

Municipality/Organization: City of Cambridge

EPA NPDES Permit Number: MAR041076

MaDEP Transmittal Number: W-040464

**Annual Report Number
& Reporting Period:**

No. 14: March 16-March 17

NPDES PII Small MS4 General Permit Annual Report

Part I. General Information

Contact Person: Owen O’Riordan

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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: Louis A. DePasquale

Title: City Manager

Date: May 1, 2017

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 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities Permit Year 15
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.	Information was developed on the following and included in the following city publications: Flooding: Is Your Property Protected (Brochure - September 2016) City View (Newsletter – Summer 2016) • Cambridge Ranked as Highest Scoring STAR Community in Nation (p1) • Cambridge Commits to Vision Zero (p3) • Tapping Into Cambridge Water (p.7) • Making Cambridge Better One Quality of Life Requests at a Time (p8) 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: • Alewife Sewer Separation Construction Update (August/September 2016) • Alewife Sewer Separation Construction Update (March/April 2017) • The Port Project – Overview (March 2017) Construction notices are also posted on the DPW Construction Projects website.	Continue to develop relevant information on stormwater management for residents and businesses.
Revised 1.a cont			Expanded BMP element in Year 3		

		Commissioner/ DPW	(ii) Post information on the web	DPW continued to update its website and make information more readily accessible to the public. Updates included during Year 14 include: • The NPDES Phase II Annual Report Year 13, • Stormwater Management Program Phase II NPDES Public Meeting 2016 presentation, • Joint Public Notice (April 2016) for the Alewife Brook CSO Progress Update • Flooding: Is Your Property Protected, and • Illegal Dumping (web page) The Cambridge Water Department (CWD) also provides information on its website regarding projects related to protection of Fresh Pond Reservoir. An example of projects during Year 14 at Fresh Pond includes: • Drainage & Community Gardens Project: Conservation Commission Presentation The Drainage and Community Gardens restoration project will seek to improve existing conditions to be consistent with the Fresh Pond Master Plan vision of better drinking water quality, universal accessibility, and enhanced habitat and user experience. Existing conditions to be addressed by the project include flooding, pooling, and icing along the perimeter road, poor drainage, lack of accessibility and poor plot definition in gardens, and debris and invasive species along the rail corridor. The project design includes elements of corridor naturalization, visual buffering from the parkway, plantings, storm water treatment and improved pond visibility. • Glacken Slope Improvement Project A high priority in the Fresh Pond Reservation Master Plan, the focus of Glacken Slope Restoration is to stabilize the slope, improve soil infiltration, control storm water runoff, and enhance habitat quality. A phased restoration approach, this project involves slope stabilization and gully repair, community-based restoration plantings, improving drainage to the Perimeter Road, and integrating the Upper Slope with the Glacken Field re-design. Phase V, was substantially completed this year (2016) and used porous paving to enhance runoff infiltration at the bottom of the slope and improve Perimeter Road surface and drainage. More CWD project information can be found at: http://www.cambridgema.gov/Water/Projects/freshpondreservation	Continue to update and expand information on our web site that is relevant to the implementation of our stormwater management program.
1.a cont		Commissioner/ DPW	(iii) Distribute materials	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	Distribute information on Stormwater

Revised			Expanded BMP element in Year 3	available at various municipal buildings and on-line and are referenced above under BMP 1.a (i). Construction notices are hand delivered to properties throughout construction project areas and are sent out in emails and posted on project web pages. Sample copies of these notices are available on-line and are referenced above under BMP 1.a (i). DPW also distributed stormwater management materials/brochures at the Rain Barrel distribution events May 19th) and at other public meetings and the annual Stormwater meeting. 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.	/Watersheds to every household actively receiving mail in Cambridge and/or through electronic media.
Revised		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. Water and sustainability related events at the 2016 Science Festival included: Tidepooling & Facility Tour (NEU Marine Science Center), RiverSmart Communities (Stream Table @ Science Carnival), Meadow Scaping...With Goats!. Dive into the Pale Blue Dot, Mapping Climate Change Through Citizen Science and Art, Energy Use and Sustainable Transportation in Cambridge, and Mass Audubon Habitat Education Center. Click here for a copy of the program guide for the 10 day event. Cambridge is also participating with other communities in the Mystic River Watershed working with the Mystic River Watershed Association on the development of a multimedia education program to increase awareness of stormwater pollution for a regional coalition of municipalities.	Participate in the 2017 Cambridge Science Festival or other public event. Continue participation in the MyRWA Stormwater Education Collaborative
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 including the Cambridge Science Festival discussed in BMP 1.a (iv) above and: • DPW Vehicle Road Show held on May 16, 2016 which featured activities explaining how DPW keeps Cambridge Clean, including a hands on demonstration using the EnviroScope model to explain how local waters can become polluted. • The Cambridge Water Department sponsors weeklong activities that highlight watershed protection, water treatment and other water related activities. DPW was on hand to demonstrate the EnviroScope model and the Conservation	Schoolchildren will be included in stormwater outreach activities in general.

