PHILADELPHIA'S WET WEATHER MANAGEMENT PROGRAMS

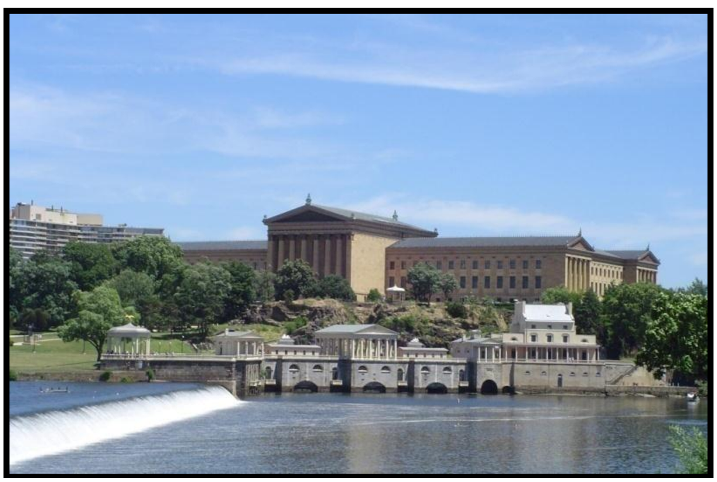
COMBINED SEWER MANAGEMENT PROGRAM ANNUAL REPORT

National Pollutant Discharge Elimination System (NPDES) Permits
Nos. PA0026689, PA0026662, PA0026671

STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

National Pollutant Discharge Elimination System (NPDES) Permit
No. PA 0054712

Reporting Period July 1st 2013 to June 30th 2014



Submitted to:

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Water Quality Management

And

ENVIRONMENTAL PROTECTION AGENCY – REGION III
Water Protection Division

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List of Abbreviations

AMD	Acid Mine Drainages
BCWSA	Bucks County Water & Sewer Authority
BFE	Base Flood Elevation
BLS	Bureau of Laboratory Services
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CAP	Credit Administration Program
CCD	Center City District
CCHL	Cobbs Creek High Level
CCR	Comprehensive Characterization Report
CCTV	Closed Circuit Television
CIP	Capital Improvement Project
CMP	Comprehensive Monitoring Plan
COA	Consent Order and Agreement
CPUE	Catch-Per-Unit Effort
CSO	Combined Sewer Overflow
CSPS	Central Schuylkill Pump Station
CVN	Code Violation Notice
DELCORA	Delaware County Regional Water Quality Control Authority
DMR	Discharge Monitoring Report
DRBC	Delaware River Basin Commission
DWO	Dry Weather Pipe
E&S	Erosion and Sedimentation
ECHO	Enforcement and Compliance History Online
EWS	Early Warning System
FPC	Fairmount Park Commission
FGM	Fluvial Geomorphology
FWW	Fairmount Water Works
FY	Fiscal year
GIS	Geographic Information System
GSI	Green Stormwater Infrastructure
H&H	Hydrology and Hydraulic
HHW	Household Hazardous Waste
HSI	Habitat Suitability Index
I/I	Inflow/Infiltration
ICE	Instream Comprehensive Evaluation
ICIS	Integrated Compliance Information System
ILF	In-lieu Fee
IPM	Integrated Pest Management
IWMP	Integrated Watershed Management Plan
IWU	Industrial Waste Unit
L&I	Licenses and Inspections
LID	Low Impact Development
LSWS	Lower Schuylkill West Side

LTCP	Long Term Control Plan
LTCPU	Long Term Control Plan Update
MGD	Million Gallons per Day
MRP	Modified Regulator Plan
MS4	Municipal Separate Storm Sewer System
NE	Northeast
NEDD	Northeast Drainage District
NHL	National Hockey League
NMCs	Nine Minimum Controls
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSCD	Natural Stream Channel Design
O&M	Operations and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PAR	Photosynthetic Active Radiation
PCB	Polychlorinated Biphenyl
PCPC	Philadelphia City Planning Commission
PCSMP	Post Construction Stormwater Management Plan
PEC	Pennsylvania Environmental Council
PennDOT	Pennsylvania Department of Transportation
PESD	Planning and Environmental Services Division
PFD	Philadelphia Fire Department
PHL	Philadelphia International Airport
PHS	Pennsylvania Horticulture Society
PIDC	Philadelphia Industrial Development Corporation
PLEPC	Philadelphia Local emergency Planning Committee
PMBC	Philadelphia More Beautiful Committee
PMP	Pollutant Minimization Plan
POTW	Publicly Owned Treatment Works
PPR	Philadelphia Department of Parks and Recreations
PWD	Philadelphia Water Department
Q&A	Question and Answer
QA/QC	Quality Assurance/Quality Control
RBP	Rapid Bioassessment Protocol
RCP	River Conservation Plan
RTC	Real Time Control
SAN	Schuylkill Action Network
SAP	Sewer Assessment Program
SARA	Superfund Amendments and Reauthorization Act
SEPTA	Southeastern Pennsylvania Transportation Authority
SFR	Storm Flood Relief
SHC	System Hydraulic Characterization
SIU	Significant Industrial User
SMP	Stormwater Management Program
SOP	Standard Operating Protocol
SPILL	Sewage Pollution Incident and Location Log

SS	Sanitary Sewer
SSO	Sanitary Sewer Overflow
SW	Southwest
SWDD	Southwest Drainage District
SWEEP	Streets and Walkways Education and Enforcement Program
SWMM	Stormwater Management Model
SYTF	Scrap Yard Task Force
TBD	To Be Decided
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
TTF	Tookany/Tacony-Frankford
UCD	University City District
USACE	United States Army Corps Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Services
USGS	United States Geologic Survey
WMR	Watershed Mitigation Registry
WPAC	Watershed Planning Advisory Committee
WPCP	Water Pollution Control Plant
WQ	Water Quality
WRB	Water Revenue Bureau
WRT	Waterways Restoration Team

Compliance Checklist

The Compliance Checklist is attached in a separate document, outside the main report in the front left pocket of report binder for the Department's and EPA's convenience to review the annual report alongside NPDES permit requirements.

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COMBINED SEWER MANAGEMENT PROGRAM ANNUAL REPORT

I Management and Control of CSOs

This report is submitted pursuant to meeting the requirements of NPDES Permits #'s PA0026662, PA0026671, and PA0026689; PART C, I. OTHER REQUIREMENTS, Combined Sewer Overflows (CSOs), III. IMPLEMENTATION OF THE LONG TERM CSO CONTROL PLAN, C. Watershed-Based Management, IV. Monitoring and Assessment. This section requires that the permittee submit an Annual CSO Status Report. The purpose of this report is to document the status and changes made to programs implemented by the Philadelphia Water Department (PWD), during the time period of July 1st, 2013 through June 30th, 2014, to manage and reduce the combined sewer overflows (CSOs) permitted to discharge to waters of the Commonwealth of Pennsylvania.

II Implementation of the Nine Minimum Controls

In the first phase of PWD's CSO strategy, and in accordance with its NPDES permits, the PWD submitted to the Department on September 27, 1995, "CSO Documentation: Implementation of Nine Minimum Controls". PWD submitted an Updated Nine Minimum Control Report to the Department on June 1, 2013 to supplement the 1995 report and describe current activities as a result of new technology or practices. The nine minimum controls (NMCs) are low-cost actions or measures that can reduce CSO discharges and their effect on receiving waters, do not require significant engineering studies or major construction, and can be implemented in a relatively short time frame.

II.A Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs (NMC 1)

II.A.1 Implement a Comprehensive Geographic Information System (GIS) of the City sewer system

In 2005, PWD completed a data conversion project that resulted in the creation of GIS coverages for all of the City's water, sewer, and high pressure fire infrastructure. In FY 2014, PWD continues to maintain this comprehensive GIS coverage of the City's sewer system. To ensure PWD's investment in GIS is as accurate and up to date as possible, edits and improvements are made to data on a daily basis. PWD utilizes the GIS coverages as the foundation for many of their operations including maintenance management, capital improvements, and hydraulic modeling. The development and progress of GIS coverage of the City's sewer system has been discussed in full detail in previous reports. For additional information on the implementation that was started in

2005, please refer to **SECTION II.A.1 IMPLEMENT A COMPREHENSIVE GIS OF THE CITY SEWER SYSTEM** on page 5 of the CSO-Stormwater FY 2008 Annual Report.

During FY 2014, new GIS layers have been designed and created for Green Infrastructure and Ecological Restoration assets. These layers will be maintained and leveraged in the same way as the traditional infrastructure. In particular, they will be instrumental in the maintenance and reporting for these assets and will integrate into our GIS-based work order management system.

II.A.2 Implement a Comprehensive Sewer Assessment Program (SAP)

PWD finished development and initiated a sewer assessment program (SAP) by March of 2006. Additional information on the program's development progress and goals have been provided in previous reports; please refer to **SECTION II.A.2 IMPLEMENT A COMPREHENSIVE SEWER ASSESSMENT PROGRAM (SAP)** on page 6 of the CSO-Stormwater FY 2008 Annual Report.

