PlaNYC

SUSTAINABLE STORMWATER MANAGEMENT PLAN

PROGRESS REPORT OCTOBER 2012

A GREENER, GREATER NEW YORK

The City of New York
Mayor Michael R. Bloomberg

The Sustainable Stormwater Management Plan Progress Report is published pursuant to Local Law 5 of 2008.

Introduction

In December 2008, the City of New York released the Sustainable Stormwater Management Plan, part of PlaNYC, the City's comprehensive long-term plan to create a greener, greater New York. Updated in 2011, PlaNYC contains 132 initiatives with more than 400 specific milestones to enhance the quality of life, protect the environment and public health, invest in the city's infrastructure, and create additional economic opportunities all while accommodating one million more New Yorkers. The Sustainable Stormwater Management Plan laid the foundation for improving water quality in our harbor, increasing opportunities for recreation, and restoring coastal ecosystems.

Over the past 100 years, the City has made significant improvements to the water quality of New York Harbor, yet challenges remain. Like other older cities, New York City is largely serviced by a combined sewer system in which stormwater and wastewater are carried through a single pipe. Our wastewater treatment plants are designed to treat and disinfect twice the amount of dry weather flow; however, during heavy storms the system can exceed its capacity and is designed to discharge a mix of stormwater and wastewater—called combined sewer overflow or CSO—into New York Harbor in order to prevent damage to the treatment plants.

The traditional solution to this challenge has been to build more capacity within the system with large detention tanks and to upgrade existing wastewater treatment plants. Since 2002, the City has invested more than $10 billion in mostly "grey" water-quality improvements in New York City that have resulted in significant reductions of pollution, bacteria, and water-borne litter and debris. These grey infrastructure investments have been effective, but they serve a singular purpose and the opportunities for the highest marginal returns on water quality improvement have largely been exhausted. Rather than build additional large storage tanks or tunnels to temporarily store wastewater at the end of the sewer system, the City determined through the analysis in the Sustainable Stormwater Management Plan that it is more cost-effective to construct source controls and green infrastructure—including bioswales, green roofs, and subsurface detention systems—to manage stormwater from impervious spaces such as roofs, sidewalks, and parking lots.

On September 28, 2010, Mayor Bloomberg issued the NYC Green Infrastructure Plan, a detailed plan for adopting green infrastructure for pollution control via watershed planning and inter-agency cooperation. The Plan is backed by a commitment of $187 million in capital funds through 2015 and $1.5 billion through 2030.

NYC's Green Infrastructure Plan

Over the past two years, the City has made considerable progress towards using green infrastructure to sustainably manage stormwater. On January 4, 2012 the City adopted a rule requiring new construction and major building alteration projects to capture more stormwater runoff, providing additional capacity in the combined sewer system and reducing street flooding. Enhancing an existing requirement to manage stormwater, the rule means that developers will employ more green roofs, blue roofs, rain gardens, and detention techniques, and will also minimize impervious areas to the extent possible. The rule was developed over the past two years with input from the building industry and environmental organizations. Based on extensive feedback, the rule credits infiltration into soil, recycling for on-site use, and minimization of impervious surfaces, all of which can reduce the size of stormwater control systems. To assist with the implementation of the new rule, the City released a companion document, Guidelines for the Design and Construction of Stormwater Management Systems, to provide the development community with guidance on the selection, planning, design and construction of onsite source controls.

On March 13, 2012 the City and the New York State Department of Environmental Conservation (DEC) finalized a historic agreement that incorporates an iterative, adaptive management approach to sustainable stormwater management. This agreement adopted many of the goals of the NYC Green Infrastructure Plan into a formal commitment between the City and the State, and committed the City to:

- Manage the equivalent of stormwater generated by one inch of precipitation on 10% of impervious surfaces in combined sewer areas
- Construct at least $2 million of green infrastructure in two neighborhood demonstration areas
- Construct $3.4 billion in grey infrastructure, of which $1.8 billion has already been incurred
- Publish 11 regional Long Term Control Plans (LTCP) to control CSOs by 2017

As part of the agreement, DEC eliminated approximately $1.4 billion in grey infrastructure projects and agreed to defer another $2 billion in additional grey infrastructure that had been proposed, providing the City with the necessary time to build, monitor, and demonstrate the effectiveness of green infrastructure projects.

To help implement the NYC Green Infrastructure Plan, the City created an interagency Green Infrastructure Task Force to incorporate stormwater controls into roadway reconstructions and other public infrastructure projects. The Green Infrastructure Task Force, led by the Mayor's Office and DEP and composed of City agencies with experience in planning, designing, and building sustainable stormwater management techniques, developed standard designs and specifications for right-of-way bioswales and siting procedures.

As part of the LTCP for CSOs, the City welcomes public participation in the decision making process through outreach programs to communities near CSO-affected waterbodies. On June 26, 2012, the City hosted a public open house to begin to develop the Alley Creek Long Term Control Plan. In 2013, the City will begin the planning process for LTCPs for Coney Island Creek, Hutchinson River, Flushing Creek, and Gowanus Canal. More information about the Long Term Control Plan process is available on DEP's website (http://www.nyc.gov/html/dep/html/cso_long_term_control_plan/index.shtml).

Key Progress

The Sustainable Stormwater Management Plan consists of ten initiatives with 61 milestones to achieve three goals: implementation of the most cost-effective and feasible stormwater source controls, resolution of the feasibility of promising stormwater technologies, and exploration of funding options for source controls. Since the release of the Sustainable Stormwater Management Plan in 2008, the City has achieved 46 of the 61 milestones with seven more on track to be accomplished on time (86.9% achieved or on track).

