



Stormwater Infrastructure Matters (S.W.I.M.) Coalition
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November 12, 2010

James M. Tierney
Assistant Commissioner for Water Resources
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233-1010

Re: “NYC Green Infrastructure Plan”

Dear Asst. Commissioner Tierney:

It is with high hopes for a greener New York City – and for a future with clean, healthy, and ecologically flourishing waterways surrounding it – that the undersigned steering committee members of the Stormwater Infrastructure Matters (“S.W.I.M.”) Coalition write to you today concerning the NYC Department of Environmental Protection’s proposed new Green Infrastructure Plan (the “Plan”).¹ We believe New York City can become a national model for using green infrastructure to reduce combined sewer overflows (“CSOs”) and look forward to working with DEC, EPA, and the City to make this a reality.

Substantial, widespread, long-term investment in sustainable green infrastructure (“GI”) must be a key component of efforts to achieve the Clean Water Act’s goal of fishable swimmable waters across New York City. We believe that DEP’s Plan lays out, in broad strokes, a strong rationale for investing in GI, both as part of an enforceable program to meet its Clean Water Act compliance obligations, and as an element of the City’s overall long-term sustainability efforts. Yet, as everyone recognizes, many essential details of such a program remain to be developed – and so do important supporting analyses, such as modeled projections of water quality improvements, on which DEP is currently working.

Therefore, we urge DEC to engage as rapidly as possible with DEP and the public to develop, and set into motion, a clear framework to define and govern DEP’s implementation of green infrastructure, as part of a combined green-grey approach to CSO control. We offer the following high-level recommendations on how to structure an incipient, enforceable, green infrastructure compliance program:

¹ S.W.I.M. is a coalition of more than 70 organizations, including community and environmental groups, academics, architects and engineers, that are dedicated to ensuring swimmable waters around New York City through natural, sustainable stormwater management practices – Green Infrastructure - in our neighborhoods. This letter is sent on behalf of the S.W.I.M. Steering Committee; S.W.I.M. intends to submit more detailed comments on the City’s green infrastructure proposal once the coalition’s full membership has had more of an opportunity to understand and discuss DEP’s plan.

- The Plan appears to suggest that DEP is willing to move forward with green infrastructure commitments only if DEC agrees to release DEP entirely from certain obligations under the existing CSO Administrative Consent Order (“ACO”), which relate to the construction of certain “grey” infrastructure projects that DEP believes are not cost-effective. Based only on the Plan and the (admittedly) incomplete analyses it presents, we cannot endorse such an approach. Since there remains much work to be done to develop a full-scale, enforceable, long-term green infrastructure plan – indeed, DEP’s Plan recognizes that CSO Long Term Control Plans (“LTCPs”), which must meet specific Clean Water Act requirements, remain to be developed over a period of years – it is premature to relieve the City of its obligations under the CSO ACO to build any particular grey infrastructure project(s).
- However, we believe an alternative approach could satisfy DEP’s immediate interests, as well as DEC’s and the public’s interests in ensuring the City is held accountable for making real progress in the near-term. Specifically, we encourage DEC to explore ways it could provide temporary “relief” to DEP from impending deadlines to complete the design of grey projects that DEP would ultimately like to eliminate. DEC’s deferral of such deadlines – *e.g.*, by 3-5 years – should only come in exchange for the City’s binding commitment, established through a legally appropriate, enforceable mechanism(s), to a series of green infrastructure obligations covering that same period of time.²
- Under this alternative approach, early implementation efforts would generate near-term environmental benefits; provide monitoring data on GI installations at both a site- and block-scale, allowing DEP to refine its modeling approach, design specifications, and maintenance protocols; and provide a means for identifying and resolving institutional barriers (*e.g.*, among various city agencies) to citywide implementation. The City’s near-term GI obligations should include enforceable targets (*i.e.*, quantitative requirements, such as a number of acres to be retrofitted to manage at least a certain amount of runoff onsite) and enforceable milestones (*i.e.*, requirements to complete certain essential tasks or projects by specific dates, such as establishing a GI maintenance program) relating to each of these objectives.
- DEC should also obtain a commitment from the City to convene a panel of independent experts to review the status of green infrastructure implementation and offer recommendations near the end of the initial 3- to 5-year period. (Of course, throughout the City’s development and implementation its GI initiatives, it should solicit expert advice from all available quarters, on an ongoing basis.) In later years, such a panel could be reconvened, periodically, as part of a transparent, structured, adaptive management decision-making process to guide long-term GI implementation.

² State law requires that any modifications to the City’s obligations under the CSO ACO must also be reflected in a SPDES permit modification, with full opportunities for public participation and citizen enforceability. *See NRDC, et al. v. Grannis*, First Amended Verified Petition (Nov. 3, 2010) (Sup. Ct. NY County, Index. No. 110898/10). Section 402(q) of the Clean Water Act requires the same. 33 U.S.C. § 1342(q). We note that six years ago, upon DEC’s issuance of the CSO ACO, EPA Region 2 emphasized that “[t]he long-term planning and implementation obligations in the [CSO ACO] should, by mutual consent, be contemporaneously incorporated into the [SPDES] permits governing discharges from the City’s fourteen wastewater treatment plants.” *See* Letter from W. Andrews (EPA Region 2), to J. DiMura (DEC) of 10/6/04.