				Commission director also had an information table representing Cambridge Community Gardens, Conservation Commission, Fresh Pond Advisory Board and New England Wildflower Society at Fresh Pond Day on June 11, 2016. For the past nine years DPW has sponsored Team GreenSense, a worksite of the Mayor's Summer Youth Employment Program. Each summer the DPW employs 10-15 teams for 6 weeks to learn about and work on solving environmental problems both locally and globally. During Year 14 the program ran from July 5 – August 11 and participants toured the Deer Island treatment facility, learned about rain gardens, composting, recycling, biofuels and urban forestry, and toured the Alewife Stormwater Wetland on August 3, 2016, among many other activities.	
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 182 have been installed: 46 in the Charles (C), and 136 in the Alewife (A) watersheds under the following contracts: Chapter 90 Contract 17: C (9), A (9) Chapter 90 Contract 19: C (25) Main Street/Kendall Sq.: C (12) Huron B: A (44) Concord Ave: A (59) New St/Concord Lane: A (24)	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 2016. 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. A sample of Sustainable Transportation activities can be viewed in Bikes in Cambridge webpage.	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 41 currently active PTDM projects, 41 submitted complete monitoring reports in 2015, or 88%. 2015 monitoring reflects:
 - More than 11.2 million square feet of commercial development and 17.3 million square feet of institutional development are subject to annual PTDM monitoring, including Harvard University.
 - A total of 18,740 parking spaces come under the Ordinance, with facility sizes ranging between 3 and 4,576 parking spaces.
 - Approximately 47,854 employees, 11,250 graduate/middle school students, and 2,000 library patrons are covered by PTDM plans in Cambridge.
 - Thirty-four of the 41 projects, or 83% met or surpassed their mode split.
 - Forty of the 41 projects, or 96%, 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:

- KSURP (new large plan)
 - 75 Moulton (new large plan)
 - 907 Main Street (new small plan)
 - 110 Fawcett (new small plan)
 - 99 Erie (F48-50 Amended)
 - 130 Brookline (F53 Amended)
- ❑ To improve and expand outreach 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
 - The DPW Facebook page can be viewed at: www.facebook.com/CambridgeDPW
 - The DPW Twitter feed can be viewed at: <https://twitter.com/CambridgeDPW>
- ❑ 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 free 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 14: May 19th. Approximately 85 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 2016 event DPW again partnered with www.GreenCambridge.org to

provide assistance or advice on the installation of the rain barrels.

- ❑ The Federal Emergency Management Agency issued new Flood Insurance Rate Maps for a portion of Cambridge in 2010. During Year 14 DPW continued to assist residents with these changes through e-mail, phone and help-desk requests for information. DPW submitted a local Community Rating System (CRS) application during Year 12 that was approved in Year 13 effective October 1, 2015 providing Cambridge residents with a 5% discount on their flood insurance premiums. As part of the CRS program DPW issues an annual letter to property owners in the flood plain regarding flood preparedness and insurance.
- ❑ [Journal of Green Building](#) published a feature article on the Alewife area in Volume 11, Number 1. The article “*Green Infrastructure and Transit Oriented Mixed Use Development: The Alewife Area of Cambridge, Massachusetts*” discusses the history of development in the Alewife neighborhood, infrastructure development and Climate Change issues.
- ❑ The DPW continues to maintain staff gauges within the Alewife Stormwater Wetland so that the City and the public could observe the elevation of the stormwater within the wetland. This will aid in understanding how the wetland responds to rain events and dry weather conditions.

MCM #2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 15
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 14 and to discuss potential issues/projects for Year 15 was held on March 28, 2017. A copy of the presentation can be viewed here. 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 at the City Clerk’s office at City Hall.	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 30, 2016 as part of Earth Day/Park Serve Day. The Conservation Commission provided support to the Charles River Watershed Association for an Invasive Control Program at Magazine Beach. CRWA will be undertaking this program through a grant from Fish & Wildlife during Year 15.	Support/assistance will be provided for one clean-up event, as needed.

2.b cont.		Commissioner/ DPW	(ii) Support educational efforts of local watershed groups as opportunities arise through talks and /or support of grant applications	The Cambridge Water Department supported the efforts of the Friends of Fresh Pond Reservation in their stewardship and educational projects. Friends of Fresh Pond describe their various activities supported by the Cambridge Water Department in the annual The Year in Review . DPW received a MassDEP 604(b) grant and will work with the Charles River Watershed Association to develop green street designs for three public rights-of-way and integrate these plans with the City's five year street and sidewalk plan. More information is provided under "MCM #2. Additional Information" See additional outreach and educational efforts listed under "MCM #2. Additional Information" at the end of this section.	The City will continue to provide support to local watershed associations as opportunities permit.
		Commissioner/ DPW	(iii) Seek permission to post links to local watershed groups' web sites	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.	As new information is added to the stormwater management web pages new hyperlinks will be added and updated as needed.
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)	Four (4) Household Hazardous Waste (HHW) collection days were held this permit year on April 19, June 18, September 10 and October 29, 2016. Approximately 12,394 tons (estimated) of materials have been recycled, including 11 tons (estimated) of HHW.	4 HHW collection days will be held on April 8, June 17, September 9 and November 4, 2017.