Since the release of the Sustainable Stormwater Management Plan update in October 2010, the City has accomplished the following:

- Announced a groundbreaking agreement with DEC to reduce CSOs by using green infrastructure. Under the agreement the City will invest approximately $187 million in through 2015 and an estimated $2.4 billion of public and private funding through 2030 to install green infrastructure technologies to manage stormwater before it enters the City's combined sewer system. This agreement is a direct result of the NYC Green Infrastructure Plan
- Established the Green Infrastructure Task Force, comprised of City agencies, that meets on a regular basis to carry out the goals of the NYC Green Infrastructure Plan
- Developed the City's first standard green infrastructure designs for right-of-way bioswales, a crucial part of meeting the City's consent order obligations
- Built 111 new Greenstreets, some with stormwater capture systems, in addition to the 146 constructed in between fall 2008 and spring 2010. Starting in 2011, all new Greenstreets will be designed to manage stormwater
- Planted more than 612,000 trees under the MillionTreesNYC program, including 94,600 street trees
- Established the Green Infrastructure Steering Committee to help the City implement its stormwater management goals and comprised representatives from stormwater management, environmental advocacy, real estate development, landscape architecture, and others
- Incorporated stormwater capture elements into the NYC Plaza Program, six of which will either be completed or begin construction by the end of 2013
- Expanded the Bluebelt system to Queens and the Bronx where the City is currently designing new Bluebelt systems for which construction will begin within three years
- Released the High Performance Landscape Guidelines: 21st Century Parks for NYC to support sustainable stormwater management in future parks
- Opened more than 219 schoolyards as part of the Schoolyards to Playgrounds program, many with renovations that decreased the amount of impervious surfaces
- Released the City's first wetlands strategy which contains updated wetlands maps and outlines 12 initiatives to help protect, preserve, and enhance wetlands with the goals of no net loss of wetlands and improvement of the quality of the city's remaining wetlands
- Installed more than 819,000 Automatic Meter Reading devices to help promote water conservation throughout the city
- Published a Water Conservation Manual that describes and evaluates the best practices for potable water use reduction and guidance for implementing these strategies based on cost, compliance with code, and environmental benefit
- Promulgated the stormwater performance standard for combined sewer areas and published an accompanying guidance manual that is projected to reduce CSOs by as many as 800 million gallons over the next 20 years based on historic development trends
- Replaced notification signs at all 410 required CSO outfalls and began to develop an enhanced notification system that tells the public of likely CSO events based on rainfall

- Published two years of preliminary monitoring results for more than 25 types of green infrastructure systems including bioswales, blue roofs, green roofs, and mini-wetlands
- Distributed more than 1,000 free rain barrels in Queens, the Bronx, Staten Island and Brooklyn and will launch an expanded program in spring 2013
- Established the Green Infrastructure Grant Program and awarded more than $7.5 million in two rounds of grants to 22 projects, matched by more than $4.1 million of in-kind services
- Established an agreement between the New York City Departments of Environmental Protection, Parks & Recreation, and Transportation to ensure that DPR will maintain all green infrastructure projects in the right of way through 2015
- Piloted a stormwater charge, which provided critical information about future charges and generated more than $114,000
- Created a green infrastructure webmap that allows the public to find and post green infrastructure installations throughout all five boroughs
- Expanded the harbor water quality survey program with seven new stations and began to post new water quality information to DEP's website on a weekly basis

Through 2030, the modified Consent Order, which is based on the NYC Green Infrastructure Plan, and the 11 LTCPs will be the guiding documents for stormwater management in the city. In 2013, EPA will release federal regulations on Municipal Separate Storm Sewer Systems. In the meantime, the City, led by the Mayor's Office of Operations, formed an interagency working group which created an inventory of city-owned facilities and developed draft standard operating procedures for pollution prevention for municipal operations.

Four years after the 2008 release of the plan, it is evident that New York City is committed to cleaning our waterways in the most sustainable way possible. Of the remaining eight milestones that have not been achieved, two are no longer applicable, one deserves reconsideration, four have been delayed due to challenges in design and construction, and one is awaiting further direction from federal and state regulators. After reviewing the 2012 Progress Report and the other documents concerning stormwater management, the City believes that a revision of the 2008 Sustainable Stormwater Management Plan is not necessary to achieve the plan's goals.

The City will continue to report on the remaining milestones that have not yet been achieved, and is already obligated to report on many of the milestones' goals set forth in the Sustainable Stormwater Management Plan in other mandated documents: the annual CSO BMP Report (March), the annual update to the modified Consent Order (April), the annual PlaNYC update (April), and the annual water conservation report (June). In an effort to be transparent, the City voluntarily posts information online concerning many other significant milestones such as the number of street trees planted per year and harbor water quality, and voluntarily generates documents like DEP's Strategic Plan Progress Report which details significant annual achievements.

