Philadelphia Water Department

The ARAMARK Tower
1101 Market Street
Philadelphia, Pennsylvania 19107-2994

HOWARD M. NEUKRUG, P.E.
Commissioner

August 2, 2012

Dear Mr. David Burke,

On behalf of the Philadelphia Water Department (PWD), I wanted to thank you and your colleagues at the PADEP for taking the time to meet with us on June 14 to discuss your comments submitted June 6, 2012 on our Implementation and Adaptive Management Plan (IAMP) submittal.

We look forward to our additional discussions as we continue to implement Green City, Clean Waters.

Sincerely,

Marc J. Cammarata, PE
Director, Office of Watersheds
215.685.4948
marc.cammarata@phila.gov

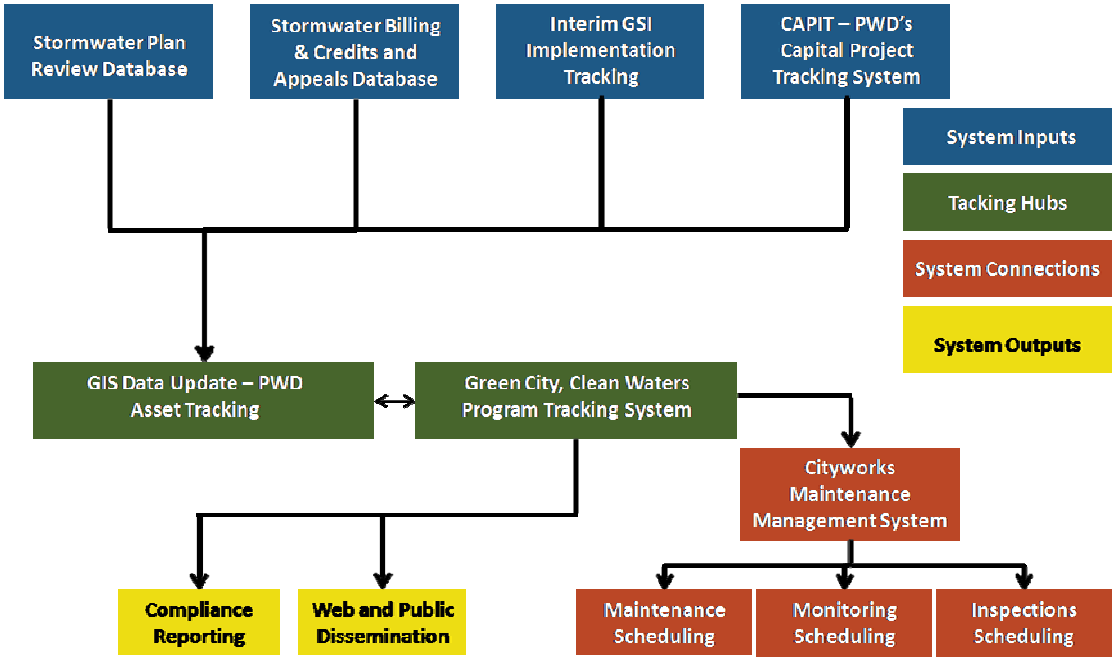
David Burke's Comments

The comments below reflect those issues about which DEP feels the need for a particular response. The comments are presented in an order that corresponds to the organization of the Plan itself.

1. **Section 2.1.1 ("Tracking System Development") contains a brief discussion of the Interim Tracking System and the Green City Clean Waters Program Tracking System ('GCCW System"). DEP requests that the City provide a more detailed schedule for the completion and implementation of the GCCW System. The language in this section implies that the system may not be completed until the fifth year of the program, and this implied time frame gives DEP some concern. We request Philadelphia Water Department's ("PWD") explanation of why this task is extended over such a long time, as well as a discussion of how PWD intends to handle the transition from using the Interim Tracking System to using the GCCW System.**

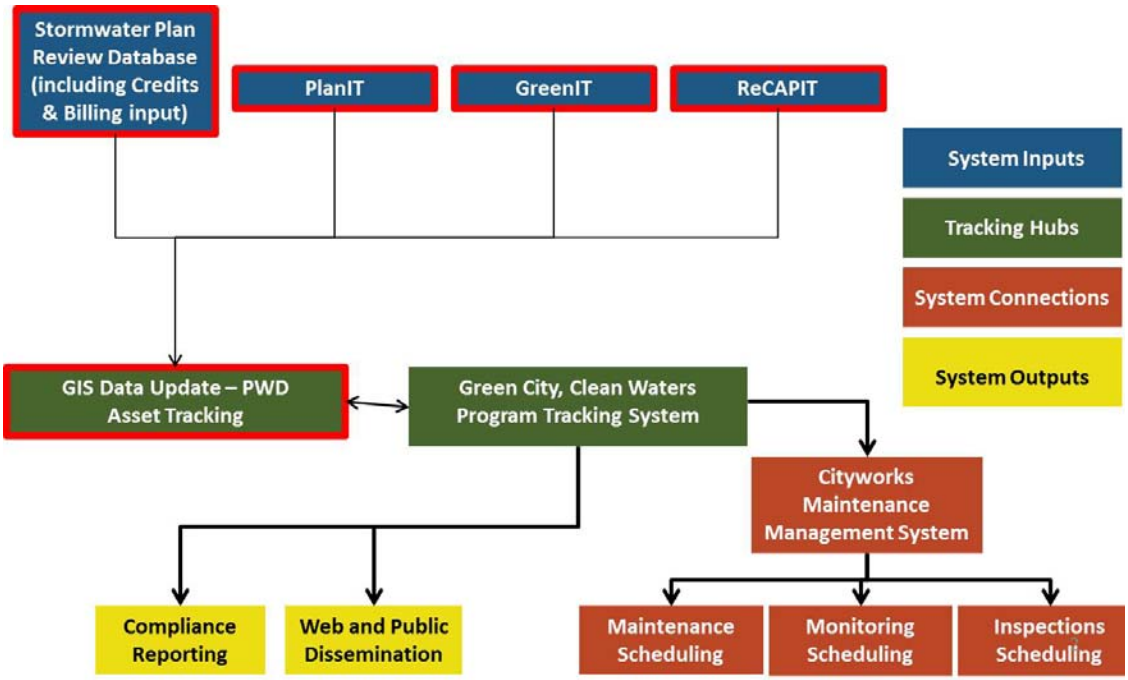
Response:

As described in the IAMP, the Water Department already has a number of robust data tracking systems in place and being utilized. What is planned is the integration of these existing data tracking systems through the creation of a *Green City, Clean Waters* Program Tracking System "hub" as a means of simplifying the compilation of information from these various systems for improved information dissemination and regulatory reporting. On page 2-2 of the IAMP, the following figure illustrated PWD's vision for linking project tracking information.



In the months since the IAMP was submitted, PWD initiated updates to some of these systems to enhance their ability to track data and prepare for the development of the Green City, Clean Waters "hub". This has resulted in an evolved graphical representation of PWD's vision for the master

tracking system. Highlighted with a red outline in the graphic below are sub-elements to the tracking process that have seen significant progress in the past few months.



Stormwater Plan Review Database

The Stormwater Plan Review Database tracks compliance data for stormwater management practices on private sites for which a stormwater credit has been awarded. From the compliance perspective, PWD only needs to include a link to the Stormwater Plan Review database as an input to the Green City, Clean Waters compliance tracking "hub".

The Water Department's Interim Green Stormwater Infrastructure Implementation Tracking – formalized with the creation of the GreenIT System

The IAMP described an interim project tracking system that PWD uses to track all green stormwater infrastructure projects from planning to construction. Since the submission of the IAMP, this interim system has been formalized with the development of a data tracking element called GreenIT (in progress). This system is designed to track compliance information related to PWD's green stormwater infrastructure projects. (More information about the GreenIT system is provided in the response to comment #2)

Once complete, GreenIT will support the following tasks for all GSI projects:

- New requests to be entered and evaluated for inclusion in the capital program
- Water/Sewer projects with green infrastructure components
- Conceptual project cost tracking
- Compliance metrics tracking
- Reporting in support of program requirements

- Transfer of project data to CAPIT (PWD's capital projects database)

GreenIT is anticipated to be fully operational in the fall of 2012.