2.c cont.		Commissioner/ DPW	(ii) Accept recycling materials at a drop off center on a regular basis	During 2016 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 from 9 a.m. – 4 p.m. More information about the Cambridge Recycling Center can be found on the Recycling web page.	DPW will continue to operate a recycling drop-off center.
		Commissioner/ DPW	(iii) Beginning in yr 2 provide information on illicit discharges and reporting	Information on proper disposal of household hazardous waste is provided on the DPW Household Hazardous Waste (HHW) web page and in eNewsletters. Information on HHW was provided to residents when they picked up their 2016 rain barrels together with other stormwater management information. During Year 14 DPW created a separate web page for Information on illegal dumping and additional information is provided under FAQ.	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.

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 14, completed in Year 1. Information from this process can be viewed at: Concord-Alewife Study See additional activities listed under “MCM #2. Additional Information” at the end of this section.	Completed.
2.d Cont.		Assistant City Manager for Community Development/CDD and Commissioner/DPW	(ii) Complete Phase II if authorized	Not applicable in Year 14, 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 14, 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 14, 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 14, completed in Year 4. DPW published the Concord-Alewife Stormwater Management Guidelines in May 2006	Completed.
		Commissioner/DPW	(vi) Place LID document on the Stormwater web site	Not applicable in Year 14, 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 14. The final EJPA was fully executed on March 4, 2005 and forwarded to EOEA. The EJPA was extended in Year 12 until December 31, 2017 (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 met three (3) times in Year 14 on July 12 and September 13, 2016 and January 10, 2017. Meetings on May 10 was cancelled due to lack of agenda items, November 8, 2016 due to election and March 14, 2017 due to weather. The Environmental Joint Powers Agreement (JPA) that authorized the ABC Flooding Board had expired during Year 10 and it was approved for continuation on May 28, 2014. The Secretary of the Executive Office of Energy and Environmental Affairs approved the extension of the ABC Flooding Board through December 31, 2017.	The ABC Flooding Board will meet 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 14, 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 14. The Progress Report was placed on the web site in Year 4 see:	Completed.
<i>revised</i>					

MCM #2. Additional Information

- ❑ The City of Cambridge in partnership with the Charles River Watershed Association (CRWA), will develop conceptual green street design plans for three public rights of way and integrate these plans with the City's five-year roadway improvement plan. The three study area streets are Park Avenue in West Cambridge, Chestnut St. in Cambridgeport and Webster Ave. outside of Kendall Square.

The Team will also develop a general green street guidance document for use by the City of Cambridge Department of Public Works (Public Works), other City agencies and private developers. The document will provide guidance on green street

implementation in space-constrained urban settings with a focus on typical residential street layouts in the City of Cambridge.

The specific activities to be conducted during this project include:

- Produce conceptual green street designs for three public roadways (study areas) scheduled for capital improvements in the coming four years;
- Evaluate each design for water quality and quantity impacts and benefits to the Charles River;
- Develop a general green street guidance document for dense residential City streets, that can be adapted to future capital improvement projects;
- Provide input on green street planning for the City-wide Masterplan;
- Engage multiple City departments and key stakeholders about green infrastructure and its application in urban settings.

This project is funded by a 604(b) grant from the Massachusetts Department of Environmental Protection (MassDEP) to the City.

- ❑ 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 2014. Sewer separation was completed in December 2015 allowing separated stormwater to discharge to the newly constructed stormwater wetland. During Year 14 many community events were scheduled allowing different venues for the community to discuss the sewer separation projects, schedules and construction activities. 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. Community outreach efforts are directed at trying to reach the broader community including open houses, coffee talks, Celebrating Observatory Hill to help support local businesses, etc. Detailed information regarding these projects and the meeting presentations can be found on the [Huron A](#) Improvements, [Huron B](#) Improvements and [Concord Avenue Neighborhood](#) websites.
- ❑ During Year 13 DPW began an investigation and design process for The Port area of the City. Over the next five years, the City anticipates spending over \$35M for the design and construction of water, sewer, drainage, street and sidewalk improvements in this neighborhood. The improvements will focus on rehabilitating existing infrastructure, constructing two underground stormwater tanks, reducing flooding in the area, and reconstructing the streets and sidewalks. During Year 14 DPW developed a pamphlet, [The Port Project Overview](#), and had a community meeting and [presentation](#) on December 8, 2016 providing outreach and information to the community about the program and its progress.