Collectively, the steps set forth above would provide a sound basis for DEP to complete all of its LTCPs – with enforceable, long-term targets and milestones for GI implementation, CSO reduction, and water quality standards compliance – before the existing 2017 deadline under the CSO ACO. Accordingly, DEC should set (and make clear that it will enforce) new deadlines that ensure the City will complete waterbody/watershed-specific LTCPs as soon as practicable.

Moreover, DEC should ensure the City immediately initiates a citizens advisory process, at both the city-wide and waterbody/watershed levels, to facilitate meaningful public participation in all of the City’s GI and CSO planning and implementation efforts. DEP has expressed its interest in working with S.W.I.M. to design a public participation program; we have provided DEP an initial set of recommendations, which we attach to this letter and urge DEC to adopt.

Finally, we encourage DEC to learn from the experience of other state and regulatory agencies that have reviewed proposals for a GI-based approach to CSOs. In particular, the Pennsylvania Department of Environmental Protection and EPA Region 3 have been reviewing Philadelphia’s “Green City, Clean Waters” plan, a proposed 20-year program to substantially reduce CSOs through widespread use of GI. Those agencies are grappling with how best to craft an enforceable framework for a long-term green infrastructure program, which can hold Philadelphia accountable for achieving results, while providing the city with sufficient flexibility to make an “adaptive management” approach work. We attach to this letter a set of comments that has been submitted on Philadelphia’s plan, which may be instructive as DEC and New York City embark on a similar path.

In sum, we are greatly encouraged by Mayor Bloomberg’s and DEP Commissioner Holloway’s strong endorsement of deploying GI across New York City. We look forward to engaging with DEC, DEP, and other New York City agencies to advance this effort. We would welcome the opportunity to meet with you, as DEC conducts its review of DEP’s new Plan.

Sincerely,

S.W.I.M. Coalition Steering Committee

Dawn Henning
Environmental Job Skills Program Director
Rocking the Boat

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Enclosures [2]

cc: Cas Holloway, Commissioner, NYC Department of Environmental Protection
Stephen Goldsmith, Deputy Mayor for Operations
David Bragdon, Director, Mayor's Office of Long-Term Planning & Sustainability
Judith Enck, Regional Administrator, USEPA Region 2
Nancy Stoner, Deputy Assistant Administrator, Office of Water, USEPA



S.W.I.M. Coalition

Stormwater Infrastructure Matters: utilizing
stormwater as a resource, not a waste!

July 7, 2010

Commissioner Caswell Holloway
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Dear Commissioner Holloway,

We understand that your agency, along with the New York State Department of Environmental Conservation and U.S. Environmental Protection Agency, is now deliberating the next steps for New York City's Long Term Control Plan for Combined Sewer Overflow. The S.W.I.M. Coalition, representing a broad membership of organizations involved with the LTCP process in their respective watershed/sewersheds (see http://swimmablenyc.info/?page_id=2), is eager for the process to move forward expeditiously. It is both timely and necessary to reinvigorate the public participation aspect of the planning process. We appreciate the initial efforts you have made in that regard, most recently through the public meeting held on June 28, 2010, and have prepared the attached summary of our recommendations for how meaningful public participation should proceed.

We thank you in advance for your consideration of these recommendations, and appreciate your ongoing collaboration as we work toward our shared goals of incorporating a broad Green Infrastructure (GI) approach into the city's LTCP, and the successful implementation and stewardship of GI throughout New York City.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kate Zidar', written in a cursive style.

Kate Zidar
Coordinator
Stormwater Infrastructure Matters (S.W.I.M.) Coalition
www.swimmablenyc.info
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Cc:

Commissioner Pete Grannis, NYSDEC
Regional Administrator Judith Enck, USEPA Region 2



Storm Water Infrastructure Matters (S.W.I.M.) Coalition Recommendations on Public Participation & New York City's CSO Long Term Control Plan

The Storm Water Infrastructure Matters (S.W.I.M.) Coalition requests that the New York City Department of Environmental Protection (DEP) establish a meaningful public participation process to support the New York City's Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) process. The goal of this public participation process is to educate and inform the concerned public on the LTCP's progress, incorporate valuable public input into the LTCP and develop community support for the projects implemented by the plan. The ultimate result of this process is the incorporation of a broad Green Infrastructure (GI) approach into the finalized LTCP, and the successful implementation and stewardship of GI throughout New York City.

This document outlines three types of recommendations:

- immediate actions DEP can take to incorporate public input,
- public participation during the development of the LTCP, and
- public participation during the implementation of the LTCP.

1. Immediate actions

- Establish a feedback-loop communication model (information traveling to and from the public; a clear route through which the public and the agency can share information and experiences).
- Dedicate appropriate personnel, such as the Public Outreach and Education Marketing Manager identified in the city's Sustainable Stormwater Management Plan, to maintain regular communication with stakeholders, and provide timely responses to requests for information.
- Convene a citywide meeting of CSO Citizen Advisory Committee (CAC) members, additional local stakeholders and agency representatives from the Sustainable Stormwater Management Working Group to (i) discuss next steps for revising the Watershed/Waterbody Draft plans resuming the LTCP process, and (ii) determine how to conduct the CAC process in the next phase of LTCP planning – e.g., whether to resume CAC's for each waterbody or establish a unified citywide CAC with local working groups.