Progress on Milestones

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
IMPLEMENT THE MOST COST-EFFECTIVE AND FEASIBLE CONTROLS						
1	**Capture the benefits of ongoing PlaNYC initiatives**					
		Street trees	DPR	Total of 220,000 street trees planted by 2017	Under MillionTreesNYC, more than 612,000 trees have been planted, including 94,678 street trees.	**Achieved**
		Greenstreets	DPR	PlaNYC to plant 800 new Greenstreets by 2017	Since the October 2010 Update, the City has built 111 new Greenstreets, in addition to the 146 constructed in between fall 2008 and spring 2010. As of winter 2011, all new Greenstreets will be funded by DEP and will be designed to capture stormwater. DPR will continue to administer the program. In total, the City intends to build 200 new Stormwater Greenstreets by summer 2013, which will bring the total number of new Greenstreets since the start of fall 2008 to 457.	**Not Achieved**
		Green roof tax abatement	DOF, DOB, DEP	NONE	The City is in the process of evaluating the effectiveness of the program and options to extend and/or modify the tax abatement. The current abatement is set to expire March 2013.	**Achieved**
		NYC Plaza Program	DOT	Goal to create 4 new Plazas per year	For the first round of the NYC Plaza Program, DOT selected nine proposals from not-for-profit organizations in Manhattan, Brooklyn, and the Bronx. In the second round of the program, DOT selected one site each in Brooklyn, the Bronx, and Queens. Many of the permanent plazas have been designed to include landscaped areas that will capture stormwater.	
		Bluebelts	DEP	Springfield Park Project slated for construction in 2012 pending funding	The current Bluebelt system drains 15 watersheds at the southern end of Staten Island, plus the Richmond Creek watershed. The combined area of these 16 watersheds is approximately 10,000 acres. Due to the success of the program, DEP has expanded the Bluebelt to other boroughs. DEP will begin construction of the Springfield Gardens Phase D project ($68 million) in Queens in fall 2012, which will include restoration of Springfield Lake and three tidal wetland best management practices (BMPs). Similar to Springfield, the Baisley Pond project ($4.3 million) in Queens will also include a BMP outlet into Baisley Pond. Construction is anticipated to begin in fiscal year 2014. DEP has also identified a Bluebelt improvement project within Van Cortlandt Park in the Bronx. The proposed project would create 5.87 acres of wetlands, restore 4.21 acres of existing wetlands and would create 39 acre-feet of dynamic storage. The proposed project is currently in the design phase and construction is anticipated to begin in 2015. Under the proposed Mid-Island Bluebelt Project, DEP would amend the drainage plans of the Oakwood Beach, New Creek, and South Beach watersheds, an area approximately 5,000 acres in size, and would design 31 new BMPs. The proposed project is currently in the design and permitting phase and construction of the first capital project is anticipated to begin in fiscal year 2014.	**Achieved**
		Schoolyards to Playgrounds	DPR	NONE	The City has opened more than 219 schoolyards as part of the Schoolyards to Playgrounds program; many with renovations that decreased the amount of impervious surfaces. In July 2007, 69 category 1 sites were opened without renovations. In partnership with the Trust for Public Land, the Department of Education, and the School Construction Authority, the City has opened 150 sites after renovation. Eight sites are under construction and will be completed by the end of 2012. An additional 10 schoolyards will completed by the end of 2013.	
		Wetlands	OLTPS, DPR, DEP, EDC	NONE	The City completed the preliminary mapping report in September 2010, which can be found here: http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/nyc_wetland_survey_september_2010.pdf. The report contains preliminary wetlands maps as well as technical information explaining the methodology used to develop these maps. In May 2012 the City released the New York City Wetlands Strategy, which includes updated wetlands maps and outlines 12 initiatives to help protect, preserve, and enhance the City's wetlands which can be found here: http://www.nyc.gov/html/planyc2030/downloads/pdf/nyc_wetlands_strategy.pdf. This analysis and other considerations have led the City to establish an overall goal and develop initiatives to achieve this goal by addressing four key areas: protection, mitigation, restoration, and assessment. The wetlands strategy establishes the goal of no net loss of wetlands and recognizes that addressing the quantity of wetlands in New York City does not provide a clear enough picture. This strategy also establishes the goal to improve the quality of the city's remaining wetlands and maximize their ecological functions to the greatest extent possible.	**Achieved**
2	**Continue implementation of ongoing source control efforts**					
		Waterfront Zoning Public Access Standards	DCP	NONE	On April 22, 2009, the City Council adopted the Waterfront Text Amendment. The amendment will ensure the development of inviting and high quality publicly accessible spaces on waterfront properties. The changes generally apply to new residential and commercial developments in medium and high density zoning districts, and to commercial and community facility developments in lower density residential and manufacturing districts along the waterfront. Among other changes, the amendment improves green space and potentially increases permeability into new waterfront development.	**Achieved**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
		Water Conservation Program	DEP	NONE	As of September 2012, the City has installed more than 819,000 Automated Meter Reading (AMR) devices, with less than 5% of all installations remaining to be completed. AMR and conservation awareness campaigns are expected to result in continued reductions per capita, offsetting expected population growth. Additionally, as a part of the Water for the Future Program, DEP has set a goal of achieving citywide reductions of 50 MGD through the Toilet Replacement Program and the Municipal Water Efficiency Program. DEP expects to fully realize these reductions by 2020. Pilot projects have already been completed with DPR and DOE to demonstrate the cost effectiveness of interagency partnerships.	**Achieved**
3	**Establish new design guidelines for public projects**					
		Street Design Manual	DOT	NONE	Released in May of 2009, the Street Design Manual provides policies and design guidelines to City agencies, design professionals, private developers, and community groups for the improvement of streets and sidewalks throughout the five boroughs, which can be found here: http://www.nyc.gov/html/dot/html/about/streetdesignmanual.shtml.	**Achieved**
		Park Design for the 21st Century Manual	DPR	Release guidelines	DPR released the guidelines in January 2011 which can be found here: http://www.designtrust.org/publications/publication_11hplg.html.	**Achieved**