- ❑ 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 amongst itself and members of the public. 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. An extensive outreach program has surrounded this construction activity. During Year 14 one (1) tour of the stormwater wetland was conducted to discuss the stormwater wetland and its benefits and construction process:
 - Team GreenSense: August 3, 2016
- ❑ DPW began the design process for the Willard Street Drainage Improvement Project. A community meeting and [presentation](#) was held on Thursday, March 30 to discuss the project needs, objectives and opportunities. The project includes replacing and/or rehabilitating the sewer and stormwater infrastructure and the construction of a new stormwater pipe and outfall at the Charles River, evaluation and implementation of stormwater best management practices, and water main replacement.
- ❑ Climate Change, Vulnerability Assessment (CVVA): The City is planning ahead and preparing for the inevitable effects of global climate change. In February 2017, the city released The [CCVA Report – Part 2](#), focusing on Cambridge's vulnerabilities to sea level rise and coastal storm surges. This report complements Part 1 and together form the basis for the development of the Climate Change Preparedness & Resilience (CCPR) Plan.

Key Findings of Part 2:

- The dams will likely protect Cambridge from storm surge flooding until at least 2030. It is projected that the Amelia Earhart Dam will likely be bypassed around 2045 and the Charles River Dam around 2055.
- The City's Alewife-Fresh Pond area will be the most impacted area by flooding from SLR/SS. Flooding may involve salt water, which if it reaches Fresh Pond, could contaminate the City's drinking water supply.
- Storm surge flooding, particularly in the Alewife-Fresh Pond area, will pose risks to populations, buildings, and infrastructure.
- By 2070, storm surge modeling shows that large swaths of the Alewife-Fresh Pond area could be subject to annual probabilities of flooding up to 20 percent or once every five years.
- The volume of flood water associated with a storm surge would be immense. Conventional flood management techniques, such as storage basins and tanks, would be insufficient to deal with the problem.

- Overland flooding from a storm surge into the Charles River appears to be a generally low probability through 2070. However, the raised river level could cause river water to back up through the storm drainage pipes and discharge onto some streets. This is called propagated flooding.
- Cambridge's exposure to SLR/SS is a regional problem. There are regional systems that Cambridge relies on, such as public transit and energy, which could be disrupted in neighboring communities and, thereby, affect Cambridge.

The City has begun work on the Climate Change Preparedness & Resilience (CCPR) Plan, which is scheduled to be completed in 2018. Public meetings will be held during the process. The CCPR Plan will also be reviewed by the Envision Cambridge advisory committees, including the Climate and Environment Work Group.

- [Envision Cambridge](#) is a community-wide process to develop a comprehensive plan for a more livable, sustainable, and equitable Cambridge. After a several-month-long process in early 2016 to listen to community members and research their values and aspirations for the City, Envision Cambridge began the visioning phase of the project to establish a City-wide vision to guide the planning process. The City first held a citywide visioning meeting in June and then held an Alewife-specific visioning meeting on July 21, 2016. At this Alewife meeting, participants discussed how Cambridge's core values applied to the Alewife context. Analysis of these conversations on how the City's core values are manifested in Alewife will be used to determine the focus areas on which the Alewife plan will concentrate and will inform the planning for Alewife in the Citywide plan. Those focus areas will inform the goals and strategies of the plan, which in turn will determine the actions the City will take and the indicators and targets towards which it will aim for both Alewife and the City as a whole. Over 40 meetings (presentations, workshops, community engagement, focus groups, etc) were held during Year 14.

MCM #3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 15
3.a	Update Stormwater Drainage System, Outfalls and Receiving Waters in GIS	Commissioner/ DPW	(i) Map Fresh Pond outfalls	Not applicable in Year 14	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 (BMPs) are tracked in a database. Approximately 180 projects underwent DPW site plan review.	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 14 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	In the Charles River watershed twenty-six (26) municipal outfalls were inspected/sampled for dry weather flow: thirteen (13) outfalls	

			Revised in Year 3 to include all Cambridge owned outfalls	were inspected/sampled two (2) times, and thirteen (13) outfalls were inspected / sampled one (1) time over the permit year. During these inspections No dry weather flow was discovered at Main Street (1x), Wadsworth St (1x), JFK east (2x), Brewer St (2x), Cambridge Cemetery Range 104 (1x) and River St (1x) were inspected, but not sampled due to the lack of dry weather flow. The Western Ave outfall is a new outfall and was added to this year's list for monitoring. In the Alewife Brook watershed sixteen (16) outfalls were sampled/inspected for dry weather flow: three (3) outfalls were inspected/ sampled three (3) times, eight (8) outfalls were inspected/sampled two (2) times, and five (5) outfalls were inspected / sampled one (1) time over the permit year. Of the above outfalls, six (6) outfalls [five (5) outfalls at Russell Field and one (1) outfall at Blanchard Road (18'')] were inspected, but not sampled due to the lack of dry weather flow. See web page and Part IV of this report for sampling locations and information.	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)	Two (2) oil & grease samples were done during Year 14: No sample in the Charles Watershed and two (2) in Alewife Watershed (Blanchard Road at Wellington Brook).	
		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	DPW began investigations into the Normandy Terrace and Matignon Road areas due to elevated e.Coli results from water quality sampling at outfalls. Section of a sewer line were lined in the Normandy Terrace area to evaluate if infiltration into the drain was causing higher levels. No point source has been identified. Investigations are ongoing.	We will continue to monitor for and remove illicit discharges. Continue investigations in the Normandy Terrace and Matignon Road areas.
		Commissioner/ DPW	(v) Perform water quality sampling at a Fresh Pond outfall annually	Nine (9) water quality samples were taken from three ponds that surround Fresh Pond including: Little Fresh Pond, Black's Nook, and North Pond. These results are analyzed in the 2016 Water Quality 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 14. Sampling equipment was purchased in Year 4.	Supplies will be purchased as needed.
3.b cont.		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. Structural problems were identified and repairs made so that investigations could continue. No additional investigations were undertaken in Year 14.	Investigation into the Sparks Street drainage area will continue.