2. LTCP development

- A CAC, or equivalent stakeholder body(ies), should be established and scheduled to meet on a regular basis throughout the development of the LTCP.

- Regular CAC meetings should provide an ongoing forum for local stakeholders and agency personnel to provide plan updates and feedback. Presentations by all parties should clearly explain technical jargon and quantitative data.
- The DEP should provide public access to plain-English planning documents and other stakeholder material (meeting schedules, agendas, presentations) on the DEP website, with open access to all members of the public.
- DEP should also hold technical work group sessions (as was done for the Open Water CAC) to educate the citywide CAC members on technical aspects of CSO abatement, such as modeling, public notification, source control, and water quality standards.
- DEP should demonstrate a complete feedback loop is in place by soliciting input from CAC members regarding the local impacts and feasibility of plan elements, defining the water quality and use goals for specific waterbodies, and clearly indicating how this feedback is incorporated into the resulting plans.
- DEP should seek public input specifically related to GI projects pursued by NYC residents on their own.
- Prioritization of city-led GI implementation should be determined in collaboration with community stakeholders.

3. LTCP implementation

- Local CAC working groups (or an analogous citywide entity) should convene to maintain involvement in the siting, planning and design of GI projects for specific waterbodies.
- DEP should work with local stakeholders as well as pertinent agencies to incorporate community-based stewardship efforts into long-term operations and maintenance and monitoring of GI.
- The citywide CAC should receive an annual CSO progress report, as per our neighbors in the New Jersey DEP who require permittees to develop a *Public Participation Report* that officially documents the dialogue between agency and the public.

Collaborating with the public is a decisive Best Management Practice (BMP) that satisfies a good government philosophy. The objective of a meaningful public participation program should be the creation of an informed and active public.¹ Future generations should know that New York City’s waterbodies are not inauspicious hazards, but rather a public benefit and therefore a public responsibility. The best solutions to environmental challenges are available at the local level, hence the development of a successful public participation program is critical to the success of DEP’s CSO abatement efforts.

¹ “Public participation in controversial decision-making is an essential element of the good government philosophy. Community members have a right to be heard and to expect government agencies to be open and responsive.” USEPA, RCRA Public Participation Manual, “Chapter 2: Guidelines for a Successful Public Participation Program,” 1996, 2-12.

Memorandum

TO: Howard Neukrug, Marc Cammarata -- Philadelphia Water Department (PWD);
Jennifer Fields, David Burke -- Pennsylvania Dept. of Env'tl Protection (DEP);
Angela McFadden, Evelyn MacKnight, Steven Maslowski -- U.S. Environmental
Protection Agency, Region 3 (EPA))

FROM: Larry Levine -- Natural Resources Defense Council (NRDC);
Brian Glass, Christine Knapp -- Citizens for Pennsylvania's Future (PennFuture);
Brady Russell -- Clean Water Action (CWA)

RE: PWD Long Term Control Plan Update (LTCPU); Comments on PWD Response
Memoranda

DATE: July 23, 2010

We want to thank all of you again for including us in your ongoing discussions about the LTCPU and for your consideration of our written comments. We agree with PWD's premise that "adaptive management" is appropriate for a green infrastructure approach to CSO control, and offer these additional comments in the spirit of strengthening the LTCPU, to ensure it provides a clear framework to govern long-term implementation efforts and will succeed in achieving Philadelphia's water quality and sustainability goals.

Specifically, this memorandum is based on our understanding of the particular issues concerning the LTCPU now under discussion among EPA, DEP, and PWD, and is intended to supplement, not supersede, the comments we previously provided in our memorandum dated December 16, 2009 (12/09 Review Memo).¹ As before, our comments are informed by

¹ In particular, this memorandum is based on our review of the following response memoranda (which we designate PWD Memos 1 through 3) that PWD has provided to EPA and DEP:

- "PWD Memo 1," which was sent under cover letter from Marc Cammarata to Jenifer Fields dated January 29, 2010 and began with the subject heading "Nine Minimum Controls." (An "updated version" of Attachment B was provided via email by PWD to DEP and EPA on March 11, 2010.);
- "PWD Memo 2," which was sent under cover email from Marc Cammarata to Jenifer Fields dated February 25, 2010 and began with the subject heading "Planning Approach and Water Quality Endpoint";
- "PWD Memo 3," which was sent under cover email from Marc Cammarata to Jenifer Fields, Dave Burke, Angela McFadden, and Evelyn MacKnight dated April 1, 2010 and began with the subject heading "Loadings";

and on these additional memoranda (which we designate PWD Memos 4 and 5) that PWD provided to DEP:

- "PWD Memo 4," which began with the subject heading "Sensitive Areas"; and
- "PWD Memo 5," which was sent under cover of a memo dated May 5, 2010 from David Burke to Marc Cammarata (with the subject: "Results of 5/6 meeting on CSO program"), and had as its own heading of "PWD Response to Items 1 through 9 of David Burke's May 7th Memo."

consultations on technical matters with Dr. Robert Traver of Villanova University and Michele Adams of Meliora Environmental Design.