PWD continues to implement a comprehensive SAP to provide inspection and maintenance of the collection system using closed circuit television (CCTV). The SAP is used to guide the capital improvement program to ensure that the existing sewer systems are adequately maintained, rehabilitated, and reconstructed. The SAP is mainly conducted through PWD's Collector Systems Unit, although many other PWD units such as design and construction make requests to have CCTV inspections conducted on their projects before, during and after their project have been completed.

For the period of July 2013 – June 2014, the Collector Systems division inspected over 38.28 miles in length of sewer via CCTV, averaging about 3.19 miles a month as shown in **TABLE II.A.2-1 MONTHLY TV INSPECTIONS**.

In addition, PWD's Green Stormwater Infrastructure (GSI) Maintenance Unit and its contractors conduct pre and post construction CCTV inspections at necessary sites. During FY2014, nearly 55,000 linear feet of pipe was inspected in GSI project areas located throughout the City.

Table II.A.2-1 Monthly TV Inspections

Date	Collector Systems (Miles Inspected)	Green Stormwater Infrastructure (Linear Ft Inspected)
Jul-13	3.75	474
Aug-13	4.52	-
Sep-13	3.37	8,560
Oct-13	3.45	5,789
Nov-13	2.89	6,781
Dec-13	1.91	3,152
Jan-14	2.04	2,278
Feb-14	1.90	-
Mar-14	3.97	7,349
Apr-14	3.94	9,539
May-14	3.04	10,202
Jun-14	3..49	710
Average	**3.19**	**4,569.5**
Total	**38.28**	**54,834**

II.B Maximum Use of the Collection System for Storage (NMC 2)

II.B.1 Continue to Institutionalize a Comprehensive Monitoring and Modeling Program

II.B.1.1 Monitoring

PWD continues to maintain an extensive monitoring network throughout the combined sewer system including rain gages, pump stations and connections from adjacent outlying communities. Information on the monitoring network with the listing of the monitors, rain gages, and pumping stations can be found in **APPENDIX A - FLOW MONITORING**.

PWD submitted the Comprehensive Monitoring Plan (CMP) to the Department on December 1, 2012 which describes the strategy for performance monitoring of natural and engineered systems associated with PWD's updated long term CSO control program (referred to as the *Green City, Clean Waters* Program) and addresses the monitoring and assessment of surface waters, groundwater, rainfall, CSO discharges, sewer flows, and green infrastructure performance. A revised CMP was submitted on January 10, 2014 and approved on May 28, 2014 by PADEP. For a copy of the most recent version of the Comprehensive Monitoring Plan, please refer to the following link: http://www.phillywatersheds.org/doc/Revised_CMP_1_10_2014_Finalv2.pdf

II.B.1.2 Modeling

PWD will continue to update the EPA SWMM 5 models as needed to ensure they can best depict existing sewer system conditions.

II.B.2 Continue to Operate and Maintain a Network of Permanent and Temporary Flow Monitoring Equipment

PWD continues to maintain a CSO Permanent Monitoring network and temporary monitoring programs to support planning for CSO control projects and to minimize dry weather overflows and tidal inflows.

II.B.2.1 Permanent Flow Monitoring Program

PWD uses a network of permanent flow monitors that are connected to a newer data acquisition system (TELOG) which uses cellular-based telemetry and improved enterprise data management software. The implementation of this TELOG System initiated in FY 2008 has been described in detail in previous reports; please refer to page 18 of the CSO-Stormwater FY 2012 Annual Report for a description of the implementation. As of FY 2014, the Collector System Monitoring Network is connected to over 320 sites at various locations including CSO Regulators, Rain Gauges, Pump Stations, Interceptors, Chemical Feed Tanks and Hydraulic Control Points which collect over 720 individual measurements with over an eighty percent operational status. All monitoring devices deployed throughout the PWD collector system continually store data and periodically communicate monitoring information back to the Collector Systems Headquarters for review and use by staff. The listing of permanent flow monitors can be found in **APPENDIX A – FLOW MONITORING.**

II.B.2.2 Temporary Flow Monitoring Program

PWD maintains its temporary flow-monitoring program, initiated in July 1999, which consists of deploying portable flow meters throughout targeted Philadelphia sewershed areas to quantify wastewater flow through sanitary sewers and characterize the tributary sewersheds. During FY 2014, PWD monitored 133 sites for the purposes of model calibration, I/I identification and design support. In addition, PWD added temporary meters to monitor two green infrastructure sites during 2014 to supplement the standard monitoring conducted by the GSI Monitoring Group. For more information on the progress conducted by the GSI Monitoring Group, please refer to page 30 in the **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT**. The listing of all temporary flow monitors, their location, and the deployment projects can be found in **APPENDIX A – FLOW MONITORING: TABLE 6 - LISTING OF ALL TEMPORARY FLOW MONITORS DEPLOYED BY PROJECTS**. Additional details on the temporary flow-monitoring program have been discussed in the previous reports; please refer to **SECTION II.B.2.2 TEMPORARY FLOW MONITORING PROGRAM** on page 18 of the CSO-Stormwater FY 2012 Annual Report.

II.B.3 Continue to Evaluate the Collection System to Ensure Adequate Transport Capacity for Dry and Wet Weather Flow

II.B.3.1 Long Term Control Plan Update

System-wide hydrologic and hydraulic models have been developed in support of the Long Term CSO Control Plan Update (LTCPU). Model evaluations have been performed to evaluate the system performance benefits of various system improvement scenarios.

The evaluations of the system-wide models were completed in FY 2008. For additional information on this assessment, please refer to **SECTION II.B.3 LONG TERM CONTROL PLAN UPDATE** on page 20 of the CSO-Stormwater FY 2008 Annual Report.

II.B.3.2 PC-30 Extreme Wet Weather Overflow

PWD continues to monitor and conduct modeling analysis for PC-30 as needed. During 2014, PWD conducted additional modeling analysis for PC-30 following two extreme weather events. For additional information on other efforts conducted for this site, please refer to **SECTION III.B.2.1.1 PC-30 RELIEF SEWER** on page 58.

II.B.3.3 Storm Flood Relief

Flooding is an on-going concern for PWD, as intense rain storms can result in riverine, street and surface flooding, basement backups, and property damage. PWD has initiated a comprehensive flooding and sewer overflow mitigation program to analyze and reduce property damage from flooding and basement backups. Aspects of this program include sewer system inspection and maintenance, property data collection, implementing individual property solutions when appropriate, and conducting sewer system hydraulic and hydrologic analysis to predict flooding-prone areas. These individual efforts have been discussed in detail in previous reports; please refer to **SECTION II.B.3.3 STORM FLOOD RELIEF** on pages 21-26 of the FY 2010 CSO-Stormwater Annual Report for more information.

<u>Flood Relief Project Summary</u>

PWD is either developing or implementing storm flood relief (SFR) mitigation solutions for 3 major sections of the city: South Philadelphia, Northern Liberties and Germantown. These sewer system projects will improve the conveyance of stormwater from intense rain events more efficiently, and ultimately reduce the potential for flooding. The hydraulic model indicates that sewer system improvements or source reduction can greatly reduce the frequency and severity of flooding events, but may not be able to handle all possible rain events. PWD will continue to refine the mitigation solutions in order to optimize each project while minimizing disruption to the community during construction.

Throughout FY 2014, approximately 70 monitors were installed around the City to capture typical wastewater flow conditions. Many of these locations were chosen to ensure that the hydraulic models in targeted SFR planning areas reflect actual sewer system conditions, including peak or extreme conditions.

In addition, PWD continues the Basement Protection Program, which involves the installation of backwater valves in homes that request and are approved for them. During FY 2014, 49 backwater valves were installed for a total cost of $180,000. To date, PWD has retrofitted 468 properties.

South Philadelphia

PWD previously completed two SFR projects in South Philadelphia, one on Porter St in 2010 and another on Snyder Ave in 2007. During FY 2014, the Moore Street project continued to refine the final design plan and design plans continued on the Weccacoe Avenue and Snyder Avenue Phase 2 projects. Also during FY 2014, PWD conducted a tunnel feasibility study to evaluate cost estimates, neighborhood impact and general feasibility of tunnels options. PWD has been modeling with possible tunnel sizes in order to evaluate their inclusion in the overall project area. Once this process is complete, the tunnel will be able to be included in the final flooding improvement options. The following table (**TABLE II.B.3.3-1**) outlines a status of the current South Philadelphia SFR projects that are being evaluated.

Table II.B.3.3-1 South Philadelphia SFR Sewer Improvement Projects

Project Name	Location	Construction Estimate	Project Status
Snyder Avenue – Phase 1	Snyder Ave	$5.4 million Final	Construction Complete
Porter Street	Porter, 10th to Broad	$3.5 million Final	Construction Complete
Moore Street	Moore St. ROW, Christopher Columbus Blvd. to Delaware River	$5 million	Design 90% complete
Weccacoe Avenue	Weccacoe Avenue, Wolf Street and Oregon Avenue	$13 million	Design Started
Snyder Avenue – Phase 2	Snyder Ave from Front to 4th	$15 million	Design Started

Northern Liberties

PWD continues to move forward with the SFR sewer designs for Northern Liberties which also impact combined sewer neighborhoods in Fishtown, Port Richmond and Lower Kensington. Phase One was completed in August of 2010. Construction started for phases Two, Three and Four in February of 2014. **TABLE II.B.3.3-1** demonstrates the status of the current Northern SFR projects that are being proposed.