		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.
3.b cont.		Commissioner/ DPW	(ix) Separate Common Manholes (CMH).	All known CMHs in separated areas have been eliminated. Separation of future CMHs will help to separate sections of combined sewer areas combined through CMH structures. Three (3) Common Manholes were removed in combined sewer areas during Year 14: one (1) on Newport and two (2) on Roseland.	The number of Common Manholes separated in combined drainage areas will be tracked.
		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	Cambridge will continue to take wet weather samples at the same 2 outfalls (Sparks Street and

				not influenced by common manholes, one catchment in the Alewife watershed (Normandy Terrace) and one in the Charles River watershed (Sparks Street). Two (2) wet weather samples were taken during Year 14, one in each watershed. The City has completed the installation of 5 automatic sampling stations three in the Alewife Watershed (wetland outlet, upstream of wetland and Columbus Ave) two in the Charles Watershed (Sparks St and Western Ave). These stations will aid in obtaining wet weather sampling data. The Sparks St and CambridgePark Dr stations include multiparameter Sondes that transmit live data to DPW on water quality conditions.	Normandy Terrace) and monitor sampling results. DPW will also begin to develop and implement a wet weather sampling program for the stormwater sampling stations. Live data from the Sondes will be linked to the DPW website.
3.c	Conduct Illicit Discharge Education Program	Commissioner/ DPW	(i) Advertise illicit discharge hotline number and information on illicit discharges	The hotline number and webpage was added to the DPW website. Non-emergency citizen requests can now be reported through the Commonwealth Connect Program. This allows residents to report issues via easy to use GPS enabled mobile apps on an online mobile interface. During Year 14 we added “dumping in catch basins” as a reportable issue. See below under “Additional Information” for further details. See MCM 2.C(iii) above for more information.	The Stormwater Hotline number for illicit discharges will be incorporated in public information where appropriate/applicable. DPW will track Commonwealth Connect “Dumping Into Catch Basin” complaints reported.
3.d	Develop Regulations Prohibiting Illegal Dumping of Non-Stormwater into the MS4	Commissioner/ DPW	(i) Develop a working draft	Not applicable in Year 14, completed in Year 1.	Complete.

		Commissioner/ DPW	(ii) Provide opportunity for peer and legal review of draft	Not applicable in Year 14, completed.	Completed.
		Commissioner/ DPW	(iii) Revise draft as necessary	Not applicable in Year 14, completed in Year 5.	Completed.
		Commissioner/ DPW	(iv) Present regulations/ordinance to City Council for consideration for adoption	Not applicable in Year 14, completed in Year 5. Click on the link to see a copy of Wastewater and Stormwater Drainage System Ordinance .	Completed.

MCM #3. Additional Information

- ❑ Common Manholes (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. A [Combine Sewer and Stormwater Catchment Areas](#) map of the combined and separated catchment areas shows areas where CMHs have been separated and the associated outfall areas. All known CMHs in separated areas have been separated. DPW will separating CMHs in combined sewer areas when sewer improvement projects are undertaken in those areas.
- ❑ 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 14 the city managed 1130 permanent and 395 temporary dumpster licenses under the new ordinance.
- ❑ During Year 13 the DPW began working on a Five Year Plan for the Cambridge Cemetery, which includes survey and design services to address issues associated with drainage, roadway delineation, and roadway pavement condition and reconstruction. Aerial and ground survey and drainage videos and investigations have been completed. The Plan will include a proposed drainage system and grading plan. During Year 14 DPW completed the first construction contract which included roadway reconstruction and improving localized drainage and erosion issues. We will finalize the five year plan report during Year 15, which will include construction phasing of drainage and roadway infrastructure. The plan includes a pavement condition

evaluation and a drainage study.

- ❑ An ordinance on the [Prohibition on the Use of Polystyrene Based Disposable Food Containers](#) went into effect on October 19, 2016. The City Council hereby enacted this ordinance to reduce the use of polystyrene food containers in the City of Cambridge to advance solid waste reductions and the health of its citizens. Polystyrene food containers are expensive and impractical to recycle and are not biodegradable.
- ❑ A New Public Service Request Platform: [Cambridge Commonwealth Connect](#) will allow residents to report quality-of-life concerns via the City of Cambridge's website, mobile applications, Facebook App, and [SeeClickFix.com](#). When submitting issues via mobile app residents can provide location, descriptive, and photographic information as they see the issue in real time. Once the resident submits an issue, the City of Cambridge and anyone 'watching' the area will receive an alert. City staff will acknowledge the service request, route it to the proper department, and update the request—and residents following the issue—once it's been resolved. Previously the categories of issues for sewer/stormwater related service requests were reported under "other". During Year 14 a new category of "Dumping In Catch Basins" was added to the issue category. Eleven (11) concerns were investigated and 10 closed.