We commend EPA and DEP for carefully reviewing the LTCPU and insisting on a level of detail – regarding enforceable targets and milestones, a binding “implementation plan,” annual reporting requirements, and other key issues – that will ensure its success. City administrations will turn over many times during the life of the LTCPU, so it is critical that the approved plan contain enough detail to ensure that subsequent administrations -- even those who may not so enthusiastically endorse the environmental vision of this administration -- will implement it successfully.

At the same time, we encourage EPA and DEP to commit whatever resources are necessary to complete their review of PWD’s materials as quickly as possible, so outstanding issues can be resolved and PWD can begin implementing the LTCPU, reducing overflows, and improving water and environmental quality throughout the city.

With these goals in mind, we offer our supplemental comments below, focusing on issues we believe must be resolved before approval of the LTCPU. We believe PWD’s outline for an “implementation plan” (see PWD Memo 2, Attachment B) – based on an adaptive management approach – identified most of the essential topics and understand that PWD is working to develop a more detailed proposal. In these comments, we emphasize that approval of the LTCPU should be contingent on the approval of an **enforceable and detailed set of requirements for:**

- **Meeting quantitative targets, and completing certain essential tasks or projects, by specific dates** (such the 5-, 10-, 15-, and 20-year marks after plan approval);
- **Undertaking an adaptive management decisionmaking process every five years** to identify any need for mid-course corrections and propose such corrections as needed, subject to DEP approval;
- **Conducting sufficient monitoring, at multiple scales, of green infrastructure performance and improvements to stream health**, to allow for (i) validation and, as needed, re-calibration of the models used to calculate sewer system performance and (ii) identification of maintenance needs for each type of green infrastructure;
- **Implementing a program for inspection and maintenance** of green infrastructure installations, including demonstrating the legal authority to ensure the performance of necessary maintenance; and
- **Submitting annual progress reports** that include, at a minimum, certain information on each green infrastructure project as well as other, programmatic information that is not project-specific.

Further, we support EPA’s and DEP’s interest in “**pilot areas**” for early implementation of **green infrastructure** and recommend that a timeline and general parameters for such a pilot be included as enforceable requirements of the approved LTCPU. Monitoring data and experience gained from such a pilot would be extremely valuable for refining PWD’s modeling approach

and its green infrastructure design specifications and maintenance protocols, as well as identifying and resolving institutional barriers (*i.e.*, among various city agencies) to citywide implementation.

We also suggest a role for a **panel of independent experts** to review the status of green infrastructure implementation and offer recommendations prior to each 5-year adaptive management decision point, which is an established practice in large-scale, long-term, projects.

Finally, we support efforts to use available data and modeling to estimate the extent to which the plan will improve compliance with water quality standards, and we re-iterate our recommendation that PWD implementation of green infrastructure retrofits should **continue beyond 20 years, to the extent necessary to achieve compliance with water quality standards**.

Our detailed comments follow below. We would welcome the opportunity to discuss them further with you in person.

1. Metrics, enforceable targets and milestones, and adaptive management: The approved plan must include major milestones and quantitative targets that are enforceable via the city's NPDES permits,² with built-in procedures for addressing any noncompliance. This is necessary to provide accountability for the plan's success, since the plan's implementation is a long-term endeavor and those who developed it, and the elected and appointed officials making the commitments now to implement it, will not all be present or in charge throughout its life. We recommend the following revisions and/or additions to the metrics, targets, and milestones³ PWD has proposed (see PWD Memo 5), and to the associated framework for "adaptive management" decisionmaking:

Metrics:

- i. **Pollutant mass reduction:** Since PWD relies on the "pollutant mass reduction" option under the CSO Policy's "presumption approach," there should be enforceable, quantitative targets for pollutant mass reduction, in addition to targets relating to CSO volume.

² See 25 Pa. Code §§ 92.31(b), 92.55 (requiring that DEP-issued NPDES permits include a "schedule of compliance," including "interim requirements and dates for their achievement," if the permittee cannot meet water quality standards immediately); *cf. In re: District of Columbia Water & Sewer Auth.*, 13 E.A.D. 714 (2008) (EPA Env'tl. Appeals Bd. ruling that, pursuant to the District of Columbia's water quality standards regulations, the NPDES permit for the District's sewage treatment plant must include a compliance schedule for LTCP implementation) [available online at [http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES+Permit+Appeals+\(CWA\)](http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES+Permit+Appeals+(CWA))].

³ We use the term "metric" to refer to a unit of measurement by which progress implementing the LTCPU can be tracked. We use the term "target" to refer to enforceable requirements that are expressed quantitatively. We use the term "milestone" to refer to other enforceable requirements that cannot be expressed quantitatively, such as a requirement to complete a particular task or project. Both targets and milestones have compliance deadlines.

- ii. Definition of greened acre: The definition of a “greened acre” should more clearly correspond to the concept described in the *Green City, Clean Waters* report (at p. 10-14):

An important performance goal used throughout this document is the achievement of a “greened acre.” This greened acre includes the area of the stormwater management feature itself and the area that drains to it (or the stormwater feature’s own little watershed). Each greened acre will manage the first inch of runoff from one impervious acre of the combined sewer service area.