Table II.B.3.3-2 Northern Liberties SFR Sewer Improvement Projects

Project Name	Location	Anticipated Construction Start	Project Status
Northern Liberties Phase 1	Delaware Avenue and Laurel Street	April 2010	Construction Complete
Northern Liberties Phase 2	Canal Street Chamber	February 2014	Under Construction
Northern Liberties Phase 3	Delaware Ave to River (Undertaken by SugarHouse)	February 2014	Under Construction
Northern Liberties Phase 4	Canal & Laurel Sts. to Germantown Ave. &Wildey St.	February 2014	Under Construction
Northern Liberties Phase 5	Germantown Ave. from Wildey St. to Girard Ave.	TBD	Design Complete
Northern Liberties Phase 6	Germantown Ave. & Thompson St. to Master & Randolph Sts.	TBD	Design 90% Complete

Germantown

PWD is modeling the East Germantown section of the City, which was impacted by flooding from intense rainstorms, such as Hurricane Irene (8/27/11) and Tropical Storm Lee (9/7/11). The U.S. Army Corps of Engineers (USACE) reviewed the modeling assumptions for the PWD's H&H model for preliminary trunk analysis and validated invert elevations. The model was expanded for greater accuracy and many preliminary solution options are currently under review and planning. During FY 2014, PWD, in conjunction with the Streets Department installed "Road May Flood" signage at intersections vulnerable to street flooding. Twenty-two (22) intersections were identified for potential signage locations based on their flooding potential during five-year and ten-year storm events. PWD is reviewing the locations where signs were installed to make sure they are accurately placed.

II.B.4 Fully Integrate the Real-Time Control Facility into the Operations of PWD

The construction of the Collector System Real Time Control (RTC) Center building was completed in the summer of 2003. The RTC Center became operational in September 2006. For full details on the development and features of this facility, please refer to **SECTION II.B.4 FULLY INTEGRATE THE REAL-TIME CONTROL FACILITY INTO THE OPERATIONS OF PWD** on page 22 of the CSO-Stormwater FY 2008 Annual Report.

Real Time Control Evaluation

Several projects were previously evaluated for Real Time Control; for additional information on these projects, please refer to **SECTION 2.1 EVALUATE REAL TIME CONTROL IN LTCP** on page 10 of the 1996 Annual CSO Status Report and **SECTION II.B.3.4 REAL TIME CONTROL EVALUATION** on page 26 of the CSO-Stormwater FY 2010 Annual Report.

For details regarding the current operational statuses of the City's Tacony Creek Park computer controlled CSO regulator (T-14) and Rock Run Relief CSO regulator (R-15) see sections II.B.5.2 and II.B.5.3, respectively.

II.B.5 Operate and Maintain In-Line Collection Storage System Projects Contained within the LTCP

II.B.5.1 Main Relief

The Main Relief Inflatable Dam storage project was completed in May of 2007. PWD continues to maintain and monitor this in-line collection system storage site. This project reduces the discharge of CSO into the Schuylkill River through utilization of the available in-system storage volume and also provides flood relief to combined sewer areas in all three of PWD's drainage districts (Northeast, Southeast and Southwest).

Following a major storm in October of 2011, the inflatable dam became torn limiting its effectiveness. The inflatable dam product was no longer supported by the manufacturer and was therefore eliminated at the location. In its place, a static 7.5 ft dam currently exists as the volume storage and overflow control. With the current configuration, this relief system is designed to achieve an overflow reduction of 33 MG annually. PWD observed the tide gates installed in the Stormwater Outfall pipe by the contractor failed under normal operation. PWD is currently in the process of having the gates re-installed by the contractor to meet the design specifications.

The full extent of Main Relief has been discussed in previous reports. For more information on Main Relief Sewer Relief Project, please refer to **SECTION II.B.5.1 MAIN RELIEF** on page 26 of the CSO-Stormwater FY 2012 Annual Report.

II.B.5.2 Construction and Implementation of Tacony Creek Park (T-14)

The T-14 trunk sewer system conveys combined sewage from the largest combined sewershed in the PWD collection system. CSO outfall T-14, a 21' by 24' sewer, discharges into the Tacony Creek during periods of moderate to heavy rainfall. T-14 has a volume of approximately 10 million gallons and a control structure is needed in the sewer to use as much of this storage as possible. The installation of a crest gate helps to retain flow within the sewer. The gate reduces CSO discharges to the creek by utilizing the relief sewer for in-system storage. This control technology provides an additional margin of protection against dry weather overflows while maintaining flood protection for upstream communities. The crest gate retains the stored flow in the relief sewer and a new connector pipe drains the stored flow to an existing nearby interceptor.

Construction was completed on this project in July of 2011 and the site was placed in service in November of 2011 following acceptance testing. The T-14 Storage System is currently operating as designed under an automated mode. Adjustments were made to the control logic to improve performance and to properly control the gates in abnormal conditions such as loss of power or a gate failure. At present, PWD is evaluating the site's online operations for further optimization of the storage and conveyance to the wastewater treatment plant.

Additional information on T-14 relief sewer project has been discussed in previous reports; please refer to **SECTION III.B.1.5.1 CONSTRUCTION AND IMPLEMENTATION OF TACONY CREEK PARK (T-14)** on page 72 of the CSO-Stormwater FY 2012 Report.

III.B.5.3 Construction and Implementation of Rock Run Relief (R-15)

The Rock Run Relief Sewer provides flood relief to combined sewer areas upstream of regulator T-8 in the Northeast Drainage District (NEDD). An inflatable dam was constructed in the Rock Run Relief Sewer to allow for utilization of in-system storage to retain combined flows during a majority of wet weather events. The inflatable dam stores combined flows in the relief sewer until storm inflows have subsided and capacity exists in the Tacony Interceptor for conveyance of combined flows to the Northeast Water Pollution Control Plant (NEWPCP). This control technology also provides an additional margin of protection against dry weather overflows while maintaining flood protection for upstream areas.

Several alternative control logics for the inflatable dam operation and drain-down gate were investigated to develop a logic that minimized the risks of flooding, increased Rock Run Relief storage utilization, and eliminated adverse effects of the project at other CSO regulators on the Tacony Creek.

The Rock Run Inflatable Dam system is currently operating as planned. PWD has developed a plan to modify the upstream diversion chamber located at 7th and Nedro Streets to further increase CSO capture during storm events. These modifications are set to occur upon completion of a current lining contract for the Tacony Creek Interceptor later this year.

Additional information on Rock Run Relief has been discussed in previous reports; please refer to **SECTION III.B.1.4.2 CONSTRUCTION AND IMPLEMENTATION OF ROCK RUN RELIEF (R-15)** on page 72 of the CSO-Stormwater FY 2012 Annual Report.

II.C Review and Modification of Pretreatment Requirements to Assure CSO Impacts are Minimized (NMC 3)

II.C.1 Expand the Pretreatment Program to Include Significant Industrial Users (SIUs) Whose Facilities Contribute Runoff to the Combined Sewer System

The City of Philadelphia's Pretreatment Program regulates all significant industrial users (SIUs) that discharge into PWD's service area, which includes SIUs in both separate and combined sewer systems. The City continually reevaluates the

Pretreatment Program to determine if improvements can be made. Through annual monitoring and inspection activities, PWD's Industrial Waste Unit (IWU) currently regulates 125 SIUs that discharge to the sanitary system. During FY 2014, only 118 SIU inspections were conducted, as the remainder of the 125 SIUs was inspected during the FY2013. IWU conducts SIU program and inspections on a calendar year cycle.

IWU updated its inspection form to include a stormwater management component in 2006. A copy of the Form can be found in **APPENDIX O** of the CSO-Stormwater FY 2009 Annual Report.

IWU also maintains a website to inform the public and industries of permitting regulations, requirements and other information that may benefit or impact industrial users. The IWU website is located at the following web address: http://www.phila.gov/water/IWU.html.

Additional information on this program expansion was reported in previous years; please refer to **SECTION II.C.1 EXPAND THE PRETREATMENT PROGRAM TO INCLUDE SIUs WHOSE FACILITIES CONTRIBUTE RUNOFF TO THE COMBINED SEWER SYSTEM** on page 27 of the CSO-Stormwater FY 2012 Annual Report.

II.C.2 Incorporate Guidance on BMPs for Industrial Stormwater Discharges into Stormwater Management Regulations Guidance

A Stormwater Management Guidance Manual was developed to assist developers in meeting the requirements of the Stormwater Regulations. The manual is revised when necessary to incorporate new information, such as updated forms or specific section details when stormwater management requirements change. The current version of the Stormwater Management Guidance Manual can be found at: http://www.pwdplanreview.org/StormwaterManual.aspx.

Additional information on the development and contents of this guidance manual has been provided in previous reports; please refer to **SECTION II.C.2 INCORPORATE GUIDANCE ON BMPS FOR INDUSTRIAL STORMWATER DISCHARGES INTO STORMWATER MANAGEMENT REGULATIONS GUIDANCE** on page 28 of the CSO-Stormwater FY 2012 Annual Report.