The screenshot shows the SeeClickFix website interface for reporting an issue in Cambridge, MA. The browser address bar shows 'seeclixfix.com/cambridge/report'. The page has a blue header with the SeeClickFix logo and navigation links: 'Get the App', 'Government', and 'Learn More'. On the right, there are links for 'CRM Dashboard', a user profile icon, and a notification bell showing '2846'. Below the header, the location is set to 'Cambridge, MA' with a '[Change location]' link. There are buttons for 'Follow this Place' and 'Invite Neighbors'. A dark blue bar contains links for 'Issues', 'Answers', 'Neighbors', and 'Watch Areas', along with a 'Report an Issue' button. A blue banner with a key icon asks 'Looking to get your government on SeeClickFix?' and includes a 'GET STARTED!' button. The main section is titled 'REPORT AN ISSUE' with a 'Help' link. It features a map of Cambridge, MA, with a location pin at '147 hampshire st, Cambridge, Massachusetts'. To the right of the map is a 'Category' dropdown menu. The menu is open, showing a list of issue categories. The category 'Dumping in Storm Drain' is highlighted in blue. Other categories include 'Abandoned Bicycle', 'A-Frame/Business Sidewalk Obstruction', 'Bike Lane Obstruction', 'Bike Rack Damage', 'Bike Rack Request', 'DPW Bike Removal (Internal)', 'DPW Bike Tagged (Internal)', 'DPW Compost Request (Internal)', 'DPW Icy or Snowy Street (Internal)', 'DPW Recycling Request (Internal)', 'DPW Street Maintenance (Internal)', 'Fresh Pond Reservation Issue', 'Graffiti', 'Icy or Snowy Street', 'Icy or Snowy Bike Lane', 'Icy or Unshoveled Sidewalk', and 'Leaf Blower Complaint'.

MCM #4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 15
4.a	Develop Program for Construction Site Runoff Control	Commissioner/ DPW	(i) Review existing planning and construction procedures	Not applicable in Year 14, completed.	Complete
		Commissioner/ DPW	(ii) Clarify needed regulatory mechanism	Not applicable in Year 14, completed.	Complete
		Commissioner/ DPW	(iii) Develop draft regulatory mechanism, procedures and guidelines	Not applicable in Year 14, 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 14. 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: ▪ Wastewater and Stormwater Drainage Use Regulations ▪ Land Disturbance Regulations	Completed.

4.a Cont.		Commissioner/ DPW	(v) Amend draft as necessary and submit for consideration for adoption	Not applicable in Year 14, completed in Year 5.	Completed.
		Commissioner/ DPW	(vi) Record number of required Stormwater Management Permits submitted	Seven (7) Stormwater Control Permits (formerly Land Disturbance Permits) were issued during Year 14 for the following projects: • 237 Franklin St • 76 Prospect St • 8 Essex St • 32 Mill St • 75 Moulton St • 147 Prospect St • 2 Leighton St Twenty-one (21) applications were submitted in Year 14.	The number of Stormwater Control Permit applications submitted and approved will be tracked.
		Commissioner/ DPW	(vii) Provide stormwater management guidance materials or references	A new brochure, Flooding: Is Your Property Protected , was developed to assist property owners protect their properties from impacts due to flooding.	Continue to maintain and revise guidelines as necessary in conjunction with adaptation strategies.
		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).	Complete.

4.a cont.		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 twenty-eight (28) Erosion and Sedimentation Control WARNING tickets issued for stormwater related violations.	The number of enforcement action taken and reported will be tracked in a database.
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	Completed. See BMPs for Construction Controls	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	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: July 11, July 18, July 25 (presentation), August 8, August 29, 2016 and March 27, 2017.	The City Engineer will discuss erosion and sediment control practices and problems with contractors at 3 construction coordination meetings.
New		Commissioner/ DPW	(iii) Record the number of guidance materials or reference materials provided.	No additional fact sheets were developed during Year 14. 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.
4.b cont.		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 14.	Meetings will be held to discuss new ordinances and regulations as necessary.