PlanIT

Because PWD receives potential GSI projects from a variety of sources, a centralized planning database is needed. PlanIT is a new application designed to allow PWD to compile and track information about *potential* GSI projects in one centralized master list/registry. All potential projects will be entered into PlanIT, where they will undergo initial evaluation and vetting before being moved into GreenIT for implementation tracking.

PlanIT has a simplified interface comprised of two main components:

- Data Entry Forms that provide fields for recording desktop analysis information and coordination and policy issues.
- A Map Viewer that allows new projects to be identified through a map interface and different project types to be viewed on one map. This will facilitate coordination between PWD's many GSI planning programs (i.e. streets, parks, schools, etc.)

The data collected in PlanIT will be used to prioritize projects and develop a framework for queuing projects. The PlanIT system is in development and is expected to be fully operational in the fall of 2012.

The Water Department's Capital Projects (CAPIT) System – evolving to reCAPIT

PWD's CAPIT system has been in place for almost 20 years, supporting the Department in tracking capital project expenditures. This system is now undergoing an update to allow for more detailed tracking of capital projects and to enable its connectivity to other tracking elements. This update process is underway and is anticipated to be completed within the coming two years.

Green City, Clean Waters Program Tracking System – "The Hub"

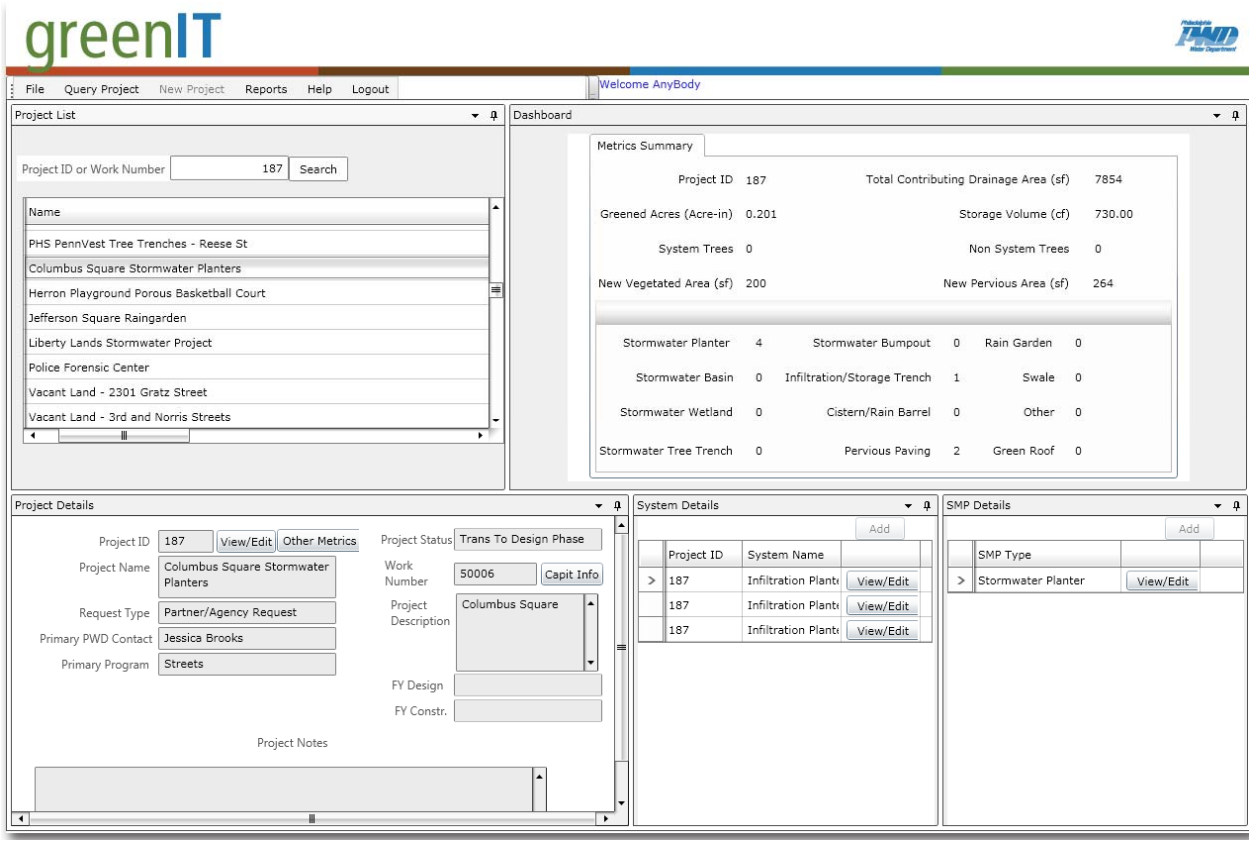
As described in the IAMP, PWD envisions development of a "hub" system to tie together all data tracking elements and streamline the Department's ability to produce compliance reporting and information for public dissemination. The IAMP describes the development of this "hub" as a process that will be undertaken during the second through the fifth years of the program. The reason for this proposed schedule is that there are a number of enhancements planned for the sub-tracking elements that will need to be developed in the interim before the systems are linked together. During the interim years before the "hub" system is in place, PWD will be able to develop all compliance reporting necessary to produce annual reporting requirements through a manual data compilation process.

2. **DEP requests an opportunity to review the Tracking System as it is developed. DEP's interest is in understanding what fields make up the data system and seeing how the system handles displaying or reporting the data. One of our chief concerns is that we should begin to clarify how DEP's roles in program oversight and compliance monitoring can be facilitated using data and reports from the system. We suggest that reports from the tracking system describing the projects listed in Table 3-1 would provide a useful example to facilitate this discussion. We request that PWD present a response to this comment either with, or before, the Annual Report that is due in September 2012.**

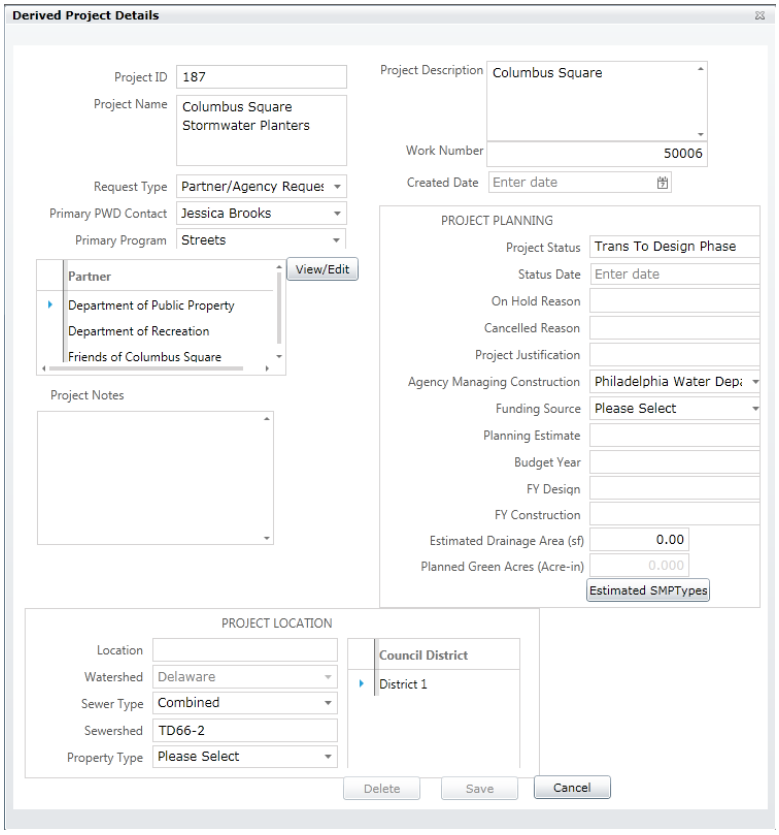
Response:

The GreenIT tracking system currently in development will house many of the metrics utilized for green stormwater infrastructure annual reporting to the PADEP. PWD is developing a user manual to accompany the GreenIT system that will define each of the fields and provide guidance to users on how to appropriately enter data to the system. A status update on the development of GreenIT will be provided in Annual Reports beginning with September, 2012. What follows are a number of [draft] screen captures and descriptions from this system:

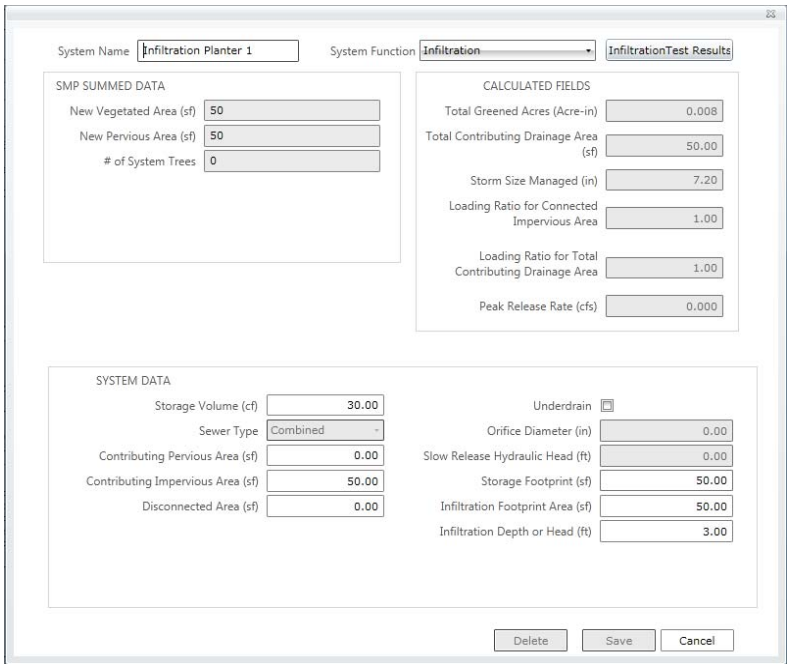
1. GreenIT Main Window. Illustrates project listing in upper left quadrant, project snapshot in upper right quadrant, project details in lower left quadrant, System and SMP details in lower right quadrant. Each of these sub-windows can be opened to unveil more detailed tracking information.



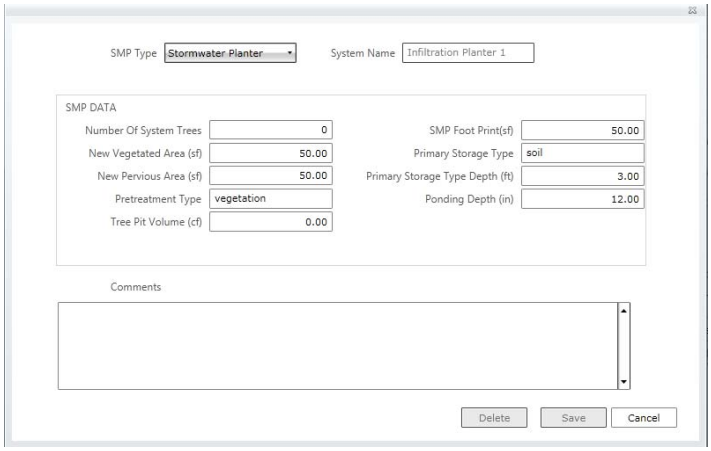
2. Project Details (The project details window will house data about the project including: Name, PWD Project Lead, Associated Program Type, Partners, Project Status, and Location)



3. System Level Details (A system can be comprised of one or more SMPs and represents a contributory area to a stormwater management system that discharges directly or can be bypassed to a connection to the combined sewer system. The Systems tab will include: new vegetated area, new pervious area, number of trees, and storage volume. It is at the system level that the Greened Acre value will be calculated.)



4. Stormwater Management Practice Level Details (Individual SMPs are distinguished most often by the entry point for stormwater to a practice – and are considered separate SMPs if multiple units are interconnected, for example, by shared underground storage. The individual SMP tab(s) will include number of trees, new vegetated area, new pervious area, pretreatment type, SMP foot print, primary storage type, primary storage depth, ponding depth, and other additional SMP specific fields.)



3. DEP believes that the tracking system(s) must be capable of assigning, or calculating some critical performance information for each stormwater project. For example, we believe that the tracking system must include information about "storage volume," which is an important design factor for each Stormwater Management Practice ("SMP"). DEP expects that <u>storage volume</u> must be calculated in a slightly different way for each SMP type, and we wish to review the methods that will be used to calculate the "storage volume" of each SMP type. In addition, we request that PWD describe any other performance characteristics that it considers to be critical for any

particular SMP type. DEP wishes to understand how the tracking system(s) will facilitate the review of information about verified performance characteristics of each project, as well as how these data may be maintained over time.

Response:

The tracking of SMP related characteristics is performed for each practice and summarized for reporting purposes at the system level. As previously described, a system can be comprised of one or more SMPs and represents a contributory area to a stormwater management system that discharges directly or can be bypassed to a connection to the combined sewer system. Individual SMPs are distinguished most often by the entry point for stormwater to a practice – and are considered separate SMPs if multiple units are interconnected, for example, by shared underground storage. Table 2-1 in the IAMP includes a comprehensive list of SMP types. The IAMP described the uniform outputs from the tracking system that are derived from these SMPs and stormwater management systems (Table 2-2). For each SMP, plans and details are evaluated to measure characteristics that determine the value of these outputs in terms of greened acres, storage volume, trees, etc. Storage volumes and other characteristics will vary depending on SMP type and are most distinct when comparing infiltration storage volumes to detention and slow release storage volumes.

- Infiltration storage volume is defined by the bottom area and depth of water from the bottom of the infiltration storage capacity (the point at which the constructed storage ends and native soil begins), inclusive of all potential storage media, including but not limited to gravel, soil, sand, and free surface water depths. This can only include volume that can be infiltrated at the SMPs measured infiltration rate, and does not include depth above slow release orifices, overflow weirs, or other storage capacity limiting discharge points.
- Slow release storage volume is defined by the bottom area and depth of water from the bottom of the orifice to the overflow weir or discharge point, inclusive of all potential storage media, including but not limited to gravel, soil, sand and free surface water depths. This does not include depths of water below the orifice for either infiltration or pipe bedding.

These are the two main distinctions when determining storage volumes. All SMP types can be categorized as either infiltrating or detention/slow release. Other characteristics, such as vegetation, surface materials, and inlet locations/types, will define the specific SMP type (tree trench, bumpout, pervious paving, etc).

Additional detail is provided in Appendix A of response summarizing the protocol for evaluating project plans and details to determine system metrics. Also included digitally are the spreadsheet and plan files of example projects used for determining characteristics and ultimately the greened acre and storage volume values.