II.C.3 Continue to Serve as a Member of the Philadelphia Inter-governmental Scrap and Tire Yard Task Force

The Scrap Yard Task Force (SYTF) was created to address numerous complaints about the operation of scrap metal and auto salvage businesses, which may cause polluted runoff to enter the City's sewers, blight in City neighborhoods, and contribute to short dumping and other environmental hazards to area waterways.

The SYTF is in its sixth year of operation since it was reorganized in September of 2008. Inspections and meetings normally take place once a month, inspecting about four (4) scrap facilities each month, in an effort to bring more scrap yards into compliance. The SYTF will occasionally inspect facilities that do not fit the strict definitions of either junkyard or metal recycler but present the potential for negative impact on the environment and surrounding area. Some of these sites are: tire accumulations; other recycling facilities; and shipping operations. The SYTF also responds to community complaints having to do with facilities or properties that are considered a nuisance or problematic in a given neighborhood.

The core agencies involved in the SYTF are PWD, PADEP's Solid Waste division, Department of License and Inspections (L&I), Philadelphia Police Auto Squad, Philadelphia SPCA and the Philadelphia Fire Dept. Haz-mat Administration Unit. Each attending agency performs specific tasks as dictated by their primary regulatory mission. For example, PWD also inspects sites for water and sewer violations, as well as violations that may be referred to the PADEP Clean Water division. PWD is the coordinating entity that designates the facilities to be visited.

The SYTF inspections are conducted once a month and typically 4 facilities are inspected at a time. The inspections are weather permitting, as scrap yards are normally located outside. Following SYTF inspections, each participating agency independently ensures any violations issued by that agency are rectified. On occasion, specialists attend the SYTF inspections. For example, local Police district supervisors have been asked to assist in property surveillance, and have joined the inspection team to give firsthand knowledge of a property.

During FY 2014, the SYTF visited 40 facilities, 28 facilities were ultimately inspected, 12 facilities were either out of business, or otherwise cleared out such that an inspection could not be performed. During this time period, the SYTF responded to community complaints for 3 properties and has initiated action for proper disposal of a tire pile totaling over 13,000 tires. More than 75% of the facilities inspected do not present direct sewer contamination potential. The vast majority of the sites inspected are graded in such a way that there is no runoff from the property but water flows toward the center of the parcel. On occasion where potential is discovered, the sites are referred to PWD's IWU or PADEP Water Quality as appropriate. Fewer than 25% of facilities inspected have water or sewer service.

II.D Maximization of Flow to the Publicly Owned Treatment Works (POTW) for Treatment (NMC 4)

II.D.1 Continue to Analyze and Implement Non-Capital Intensive Steps to Maximize the Wet Weather Flow to the POTW

II.D.1.1 Modified Regulator Plan

The Modified Regulator Plan (MRP) was designed to deliver more flow to the WPCPs more frequently and enable greater pollutant removals. The projected flow increase associated with the MRP was completely implemented by the submission of the 1997 Annual Combined Sewer Overflow Status Report. For a full description of this plan, please refer to **SECTION II.D.1 MODIFIED REGULATOR PLAN** on page 27 of the CSO-Stormwater FY 2008 Annual Report. Additional plan implementation efforts were included in the Updated Nine Minimum Controls Report which can be found online by accessing the following link:
http://phillywatersheds.org/doc/Updated%20NMC%20Report.pdf

II.D.1.2 Maximization of Wet Weather Treatment in the LTCPU

Facility Concept Plans for each of the WPCPs were developed and submitted to PADEP and the US EPA on June 1, 2013. The Facility Concept Plans describe specific engineering and construction activities proposed to increase the maximum wet weather flow rates to or through the plants, thereby increasing the capture rate of combined sewage. The Northeast Facility Concept Plan (NE FCP) was revised based on comments from PADEP and re-submitted on December 31, 2013. As a continuation of the NE FCP, PWD will complete a comprehensive Wet Weather Facility Plan prior to June of 2016, which will provide details including schedule, cost and anticipated performance for each project presented in the NE FCP. More details on these plans can be accessed at the following link:
http://phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan

II.D.2 Continue the Program which Requires Flow Reduction Plans in Agreements to Treat Wastewater Flows from Satellite Collection Systems where Violations of Contractual Limits are Observed

PWD provides wastewater service to some of its neighboring communities. Communities that exceed their contractual limits must develop flow reduction plans under PWD review. The following progress has been achieved with the following municipalities/counties during FY 2014.

Abington Township

A new contract has been drafted to replace the existing expired contract. A meeting was held with Township Officials in July of 2014 to discuss the contract, and approval by the Township Board of Commissioners is pending. The proposed new contract includes sections that specify exceedance charges for excessive flows and requires a plan of action from the Township to eliminate the excessive flows within one year from the date that the Township receives approval of a corrective action plan. In addition, the proposed contract will require the Township to pay its proportionate share of PWD's Long Term Control Plan Update (LTCPU) to reduce combined sewer overflows.

Bucks County Water & Sewer Authority

Under the terms of a negotiated agreement with PWD in 2008, the Bucks County Water & Sewer Authority (BCWSA) installed meters at all connection points not previously monitored. In addition, BCWSA agreed to construct a 1.8 million gallon surge tank and pump station in early 2012 to address high peak flows to PWD's system. PWD requested technical drawings and flow data from BCWSA in order to evaluate the effectiveness of the tank. PWD continues to monitor the flow monitoring data along the city border to ensure contact exceedances do not occur.

Cheltenham Township

An amendment to Cheltenham's contract was executed and signed in April of 2014. The amendment requires the Township to pay their proportionate share of the LTCP and construct additional sewer capacity within the City or build a storage tank to temporarily hold excessive flows during periods of high flow. The Township has until March of 2016 to evaluate its hydraulic conditions and determine which of the two options it will implement.

Delaware County Regional Water Quality Control Authority (DELCORA)

A 15-year contract with DELCORA was executed effective April 1, 2013. As part of the contract, DELCORA agreed to pay its proportionate share of the City's LTCPU to reduce combined sewer overflows. If DELCORA has excessive flows, they are required to develop a PWD-approved plan of action to eliminate them within a one year period. If DELCORA does not address continued exceedances of flow limits, the contract allows for PWD to terminate the agreement.

Springfield Township

A new contract with the Township was signed in 2014 and includes a provision requiring the Township to correct excessive flows within one year from receiving City approval of the Township's plan of action, and to pay its proportionate share of the LTCPU. PWD has begun the process of assessing the Township's flow characteristics to determine what flow reductions, if any, will be required by the Township. Once this assessment is complete, any required flow reductions will be incorporated into the contract, along with revised penalties for flow exceedances, charges for any modifications to the PWD collector system required to accommodate flows from

Springfield, and a commitment from the Township to correct any excessive flows within one year from receiving an approval of a corrective action plan.

The list of outlying community contracts can be found below in **TABLE II.D.2-1: LISTING OF WHOLESALE WASTEWATER CUSTOMER CONTRACTS AND CAPACITIES.**

Table II.D.2-1 Listing of Wholesale Wastewater Customer Contracts and Capacities

Customers	**Average Annual Daily Flow Maximum (MGD)**	**Maximum Daily Flow (MGD)**	**Instantaneous Maximum Rate (Cubic ft./sec)**	**Maximum Annual BOD Loadings (000's lbs.)**	**Maximum Annual SS Loadings (000's lbs.)**
Northeast Plant					
Abington		4.453	9.247		
Bensalem	6.133		11.740	5,340	3,734
Bucks	24.000	33.000	74.260	13,400	13,400
Cheltenham	13.380		31.750		
Lower Moreland	1.450	2.900	8.970	568	592
Lower Southampton	7.140	9.28	15.790	5,500	6,000
Southwest Plant					
DELCORA	50.000	75.000	155.000	21,771	19,487
Lower Merion	14.500		31.570	6,871	7,250
Springfield (Erdenheim)	3.200		4.600	1,050	1,200
Upper Darby	17.000		35.000	6,831	7,348
Southeast Plant					
Springfield (Wyndmoor)	1.000		1.930	155	200

II.D.3 Use Comprehensive Monitoring and Modeling Program to Identify Suburban Communities where Excessive Rainfall-dependent I/I Appear to be Occurring

The U.S. EPA's SWMM was used to develop the watershed-scale model for the PWD combined sewer system. Outlying communities are modeled as separate runoff sheds that load directly to the PWD sewer network. The sheds are calibrated to flow monitoring data collected at each respective connection. PWD has identified 129 connections from outlying communities. Presently, permanent flow monitors are installed at 110 connections and temporary monitors installed at 16 connections. 3 connections are unmonitored at this time. Through temporary deployments, average flow statistics were determined. **APPENDIX A – FLOW MONITORING: TABLE 2** contains the list of all known connections, their location and whether the connection is permanently monitored.