		Sustainable Sites Manual	DDC	NONE	Released in July 2009, the Sustainable Urban Site Design Manual offers an introduction to more environmentally, economically, and socially responsible urban site design practices for New York City capital projects. The design manual can be found here: http://www.nyc.gov/html/ddc/downloads/pdf/ddc_sd-sitedesignmanual.pdf.	**Achieved**
		Water Conservation Manual	DDC	NONE	The DDC Water Conservation Manual, published in June 2011, describes and evaluates best practices for potable water use reduction and a hierarchy for implementing the methods weighted on costs, code compliance, and environmental reward. It triggered several professional educational events over the past year. The document can be found here: http://www.nyc.gov/html/ddc/downloads/pdf/pubs/water_matters.pdf	**Achieved**
4	**Change sewer codes to adopt performance standards for new development**					
		Stormwater Performance Standard	DEP	NONE	DEP promulgated the stormwater performance standard for connections to combined sewer system rule on January 2012 and effective date was July 2012. More information can be found here: http://www.nyc.gov/html/dep/html/environmental_reviews/stormwater_release_rates.shtml	**Achieved**
5	**Improve public notification of CSOs**					
		New notification signage	DEP, OLTPS	NONE	DEP has replaced signs at 410 CSO outfalls and received waivers from DEC for the remaining 12 outfalls.	**Achieved**
		Online notification system	DEP, OLTPS	NONE	Starting in 2009, the DEP website has featured a waterbody advisory page that allows the public to see where CSOs are likely based on recent rainfall activity. DOHMH also has a monitoring and advisory system to protect bathers from pathogen infection, and this system is integrated with the City's 311 system and an email notification system to provide information to the public. The waterbody advisory page can be seen here: http://www.nyc.gov/html/dep/html/harborwater/nyc_waterbody_advisory.shtml DEP is currently in the process of developing an expanded system that would include email and text notifications.	**Achieved**
RESOLVE THE FEASIBILITY OF PROMISING TECHNOLOGIES						
6	**Complete ongoing demonstration projects**					
		Green Roof/Blue Roof Pilot Study	DEP	Monitoring and reporting to be completed in 2011	DEP is undertaking a blue and green roof comparison pilot study in the Jamaica Bay watershed to allow for a direct comparison of design, installation, performance, maintenance, and cost between these two stormwater management technologies. In partnership with DOE and SCA, DEP selected PS 118 Lorraine Hansberry School in Queens as the site for the rooftop pilot. In addition to the blue and green roof installations, a section of the roof will remain unmodified to serve as the control in the study. Construction was completed in August 2010 and 3-year monitoring program is ongoing.	**Achieved**
		Blue Roofs on Existing Buildings Pilot Study	DEP	Monitoring and reporting to be completed in 2012	The purpose of this study is to develop and test different blue roof technologies to address existing roof conditions such as slope, size and number of drainage areas to each drain, and detain maximum stormwater volumes that would otherwise run off into the combined sewer system. Construction on several different buildings including PS118 (described above), a DEP storehouse facility in the Newtown Creek watershed, and NYCHA community facility at Bronx River Houses (described below) was completed between August and December 2010. Monitoring will last for at least two years after construction. Preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Rain Barrel Give-Away Pilot Study	DEP	Monitoring and reporting to be completed in 2012	In 2011, DEP gave away 1,000 free rain barrels in Brooklyn, Queens, the Bronx, and Staten Island. In spring 2012 DEP released a solicitation for a city-wide rain barrel voucher program. DEP is currently negotiating with a potential vendor and anticipates a new program in the spring 2013. More details on the rain barrel program can be found on the DEP website: http://www.nyc.gov/html/dep/html/stormwater/rainbarrel.shtml	**Achieved**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
		Parking Lot Pilot Study	DEP	Monitoring and reporting to be completed in 2011	This pilot project by DEP includes various green infrastructure technologies installed on two DOT municipal parking lots. The treatment technologies include vegetated swales with enhanced subsurface stormwater storage, soil infiltration, and various porous pavement materials at a park and ride facility in Far Rockaway, Queens and in Canarsie, Brooklyn. DEP completed construction in spring 2011.Preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		NYCHA or HPD Pilot Study	DEP	Monitoring and reporting to be completed in 2012	Between October 2010 and April 2011, DEP and NYCHA constructed a blue roof system, a bioretention system, and two subsurface stormwater systems under parking lots at the Bronx Rover Houses campus. DEP has been monitoring each system for nearly two years. DEP decided that the porous pavement system was not feasible for this location. Preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Porous Pavement Pilot Study	DEP	Monitoring and reporting to be completed in 2012	To investigate the benefits of permeable pavement source controls and potential maintenance issues, DEP has installed permeable pavement at the Paerdegat Basin CSO Detention Facility and English Kills Aeration Facility. DEP continues to monitor the sites to evaluate maintenance requirements and stormwater management performance.	**Achieved**
		Green Roofs on the Five Borough Buildings	DPR	NONE	DPR has constructed and monitored multiple green roof systems on their headquarters building of the Five Borough Technical Services Division on Randall's Island. Their strategy has been to build a variety of green roofs, featuring various growing mediums, plant types, planting depths, and installation designs, as a type of experimental station to determine the best practices in green roof technology. The green roof currently totals 26,000 square feet and is home to 21 uniquely-designed landscapes.	**Achieved**
		Domestic Sewage Treatment Plant Pilot Study	DEP	Monitoring and reporting to be completed in 2012	This pilot will analyze the benefits and opportunities to the city's wastewater infrastructure of the decentralization of sanitary wastewater treatment. DEP has put the pilot on hold and has not yet selected a site for the pilot study.	**Not Achieved (May Reconsider)**
		Flushing Bay and Gowanus BMP Grant Programs	DEP	Monitoring and reporting to be completed in 2013	DEP awarded $2.6 million in July 2010 to implement five innovative green infrastructure projects that manage and capture stormwater runoff. Grant recipients included the applications most likely to succeed and be replicated on a large scale. The awards went to Manhattan College for the installation of a modular green roof project on New York Hospital; Columbia University; a Greenstreets stormwater capture system in Rego Park; Regional Plan Association for Sponge Park™ bioretention basins under the Long Island Expressway near the Van Wyck Expressway; Gowanus Canal Conservancy for the 6th Street Green Corridor Project that will build seven curbside swales; and Unisphere, Inc. for wetlands and rain gardens to treat stormwater entering Meadow Lake. Contracts for each of the grantees were developed and signed in spring 2011. Topographic surveys and soil boring investigations have been completed and designs for many of these efforts are nearly complete and several, including the modular green roof, the Sponge Park (TM), 6th Street Green Corridor, and Meadow lake wetlands project are expected to begin construction in late fall 2012. The Greenstreets stormwater capture system design is underway and is expected to begin construction in spring 2013.	**Achieved**