MCM #4. Additional Information

- ❑ In addition to the seven (7) Stormwater Control Permits issued during Year 14 an additional seventeen (17) additional permits were submitted for review, but not yet approved as follows:
 - 907 Main Street
 - 2551 Massachusetts Ave
 - 64 Pearl Street
 - 84 Raymond Street
 - 163 Allston Street
 - 121 First Street
 - 249 Third Street
 - 75 New Street
 - 35 CambridgePark Drive
 - 1868 Massachusetts Ave
 - 1350 Massachusetts Ave
 - 1 North Street
 - 579 Concord Ave
 - 850 Cambridge Street
 - 1 NorthPoint Blvd
 - 49 Smith Place
 - 10 Holyoke Place
- ❑ The City's Wastewater (Stormwater) Compliance Officer completed one hundred and sixty two (162) inspections:
 - 162 stormwater erosion and sediment control site inspections, and
 - Issued 28 violation/warnings for erosion and sediment control
- ❑ DPW transitioned to the Energov system in November 2015 to process all permits, inspections and code enforcement investigations. This DPW is no longer using the Cambridge Request System for permitting. The Energov system allows for permitting, inspection and code enforcement (post construction inspections, erosion and sediment control inspections, and fats, oils and grease inspections) to be conducted within the Energov system. Currently the DPW and Inspection Services Department are using Energov, the goal is to bring all municipal permits under this program.
- ❑ The Conservation Commission received thirteen (13) Notice of Intent. For various projects and has issued eight (8) permits for this work.

- The Conservation Commission issued two (2) Violation notices, one in the Charles Watershed and one in the Alewife Watershed. One violation has been resolved the other is pending further information.

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 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 15
5.a	Revise Sewer Use Regulations and Guidance	Commissioner/ DPW	(i) Complete a working draft	Not applicable in Year 14, 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 14, completed in Year 5. 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 14. New guidelines will be developed to support the CVVA findings and adaptation strategies.	Stormwater management guidance will continue to be revised, as necessary.
		Commissioner/ DPW	(iv) Discuss final draft and guidance with City Manager, City Council and the community	Not applicable in Year 14, 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	Not applicable in Year 14, completed in Year 5. The Commissioner of Public Works promulgated Land Disturbance Regulations and Wastewater and Stormwater Drainage Use Regulations. ☐ 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. A copy of the Ordinance and Regulations can be viewed on the DPW Stormwater website (see MCM 5.a (ii) above) and by clicking on the links above. Staff continued to review Regulations for revisions. These changes are still draft and have not yet been advertised.	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	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 seven (7) Stormwater Control Permits issued in Year 14.	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 14, completed in Year 6.	Completed.
		Commissioner/ DPW	(ix) Adopt procedures for post construction inspections	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. A private BMP database is maintained for use in post construction inspections. Eighty-six (86) post-construction inspections were performed during Year 14. Currently there are seventy nine (79) projects with a Stormwater Control Permit either completed or in construction.	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	Completed. Owner's are required to perform long-term operation and maintenance of BMPs as follows: • 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. It is expected that the Wastewater Compliance Officer will work with property owners to ensure that their BMPs are being maintained. During Year 14 DPW continued to work with both Harvard and MIT on a tracking system and reporting format for all of the university owned properties covered under Stormwater Control Permits to allow the universities to better track maintenance activities of post construction Stormwater control devices.	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 14, 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 14 activities included: • Arbor Day Celebration on April 15th, 2016 • <u>Forestry Programs and Volunteer Opportunities</u> including: the Water by Bike/Tree Ambassador and Tree Inventory Intern • Tree Planting Specification were significantly updated • The Urban Forestry Division install 100 new street trees through the Participatory Budget process. • Flexi-pave installation was ramped up to help mitigate soil compaction and other tree well related issues. 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 had eleven (11) meetings with the Committee on Public Planting regarding the benefits of green space and trees, and worked with them to strengthen tree planting specifications to help support the long term health of urban street trees. With the help of the CPP, the Urban Forestry Division was able to receive more funding for tree planting in the City

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 14 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 14
6.a	Educate Municipal Employees about Pollution Prevention	Commissioner/ DPW	(i) Provide stormwater training for municipal employees annually	During Year 10 DPW purchased <i>RAINcheck Stormwater Pollution Prevention for MS4s</i> from Excal Visual as a training aid for employees. During Year 14 fifty-one (51) Cambridge Public School Dept. employees were trained using <i>RAINcheck Stormwater Pollution Prevention</i> on August 3, 2016. Twenty-one (21) DPW employees were trained on the MS4 Permit requirements and status of pending changes.	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	A list of responsible operations personnel with stormwater responsibilities is maintained.	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 14, completed in Year 5.	Completed.
		Commissioner/ DPW	(iv) Record number of municipal facilities inspected on an annual basis	Ninety-one (91) facility inspection reports have been completed and returned to DPW. This represents 71% of the facilities in separated areas and 48% 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 14, 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.	Fresh Pond Reservation updated stormwater management BMPs	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	DPW is working on a multi-year sewer capital repair program using Infomaster software to characterize code defects. This information is used to implement rehabilitation projects. During Year 14 the first sewer lining contract was completed and a second contract is in design.	New activities at facilities should be noted and applicable BMPs implemented.