The definition proposed in PWD Memo 5 (at p. 5) conceptualizes a “greened acre” as “an expression of [a] physical volume of stormwater,” rather than as an area that is equipped to retain (or detain for slow release) at least an inch of rainfall. One concern we have with this approach is that it seems to give equal “credit” to a half-acre site capable of managing 2 inches of rainfall and a one-acre site capable of managing 1 inch of rainfall, even though these two scenarios could result in very different outcomes in terms of CSO volume and frequency in a typical rain year.⁴

The operative definition of a “greened acre,” for purposes of measuring compliance with enforceable targets, should be consistent with the set of assumptions used in the modeling that underlies the LTCPU. The LTCPU’s modeling approach equates a “greened acre” to an acre that satisfies the “water quality” requirements of PWD’s Stormwater Management Regulations (see PWD Reg. § 600.5(a)). The regulations, as summarized in the LTCPU (at pp. 6-14—6-15), require on-site retention, or detention for slow release, of one inch of rainfall over the directly connected impervious area (DCIA) of a site. Therefore, we suggest that the definition of a greened acre – for the purpose of measuring compliance with enforceable numeric targets for greened acres – should be an acre that, whether or not it is legally subject to the “water quality” requirements of the PWD regulation, meets that performance standard. An acre that only partially meets that standard should be counted, proportionally, as a fraction of a greened acre -- *e.g.*, one acre that achieves on-site retention, or detention for slow release, of a half-inch of rainfall would receive credit of 0.5 toward the numeric target for greened acres.⁵

Additionally, “greened acre” credit for any project should be contingent on PWD’s compliance with its maintenance obligations for that project (see comment 3 below).

⁴ Also, the proposed definition does not make clear whether the “greened acre” includes the area of both the stormwater management feature and the impervious area that drains to it.

⁵ It may also be appropriate for PWD to receive credit of more than “1.0 greened acres” for an acre that is retrofitted to manage on-site more than one inch of rainfall, provided there is some logical limit on the additional amount of stormwater capture capacity for which such credit is available on a given site, linked to the rainfall distribution patterns in Philadelphia.

Targets:

- i. There should be enforceable targets for pollutant mass reduction for years 5, 10, 15, and 20, if compliance with the “presumption approach” is based on the “pollutant mass reduction” method.⁶
- ii. Watershed/sewershed-specific targets for CSS performance and CSO volume: We believe there should be separate targets for each receiving waterbody or drainage district (or other appropriate hydrologic/hydraulic sub-unit) for “percent capture,” annual CSO volume, and pollutant mass reduction. These targets could be derived from analyses such as that presented in Attachment B to PWD Memo 1, which identifies projected CSO volume and percentage capture at each 5-year interval, broken down by receiving waterway and by interceptor.
- iii. Flexible allocation of greened acres between “private development” and “PWD capital projects”: The use of targets for greened acres from “PWD capital projects” and “private development” projects, in addition to the target for total greened acres, may inhibit flexibility. For example, if PWD finds that it can achieve more total greened acres -- perhaps even more acres than the target -- by using a portion of its available funding to subsidize or incentivize private retrofits, PWD may be unable to do so if it is required to achieve a certain number of greened acres specifically from “capital projects”. We suggest EPA, DEP, and PWD consider allowing deviation from the targets for “greened acres from private development” and “greened acres from PWD capital projects,” provided the target for “total greened acres” is achieved. (We believe, however, that PWD should still be required to spend the full amount budgeted under the LTCPU, even if it reaches the enforceable targets for less than that amount, unless PWD demonstrates that water quality standards are attained in the receiving water bodies.)
- iv. Wet weather inflow and infiltration control: Although we have not had the opportunity to closely examine these issues (see PWD Memo 5, pp. 22-23), we note that DEP has taken an interest in more closely examining the potential for volume reduction through measures such as “offloading groundwater pumpage” and “reduction of contractual flow” (*i.e.*, from neighboring municipalities authorized to discharge into Philadelphia’s CSS). We urge PWD to take full advantage of any “low-hanging fruit” these approaches may have to offer. As appropriate, targets should be established for reducing these flows.

⁶ It appears that PWD’s projections of pollutant mass reduction (see PWD Memo 2) are based on an assumption that all of the “greened acres” will rely entirely on vegetation, as opposed to decentralized gray infrastructure for storage and delayed release. As we noted in our 12/09 Review Memo, truly “green” infrastructure would remove from the sewer system all, or nearly all, of the pollutant load in the flow directed to such sites, while slow release for treatment at the sewage treatment plants is less effective at pollutant removal. Therefore, it is critical that PWD differentiate between these different types of stormwater capture methods when doing post-construction modeling of the cumulative effects of “greened acres,” for purposes of determining compliance with the enforceable targets for pollutant mass reduction. Along with the triple-bottom-line benefits that only vegetative techniques can provide, this difference in water quality performance underscores the importance of prioritizing vegetative techniques in PWD’s implementation strategy.

With regard to contractual flow, in particular, we urge PWD to amend its user agreements, to the greatest extent possible by law, to apply green infrastructure requirements to neighboring municipalities that discharge to the city's sewer system, as a condition of their continued access to it. We also recommend that DEP seek to use its own enforcement authorities directly with such municipalities, to ensure they take all feasible steps to reduce their contribution of wet weather flow to PWD's system.