		DEP Tree Pit Pilot Study	DEP	Monitoring and reporting to be completed in 2011	In spring and summer 2010, DEP constructed five 20' x 5' enhanced tree pits to capture, treat, and monitor stormwater runoff from public right of way. Runoff from the street is diverted by curb cuts and routed into innovative green infrastructure sites that have specially engineered soils and native plant species to absorb water and filter associated pollutants. The enhanced tree pits tested different subsurface storage systems including stormwater chambers, 2" crushed stone, and 3/8" recycled crushed glass. In the event of heavy rainfall, the tree pits also have curb-cut outlets to relieve additional flow volumes. DEP has monitored the sites and preliminary monitoring results are available here: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		DPR Tree Pit Pilot Study	DPR	NONE	Since 2010, DPR and the Gaia Institute have constructed experimental tree pits in the Bronx, installed monitoring equipment in the tree pits, and are beginning to gather data. DPR will publish data as it becomes available.	**Not Achieved (On Track)**
		Enhanced Greenstreets Pilot Project	DPR	Publish findings, inform designs with data, to be completed by 2014.	DPR is working with the New York City Soil and Water Conservation District, Drexel University, and Atlas Scientific on this pilot. Drexel University designed a four-experiment that will ultimately inform the development of standard protocols for monitoring Greenstreets. Since the 2010 update, DPR has installed all of the monitoring equipment and is working closely with partners to collect and analyze monitoring results from these sites, but has not yet published findings from the pilot studies.	**Not Achieved (On Track)**
		Bronx Block Saturation Pilot Study	DEP	Monitoring and reporting will start 2013 and continue through 2016	DEP is studying the aggregate effects of vegetated source controls at 172nd Street in the Bronx. Through this pilot, two blocks have been saturated with vegetated source controls, including the expansion of existing tree pits. Topographic information and soil boring investigations have been completed and 60% designs have been submitted. Design challenges are currently being addressed to account for high bedrock and groundwater in the area. Designs will be unique to this type of conditions and can be applied in other areas of the City with similar conditions. Designs are expected to be completed by later fall 2012 and construction in spring 2013.	**Not Achieved (On Track)**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
		Albert Road Area Reconstruction Pilot Project	DDC/DOT	Monitoring and reporting to be completed in 2012	In its ongoing design for the Albert Road Area project in Queens, DDC is considering several source control opportunities. The final design of the Albert Road Area Reconstruction will include permeable gutters and permeable asphalt, and right-of-way bioswales. This project is currently in final design and construction will begin in the summer of 2014.	**Not Achieved (Delayed)**
		East Houston Street Reconstruction Pilot Project	DDC/DOT	Monitoring and reporting to be completed in 2012	The reconstruction of East Houston Street focuses on the creation of two large pedestrian areas at East 1st and East 2nd Streets. The remaining blocks from the Bowery to the FDR will maximize street tree plantings and include elongated tree pits covered with permeable pavers. In addition, a strip of permeable pavers will be used to filter stormwater before it enters proposed biofiltration areas to be located at the intersections of Houston Street and Avenues A and D, where there is roadbed at present. Construction is ongoing and will likely be completed by the end of 2014.	**Not Achieved (Delayed)**
		Astor Place/Cooper Square Reconstruction Pilot Project	DDC/DOT	Monitoring and reporting to be completed in 2012	The conceptual plan for Astor Place/Cooper Square calls for wider sidewalks and the expansion of Cooper Park in an effort to create additional green space. Where space and subsurface utilities permit, DDC will include 10 bioswales constructed of native, salt-tolerant plants and permeable pavers to capture and infiltrate stormwater from surrounding areas. This project is in final design and construction will begin in 2013.	**Not Achieved (Delayed)**
		Atlantic Avenue Reconstruction Pilot Project	DDC/DOT	Monitoring and reporting to be completed in 2012	The reconstruction of Atlantic Avenue includes the widening of Atlantic Avenue's raised median for a stretch of about one mile. The median will be planted with a variety of native trees in structural soil and spaced to maximize shading. With the use of structural soil, DDC hopes to produce larger, healthier trees. The crowning of the roadbed prohibits stormwater from being directed to the center median, but the center median's runoff will be directed towards the porous pavement surrounding the median's trees. Because the Long Island Railroad runs directly below Atlantic Avenue, DDC is limited in the amount of stormwater that can be infiltrated on-site. The second phase of this project will continue into Queens. Phase II of this project is currently delayed due to budget constraints.	**Not Achieved (Delayed)**
		Constructed Wetlands Pilot Study	DEP	Monitoring and reporting to be completed in 2011	In July 2011, DEP announced completion of the pilot wetland meadow at an MTA bus depot facility parking lot in the Jamaica Bay watershed. The constructed wetland treats and absorbs stormwater runoff from impervious surfaces within the parking lot. Monitoring is ongoing and will be performed over a three-year period to evaluate the effectiveness over time. Preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Belt Parkway Bridges Roadside Swale	DEP	Monitoring and reporting to be completed in 2014	DEP and DOT, in consultation with DPR, have developed designs for stormwater source controls adjacent to the reconstruction of the Fresh Creek, Paerdegat, and Rockaway Bridges along the Belt Parkway. This project will be installed after the completion of bridge construction, which has been delayed due to budget cuts. Construction of the BMP stormwater source controls were completed in spring 2012 but have not been planted. Construction for roadway is still underway and is expected to be completed in late 2013. After completion of roadway improvements, the stormwater BMPs will be planted.	**Not Achieved (on Track)**