II.E Prohibition of CSOs during Dry Weather (NMC 5)

II.E.1 Optimize the Real-Time Control Facility to Identify and Respond to Blockages and (non-chronic) Dry Weather Discharges

Regular and reactive inspections and maintenance of CSO regulators are performed throughout the City to ensure that sediment accumulations and/or blockages are identified and corrected immediately to avoid dry weather overflows. PWD utilizes a remote monitoring network system daily to help identify locations showing abnormal flow patterns.

CSO Regulator Inspection & Maintenance Program
PWD maintains 175 combined sewer regulator chambers with regulator devices that control the diversion of wastewater flow to the interceptor system and 21 storm relief diversion chambers that allow excess flow during storm events to be diverted to storm relief sewers. These chambers discharge through 164 NPDES permitted point sources which make up the PWD's CSO outfalls. The maintenance of the chambers is critical to the performance of the system in that they control the frequency, duration and quantity of CSO discharges. Annual summaries of the comprehensive and preventative maintenance activities completed in the combined sewer system over the past year are detailed in **SECTION III.C.4.2 NPDES – ANNUAL CSO STATUS REPORT** on page 78 and any changes are discussed below.

PWD instituted a policy of next day follow-up inspection at sites that experience a DWO. PWD will conduct an evaluation of the effectiveness of twice-weekly inspections. During FY 2014, 5377 inspections were completed on 201 CSO regulator sites and storm relief diversion chambers. There were 3 dry weather discharges and a total of 235 blocks cleared to prevent a possible discharge from developing. Details of the inspections during the past fiscal year can be found beginning on page 2 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT.**

Tide Gate Inspection and Maintenance Program
Eighty-nine (89) tide gates are located at approximately half of the CSO regulator chambers in the City's system and prevent tidal inflow into the combined sewer system from the estuary receiving water body. Maintenance of the gates is critical to system performance because inflow from the receiving water body can adversely affect the combined sewer system and treatment facilities by reducing system capacities, potentially causing dry weather discharges. In FY 2014, CSO tide gate preventative maintenance was completed at 10 of the tidal-affected CSO regulator sites. Summaries of the tide gate inspection and maintenance completed during the past fiscal year are on page 19 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT**, which documents the locations of tide gate preventative maintenance performed in FY 2014.

Somerset Grit Chamber Cleaning
PWD regularly monitored the sediment accumulation in the grit chamber at the origin of the Somerset Intercepting Sewer. In FY 2014, an estimated 72 tons of grit were removed from the Somerset grit chamber. During FY 2014, the grit chamber was removed from service because the entire regulator is being relocated and is currently under construction. A plan to evaluate the grit accumulation patterns in the Somerset Intercepting Sewer has been put into place to determine the necessity for a new grit chamber including sonar inspections and visual grit surveys. Summaries for Somerset Grit Chamber cleaning activities are available on page 19 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT.**

Central Schuylkill Pumping Station Grit Pocket Cleaning
PWD performs specialized maintenance activities at the Central Schuylkill Pump Station (CSPS). The siphon conveys the wastewater flow from the interceptors on the East side of the Schuylkill River to the West side. The siphon grit pockets are located on the downstream side of the siphon where sewers enter the wastewater pump station. During FY 2014, the two grit pockets at the CSPS siphon were cleaned four times, and a total of 106 tons of settle grit were removed to ensure proper functionality of the site. Additional information on the CSPS cleaning activities conducted in FY2014 is available on page 19 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT.**

II.F Control of Solid and Floatable Materials in CSOs (NMC 6)

The ultimate goal of NMC 6 is to, where feasible, reduce or eliminate the discharge of floatables and coarse solids from combined sewer overflows to the receiving waters by relatively simple means. Various technologies can be used to control solids and floatables entering the receiving waters from CSOs, ranging from simple devices that remove material from the CSO flow stream to devices that remove floatables from the receiving water after they are discharged.

II.F.1 Control the Discharge of Solids and Floatables by Cleaning Inlets and Catch Basins

PWD is responsible for the inspection and cleaning of approximately 72,500 active stormwater inlets within the City. PWD has thirty-two inlet cleaning crews, whose primary duties include cleaning, removing and properly disposing of debris (solids and floatables) from inside City inlets as well as street level cleaning in the vicinity of inlets to prevent debris from entering the drainage system. Other duties include inspection of inlet conditions and referral structural defects to the Sewer Maintenance Unit for repair to ensure proper functioning. Furthermore, dedicated crews are responsible for cleaning high volume traffic areas; retrieving and installing inlet covers; replacing inlet covers that are missing; installing locking covers; unclogging choked inlet traps and outlet pipes so that inlets can take water. A high level of focus is placed on responding to customer complaints of flooding, blockages, and foul odors.

For the period of July 2013– June 2014, 112,552 inlets were inspected, 88,547 inlets were cleaned. The average amount of debris removed from each cleaned inlet was 250 lbs. The frequency of inlet inspections and cleaning have significantly increased since the implementation of Cityworks, an asset management system that generates automated work schedules based upon complaints and routine maintenance schedules. Additional statistics and information pertaining to Inlet Cleaning from FY 2014 can be found in **TABLE II.F.1-1.**

Table II.F.1-1: FY14 Inlet Cleaning Statistics

	FY2014
Total Inlets Inspected	1117,090
Total Inlets Cleaned	88,547
Total Covers Replaced	225*
Total Covers Retrieved	42*
Total Covers Chained	5,788
Tons of Debris Removed	9,058
Avg. Lbs./ Inlet	250

* The number of inlet covers replaced and retrieved has reduced significantly following PWD's increased focus on chaining and locking inlet covers.

II.F.2 Continue to Fund and Operate the Waterways Restoration Team (WRT)

PWD's Waterways Restoration Team (WRT) is a multi-crew force dedicated to performing stream examinations and cleanup work throughout the city including large trash and debris removal, and restoration of eroded streambanks and streambeds. WRT's stream examinations consist of assessing a variety of field conditions including waterway, infrastructure, site access and sewage discharge assessments. WRT waterway maintenance work involves debris removal, stream restoration work, and assisting with sewer maintenance work to help provide a safe work environment while protecting stream ecosystems. WRT works in partnership with Philadelphia Parks and Recreation (PPR) staff and various Friends of the Parks groups to maximize resources and build positive relationships with our communities. During FY2014, WRT began using the Department's Cityworks Work Order Management System to document stream exams in addition to the already documented stream cleanup activities.

In FY 2014, WRT conducted 483 stream examinations and removed a total of 710 tons of debris from the City's waterways, including 4 vehicles, 1428 tires and 20 shopping carts from 686 sites (**TABLE II.F.2-1**). Of the total debris removed, a majority of the weight can be attributed to large organic material (e.g. trees) that have fallen into the waterways and restricted flow, thus increasing the potential for bank erosion and/or damage to infrastructure.

Table II.F.2- 1 Waterways Restoration Team – Annual Activity Summary FY 2008-2014

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Total Tons Removed	326	657	1438	750	741	1416	710
Cars Removed	80	15	12	11	14	4	4
Tires Removed	861	924	1062	1392	1256	4756	1428
Shopping Carts Removed	72	268	102	89	50	27	20
# of Stream Site Cleanups	178	375	335	459	434	467	686
# of Stream Site Exams	*	*	*	*	*	*	438

*This metric was not available until FY2014

II.F.3 Continue to Operate and Maintain a Floatables Skimming Vessel

Reduction in floatables improves both the water quality and aesthetics of receiving streams. The use of a skimming vessel is a proactive control measure, capable of managing debris at various locations in open water before they reach static control methods. In addition, the boat is a visible control that increases public awareness and education of floatables impacts. PWD currently has two (2) skimming vessels; a large marine vessel, the R.E. Roy, and a smaller pontoon vessel.

II.F.3.1 Floatables Skimming Vessel – R.E. Roy

In 2006, the Water Department implemented an aquatic floatables control strategy that included the skimmer vessel, the R.E Roy to manage floatable and other debris along the tidal portions of the Delaware and tidal Schuylkill Rivers in the City. The 39-foot skimmer vessel is operated for approximately five days per week, for about 7 months out of the year, or more. The vessel's main purpose is to perform general debris collection and removal on both these rivers, while also serving as a mechanism for public relations events. In FY2014, the skimming vessel experienced both mechanical and contractual issues that limited the amount of field operation days. During the 91 days of on-water operation in FY 2014, a total of 11.0 tons (180 cubic yards) of debris and floatables material were removed from the Delaware and Schuylkill Rivers (**TABLE II.F.3.1-1**). The skimming vessel has been discussed in detail in previous reports; please refer to **SECTION II.F.3 FLOATABLES SKIMMING VESSEL – R.E. ROY** on page 37 of the CSO-Stormwater FY 2012 Annual Report for additional information on the skimming vessel.

Table II.F.3.1-1 Debris Collected and Days of Operation by R.E. Roy Skimming Vessel

Date	Tons Removed*	Cubic Yards Collected	Days in Operation	Days on Schuylkill	Days on Delaware
July 2013	0	25	20	12	8
August 2013	Out of Service for Mechanical Maintenance				
September 2013	0	30	18	10	8
October 2013	3.86	35	20	13	7
November 2013	Skimming Vessel Dry-Docked for Winterization Period				
December 2013	Out of Service for Contractual Negotiations And Winterization Period				
January 2014					
February 2014					
March 2014	Skimming Vessel Dry-Docked for Winterization Period				
April 2014	Out of Service for Mechanical Maintenance				
May 2014	2.42	50	13	6.5	6.5
June 2014	4.72	40	20	13.5	6.5
FY 2014 TOTAL	**11.0**	**180**	**91**	**55.0**	**36.0**

* *Tons removed* is not a monthly metric and is only calculated when floatables/debris are removed from the shipyard and transported to the weigh station at the trash collection facility.