4. **Trees are involved in many SMP projects, and it appears that the data systems discussed in Chapter 2 are set up to track data about the numbers of trees on a per-project basis. However, it is not clear to DEP whether PWD intends to quantify the benefits of trees in managing stormwater volume. We request that PWD explain its intentions with respect to the quantitative impacts of trees (e.g., "stormwater trees" and "noncredit trees"), as well as any other characteristics of trees that may be relevant.**

   Response:

   The GreenIT tracking system is designed to track trees installed within stormwater management practices, as well as stand-alone trees planted in otherwise impervious areas. It is recognized that trees outside of the designed stormwater management practices serve a direct stormwater management function if intercepting rainfall above impervious cover. These trees include those planted along streets and sidewalks, parking lots and distributed throughout a given site. At this time, these trees are tracked within the GreenIT system as "non-credit trees" and are not included in calculated Greened Acre valuations. Trees planted as part of stormwater management practices, such as designed tree trenches, also serve to enhance the SMP's effectiveness. At this time, PWD is not taking credit for the additional evapo-transpiration provided by non-credit and SMP trees. It is the intention, however, to initiate a study to quantify rainfall interception and evapo-transpiration so that eventually, the stormwater reduction effect of both "non-credit" trees and trees in SMPs can be calculated and included in the volume reduction calculations. Additionally, as PWD assesses the triple bottom line value of the program, the tracking of all trees will become even more important.

5. **For many SMPs, infiltration is an important performance characteristic. DEP requests to know how PWD intends to determine, use, and maintain project-specific information about infiltration characteristics of sites where infiltration is a factor affecting SMP performance.**

   Response:

   The native soil's ability to infiltrate can be evaluated several times through the design, construction and monitoring phases. Projects designed and constructed to date had soil infiltration rates measured during the design phase utilizing a few standard methods, most commonly with a Double-Ring Infiltrometer test. Appendix B: Soil Infiltration Testing Procedures of the Philadelphia Stormwater Management Guidance Manual provides details of this and other soil infiltration testing methods (available online: http://www.pwdplanreview.org/StormwaterManual.aspx). Infiltration performance monitoring capabilities are integrated into the design of a number of the GSI controls. This typically includes installation of monitoring chambers and wells and instrumentation adjacent to storage elements to record water depths. Measurement techniques may include tracking flow into or out of control structures, recording storage volume over time, and soil moisture conditions. This data can be evaluated to determine if soil infiltration rates are similar to pre-construction conditions.

For projects implemented in the future, soil infiltration testing will be completed either during design, construction or post-construction to improve our understanding of native soil conditions. This information will be tracked with the other detailed project information in the GreenIT tracking system and, if assessment of monitoring data shows infiltration rates have changed, the project information will be updated.

As discussed in Section 6 of the IAMP, performance assessment of GSI controls will be used to refine control measure designs and to better estimate and take credit for infiltration. Improved information about infiltration rates is already being used to improve the predictive capabilities of the hydrologic and hydraulic models. Also mentioned was the initiation of a USGS managed network of groundwater level recording wells and the measurement of groundwater levels at selected SMP locations. USGS groundwater monitoring will establish a baseline of groundwater levels throughout the City and monitor changes in the water table over time. Groundwater levels at SMP locations will be used to assess short-term groundwater effects in response to infiltration. The Comprehensive Monitoring Plan will define PWD's green stormwater infrastructure site monitoring plans.

6. **Section 3.1.1 ("Water Department Initiated Green Stormwater Infrastructure") states that a loan from the Commonwealth's PENNVEST program is being used by the City to implement some 27 projects which are expected to yield approximately 75 Greened Acres. At the time the IAMP was prepared, four of these projects had been constructed. DEP requests that PWD's Annual Reports should each provide a summary of progress achieved on the PENNVEST-funded green infrastructure projects, for as long as the PENNVEST funding source is active.**

   Response:
   The Philadelphia Water Department will provide a PENNVEST funded Green Stormwater Infrastructure update with each annual report submission until the $30 Million allocation is fully expended, beginning with the September 30, 2012 annual report submission.

7. **DEP is interested in following the progress of each of the Strategic Initiatives described in Section 3.1.1.1., and we expect that we will be able to do so using the Annual Reports and other Program deliverables to come. We provide particular comments about certain Strategic Initiatives below:**

   a. **One of PWD's Strategic Initiatives is the development of Stormwater Management Enhancement Districts ("SMEDs"). The section states that PWD "hopes to begin evaluations of four (4) SMEDs in the next year." DEP requests that PWD identify the location of each of the SMEDs that is currently being evaluated, and provide a detailed response that explains the process and the anticipated schedule for these evaluations, including when the concept design phase is expected to begin and end.**

Response:

Since the submission of the IAMP in December 2011, PWD has made progress toward developing their SMED program concept. To date, PWD has conformed contracts to bring a number of SMED contractors on board to support this planning process. Simultaneously, PWD has begun to hone in on initial candidate areas for potential selection as the first SMED area. Work is anticipated to begin on the first SMED in the fall of 2012.

Once SMED areas are identified and a SMED contractor is assigned to the area, PWD will develop scope of service requests that are specific to the study area. Contractor teams will be responsible for conducting an evaluation of the area, including data gathering and analysis to support development of a Stormwater Improvement Plan (SIP) based on the results of the evaluation. Evaluations are expected to take 3-6 months and SIP development is expected to take 3-9 months. (Note: The expected timeframe from kickoff to concept design phase will vary based on the size and complexity of the study area.) During this time potential catalyst/early action projects may be identified and concept plans may be developed for these projects. PWD is actively working to secure stakeholder/partner commitments with these initial geographic areas.

As described in the IAMP, PWD has identified a variety of approaches for implementing SMEDs. Most of these projects will fall into one of the following categories; neighborhood/district planning, gateway and corridor planning, transit oriented development, commercial corridors, and waterfront planning. PWD will be looking to complete a variety of these project types during the first five years. Consultant teams will work to identify an opportunities matrix for each project area they are assigned regardless of the type.

b. The section on Green Parking Lots mentions that the City is considering Zoning Code changes to facilitate the implementation of green practices at parking facilities. One might expect that this would be further explained in Chapter 4/Streamlining, but that Chapter does not contain significant additional detail about this proposal. Please provide a response detailing the specific Zoning Code changes that PWD believes would be important for facilitating the implementation of green parking lots.

Response:

PWD has already made the necessary changes. The new zoning code that takes effect on August 22, 2012 includes changes suggested by PWD that should assist the facilitation of green parking lots. One of these changes relates to motor vehicle parking ratios in that, within certain commercially-zoned areas, parking ratios decrease as square footage increases. This is a reduction of required parking spaces from the previous code, which makes available more development area to dedicate to greening measures. The new zoning code now requires that structured parking lots and garages must follow parking landscape and screening guidelines, which includes a 5-foot wide vegetated buffer perimeter screen from public streets. Additionally, landscaping guidelines for both perimeter and interior buffers now states that “required perimeter and interior landscaped areas shall maximize

effective stormwater management by incorporating: a bioretention system, curb cuts around planted areas, or lower grade planted areas." Finally, the new zoning code includes a requirement that all surface lots providing more than 20 spaces beyond the minimum off-street parking requirement must use pervious paving materials that meet PWD standards.

8. **Section 3.1.2.2 states that the City is developing a Green Streets Design Manual ("Manual"), scheduled to be completed in 2012. DEP requests that PWD agree to provide a copy of the Manual to DEP when it is complete.**

Response:

The Green Streets Design Manual is planned for completion in the winter of 2012 – 2013. Upon completion PWD will share a copy with the PADEP.

9. **Section 3.1.2.4 suggests that Philadelphia Department of Parks and Recreation (PPR) has traditionally had the lead role in the establishment and maintenance of City-owned and City-maintained trees. Further, it suggests that PWD is now seeking to increase its role as a partner to PPR, as well as to other City agencies that plant trees, specifically for trees that are planted in stormwater management structures. We suggest that the City and DEP should plan a meeting at a mutually convenient time to discuss this issue in depth. We are seeking to better understand issues such as the following:**

Response:

PWD would welcome the opportunity to host the PADEP and representatives from Philadelphia Parks & Recreation (PP&R) to discuss any remaining questions.

   a. **How are existing City-owned trees categorized, assessed, tracked, and maintained.**

Response:

Historically, PP&R has maintained a database of trees planted and removed dating back to 2001. Upon completion of the PlanIT tracking system, PWD plans to upload the PP&R tree data to the system and to develop a regular interval at which this information will be updated. Each street tree planting request received by PP&R is reviewed by a certified arborist for site placement, pit size and species. Assessments are performed on a block by block basis, triggered by a request from a citizen or observation by the arborist. Planting, pruning and removals are completed by PP&R contractors, while emergency street tree removals and pruning, as well as maintenance of park trees, is done by PP&R Urban Forestry staff.