		Commissioner/ DPW	(ii) Identify municipal facilities in separated areas and identify structural controls	Changes are updated annually. 156 municipal facility sites were mapped in GIS according to location in separated or combined sewer areas. During Year 14, 86 facilities were within a combined sewer area and 70 were within a separated stormwater area. These numbers changed due to the completion of the Alewife Sewer Separation project and partial separation of Western Avenue.	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 14, 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	3,864 work orders were tracked for storm and sanitary system inspection, repairs, maintenance, clean, clear in the Cambridge Request System and the Cartegraph system. Over 1,756 work orders were tracked for stormwater system activities and 2,108 for sanitary system activities during Year 14.	Continue to track of the number and type of drainage system work orders completed.
		Commissioner/ DPW	(v) Record percentage of City catch basins cleaned	1562 catch basins cleaned (364 tons) [approximately 26% (6,000 total)]	Keep record of City catch basins cleaned annually.
		Commissioner/ DPW	(vi) Record tons of street sweepings collected	1,021 tons	Keep record of tons of street sweepings collected annually.
		Commissioner/ DPW	(vii) Record tons of waste/recycling collected	14,419 tons trash 9,848 tons recycling 2,535 tons organics	Keep record of tons of waste and recycling collected annually.
		Commissioner/ DPW	(viii) Record number of new trees planted	279 trees were planted by the forestry division.	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 three times a year as part of our standard operations, vacuum sweeping of all municipal streets in done in April, July and November.

- ❑ In public construction projects the following stormwater best management practices (BMPs) were constructed:
 - Number of new catch basins with deep sumps and hoods: 92 (citywide)
 - Number of new catch basin hood installed: 96 (citywide)
 - Number of deep sump drain manholes (grit pits): 17 [(Concord Lane(1), Huron B (1), Chapter 90 (14) and Remedial (1)]
 - Infiltrating Catch Basins/dry wells: 8 [(Pearl (4), Newport Rd (1) and Roseland (3)]
- ❑ Additional maintenance activities were performed on stormwater drainage systems including:
 - Pump Inspections & Maintenance = 111 (Pump Inspections Maintenance Contract)
 - Storm drain cleaned and televised = 51,008 LF (TV and Cleaning Contract)
- ❑ DPW began an inspection program for privately owned sewer holding tanks. There are a total of nineteen (19) private sanitary

holding tanks within Cambridge, during Year 14 sixteen (16) have been inspected.

Part IV. Summary of Information Collected and Analyzed

- The following water quality samples were collected and analyzed at Alewife Brook, Charles River and Fresh Pond from April 2016 through March 2017.
 - [Alewife Brook dry weather samples 2016](#) (various dates) includes Alewife Brook Oil and Grease samples: Blanchard Road at Wellington Brook (May 27 and September 15 2016)
 - [Alewife Brook wet weather sample: Normandy Terrace](#) (September 27, 2016)
 - [Charles River dry weather samples 2016](#) (various dates)
 - [Charles River wet weather sample: Sparks Street](#) (September 27, 2016)
 - [Little Fresh Pond, North Pond and Black's Nook Water Quality Samples](#): July 27 and November 2, 2016, and February 2, 2017).

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, 2014 through March 31, 2015)

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)		

⁺ 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 **	(#)	4
▪ community participation **	(# or %)	929 vehicles
▪ material collected **	(tons or gal)	11 tons ⁺
School curricula implemented	(y/n)	

⁺ A total estimate of 11 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	(#)	45
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 **	(#)	0
Illicit discharges identified (Since beginning of permit coverage)	(#)	40
Illicit connections removed **	(#); and (est. gpd)	1
Illicit connections removed (Since beginning of permit coverage)	(#); and (est. gpd)	40
% of population on sewer	(%)	99.9%
% of population on septic systems	(%)	.1%

Construction

	(Preferred Units)	Response
Number of construction starts (>1-acre) **	(#)	2 ⁺
Estimated percentage of construction starts adequately regulated for erosion and sediment control **	(%)	100%
Site inspections completed **	(# or %)	100%
Tickets/Stop work orders issued **	(# or %)	28 warning tickets
Fines collected **	(# and \$)	0
Complaints/concerns received from public **	(#)	15 ⁺⁺

⁺ 2 Leighton Street and 32 Mill Street

⁺⁺ Not all of these complaints were related to construction activities.

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 **	(#)	1,562
Qty. of storm drain cleaned **	(%, LF or mi.)	51,008 LF
Qty. of screenings/debris removed from storm sewer infrastructure **	(lbs. or tons)	1,021
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)	\$76/basin
• Disposal cost**	(\$)	\$140/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)	9 times/yr (April – Dec)
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)	1,285 tons
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.) **	(location)	Landfill & transfer station
Annual Sweeping Costs		
• Annual budget/expenditure (labor & equipment)**	(\$)	\$440,020 (contract only)
• Hourly or lane mile contract rate **	(\$/hr. or ln mi.)	\$99.00/hr/rotary sweeper \$71.00/hr/vacuum sweeper
• Disposal cost**	(\$)	\$37/ton (apr-sept) \$97/ton (sept-dec)
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

⁺ Vacuum sweepers accompany rotary brush sweepers for the months of April, July, and November

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	