		Streetside Infiltration Swales Pilot Project	DEP	Monitoring and reporting to be completed in 2011	Since 2010, DEP has constructed numerous streetside infiltration swales. The pilot studies have been closely monitored and preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Ballfields Source Controls Pilot Project	DPR/DEP	Monitoring and reporting to be completed in 2012	In fall 2010, DEP and DPR constructed stormwater source controls within Shoelace Park in the Bronx to help improve local water quality and promote beneficial infiltration practices that enhance existing natural areas. Preliminary monitoring results are available on DEP's website: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Bronx River Pilot Project	DPR	NONE	Under a NYSERDA grant, DPR is piloting green infrastructure stormwater technologies in the Morrisania section of the Bronx. These technologies include enhanced tree pits, connected tree pits, CU-Structural Soil™ pits, new lawn strip sites, and porous concrete. There will be up to 195 trees in CU-Structural Soil™ pits, with many trees in shared pits containing 2-4 trees. 71 trees are planted in stormwater capture tree pits which utilize a 1ft-thick "L-shaped" crushed bluestone wall both on the curb side and underneath the soil. Construction of this pilot was completed in spring 2010.	**Achieved**
7	**Continue planning for the implementation of promising source control scenarios**					
		Sidewalk standards	OLTPS/ DOT/DEP/ DPR	Explore options for funding	The Green Codes Task Force developed a standard sidewalk specification proposal for consideration by the City. The proposal would require a permeable strip along the outside edge of a sidewalk and require structural soil, and mandate more sustainable materials where appropriate. During this process, OLTPS convened multiple City agencies to discuss opportunities and challenges. The School Construction Authority has implemented new specifications for sidewalks and landscaping that include sustainability requirements. OLTPS and DDC are working on applicable standards for use in the city. DOT, DPR, DEP, and PDC-approved bioswale standards on DEP's website here: www.nyc.gov/html/dep/pdf/green_infrastructure/bioswales-standard-designs.pdf	**Not Achieved (On Track)**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
		Road reconstructions	OLTPS/ DOT/DEP/ DPR	Explore options for funding	The City agencies responsible for policies or projects in the city's right of way have met on a regular basis to discuss opportunities to incorporate sustainable stormwater management source controls into road design and reconstruction projects. Agencies have met as part of the Street Design Manual Task Force, a group that exists specifically to address street design issues. OLTPS has also convened agencies specifically to examine funding and maintenance challenges. To date, four stormwater recommendations and three water efficiency recommendations have been either signed into law or implemented as agency rules. With the release of the NYC Green Infrastructure Plan and the creation of the Green Infrastructure Task Force, City agencies will continue to meet to discuss how road reconstruction projects could be designed to incorporate source controls. DOT, DPR, DEP, and PDC-approved bioswale standards on DEP's website here: www.nyc.gov/html/dep/pdf/green_infrastructure/bioswales-standard-designs.pdf	**Not Achieved (On Track)**
		Performance standard on existing buildings	OLTPS/ DEP/DOB	Explore options for funding	As part of the Green Codes Task Force, OLTPS, DEP, and other City agencies engaged with outside experts to investigate the merits and technical challenges associated with requiring rooftop detention on existing buildings. The GCTF recommended that the City convene a study to closely examine a range of technical questions. Multiple pilot projects are testing blue roof and green roof technologies on existing buildings and other stormwater source controls on lots with existing development. Preliminary monitoring results of those pilot projects can be found here: www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_pilot_monitoring_results.shtml	**Achieved**
		Low- and medium-density residential	OLTPS/DEP	Explore options for funding	As part of the Green Codes Task Force, OLTPS, DEP, and other City agencies engaged with outside experts to investigate the merits and technical challenges associated with requiring rain barrels and cisterns on residential properties. The GCTF recommended that the City conduct a study to closely examine a range of technical questions, and OLTPS continues to monitor the update of the city plumbing code and to promote the use of recycled water. Based on DEP's pilot and programs of environmental organizations such as GrowNYC and NYC Soil and Water Conservation District, rainwater harvesting provides irrigation, conservation, and other benefits for single- and two-family homeowners. In addition, DEP surveyed homeowners who participated in the rain barrel pilot program and found that 84% of survey respondents were likely to recommend a rain barrel to a friend or neighbor, 95% said they would reconnect their barrel in the spring, and 80% said that the barrel satisfied at least half of their landscape watering needs.	**Achieved**
		Green roofs on public projects	OLTPS/ DPR/DOB/ DEP/DDC	Explore options for funding	Since 2010, the City has committed more than $187 million through 2015 to install green infrastructure projects, including green roofs, throughout the city and on public projects. In addition to two green roofs opened since 2010 on wastewater treatment plants, DEP is working with other city entities, including the School Construction Authority and the New York City Housing Authority.	**Achieved**
		Protocols for public projects	OLTPS	Explore options for funding	Multiple City agencies have considered new design standards to incorporate stormwater source controls, as evidenced by the recent release of the Street Design Manual, the Sustainable Urban Site Design Manual, and the High Performance Landscape Guidelines. In 2012, DEP released a set of standards for right of way bioswales which can be found here (http://www.nyc.gov/html/dep/pdf/green_infrastructure/bioswales-standard-designs.pdf). The standards were developed through the interagency Green infrastructure Task Force with input from external stakeholders on the Green Infrastructure Steering Committee. The Green Infrastructure Task Force continues to meet on a quarterly basis and will continue to develop and improve design standards for stormwater source controls including technologies such as permeable pavement, blue roofs, and green roofs.	**Achieved**
		New demonstration projects	OLTPS	Explore options for funding	Instead of creating separate additional pilot projects, the City has incorporated these additional areas into the existing pilot projects that were already in development.	**N/A**
		Green Codes Task Force	OLTPS	NONE	On February 1, 2010 the NYC Green Codes Task Force released an analysis of building codes as well as other codes, such as zoning, health, consumer affairs, and environmental protection. Convened at the request of Mayor Bloomberg and Council Speaker Quinn in July 2008, the Task Force – led by Urban Green Council – was charged with recommending green changes to the laws and regulations affecting buildings in New York. The report contains 111 recommendations, including 7 for stormwater, 7 for water efficiency, and 5 for urban ecology. To date, 29 of the 111 recommendations have been enacted. OLTPS is currently working on 15 of the recommendations to bring them to enactment. An additional 27 recommendations are slated to be brought to enactment over the next 15 months.	**Achieved**