For trees serving a stormwater management function planted within an SMP, PWD and PP&R will jointly develop standard operating procedures for maintenance and defining roles and responsibilities.

b. Are traditional City policies and programs for planting and maintenance of trees being changed as a result of the Green City Clean Waters Program implementation or to reflect current state knowledge and current City priorities?

Response:

Prior to the Green City, Clean Waters program the City of Philadelphia ramped up its commitment to tree planting. Through the Greenworks program, the City committed to increasing the tree canopy city wide to 30% from the current 20%. Programs have been developed to achieve this goal, and policies have been adapted to make the tree planting efforts more efficient. Additionally, PWD and PP&R are coordinating to align street tree placement and replacement with green street priorities to leverage opportunities and to also avoid duplication of efforts.

As previously noted, historically the maintenance of street trees was within the purview of PP&R. As PP&R and PWD move forward in jointly planting street trees that serve in a stormwater management capacity, maintenance policies will be developed. At present, PWD is maintaining stormwater trees to support tree health (including watering, filing of 'treegators' during drought, pruning when necessary, etc).

c. Under what conditions might tree replacement at existing sites be done so as to allow retrofitting the site for better stormwater capture?

Response:

PP&R has instituted a policy of replacing each tree removed (unless the property owner states that they opt-out of the replacement). At the time the tree is removed, the arborist confirms that a tree can be replanted in the pit, any alterations to the pit size or design, and species change if needed. PP&R and PWD are currently coordinating efforts to evaluate the potential for retrofitting standard tree pits with stormwater pits.

d. What are the key factors that influence the City's decision-making about what kind of tree pit or tree trench design is appropriate for a particular site?

Response:

Tree pit size is determined by the site, primarily the width of the sidewalk. PP&R and PWD are jointly evaluating candidate sites for their potential for stormwater tree pit/trench designs.

e. How will life cycle issues be handled for trees that are installed in stormwater management structures? This question is basically to ask how trees will be replaced, considering that some will die while still small and other only after achieving a very large size.

Response:

Currently, the trees are under a warranty period for 1 year when they are planted under a construction contract. PP&R has instituted a policy of replacing each tree removed (unless the property owner states that they opt-out of the replacement). Once planted, or replanted, the roles and responsibilities of tree maintenance will be further developed with the development of the SOPs and protocols through development of the GSI maintenance manual. Tree maintenance costs will be tracked via the maintenance contracts in relation to the maintenance and care of trees planted in SMPs. PWD will work with PP&R to estimate costs for tree removal and replacement (as this role is fulfilled by PP&R).

10. **Tables 3-8 and 3-9 present lists of projects planned for the early years of implementation; however, they do not provide any specifics about those projects, and it is difficult to tell anything about the nature of most of these items, using only the "project name." DEP requests that PWD briefly explain whether the projects in these tables relate to any of the previously described initiatives or programs, and how they relate. We are not necessarily requesting a project-by-project explanation of every item in both lists, but a generalized explanation, which we presume will account for a majority of the projects listed. We expect this explanation to help us understand the nature of the projects listed, and also how much each of the strategic initiatives is contributing towards getting projects into the implementation queue.**

Response:

Table 3-8 includes projects anticipated for construction within the coming year. Table 3-9 includes a broader list of projects that PWD will continue to add to, but could be constructed at some point within the 5-year implementation planning window.

PWD will keep an active queue of projects updated on a daily basis (tracked within the PlanIT system). As projects are vetted and deemed good candidates for implementation, they will be transitioned into the GreenIT system. Within each annual report, beginning with September 2012, PWD will provide a snapshot list of projects for the year ahead. While this list will not be a complete list of projects for the year ahead, it will provide a glimpse into the queue of projects that PWD is working on.

When sharing information about projects for a given year, PWD will provide a project name, the watershed that the project will be located within and the associated GSI program type (whether the project is on a street, school, park, vacant land, etc).

11. **Table 3-9 presents a list of projects that are "conceptualized" for the next few years; this list also referred to in the text as the "project queue." Please provide an expanded explanation of whether and how this list will be maintained by PWD. Will such a list become an integral part of the management of the overall Green city Clean Waters Program? If so, how often would such a list**

be updated? How would the information in this list relate to data maintained in the Green City Clean Waters Program Tracking System?

Response:

As previously described, PWD is developing an application called PlanIT that will serve as the tracking system for the project queue. This database and map viewer will be used to collect information on all potential projects in one centralized location, allowing planners to organize implementation strategies for various programs and geographic areas. All potential GSI projects will be entered into PlanIT where they will undergo initial prioritization, analysis of site characteristics, and assessment for coordination and policy needs. Once a project has been vetted and found to have suitable investment potential, it will be recommended/added to the queue of projects in GreenIT. This list will be constantly updated as additional analysis is completed, partnerships are developed and priorities shift. The idea is that only projects with an initial level of vetting would be entered into GreenIT's project queue and program tracking system.

12. **The description of the Plan Review process on page 3-35 is incomplete, because step "4. Project Close-out" only describes improvements that PWD wishes to make to the process and does not describe the current practice. Your description of proposed improvements to the process cannot be clearly understood without a description of what is currently being done. Please provide a revised Section 3.1.4.1 with additional details that address this comment.**

Response:

PWD apologizes for this oversight. When drafting this section, PWD inadvertently described enhancements to the close-out process intended for evaluation in the coming years before describing the current process.

The current close-out process is described as follows:

Project Close-out: The current Plan Review Project Close-out process consists of a final inspection of the project site and a record drawing compliance review. The final inspection is conducted once all stormwater management practices have been installed. The final inspection is held with the property owner, design engineer, and general contractor present, and consists of verifying all stormwater management practices and components are correctly installed. Any discrepancies observed must be noted and shown in a record drawing to be submitted for review. Once a record drawing is received by PWD, a compliance review proceeds to verify constructed site conditions meet the applicable Stormwater Regulation requirements.

13. **Please describe how PWD proposes to provide for the verification of newly privately-owned SMPs that will be used to meet the quantitative targets of the CSO Program. We expect that your response will include a description of when the Plan Review Process is considered complete, and of what should happen after that time to provide for the ongoing monitoring of SMPs and their**

condition. If this aspect of monitoring will be thoroughly addressed in the Comprehensive Monitoring Plan that is due December 1, 2012, then a detailed response to this part of the question is not required at this time.

Response:

The Plan Review process concludes with the close out process described above in the response to comment number 12. Upon completion of project close-out, all associated SMPs are considered verified. The maintenance phase that follows ensures on-going compliance and is described in section 5.1.2 of the IAMP.

14. **Regarding Section 3.2 ("Waterfront Disconnection"): While DEP wishes to accept PWD's claim that PADOT is committed to the ideas included under this heading, we note that DEP has seen little evidence of that commitment to date. In fact, some of the language in the IAMP makes the waterfront disconnection effort seem tentative; for example, your description of the new structure at the first segment ("CPR") is of a temporary connection ("PennDOT will…temporarily connect to a City outfall conduit below the regulation structure.") In order that DEP may be assured that PWD and PADOT are following through on this promising effort, we request that PWD provide regular updates on the progress of the Waterfront Disconnection efforts, using the Annual Reports. We request that these updates include technical details, including description and scale drawing showing the new structures and how they connect to existing structures.**

Response:

As described in Section 3.2, the disconnection of the waterfront area from the CSO system is intended to happen incrementally throughout the duration of the COA. In the past year, progress has been made through the establishment of a coordination process, tracking the numerous policy aspects involving coordination with PennDOT on the multi-phased I-95 project. Emphasis to date has been on cost-share arrangements between PennDOT and PWD and collaborative planning for the construction of new separate sewer pipes upsized to manage the stormwater needs of all development between I-95 and the Delaware, in addition to the runoff from the highway itself.