II.F.3.2 Floatables Pontoon Vessel

PWD also operates and maintains a small pontoon skimming vessel that is used along the Schuylkill River within Philadelphia to retrieve floating trash and debris from the waterways. The debris is hand netted from the water surface by employees standing on the vessel deck. The nets are emptied into ten 44-gallon debris containers on the deck and the containers are then offloaded. The pontoon vessel can be utilized in tight spaces found in marinas, among piers, and in near shore areas.

In FY 2014, the pontoon skimming vessel was operational from July – September 2013 and during June 2014, equating to eight deployments. During this period, the pontoon skimming vessel removed a total of 8.1 cubic yards of recyclable material including bottles, plastic, paper; 5.6 cubic yards of mixed trash and 10 tires. Unfortunately, skimming operations for the Pontoon Vessel were curtailed during early 2014 due to motor malfunction and subsequent replacement. PWD has not observed significant trash and debris accumulation upon resuming operation from lack of vessel deployment. The pontoon vessel has been discussed in detail in previous reports; please refer to **SECTION II.F.3 FLOATABLES PONTOON VESSEL** on page 38 of the CSO-Stormwater FY 2012 Annual Report for additional information on the vessel.

II.F.4 Other Initiatives

II.F.4.1 Repair, Rehabilitation, and Expansion of Outfall Debris Grills

Debris grills are maintained regularly at sites where the tide introduces large floating debris into the outfall conduit. This debris can become lodged in a tide gate, causing inflow to occur. Additionally, debris grills provide entry restriction and some degree of floatables control. During FY 2014, 30 debris grill inspections and cleanings were done. The list of the debris grill preventative maintenance activities is available on page 19 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT.**

II.G Pollution Prevention (NMC 7)

Most of the city ordinances related to NMC 7 are housekeeping practices that help to prohibit litter and debris from being deposited on the streets and within the watershed area. As pollutant parameters accumulate within the watershed practices such as, regular maintenance of catch basins can help to reduce the amount of pollutants entering the combined system and ultimately, the receiving water.

II.G.1 Continue to Develop and Share a Variety of Public Information Materials Concerning the CSO LTCP

The Public Outreach and Participation conducted in FY 2014 for the *Green City, Clean Waters* program which is the City's vision for addressing CSO reductions has been provided in **SECTION 7.0 - PUBLIC OUTREACH AND PARTICIPATION** starting on page 37 of **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** and **SECTION II.G.3 CONTINUE TO PROVIDE ANNUAL INFORMATION TO CITY RESIDENTS ABOUT PROGRAMS VIA TRADITIONAL PWD PUBLICATIONS** on page 37 of this report.

II.G.2 Continue to Maintain Watershed Management and Source Water Protection Partnership Websites

II.G.2.1 Phillywatersheds.org

Phillywatersheds.org is an important PWD website which acts as a hub for all watershed-based programs and partnership information. The website provides information to the public on issues that are currently problematic for the City's watersheds, what PWD is doing to address these issues, and what residents of Philadelphia can do to help improve watershed health. It also includes educational tools, public meeting materials, maps and reports generated by PWD or partners. Daily activity on the site has increased compared to the previous year, according to Google Analytics, from 136,614 visitors in FY 2013 to 149,030 in FY 2014.

The website features interactive mapping for green stormwater infrastructure projects, traditional infrastructure projects, waterways restoration projects, and community partnership projects. There are also maps for each of the seven major watersheds within Philadelphia. One of the main uses of the mapping system is the Combined Sewer Overflow Public Notification System, known as CSOcast. CSOcast shows CSO outfall overflow information retrieved from PWD's sewer monitoring network. More information on PWD's CSOcast is described in further detail in **SECTION II.H.2** of this report on page 49.

The website also hosts information for various PWD initiatives and programming. The page for the Soak it Up Adoption Program, for example, allows groups to check if their organization is eligible to participate, complete the program applications, and schedule training. Additionally, once groups are active in the program they can report issues and log their adoption activities.

Watersheds Blog
The website continues to host a blog that is updated regularly with posts on a wide variety of topics including current programs and events, relevant partner initiatives, and programs that support GSI, the City's waterways, parks and the urban landscape. During FY 2014, there were 109 posts, up from 82 posts in the previous year. The blog was viewed at least 3382 times in FY2014. This number does not fully represent the blog's reach as it does not account for the number of views and shares across platforms such as Facebook and Twitter.

In January of 2014, the Watersheds blog was named one of the top water blogs of the year by Donna Vincent Roa of www.speakingupaboutwater.com. The blogs were ranked using criteria such as traffic statistics, online buzz, search authority and frequency of posts and comments. The final rankings were based upon design and excellence in both branding and content. The Watersheds Blog was ranked #4 in brand excellence and #33 overall out of the top 50 blogs.

II.G.2.2 RiverCast

Philly RiverCast (www.phillyrivercast.org) is the first operable web-based recreational warning system in the United States. Using near real-time flow, precipitation, and turbidity data, the RiverCast algorithm translates the predicted bacteria levels in the Schuylkill River into one of three ratings, each of which corresponds to suggested guidelines for safe recreation. RiverCast guidelines offer tools for the public to make informed decisions about recreation, and thus help protect the public against illnesses caused by bacteria. Ultimately, RiverCast will help ensure continued safe recreational use of the Schuylkill River, while promoting public awareness of water quality concerns and indirectly engaging support for source water protection measures. More than 650,000 users have visited the Philly RiverCast website since it was first released in June 2005.

II.G.2.3 Schuylkill Action Network

The Schuylkill Action Network (SAN) was established as a permanent watershed-wide organization charged with identifying problems, prioritizing projects, and funding sources to bring about real improvement in water quality through the Schuylkill River watershed. The SAN Stormwater Workgroup was formed to identify a cost-effective approach to stormwater management through project prioritization and planning. The workgroup is a partnership of representatives from PWD, PADEP, EPA, DRBC, conservation districts, watershed organizations, municipalities, and others groups throughout the watershed. The SAN website supports the SAN's Stormwater Workgroup by providing information about projects, events, publications, and a public component that conveys the SAN's message about protecting and improving the Schuylkill River to outside audiences. The SAN Stormwater Workgroup's ultimate goal is to maximize reduction and/or prevention of stormwater runoff pollution. In its 10 years of existence, the workgroup has served as an advisory committee for state and local governments, an ordinance review board for municipalities, and support group for large and small projects throughout the Schuylkill River Watershed. During the last year, SAN projects have addressed important pollution sources including agriculture, abandoned mine drainage and stormwater. Efforts from the last calendar year are documented in the following table (**TABLE II.G.2.3-1**):

Table II.G.2.3-1: 2013 Schuylkill Action Network Project Progress

Agriculture	Abandoned Mine Drainage (AMD)	Stormwater
• Secured $1,000,000 of designated funding for the Maiden Creek Watershed for agricultural restoration work through NRCS National Water Quality Initiative • Completed implementation plans for the Maiden, Tulpehocken, and Upper Perkiomen Creek watersheds through the William Penn Foundation Delaware Watershed Initiative • More than 8 acres of riparian buffer planted • 4 Comprehensive Nutrient Management Plans completed • 80 Conservation plans completed on watershed farms • 9 manure storage facilities completed • 6 barnyard repairs completed • 2 stream crossings installed A stormwater guide specific to the agricultural community completed	• Nearly $2 million invested to address AMD issues in the watershed • 1 AMD treatment system completed • 1 existing AMD treatment system upgraded • West Branch of the Schuylkill River restored • 1 feasibility study for AMD prevention • 1 conservation plan • Crop falls and collapsing mine workings sealed near Pottsville • Rain gardens and trails installed at an existing treatment system for public education and access • 1 mine land reclamation project	• To date, the SAN has invested more than $21 million to complete over 200 projects to reduce stormwater pollution problems throughout the watershed. • 6 schools in the watershed took steps to manage stormwater on their campuses by installing rain gardens; planting meadows, riparian buffers, and trees; and restoring streams • 3 land transaction assistant projects completed, protecting 326 acres of priority watershed land

In order to communicate to SAN stakeholders the accomplishments of the SAN Stormwater workgroup, as well as other workgroups in the partnership, the SAN routinely updates their website with input from PWD and the SAN Planning and Education and Outreach committees. The website, www.schuylkillwaters.org, includes an internal component that allows for improved communication among SAN workgroup members and facilitates on-the-ground work. The SAN website, together with Phillywatersheds.org, provides data and reports from the source water assessments for the Schuylkill River. For additional information on this committee, please refer to **SECTION II.G.2.3 SCHUYLKILL ACTION NETWORK** on page 41 of the CSO-Stormwater FY 2012 Annual Report.