Milestones:

Approval of the LTCPU should include the establishment of enforceable timelines for the following additional tasks or projects, which may include deadlines falling in-between the adaptive management decision points in years 5, 10, 15, and 20:

- i. Installing and monitoring “pilot areas” for early implementation of green infrastructure: We fully support the concept of a pilot area or areas for early implementation of green stormwater infrastructure, to be scheduled for installation by a set deadline within the first several years of plan implementation; specific details, such as location and number of areas, could be determined in an implementation plan to be submitted 6 months after LTCPU approval. As described further below under the heading of “sewershed monitoring” (see comment 2.i.b), we believe the installation and intensive monitoring of a small number of pilot areas could serve as the primary means for gathering data on BMP performance, which is needed to demonstrate the plan's success. Specifically, pilot areas should be carefully monitored, with data used to refine both PWD's modeling approach, its design specifications, and maintenance practices for specific types of green infrastructure installations.

The pilot should also be used as an opportunity to identify institutional barriers to green infrastructure implementation and recommended institutional fixes. Necessary adjustments to the LTCPU, based on lessons learned from the pilot, should be made no later than the first 5-year adaptive management review. (Note, however, that construction and monitoring of this pilot project should not be a reason to defer construction of other “greened acres” needed to meet the enforceable targets for year 5.)

- ii. Completing priority tasks related to “streamlining” of city policies and inter-agency coordination:
 - a. There should be binding timelines for specific steps toward achieving key institutional reforms. Such timelines should be heavily front-loaded in the first five years of plan, since success of the rest of the plan depends on resolving these regulatory/bureaucratic barriers to effective plan implementation. (Note that we also propose, above, a specific requirement to use the “pilot area” project as a tool to identify and resolve institutional barriers to plan implementation.)

- b. If the NPDES permits do not include compliance obligations binding directly on city agencies other than PWD, they should include a near-term deadline for PWD to obtain, or to demonstrate that it already possesses, legal authority over other city agencies' activities sufficient to ensure full implementation of the LTCPU. (As one example, this includes authority to ensure relevant city agencies conduct the necessary maintenance activities for green infrastructure projects in the public right-of-way or on other city property.)
 - c. Within 6-12 months of LTCPU approval, PWD should be required to complete a review of its maintenance capabilities for city-maintained properties and determine what maintenance capabilities, practices, and policies need to be revised to better accommodate green infrastructure. PWD would then submit a report to DEP setting forth its findings and describing corrective actions PWD will take, to ensure it has in place the necessary protocols and resources to meet its maintenance obligations under the LTCPU .
 - iii. External expert review process in years 5, 10, 15, and 20: We recommend that an external review be performed by a small panel of experts unaffiliated with PWD, DEP or EPA, in the year prior to each 5-year adaptive management decision point. The review panel should:
 - a. Review annual reports. (PWD should provide the panel with access to any additional backup information, upon request.)
 - b. Audit a representative sampling of green stormwater infrastructure projects (both private and public) to confirm that they are being properly designed, constructed, operated and maintained.
 - c. Report on findings and make recommendations for future implementation of the LTCPU. These reports should be made publicly available and PWD should be required to consider and address the panel's recommendations at each 5-year adaptive management decision point. (To the greatest extent possible, the expert panel should also review and make recommendations concerning the "triple bottom line" benefits of LTCPU implementation.)
 - iv. Securing commitments concerning the I-95 disconnection project (or submitting an alternative plan to achieve equivalent CSO reductions): We support DEP's request for formal, binding assurances that PADOT will move forward with this sewer disconnection project as PWD envisions; we continue to encourage both EPA and DEP to support PWD's efforts in that regard.⁷ However, it appears that implementation of this project is reflected in the enforceable targets it proposes for the LTCPU – *e.g.*, targets for greened acres, CSO performance, etc. Assuming it is, formal assurances in advance of LTCPU

⁷ We also strongly encourage EPA and DEP to remain engaged in the design of this project, to ensure any direct discharge from newly disconnected portions of the highway is subject to controls that reduce pollutant loadings "to the maximum extent practicable," as per Clean Water Act requirements.

approval may be less important, since PWD would be responsible for meeting the targets through alternative means if the I-95 project does not come to fruition. In that scenario, it would be appropriate to require that each PWD annual report include an update on the I-95 project, and that PWD submit contingency plans by a certain date for meeting its performance targets if implementation of the I-95 project has not been secured.

- v. Water Pollution Control Plant treatment upgrades: PWD should identify a timeline for completion of these upgrades before LTCPU approval. It appears to us that DEP and PWD may be considering deferring the establishment of construction schedules until after LTCPU approval. These upgrades are critical components of the plan that will have a significant effect on DEP's ability to achieve water quality improvements. As such, schedules for these upgrades should be determined before the plan is approved. Alternatively, specification of construction schedules for each upgrade could be deferred until a short time (*e.g.*, 1 year) after LTCPU approval, provided such schedules are sufficient to meet the pre-defined, enforceable targets for CSO volume, percent capture, and pollutant mass reduction in years 5, 10, 15, and 20.

Also, it appears that these upgrades will result in more dramatic improvements in some watersheds than others. For example, Appendix B of PWD Memo 1 projects that the “% Capture” in the Tookany-Tacony/Frankford Creek watershed will increase from 58 to 83 in the final five years of LTCPU implementation, presumably due to the upgrades at the NE plant. PWD, DEP, and EPA should consider whether these upgrades can be prioritized and/or completed on an accelerated timetable, so the resulting water quality improvements can be realized sooner rather than later.