PWD and PennDOT have agreed that all phases of the I-95 reconstruction project will include new separate sewer pipes sized to manage not only the runoff from the new and existing impervious surface of I-95, but also runoff from the parcels located between I-95 and the Delaware River. In some cases, condensed construction timelines have forced PennDOT to connect its runoff temporarily to a City outfall conduit below the regulating structure until new separate sewer pipes are constructed. For instance, in the CPR and GIR sections, I-95 runoff during construction phases GR1, GR2, CP1 and CP2 was connected below the regulating structure. However, in phases GR3 and GR4 (construction of which is estimated to begin in 2013), the new upsized separate sewer pipes will be constructed and the runoff from I-95 will thus be permanently connected to the new pipes.

PennDOT is in the process of developing plans and details for the new separate sewer pipes and outfall locations as part of their submittals for GR3 and GR4.

Future Annual Reports will provide progress updates on coordination with PennDOT and other agencies and a description of physical changes to PWD's infrastructure or drainage areas.

15. **Regarding Section 3.3 "Interceptor Rehabilitation Program Commitments," DEP has two questions at this time:**

    a. **What test(s) or inspection protocol does PWD use to prove successful completion of an interceptor rehabilitation project and release a contractor from his obligations?**

    Response:
    PWD provides 100% inspection of all of the Contractor's work under these contracts, including installations of sewer liners, manhole lining, new sealed manhole frames and covers etc. PWD Construction also reviews the Contractor's post-lining CCTV video inspections by computer, or physical entry as necessary, to ensure that the liner was installed correctly. Any issues with the liner would be corrected prior to issuing any payment on that work. The Construction Engineer is looking for anomalies, defects, infiltration, etc. If any are found, they are addressed and repaired to our satisfaction prior to any payment being made. PWD also performs destructive testing on samples of the liner at our Labs. Any abnormalities are addressed by Construction and resolved prior to any payment. There is also a 1 year guarantee that any defects or issues occurring within one year of the work will be repaired and paid for by the Contractor to our satisfaction.

    b. **Does PWD propose to conduct any test of investigation that may be capable of documenting the benefits of interceptor lining, as those benefits are described on page 3-41 of the IAMP?**

    Response:
    No, interceptor relining is conducted as part of the on-going maintenance of the system. The associated benefits will not be quantified for the COA.

16. **Regarding Section 4.2.4 Policy Priorities/Green Streets (and in consideration of Section 4.3.2, Table 4-2, Table 4-24, and Section 4.3.3.2): Several initiatives relating to Green Streets are proposed in the IAMP, including interagency coordination and technical standards. DEP requests additional information about these programs. We request a detailed response explaining the following:**

a. Status of negotiation or agreement between PWD and Philadelphia Streets Department on capital projects planning and maintenance responsibilities.

Response:

Through the Green Streets Manual development process, a working group including PWD, the Streets Department, PennDOT, and several major utility companies has formed to identify standard green infrastructure designs, as well as policies and procedures needed to implement them. These policies and procedures will cover all aspects of Green Streets implementation, from project identification and capital projects alignment, to cost share, project maintenance and infrastructure replacement. Decisions by the working group will ultimately be codified in the Green Streets Manual and in additional supporting documents.

b. Status of the proposed Green Streets Manual and a schedule for its completion and adoption by the agencies that will need to use it.

Response:

The Green Streets Design Manual is on track for completion by the winter of 2012-2013. To date, efforts have focused on selection and refinement of standard designs and development of design details jointly by PWD and the Philadelphia Streets Department, with additional feedback from PennDOT and the Mayor's Office of Transportation and Utilities. Status updates regarding completion of the manual and adoption by City Agencies will be provided in Annual Reports beginning in September, 2012.

c. Please explain whether there are unique issues that may require PWD to coordinate with PADOT, separate from those issues involving Philadelphia Streets Department, for the promotion of GSI? Such issues would include the elimination of conflicts that may currently exist in PADOT policies or procedures.

Response:

The working group formed through the Green Streets Manual development process, which includes representatives from PWD, the Philadelphia Streets Department, PennDOT, and several major utility companies, is charged with developing a policy framework to address all aspects of implementing a green street, from capital projects alignment, to project maintenance and replacement. Occasionally, unique solutions are needed in order to accommodate specific agency interests. However, the ultimate goal of the working group and of the Green Streets Manual is to develop a straightforward and consistent set of policies that can be easily implemented regardless of project location. Additionally, the working group structure helps to streamline communication and coordination among the agencies.

17. Regarding Section 4.2.4 Policy Priorities/Stormwater Regulations and Credits Program;

a. Please provide an update on the effort to collaborate with Department of Licenses and Inspections ("L&I") to establish a process for the provision of as-built plans for all new GSI be filed with PWD.

Response:

Currently, the tool available to PWD to ensure the submittal of as-builts is the ability to withhold stormwater credits. PWD recognizes that a more effective enforcement tool or process may be necessary to guarantee the acquisition of as-builts. PWD is evaluating the L&I MOU with the intention of suggesting revisions to strengthen enforcement tools. Progress to date has focused on brainstorming potential enforcement tools and obtaining legal opinion and advice. For information regarding PWD's relationship with L&I please refer to question 22.

b. Please provide an update on the several ways in which PWD is considering modifying the Stormwater Regulations and review process (Section 4.2.4, pages 4-4 and 4-5).

Response:

PWD will be engaging in a full review of the Stormwater Regulations in the coming months. The focus of this review will be on identification of regulatory changes to enhance Greened Acre potential from development and redevelopment projects. PWD has also initiated a Development Services Committee, which provides a forum for the regulated community to propose recommendations for changes to the PWD plan review process to streamline the process from their perspective. PWD is convening bi-monthly meetings with the Development Services Committee to evaluate suggestions.

18. Regarding Section 4.2.4 "Policy Priorities," and with respect to PWD capital investments at Parks and Schools, please provide an update on the status of agreements with Philadelphia Departments of Parks and Recreation and School District of Philadelphia, as discussed in this section.

Response:

PWD views Green 2015 as the main vehicle to achieve partnership agreements with the Philadelphia Department of Parks and Recreation (PPR) and the School District of Philadelphia (SDP). Green 2015 is a mayoral initiative between the Trust for Public Land, PWD, PPR and SDP to increase public access to park land. The collaborative nature of the initiative has provided an opportunity for PWD to engage both PPR and SDP in discussions regarding long term green stormwater infrastructure goals and the legal mechanisms needed to establish formal partnerships. Some of the key policy areas addressed to date via Green 2015 include; maintenance, funding, liability and crediting. PWD

has committed $2,000,000 to the initiative and will fund stormwater infrastructure at a fixed price per greened acre. PWD has also submitted memorandums of understanding to both PPR and SDP, which are currently under review. Green 2015 has provided PWD with the opportunity to document workflow between the agencies. These interface documents can help guide future collaboration and highlight areas where coordination could be improved. PWD foresees building upon the progress made through Green 2015 to further Green City, Clean Waters implementation goals.

19. Regarding Section 4.2.4 "Policy Priorities," and with respect to the "Recommendations for Existing City Codes and Ordinances:"

a. The statement provided here about PWD is "continuing to work with the Zoning Code Commission" is quite vague. Does PWD's have specific goals for the Zoning Code revision/ Do PWD's specific goals go beyond the changes that are listed in Section 4.3.3.3 (pages 4-29 and 4-30)? If so, please discuss the scope of PWD's goals for Zoning Code revision, and the anticipated process for implementation.

