Stormwater Management Citywide calendar posting and Cambridge Chronicle Wicked Local on-line posting
- FAR Annual Meeting Presentation: Alewife Stormwater Wetland
- Friends of Fresh Pond The Year in Review 2011
- Household Hazardous Waste collection summaries
- Black's Nook Restoration Project summary and graphic of the Restoration Plantings
- 2011 GoGreen Awards -Stormwater Management Award display boards
- Mystic River Steering Committee presentation on the Alewife Stormwater Wetland
- Fresh Pond Volunteer Steward Program and Activities
- Watersheds Within Watersheds (presentation)
- Agenda and presentation for the Community Meeting for the Alewife Reservation Stormwater Wetland

Appendix 3 - Illicit Discharge Detection and Elimination

- Private BMP's Installed
- Site Plan Review Listing
- Water Quality Samples, Reports and Maps
 - Charles River Dry Weather Sampling (August 2010 - May 2011, May 2011 - November 2011), includes oil & grease sample for Charles Watershed: JFK West (05-02-11)
 - Charles River: East, Central and West sampling location maps
 - Alewife Brook Dry Weather Sampling (March 2011 - May 2011, May 2011 - September 2011, November 2011 - February 2012), includes oil & grease sample for Huron Ave (Belmont 39") (09-14-11)
 - Alewife Brook: North and South sampling location maps
- 2011 Water Quality Report and sample results - Fresh Pond Reservation
- Charles River and Alewife Brook wet weather sample results (January 12 and 14 2012)
- Map of Separated Common Manhole through March 31, 2012

Appendix 4 - Construction Site Stormwater Runoff Control

- Construction Coordination Meeting - sign-in sheet (April 4, 2011, May 16 and May 23, 2011, June 13, 2011, July 18, 2011, November 14, 2011, and March 19 and 26 2012).
- DRAFT Inspectional Services Department (ISD) checklist for "Triggers for Site Plan Reviews by the DPW of Building Permit Applications"

- Construction Coordination Meetings invitation and sign-in sheets (April 4, 2011 and March 19,2012)

Appendix 5 - Post-Construction Stormwater Management in New Development and Redevelopment

- BMP fact sheets for Green Roofs, Pervious Pavement, and Bio-Retention Areas

Appendix 6 - Pollution Prevention and Good Housekeeping in Municipal Operations

- Municipal Facilities Good Housekeeping Inspections summary
- Updated Facility Maps
 - Cambridge Hospital
 - King Open School
 - Morse School
 - Windsor Street Health Center
 - Rain Garden @ DPW
 - Robert W. Healy Public Safety Building
 - Cambridge Main Library (garage)
- Stormwater Work Order Requests Submitted (CRS)
- Trees Planted in Cambridge in 2011
- USGS DRAFT report on Improving Water-Quality in Urban Watersheds Using a High-Efficiency Street-Cleaning Program, Cambridge, Massachusetts (abstract and table of contents only)