II.G.2.4 Delaware Valley Early Warning System

The Delaware Valley Early Warning System (EWS) is an integrated monitoring, notification, and communication system designed to provide advanced warning of surface water contamination events to subscribing water suppliers, industrial surface water users and partner government agencies in the Schuylkill and Lower Delaware River Watersheds. The Delaware Valley EWS covers the entire length of the Schuylkill River as well as the Delaware River from the Delaware Water Gap to just below Wilmington, Delaware.

The EWS monitoring network is comprised of nearly 90 online water quality data stations throughout the watershed. Access to this real-time data allows EWS users to identify changes in water quality associated with both natural and accidental contamination events. The user can also access historical data from these stations with the data query wizard. Real-time and historic flow data are applied to a time of travel model that generates a range of estimated arrival times for each intake in the system. This time of travel model is also incorporated into a spill simulation tool that can be used for planning purposes.

When a responding agency reports a water quality event via the EWS website or telephone hotline, the entire userbase is notified almost instantaneously via email. In the case of a high risk event, supplemental phone notifications are placed using CodeRed technology, allowing all users to receive an automated telephone notification in less than 3 minutes. EWS users can log in to the secure website to view additional event details, spill routing, and predicted arrival times to their intakes. Additionally, a sophisticated tidal modeling component has been developed to better predict and communicate the arrival times of spills on the tidal Delaware River with a user-friendly spill trajectory animation.

During FY 2014, a total of 19 unique water quality events were reported to the EWS. The EWS was also featured at the 2014 SmartAmerica Challenge Expo of cyber-physical systems in Washington DC. Additional outreach events throughout FY14 expanded the EWS userbase, which is currently comprised of more than 300 individual users from 50 organizations.

EWS has been discussed in further detail in previous reports; for additional information on this system please refer to **SECTION II.G.2.4 EARLY WARNING SYSTEM** on page 37 of the CSO-Stormwater FY 2012 Annual Report.

II.G.2.5 Other PWD Related Websites and Social Media

Philadelphia Water Department Main Web Site: www.phila.gov/water
The official website for the Philadelphia Water Department (PWD) underwent a redesign and content overhaul in FY2014 that resulted in a more user friendly and comprehensive resource. The redesign provided an opportunity to successfully integrate the stormwater information, previously located at www.phila.gov/water/stormwater_billing.html with the other services that PWD provides as a water utility. Providing more context for stormwater management, i.e. the urban water cycle and customer service issues, is critical in helping the average customer understand the importance of stormwater management. The site has averaged over 30,000 views per month since the launch in the last quarter of FY2014.

PWD's stormwater billing web resources include a map application showing the stormwater charges for every property in Philadelphia as well as helpful documents and forms regarding the stormwater fees. Customers are encouraged to explore and get more information about their stormwater charges and information concerning PWD's Appeals, Credits or CAP programs. This information can help property owners reduce the amount of stormwater entering the sewer system. For more information on the stormwater billing program please refer to **SECTION III.C.1.5 – PARCEL-BASED STORMWATER BILLING** on page 64.

The site continues to provide resources such as current news, recent reports, important programs and other facts concerning water that are helpful to consumers.

Development Review Program Website

PWD's Development Review Program has a website that provides guidance on the Philadelphia Stormwater Regulations, explains the plan review process, and allows developers to submit applications online. The site also provides access to the Stormwater Management Guidance Manual and updated news regarding stormwater. This site can be found at: http://www.pwdplanreview.org/. For more information on the activities conducted by Development Review Program please refer to **SECTION F.5 – MONITOR AND CONTROL STORMWATER FROM CONSTRUCTION ACTIVITES** on page 112.

Philadelphia Water Department on Social Media
Social Media has become an essential tool for disseminating departmental messaging about stormwater management, pollution prevention and programs, which improves the City's water resources. Additionally, social media has expanded the reach of partner programming and strengthened PWD's connections with other institutions around the City.

Facebook
PWD maintains two Facebook pages to keep residents informed on any news and events at or hosted by the Water Department. These pages can be accessed at: http://www.facebook.com/PhillyH2O and http://www.facebook.com/phillywatersheds.

PWD's Fairmount Water Works (FWW) also maintains a Facebook page that extends the reach of departmental messaging. The page can be accessed at https://www.facebook.com/28309557520. Between these three Facebook pages, the department reaches over 2000 fans.

Twitter
Twitter has become an important tool for resolving customer complaints, providing helpful hints, and providing news concerning the department, education and water in general. Both PWD and the FWW have Twitter accounts and their feeds can be found at: https://twitter.com/PhillyH2O and http://www.twitter.com/FairmountWW and one can follow the accounts at @PhillyH2O and @FairmountWW. The @PhillyH2O account activity has again increased, averaging 65 tweets per month, up from 55 tweets per month in 2013. In addition, @PhillyH2O has 2558 followers, up from 1333 in 2013. Including the @FairmountWW followers, PWD has over 3750 followers.

Philadelphia Water Department Videos
PWD hosts videos on Vimeo and YouTube which provide information and news on its programs and vision for Philadelphia. The videos can be accessed at the following link:

- http://www.vimeo.com/phillywatersheds
- http://www.youtube.com/pwdepartment

Between the two platforms, the videos have been viewed over 4500 times between July 1, 2013 and June 30, 2014. This is up from 2900 views in FY 2013. These represent the number of full views of videos three to fifteen minutes in length.

II.G.3 Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications

II.G.3.1 Billstuffers and Waterwheel Watershed Newsletters

PWD develops numerous publications for the public that are distributed throughout the City at advisory committee meetings, public meetings, and other public events, in addition to being distributed through the bill to PWD customers. The following components have been shared with the public during FY2014:

Billstuffers

Rate Increase Billstuffer – July 2013

A billstuffer was distributed to explain to customers about the final phase of a three-phase change to rates for water, wastewater and stormwater services for the period of July 1, 2013 – June 30, 2014.

Keep Your Water Flowing – March 2014

A billstuffer was distributed to alert customers that the Moratorium for water shutoffs ends on April 1, 2014; the different methods of payment, locations of approved WRB payment centers and customer's rights and responsibilities as water customers.

Publications

2014 Water Quality Report (with 2013 Data) – April 2014

Annual consumer confidence report mandated by the federal Safe Drinking Water Act to be published each year to PWD wholesale and retail account customers, and other consumers of the city's water.

2013 Annual Financial Report – June 2014

Annual financial report distributed to bond rating agencies and other financial institutions. Report provides information on the Department's financial strength, water quality, water environment, asset management, water and wastewater treatment, Office of Watersheds, Information, Science & Technology and Public Affairs.

Waterline– January 2014

A quarterly employee newsletter publication distributed to all PWD employees. The new Biogas Cogeneration Facility, Industrial Waste's Operations Challenge and Fairmount Water Works winter happenings were in the January 2014 winter edition.

Media Advisories - alerts the media in a concise manner, to upcoming events, offering basic information (who, what, when, where and why).

October 3, 2013 – Volunteers Work Together to Improve Stormwater Management in Overbrook; Connecting Communities with their Water Environment

October 11, 2013 – Opening Reception for Infill Philadelphia: Soak It up! Exhibition

November 21, 2013 – Philadelphia is Leading the Way in Energy Efficiency, Biogas Cogeneration Project a Ready Source of Renewable Energy

April 23, 2014 – Water Department, Parks and Recreation & U.S. Army Corps of Engineers Partner to Protect Waterways and Celebrate Restoration of Overbrook Natural Treasure

May 1, 2014 – Water Department & Mural Arts Announce Design Winners; Uncover the Green: City's 1st Medallion & Manhole Cover Competition!

May 8, 2014 – The City of Philadelphia and the Synagro Team are Blazing a Technical and Environmental Trail! Philadelphia Renewable Bio-Fuels Facility's Public Opening and Tour

June 30, 2014 – Update on 56th & Woodland Water Main Break and Gas Service Loss

Press releases- Provides quotes and facts, to stimulate possible news outlets and to generate print and broadcast reports.

July 15, 2013 – Reporting Hydrant Abuse this Summer Could Save Someone's Life; Residents who see unauthorized use of fire hydrants are prompted to dial 3-1-1

July 31, 2013 – PWD and PIDC Award $4.7 Million in Grants to Promote Green Stormwater Management Practices on Private and Non-Profit Properties Resulting in the Planned Development of 77 Greened Acres

August 7, 2013 – Heavy Rains May Lead to Flooding; Residents Urged to Plan Ahead to Protect Themselves in an Emergency

October 3, 2013 – Volunteers Work Together to Revitalize Neighborhood Green Infrastructure Stormwater Management Project

October 5, 2013 – PWD-EPA Project to Test Paving Materials for Pollution Prevention Potential; Results to Help Advance City's Renowned Green City, Clean Waters Plan

November 22, 2013 – Green Energy Is Highlighted in New Biogas Cogeneration Facility; Resource Recovery Project will Generate Electricity for Northeast Plant

November 25, 2013 – Heavy Rains May Lead to Flooding; Residents Urged to Plan Ahead to Protect Themselves in an Emergency

February 11, 2014 – The Philadelphia International Flower Show; Where Art and Nature Unite!