Response:

The new zoning code for Philadelphia takes effect on August 22, 2012. PWD was actively involved throughout the development of the zoning code to make sure that language supportive of stormwater management was added and/or maintained throughout the code. The changes listed in Section 4.3.3.3 have been mostly incorporated into the new code and will take effect, with only two edits. The first change is in the parking standards section, as the new code no longer contains a maximum number of parking spaces. The second change is that the stream buffer section of the code now requires the Hydrology Map to be adopted by ordinance, and restricts the map to include only water courses that contribute to drinking water sources. PWD is continuing to work with the Planning Commission to lobby for an expansion of stream buffers on more city water courses. The stream buffer and parking standards sections will be changed to read as follows:

(5) Stream Buffers: The buffer width was increased from 25 to 50 feet. The stream buffer applicability requirements are expanded to include lots located along watercourses listed on the Water Department's Hydrology Map, rather than listing individual streams. The Hydrology Map must be adopted by City Council ordinance and can only include water courses that contribute to the City's surface drinking water sources. New text prohibits "any other directly connected impervious surface," allowing for the development of riverfront trail systems and other forms of public access to Philadelphia's water resources.

§14-803 Motor Vehicle Parking Standards: New standards allow for use of pervious paving material and required use of pervious paving material if more than 20 spaces beyond the minimum off-street parking requirement are provided along with a cross-reference to the

Philadelphia Stormwater Management Guidance Manual. The new code reduces the number of required parking spaces for certain land classes, such as shopping centers. The code also requires parking lots to be included in landscape area plans, which incorporate stormwater management design.

b. This subsection ("Recommendations for Existing City Codes and Ordinances") contains fewer "priorities" than we might have expected; it mentions only the Zoning Code and the Plumbing Code. Earlier in the Chapter, Section 4.2.1 suggests that PWD Strategic Policy staff would review various codes and identify conflicts, listing a number of such ordinances that would be of interest. Please explain why Section 4.2.4 does not mention the same broad set of ordinances that are referenced in Section 4.2.1, including Philadelphia Building Code, Philadelphia Water and Sewer Code, and the State Utility Law? Has the review by PWD Strategic Policy Staff concluded that there are no other important conflicts to GSI implementation in the existing codes? If this process of review by PWD Strategic Policy staff is not yet complete, please provide a more detailed description of the process and schedule.

Response:

PWD has reviewed the Philadelphia Building Code, Plumbing Code, and Zoning Code, as well as the State Utility Code, for potential obstacles to implementing green infrastructure. The primary conclusion from this analysis is that there are few real barriers within these codes to Green City, Clean Waters implementation. Of the potential concerns that were identified, we found PWD had already encountered them in implementing pilot projects and initiated efforts to address them. For example, PWD has been working with L&I to legalize downspout disconnects per the Plumbing Code. Based on the results of this analysis, PWD has turned its attention away from seeking out potential barriers to initiating policies and procedures that will enhance, streamline and generally facilitate implementation of green stormwater infrastructure.

20. Section 4.3.3.3 tells us that in 2009 City Council passed an ordinance revising how the Board of Surveyors may approve revised curb lines. Please provide further discussion to explain if this change is sufficient to facilitate the implementation of GSI along curb lines of City streets (e.g., stormwater bumpouts). Are there any other conflicts in the Code that may also need to be addressed? If so, what are they?

Response:

Before the change in 2009, the Board of Surveyors required that all proposals requiring curb relocation obtain approval from City Council, a lengthy process often taking more than 6 months to accomplish. Bill No. 090749 provided that the Board of Surveyors could approve curb relocations without the approval of City Council if the purpose of the relocation was for pedestrian safety or

stormwater management. This change has eliminated one of the most time consuming steps in the process of permitting features such as stormwater bumpouts. To date we have not encountered any other City Code elements that act as impediments to GSI implementation. Our current focus for streamlining stormwater bumpouts is on developing collaborative projects. For example, whenever feasible, we are proposing stormwater bumpouts in locations where curb extensions are already desired, such as part of the Safe Routes to Schools Program being managed by the Streets Department, or stop consolidation projects managed by SEPTA. In these instances, the partner has often already gained approval for the bumpout location and done the necessary coordination with permitting agencies. We are also working to develop standard policies such as minimum intersection widths for emergency vehicle access, which can reduce time in both design and review.

21. **Section 4.3.2, Table 4-6 presents in summary form PWD's goals to secure the support of City of Philadelphia Council for program initiatives. DEP requests that PWD identify those specific priorities from Section 4.2.4 that would not be feasible without legislative action by City Council.**

Response:

To date, PWD's focus has been on engaging City Council members in the planning process and raising awareness of the Green City, Clean Waters program and potential for leveraging implementation opportunities. PWD has not formulated any legislative requests for City Council at this time.

22. **Section 4.3.2, Table 4-11 describes PWD priorities related to coordination with the Department of L&I. Please provide an update concerning PWD's progress in working with Department of L&I to identify, prioritize, and resolve conflicts.**

Response:

PWD and L&I have a Memorandum of Understanding (L&I MOU) which defines their relationship and respective enforcement roles. The L&I MOU assigns enforcement power to PWD to regulate stormwater management practices. PWD is delegated the power to issue a Notice of Intent to Stop Work Order when construction activities are not in accordance with approved specifications and designs. PWD can also issue Stop Work Orders if corrective action is not taken or when a site condition is actively causing pollution to a waterway or damage to an adjacent property. Additionally, PWD is able to issue a Notice of Violation under the Property Maintenance Code when inspection reveals that detention basins are not operating properly or are not maintained, and when SMPs are not constructed or maintained in accordance with the most current SMP Manual. PWD currently has a verbal agreement with L&I to withhold the Certification of Occupancy for conditionally approved projects until PWD has signed off on the stormwater features. PWD is in the process of evaluating opportunities to enhance the enforcement tools available.

PWD and L&I interact at various times between the official review of a project and the act of construction. In particular, PWD will communicate with L&I when it issues a conditional approval of

the stormwater management features for a project. PWD will contact district supervisors at L&I to ensure that they will not issue a Certificate of Occupancy prior to PWD approval. PWD also reaches out to specific L&I staff when issues arise because of zoning, plumbing or other code enforcement problems and on an ad hoc basis regarding issues found during construction inspections.

23. Section 4.3.3.3 discusses the opinion of City legal advisors concerning the use of public funds for development of GSI on private and public property. This section emphasizes the importance of establishing property interests in GSI projects funded by the City on private property, through the use of deed restrictions, easements, or other mechanism. DEP requests a response that discusses this issue in greater detail. The response should explain whether there is a particular kind of property interest that the City favors and why; and should provide an update on the City's work to develop language and an implementation plan for securing property interests.

Response:

PWD analyzed the various property interest tools suggested by the City's legal advisors and found that deed restrictions were the least complicated tool to achieve an interest in a property. PWD is piloting their use via the Stormwater Management Incentive Program (SMIP) Grant . The SMIP Grant provides financial assistance to non-residential property owners in Philadelphia to design and construct GSI on their property. Grant awardees are required to file a property deed restriction in the form of an Access, Operations and Maintenance Agreement to ensure that the stormwater infrastructure funded from the SMIP Grant shall remain in place and be properly maintained for a period of at least 45 years. PWD has developed the Access, Operations and Maintenance Agreement which secures the deed restriction and will be implementing its use with the first round of grant recipients this summer.

24. Section 5.1.1 ("Maintenance of Public Facilities") indicates that there is an existing maintenance contract for publicly-owned GSI projects. This section ought to have contained additional information about this, including the following:

a. Who is the contractor?