8	**Continue planning for the maintenance of source controls**					
		Explore maintenance options	OLTPS/ DEP/DOT/ DPR/DSNY	Explore options for funding	On November 9, 2011, DEP signed an agreement with the Departments of Parks & Recreation and Transportation to maintain all green infrastructure in the right of way. The agreement is publicly available on the DEP website here: http://www.nyc.gov/html/dep/html/about_dep/interagency_mou.shtml. Green infrastructure built on property managed by City agencies not in the right of way will be maintained through individual agreements with the City agencies. In addition, all recipients of DEP's Green Infrastructure Grant Program must agree to maintain their infrastructure for at least 20 years.	**Achieved**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
EXPLORE OPTIONS FOR FUNDING SOURCE CONTROLS						
9	**Broaden funding options for cost-effective source controls**					
		Broaden funding options	DEP/OLTPS	Assess progress and impacts of city-wide source control implementation	On March 13, 2012, DEP and the New York State Department of Environmental Conservation announced an agreement to improve water quality in New York City harbor by using investing in a variety of wastewater infrastructure, including green infrastructure. Under the agreement, the City will invest $187 million for green infrastructure projects on city-owned property by July 2015. Under this agreement, the City has committed a total of $1.5 billion to install green infrastructure technologies such as bioswales, rain gardens, and green roofs on city-owned property by 2030.	**Achieved**
10	**Complete water and wastewater rate study and reassess pricing for stormwater services**					
		Rate study	DEP	Evaluate billing system and potential modifications	The Water Board completed a water rate study in December 2009 that evaluated expenditures, revenue sources, and alternative water, wastewater, and stormwater rate structures. A primary goal of the study was to research possible structures that could be implemented in New York City to enhance revenue stability, equity for customers, and resource conservation. One strategy resulting from the study is a Sewer Charge for Stormwater for Parking Lots. In January 2011, DEP implemented a charge that would apply to parking lots that have no water service and therefore do not pay for wastewater services, yet are generating demands on the wastewater system. Parking lots were billed an annual wastewater charge for stormwater of $0.05 per square foot of property area. In Fiscal Year 2011 (January 2011 to June 2011) the pilot program generated $83,799.31 and in Fiscal Year 2012 (July 2011 to June 2012) the pilot program generated $114,236.20. DEP is using this revenue for stormwater-related expenditures, including stormwater conveyance and/or treatment. In tandem with the pilot program, DEP implemented a green infrastructure/stormwater best management practice credit program to encourage green infrastructure, in which parking lot owners who build green infrastructure in their parking lot to capture stormwater would be exempt from the stormwater charge. To date, no green infrastructure has been implemented through the credit program. Based on an analysis of charges and costs, DEP believes that the charge was too low to encourage parking lot owners to enroll in the credit program and will continue to analyze stormwater charges applied to parking lots and other land uses.	**Achieved**
SUPPORT THE IMPLEMENTATION OF THE SUSTAINABLE STORMWATER MANAGEMENT PLAN						
		Tracking and monitoring	DEP	NONE	In 2011 and in consultation with the Department of Information Technology & Telecommunications (DOITT), DEP developed a green infrastructure web map that is hosted on CityMap. Users can see where green infrastructure projects are planned or constructed and upload information about their own green infrastructure projects here: http://www.nyc.gov/citymap. In addition, DEP is currently developing a project tracking/asset management system to track all green infrastructure projects and maintenance activities for our installations.	**Achieved**
		Reporting	OLTPS	NONE	The 2011 PlaNYC Progress Report and the 2011 PlaNYC Update contain a series of new sustainability indicators, adding to those that were released in 2009 as part of the Citywide Performance Reporting system. These indicators provide a new way to measure the City's overall progress toward achieving each of the ten goals laid out in PlaNYC, beyond the implementation of the 132 initiatives in the plan. The indicators are designed to help assess whether changes to the plan are needed and are part of the City's ongoing commitment to transparency and accountability.	**Achieved**
		Public information tools	OLTPS/DEP	NONE	The City and DEP continuously update their websites to include the latest information about the green infrastructure program and the other resources to support implementation of stormwater source controls. There is now a section of DEP's website dedicated to green infrastructure (http://www.nyc.gov/html/dep/html/stormwater/using_green_infra_to_manage_stormwater.shtml) which has information about the purpose of source controls, green infrastructure projects DEP has built, and links to other helpful resources such as standard designs for right of way bioswales, a link to the green infrastructure web map, and preliminary monitoring results from the agency's various pilot studies. DEP has also moved the application process of the Green Infrastructure Grant Program online and has included tools to help applicants calculate the potential stormwater managed by their proposed green infrastructure installations. In 2011 the City launched the Change By Us website which is intended to support local projects and has a dedicated webpage to DEP and links to green infrastructure resources.	**Achieved**
		BMP Design Manual	DEP	Manual to be completed in 2012	In July 2012, DEP published Guidelines for the Design and Construction of Stormwater Management Systems on the promulgation date of the stormwater performance standard which is available here DEP's website: www.nyc.gov/html/dep/html/stormwater/stormwater_management_construction.shtml The goal of the manual is to assist in the design of different onsite stormwater controls for new development and expansions of existing development. The design guidelines support the promulgation of the new stormwater performance standard. The stormwater management systems detailed in the guidelines are considered "approvable systems" by DEP and DOB if such systems are developed according to the siting, sizing, construction, and operation and maintenance guidance provided within the guidelines and submitted for DEP review as part of a developer's site connection application.	**Achieved**