- vi. Public outreach: We recommend that, in addition to any other public outreach it may be considering, PWD convene a meeting of its *Green City, Clean Waters* Advisory Committee in the year prior to each 5-year adaptive management decision point. The meeting should be open to the public. PWD should brief the Committee on the progress it has made over the past five years and any adaptive management decisions that it is considering. PWD should entertain comments from the Committee and the public and consider those comments at each 5-year adaptive management decision point.

Adaptive Management:

At each 5-year review, PWD should be required to identify the cause of any failure to meet enforceable targets or milestones and propose remedial steps to achieve compliance.⁸ Additionally, with respect to the numeric target for greened acres, EPA and DEP should

⁸ We note that, in Syracuse, NY – the only CSO community, to our knowledge, with an enforceable green infrastructure-based approach to CSO abatement (albeit on a smaller scale than Philadelphia proposes) – the governing federal court consent decree includes such a requirement to propose remedies for any non-compliance. The consent decree was amended last year to substitute green infrastructure requirements for certain gray infrastructure projects, with the support of EPA. *Atl. States Legal Found. v. Onondaga County Dep't of Drainage and Sanitation*, No. 88-CV-0066 (N.D.N.Y. filed June 17, 1993) (Fourth Stipulation and Order Amending the Amended Consent Judgment, filed and entered Nov. 16, 2009). A copy of the consent decree amendment and EPA's letter of support is available upon request.

create a strong incentive for compliance, by requiring that PWD compensate for any shortfall at a 2 to 1 ratio in the next 5-year compliance period – *e.g.*, if PWD falls ten acres short of its target for year 5, it should be required to add twenty acres to its target for years 6-10. Further, if PWD fails to meet any numeric targets concerning sewer system performance (*e.g.*, CSO volume reduction), due in whole or in part to under-performance of green infrastructure installations, PWD should be required to propose some combination of: (i) increasing the enforceable targets for greened acres; (ii) improving the design of green infrastructure features in future greened acres; and/or (iii) increasing investments in gray infrastructure. If detailed monitoring demonstrates that green infrastructure or other measures provide greater benefits for volume reduction and in-stream water quality improvement than currently assumed, DEP and EPA should recognize the documented performance and allow PWD to adjust its model to more accurately reflect progress towards meeting its enforceable CSO targets.

2. Monitoring and regular updates of modeling: The approved LTCPU must require PWD to collect monitoring data and conduct modeling analyses sufficient to demonstrate achievement of the LTCPU’s enforceable targets. It may be appropriate to reserve development of detailed protocols until after LTCPU approval, so long as those protocols are subject to DEP review and approval. However, at the time of LTCPU approval, there must be clear and enforceable requirements for PWD to do the following:

- i. Monitoring. PWD should be required to submit for approval within 6-12 months of LTCPU approval a detailed monitoring plan, which must meet the following criteria and will become binding upon approval by DEP. Note that monitoring of BMP effectiveness must include not only measurements of flow (*e.g.*, rate, volume), but also pollutant mass loading.
 - a. *Outflow and Stream Health Monitoring.* PWD has experience in monitoring parameters to establish the health of the river systems – under both base flow conditions and following storm events – and outflow discharges. Such monitoring should continue throughout the life of the plan. The specific monitoring protocols must provide for the collection of sufficient data to validate and, if necessary, recalibrate PWD’s models of sewer system performance. (It should be noted that stream health monitoring, including biological in-stream assessments, can be used to evaluate the benefits of stream restoration, as well as CSO volume and pollutant load reductions.)
 - b. *Sewershed Monitoring.* Multiple sewersheds with nested BMPs should be developed and monitored, both at the site level and at the block scale (*i.e.*, measuring the effectiveness of BMPs both individually and cumulatively). As noted above, “pilot areas” for early installation of green infrastructure would serve as ideal locations for these focused sewershed monitoring efforts. This monitoring should continue throughout the life of the plan and the specific monitoring protocols must provide for collection of sufficient data to: (i) validate and, if necessary, recalibrate PWD’s models of sewer system performance; and (ii) evaluate the operation and maintenance programs required to maintain BMP effectiveness. (We also encourage PWD to

coordinate with, and take advantage of appropriate data from, any other field studies of green infrastructure undertaken by independent researchers in Philadelphia.)

- ii. **Modeling.** PWD should be required to update the Stormwater Management Model (“SWMM”) periodically, using the monitoring data to validate and, as necessary, re-calibrate SWMM values and outputs. Specifically, PWD should be required to complete these tasks and submit appropriate technical documentation in connection with the annual progress reports for years 9, 14, and 19, so DEP can review and approve any changes to the model before it is used to evaluate PWD’s compliance with the enforceable targets in years 10, 15, and 20.⁹
3. **Maintenance issues:** Because the success of the LTCPU will depend on proper operation and maintenance of green stormwater infrastructure, PWD should be required to (a) for any project on city-owned property, maintain and implement (or ensure implementation by another city agency of) an operation and maintenance plan; (b) for any project not on city-owned property, require submission and approval of an enforceable operation and maintenance plan and demonstrate that PWD has authority to ensure compliance with such plan; (c) ensure the performance of inspections of public and private projects to certify that they are being properly operated and maintained and document any follow-up steps taken to achieve compliance.
 4. **Annual reporting on LTCPU implementation:** We support PWD’s idea to report annually on progress implementing the plan, and believe that the annual reports should include as much detail as practicable. In addition to assessments of overall progress toward meeting each of the enforceable targets and milestones, we believe that annual reports should include the following information.¹⁰
 - i. **Specific information on individual green infrastructure projects,** including, but not limited to, the detailed information set forth in PWD Memo 5, Section 1 (including Tables 1.1 and 1.2). This information is critical for accountability, oversight of maintenance responsibilities, and overall evaluation and adaptive management of LTCPU implementation. We were particularly pleased to see the inclusion of information to help track whether the green stormwater infrastructure that is being implemented is truly “green” and thus likely to result in the triple bottom line benefits that PWD has projected; we suggest that PWD also identify any other data needs for tracking triple bottom line benefits and collect the appropriate data during implementation of the LTCPU.