Response:

AKRF Consulting Firm was the lead consultant from 2008 through 2012. AKRF used David Brother's Landscape Services and Four Seasons Total Landscaping Company to perform the maintenance at the GSI projects. AKRF Consulting Firm has been re-selected as the lead consultant for the FY13 contract. They will use David Brother's Landscape Services to provide surface maintenance and Locating Logistics, LLC to perform subsurface maintenance. In addition, PWD operations crews were utilized throughout FY12 to perform maintenance at selected sites.

b. Does the contract cover every existing publicly-owned GSI project or just some of the projects?

Response:

The contract covers all of the PWD initiated publicly-owned projects. Public sites that undergo redevelopment on their own and meet the stormwater regulations are not maintained by PWD.

c. What are terms of the contract for expiration or termination?

Response:

AKRF was initially hired by the city in FY09. Due to PWD contract protocols, the contact was allowed to be amended for 3 additional years through FY12. The Contract was terminated on June 30, 2012.

The city re-issued an RFP for Fiscal Year 2013, which has been awarded to AKRF. This contract has the potential to be amended up to 3 additional years.

d. Confirm that each SMP does in fact have a maintenance plan associated with it.

Response:

The Maintenance Manual will include the development of standard protocols and procedures for various SMP types that can then be applied specifically to a site or an SMP. Therefore, while each SMP type will have defined standard operating procedures, individual maintenance plans will not be developed per SMP.

The Green Infrastructure Maintenance Manual Development Process Plan does reference the current maintenance tasks and outlines the steps that will be taken to properly maintain SMPs. For reference to the current and future tasks, this document will provide insight into the maintenance program.

25. Section 5.1.2 ("Maintenance of Private Facilities") is unspecific and contains several conditional statements. DEP looks forward to reviewing future deliverables in which this subject will be described in more detail and with more clarity and assurance. Until that time, we urge the City to keep records of all inspection, maintenance, and replacement activities for all privately owned SMPs. We also urge the City to require timely maintenance or replacement in any cases where there is an indication of SMP failure.

Response:

The City has multiple tools at its disposal to address stormwater management practices that are not being maintained by private property owners. For properties that have entered into an Operation and Maintenance Agreement with the City, PWD can inspect the stormwater infrastructure, notify

the owner of deficiencies, repair the deficiencies on the property, bill back any work performed and place a lien on the property for the outstanding monies. PWD can also issue a Notice of Violation under the Property Maintenance Code when stormwater management practices are not maintained in accordance with the most current SMP Manual. L&I can levy fines against nonresponsive property owners. For property owners that participate in the stormwater credit program, PWD can withhold credits until corrective action is taken.

26. **Section 6.2 ("Sewer System Monitoring") contains a general list of the types of locations where long-term flow or water level monitoring is conducted by PWD. DEP requests that the Comprehensive Monitoring Plan (due December 1, 2012) include a specific list of these sites.**

    Response:

    The Comprehensive Monitoring Plan will include a list of locations where long-term flow or water level monitoring is conducted.

27. **Section 6.9 ("Inflow and Infiltration Reduction") proposes two deliverables that have not yet been identified specifically in the administrative record for this project: a report following completion of Phase 2 of the SSES, to be completed by June 1, 2014, and a report on Outlying Communities flows, to be completed by June 1, 2015. DEP hereby accepts this proposal. In addition, we request that Annual Reports that are due in September 2012 and September 2013 should each include a section that provides an interim report on the progress and status of the Inflow and Infiltration Reduction project.**

    Response:

    PWD will provide updates on progress toward completion of the SSES in annual reporting beginning with September, 2012.

Response to DEP IAMP Comments – Appendix A
Office of Watersheds - PWD
July, 2012

Subject: **PWD Stormwater Management Practice and System Data Collection and Tracking**

This appendix describes the characteristics collected from project plans and files for measuring, tracking and calculating stormwater management practice and system storage volumes.

Metric tracking is completed when SMP designs are complete – details and plans of the stormwater management practices and systems are evaluated to measure characteristics that determine a SMPs capability to store and manage runoff.

The values for the metrics described in Table 1 are collected from each stormwater management practices' plans and details, if applicable to the SMP type. These characteristics provide the information necessary to determine runoff storage volumes and ultimately greened acres.

Table 1 – SMP and System metrics and characteristics for determining runoff storage volumes.

Metric/Characteristic	Description
SMP Type	Type of SMP (Tree Trench, Rain Garden, Planter, Bump out, Infiltration/Storage Trench, Pervious Paving, Wetland, Cistern / Rain Barrel, Green Roof, Swale, Basin, Disconnection (impervious to pervious), Stormwater Tree)
New Vegetated Area	The New Vegetated Area is the total area planted with vegetation, exclusive of tree pits.
New Pervious Area	The New Pervious Area is the total area of the pervious surface of the SMP installed, inclusive of tree pits inside of systems.
Primary Storage Type	The Primary Storage Type is the type of material or structure used.
Primary Storage Type Depth	The Primary Storage Type Depth is the depth of the storage medium/type.
SMP Trees	SMP Trees is the number of new trees planted within or immediately adjacent to the SMP.
Ponding Depth	The maximum depth of free surface water in surface systems, taken as the finished soil grade to the overflow or discharge point.
Pre-Treatment	Pre-Treatment refers to the type of method used to screen particles before entering green infrastructure.
SMP Foot Print	SMP Foot Print is the area of the SMP.
Infiltration Test Type	The Infiltration Test Type refers to the method used to test the infiltration rate at the project location.
Infiltration Test Rate	The Infiltration Test Rate represents the final adjusted infiltration rate from the infiltration test.
Depth to Groundwater	The Depth to Groundwater is the depth to the groundwater table measured from the surface.
Depth to Bedrock	The Depth to Bedrock is the depth to the bedrock measured from the surface.

Metric/Characteristic	Description
Total Contributing Drainage Area	The Total Contributing Drainage Area is the impervious and pervious drainage areas flowing into the system
Connected Impervious Area	The Connected Impervious Area is an impervious or impermeable surface, which has a direct connection to the stormwater management system.
Disconnected Area	The Disconnected Area is the impervious surface that drains to pervious surfaces (according to the definition in the Philadelphia Stormwater Management Guidelines) and does not connect to the sewer drainage system.
Infiltration Depth Head	The Infiltration Depth Head is the depth of water from the bottom of the infiltration storage capacity (the point at which the constructed storage ends and native soil begins), inclusive of all potential storage media, including but not limited to gravel, soil, sand, and free surface water depths. This does not include depth above slow release orifices, overflow weirs, or other storage capacity limiting discharge points.
Orifice Diameter	The Orifice Diameter is the size of the orifice used to regulate the flow back to the sewer system.
Underdrain	An Underdrain is a perforated pipe placed within a system for the purpose of slow releasing or draining stormwater back to the sewer.
Infiltration Foot Print Area	The Infiltration Foot Print Area is the area occupied where infiltration will occur.
Storage Foot Print	The Storage Foot Print is the area occupied by the physical storage volume of the SMP.
Storage Volume	The Storage Volume is the volume of runoff storage created by the system.
Contributing Pervious Area	The Contributing Pervious Area is the drainage area to the system from pervious surfaces.
Peak Release Rate	The Peak Release Rate is the rate at which the storage volume of rainfall is released from a given control type in CFS. Calculated from Slow Release Hydaulic Head and Orifice Diameter.
Slow Release Hydraulic Head	The Slow Release Hydraulic Head is the depth of water from the bottom of the orifice to the overflow weir or discharge point, inclusive of all potential storage media, including but not limited to gravel, soil, sand and free surface water depths. This does not include depths of water below the orifice for either infiltration or pipe bedding.
Storm Size Managed	The Storm Size Managed is the static depth of runoff managed by the system (not based on storage depths). This value is calculated from storage volume and drainage area.
Loading Ratio Total Drainage Area	The Loading Ratio Total Drainage Area is the relation of the total contributing drainage area to the infiltration footprint.
Loading Ratio Connected Impervious Area	The Loading Ratio Connected Impervious Area is the relation of the connected impervious area to the infiltration footprint.