	GOAL	INITIATIVE	LEAD AGENCY	LONG-TERM MILESTONE	PROGRESS SINCE 2010	STATUS
		BMP Modeling by Watershed	DEP	Modeling and analysis to be completed in 2012	DEP's $15 million green infrastructure planning study has supported the modeling for the NYC Green Infrastructure Plan and future refinements to that modeling analysis. The results of the demonstration projects, tracking efforts, and modeling will be incorporated into watershed-specific Long-Term Control Plans (LTCPs) and the citywide LTCP. The modeling results underlying the NYC Green Infrastructure Plan are preliminary and reflect CSO reductions rather than ambient water quality improvements, which DEP will evaluate as part of the Long-Term Control Plans. Additional CSO and water quality modeling to be undertaken between 2013 and 2017 to support the waterbody-specific and citywide LTCPs. More information on the LTCP process can be found here: http://www.nyc.gov/html/dep/html/cso_long_term_control_plan/index.shtml	**Achieved**
		Impervious surfaces data mapping	DEP	NONE	In 2009, DEP completed impervious surface mapping using detailed impervious data for the entire City based on a satellite flyover that took infrared images and captured the light spectrum emitted by vegetated and impervious areas. In 2010 this mapping was incorporated into the recalibration of the city-wide watershed model.	**Achieved**
		Public education and training	DEP	NONE	DEP continually develops educational materials that are available on the website or used for community presentations and meetings, much of which can be found here: http://www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_outreach.shtml. DEP is also working with the Green Infrastructure Steering Committee to expand green infrastructure educational programming to a broader audience throughout New York City.	**Achieved**
		Green sector employment study	OLTPS/EDC	NONE	EDC conducted a comprehensive study of green sector jobs to capture a global view and better understanding of the industry's current activity. This research provided valuable insight as the City developed the NYC Green Economy Plan. This plan, released in October 2009, details programs to support and attract green businesses and entrepreneurs and provide specialized job training for New Yorkers with the objective to create 13,000 green jobs over the next decade. A copy of the NYC Green Economy Plan can be found here: http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/nyc_green_economy_plan.pdf	**Achieved**
		Ambient water quality monitoring	DEP	DEP will add a total of 27 sampling sites as CSO facilities are completed	DEP collects 20 water quality parameters from 70 stations across the Harbor, more parameters and locations than other municipalities in New York State. DEP conducts monthly testing at all 70 stations, with weekly testing during the summer season. DEP samples the waterways for dissolved oxygen to protect marine life and fecal coliform bacteria to protect human health. In addition to mandatory parameters, DEP measures 18 additional indicators in its testing regime, including water transparency, chlorophyll A (for algae blooms), temperature, and pH. DEP's water quality testing is supplemented with a shoreline water quality testing program conducted in partnership with the New York City Department of Health. These results are reported in DEP's New York Harbor Water Quality Annual Reports and in 2011 DEP began posting water quality information on its website here: http://www.nyc.gov/html/dep/html/harborwater/harbor_water_sampling_results.shtml. Since 2010, DEP has expanded water quality monitoring by adding 7 stations in the following areas: Coney Island Creek, Fresh Creek, Bronx River, and Jamaica Bay. DEP will continue to add additional sampling stations as necessary.	**N/A**
		Analysis on stormwater capture in separate sewer areas	DEP		A full analysis of stormwater capture opportunities in separate sewer areas has not been completed. Since 2010 DEC and NYC DEP held a series of discussions regarding Municipal Separate Storm Sewer System (MS4) areas. During this time, the Mayor's Office of Operations formed an interagency working group which created an inventory of city-owned facilities and developed draft standard operating procedures for pollution prevention for municipal operations. Future discussions with DEC are anticipated to reconvene after federal stormwater rulemaking which is anticipated to start public review in June 2013.	**Not Achieved (Delayed)**
		Local Law 5 updates	OLTPS	Provide progress update every two years	This status update is submitted in accordance with the Local Law 5 of 2008 requirement that OLTPS "shall submit a report to the mayor, the speaker of the council, and the public, which shall include, but not be limited to, the implementation status of the measures included in the plan… including a quantitative assessment, where susceptible to quantification, and a qualitative assessment of the progress made toward achieving each of the milestones identified in such plan and, where revised, an explanation for such revision." In addition to this status update, DEP released an update to the NYC Green Infrastructure Plan (http://www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_plan.shtml), an update to the DEP strategic plan in March 2011 (http://www.nyc.gov/html/dep/html/about_dep/dep_strategic_plan.shtml), and an update to the CSO BMP Report in April 2011 (http://www.nyc.gov/html/dep/html/harborwater/spdes_bmp_report_2010.shtml).	**Achieved**

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