We have the following specific comments on PWD’s proposed list of project-specific data to be reported:

⁹ As appropriate, PWD should also consider the use of new modeling platforms, as state-of-the-art techniques for modeling green infrastructure improve over time.

¹⁰ We note that para. 14H of the Syracuse consent decree, referenced above, requires submission of annual reports that include many of the items identified here.

- a. *Specification of drainage area.* With respect to the “drainage area” within which each project is located (Table 1.1), both the sewage treatment plant and the interceptor should be reported.
- b. *Categorization of green infrastructure projects.* With respect to identifying a “category” or “type” for each project (see the note below Table 1.1.), we believe a set of functional categories would be more useful than identifying projects according to “GI programs,” although the reporting of both could also be useful.
- c. *Applicability of reporting requirements.* We do not understand PWD’s caveat (PWD Memo 5, p. 2) that “not all the information for every project will be collected, depending on the type of project.” Rather, we believe that all of the listed information can and should be collected for every project.
- d. *Additional categories of project specific information.* We also believe that the following categories of information should be added, for each green infrastructure project:
 1. *Operation and maintenance obligations.* These are critical to the success of the LTCPU and should be reported, including identification of: O & M protocols and frequency; party responsible for O & M; and, for private projects, identification of which city agency has lead responsibility for oversight and the legal authority for enforcement. Additionally, for public projects, projected operation and maintenance costs should be reported and tabulated to ensure that the \$100 million PWD has set aside for operation and maintenance will be sufficient, and, if not, to ensure that issue is addressed at the next adaptive management decision point.
 2. *Sub-categories of “private” projects:* Each project on private property should be identified as one of the following: private development or redevelopment consistent with PWD stormwater regulations; private retrofit project that qualifies for credits against the PWD’s stormwater charges; or private retrofit project receiving public financing or other incentives (type and amount of public financing/incentive should also be reported).
 3. *Pollutant removal.* Since PWD relies on the “pollutant mass reduction” option under the CSO Policy’s “presumption approach,” data on pollutant mass reduction should be reported, not only information on the volumes of runoff managed by a project. (For the same reason, as recommended elsewhere in this memorandum, there should also be enforceable milestones for pollutant mass reduction and monitoring to validate modeling assumptions.)
 4. *Methodologies used to calculate anticipated project performance.* Specifically, the methodologies used to calculate design storage volume, peak release rate, and any other performance characteristics should be identified. (Presumably, a set of standard methodologies could be fully described in a technical support document,

so that project-specific reporting could rely on cross-references to such technical documentation.)

- ii. Additional information that is not specific to individual green infrastructure projects, including:
 - a. A description and results of monitoring efforts undertaken to verify assumptions about performance of green infrastructure designs. This must include monitoring both of projects undertaken by PWD and of projects done by private property owners pursuant to the city's stormwater regulations (or other retrofit incentive programs).
 - b. A description and results of the ambient water quality monitoring program to evaluate progress towards meeting water quality standards.
 - c. A list of institutional barriers to implementation that had to be overcome over the course of the year, and institutional fixes implemented or proposed.
 - d. A description of steps taken over the year to further incentivize private green stormwater infrastructure projects.
 - e. A description of efforts taken over the year to ensure compliance with operations and maintenance requirements.
 - f. A summary of public outreach efforts, including how many residents and organizations have been reached through various modes of outreach.

5. **Water quality standards compliance:** We understand EPA has asked PWD to further evaluate the LTCPU's likelihood of achieving compliance with water quality standards for pathogens, using the anticipated post-LTCPU frequency of CSO events as a surrogate for water quality impairment. We support this request, given the CSO Control Policy's requirement that, even under the "presumption approach," it must be "reasonable in light of the [LTCPU's] data and analysis" to presume that implementation of the LTCPU will achieve water quality standards. We recommend that the agencies keep on the table, as one option for addressing any anticipated non-compliance with water quality standards, an extension of the length of the LTCPU.¹¹

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We appreciate the continued opportunity to engage with PWD, DEP, and EPA and would welcome the opportunity to meet with you soon to discuss our comments. Thank you again for your consideration.

¹¹ For example, EPA recently entered into a CSO consent decree with Kansas City that includes green infrastructure elements and allows a 25-year implementation schedule. See *United States v. Kansas City*, No. 4:10-cv-0497-GAF (W.D.Mo. filed May 18, 2010) (Consent Decree), available at <http://www.kcmo.org/idc/groups/public/documents/waterservices/consentdecree.pdf>.