February 12, 2014 – Philadelphia Water Department Releases Green Streets Design Manual; Supporting its Citywide Green Stormwater Management Initiative

February 20, 2014 – Only Rain Belongs Down the Drain! Water Department Crews Need your Help to Prevent Street Flooding

March 5, 2014 – Water Department and Mural Arts Announce Design Competition Undergrad and Graduate Students Urged to Uncover the Green!

March 13, 2014 – Delinquent Water Bill Customers Urged to Pay Bill or Enter A Payment Agreement Before the End of Winter Moratorium

April 23, 2014 – Water Department & Army Corps Celebrate Restoration of Overbrook Natural Treasure

May 1, 2014 – Water Department and Mural Arts Announce Winners! Uncover the Green: City's 1st Medallion and Manhole Cover Design Competition

May 9, 2014 – Innovative Recycling & Sustainability Transforms City's Biosolids Management Program; Public Opening and Tour of the Philadelphia Renewable Bio-Fuels Facility

May 29, 2014 – PWD and PIDC Award $3.5 Million in Grants to Promote Green Stormwater Management Practices on Private Properties, Resulting in the Planned Development of 58 Greened Acres

May 30, 2014 – Water Department to Begin Construction on Bells Mill Run Stream, Stormwater Management Improvements Necessary to Reduce Streambank Erosion

Community Letters
A letter was sent to over 2,000 customers in July 2013, alerting non-residential customers that the enrollment period for PWD's Customer Assistance Program ends on September 30, 2013.

A letter and Q & A was sent to Port Richmond residents on August 5, 2013, who experienced flooding when an intense rain storm occurred in Philadelphia.

A letter was to approximately 8,000 targeted customers in February 2014 who possibly had lead service lines, requesting their participation in PWD's 2014 Lead and Copper Sampling Program.

Advertisements
A paid advertisement was placed in the Water Resources Association's Awards Program that described the New Biogas Combined Heat and Power Facility Resource Recovery Project for the Northeast Water Pollution Control Plant. – April, 2014

Paid advertisements were placed in the following newspapers to alert the public that the 2014 Water Quality Report (featuring 2013 tap water quality results) was available electronically at www.phila.gov/water/2014WaterQuality:

1. The Philadelphia Inquirer – April 11, 2014
2. The Philadelphia Daily News – April 11, 2014

Paid advertisements were placed in the following newspapers to advertise the Public Meeting for the Wissahickon Watershed Act 167 Stormwater Management Plan:

1. Philadelphia Inquirer – June 2 and 11, 2014
2. Philadelphia Daily News - June 2 and 11, 2014
3. Montgomery Times Herald - June 2, 2014
4. Montgomery County Times Chronicle - June 8 and 15, 2014

Events

Water Blues Green Solutions Stormwater Management Community Event Welcome and Kick-off
October 5, 2013 - Penn State Students, Penn State Extension Subaru America, Overbrook Environmental Education Center, UC Green, Penn State Public Media and PWD kicked off an exciting community event where students and employees from Penn State and employees from Subaru America and the Philadelphia Water Department (PWD) volunteered to work together to revitalize the green infrastructure tools along four blocks of Lancaster Avenue.

Opening Reception for Infill Philadelphia: Soak It Up! Exhibition
October 15, 2013 – A reception was held at the City Hall Caucus Room for an exhibition of new green tools for Philadelphia and its neighborhoods. Dozens of design concepts for green stormwater infrastructure—blue-green roofs, roof drain gardens, meeting greens, and more—was on display on the 2nd and 4th Floors of Philadelphia City Hall from October 7 through December 7.

Biogas Cogeneration Facility Ribbon-cutting and Tour
November 22, 2013 – The Philadelphia Water Department partnered with Ameresco, Inc. and Bank of America on an innovative wastewater biogas-to-energy facility, which will generate electricity and thermal energy for use on-site at the Northeast Plant.

Ribbon Cutting and Tour of the West Branch of Indian Creek
April 25, 2014 - The Water Department, Parks and Recreation, the Army Corps of Engineers, representatives from Friends of Cobbs Creek and Friends of Papa Playground and several public officials participated in a ribbon-cutting and tour of the newly restored west branch of Indian Creek, which had been diverted underground and integrated into the City's sewer network, is now visible for the community to enjoy.

Uncover the Green
May 2, 2014 – The Water Department and the Mural Arts Program held a ceremony to announce the winning designs of Uncover the Green – the city's first medallion and manhole cover design competition. The Design Competition was sponsored by PWD, Murals Arts, Next Fab and Fleisher Art Memorial.

Public Opening and Tour of the Philadelphia Renewable Bio-Fuels Facility
May 9, 2014 – The City and Synagro Technologies held a ribbon-cutting and tour of the Philadelphia Renewable Bio-Fuels Facility where the City will save $200 million over the 20-year contract, elimination of off-site odors and the transformation of 100 percent of the City's biosolids into a Class A biosolids product.

PWD Employee Memorial Tree Grove Ceremony
June 17, 2014 - Water Commissioner Howard Neukrug and several PWD Divisions collaborated on the 2nd Annual Memorial Tree Grove ceremony that commemorates the PWD employees who have passed away within the last year.

PA Coast Day
PWD along with Partnership for the Delaware Estuary and PADEP Coastal Zone Management Program sponsored the 12th Annual Pennsylvania Coast Day on Saturday September 7, 2013. This year, out of the approximately 5,000 estimated attendees, 789 people participated in enough activities at the various organizations' booths to qualify for prizes in the Clean Water Challenge. All of these activities had a water or environmental education theme. During the event, 400 passes were distributed to attendees for a free ride on the Delaware RiverLink Ferry. 518 people got to try out a kayak or pedal boat in the Marina. In addition to the Coast Day activities, over 449 people visited the neighboring Independence Seaport Museum (significantly higher than usual attendance) and 225 adults and children took a free shuttle to FWW.

A 2014 Coast Day Event is currently scheduled for Saturday, September 6, 2014. For more information on Coast Day visit: http://www.delawareestuary.org/coast-day

Philly FUN Fishing Fest
In celebration of the improving water quality, PWD and its partners, Philadelphia Parks & Recreation, Schuylkill River Development Corporation, and the Fish and Boat Commission, have hosted the annual Philly FUN Fishing Fest on the banks of the Schuylkill River. The all-ages fishing festival is open to the public, no experience required. Prizes from various local sponsors are provided to the winners of various categories. Fishing instruction is provided by volunteers, while fishing rods are on loan and bait is donated. The event does not require a fishing license and it is free of charge. The Fishing Fest is an effective means to educate the public on the improving water quality and aquatic resources the City offers. This year, the event took place on Saturday, September 7, 2013, where approximately 145 individuals participated and approximately 81 fish were caught during the tournament. For more information on the Philly Fun Fishing Fest, please visit: http://www.phillyriverinfo.org/fishingfest/.

Delaware Estuary Watershed Workshop for Teachers
In the 18th year of the Delaware Estuary Teacher Workshop program, two teacher workshops were held in July 2013 in coordination with the Partnership for the Delaware Estuary, Delaware National Estuarine Research Reserve and PWD. One 2-day workshop focused on Urban Waters and the other 2-day workshop focused on exploring the estuary. 28 teachers total attended the two workshops. Workshop activities typically involve a boat trip along the St. Jones River, visiting green infrastructure projects, performing chemical, physical and biological analysis in fresh and estuarine waters, discovering wetlands, dissecting oysters, participating in hands-on classroom and field experiences and much more. PWD hosted the teachers on tours of green infrastructure locations/projects, the Fairmount Fishway, FWW, the Belmont Water Treatment Plant, and Southeast Water Pollution Control Plant. This segment of the

teacher workshop provided the participants with crucial information on non-point source pollution, the local waterways as a source of their drinking water, and the process undergone to return the water in an acceptable condition. This year PWD introduced teachers to the new Green Schools, Clean Waters curriculum. The workshop provided an opportunity for educators to receive free educational and classroom materials to teach students about the importance of watershed maintenance and pollution prevention. For more information on the teachers' workshop visit: http://www.delawareestuary.org/wetland-workshop.

Philadelphia Flower Show – PWD Exhibit

The Philadelphia Water Department has designed and installed an exhibit at the Philadelphia International Flower Show for over thirty years. PWD uses the display to incorporate educational elements relevant to its current mission. The theme of the 2014 show was "Articulture" and took place from March 3rd to March 9th, 2014. The display , "The Art of Stormwater Management", included signage and features highlighting the issues created by stormwater and the benefits of using green tools to manage stormwater. The live exhibit was seen by over 250,000 people and additionally highlighted the department's Green City, Clean Waters program. 2014 will be the last year that the Philadelphia Water Department will participate in the Philadelphia International Flower Show in the near future.

II.G.4 Continue to Support the Fairmount Water Works

The Fairmount Water Works (FWW) is PWD's renowned education center, located on the banks of the Schuylkill River in Philadelphia. The Center tells the story of the Schuylkill River and its human connections throughout history. Innovative exhibits and interactive educational programs meld the history, technology and science, providing education on the many issues facing the regions' urban watersheds.

As detailed in **TABLE II.G.4-1,** during FY 2014, over 31,000 visitors attended the FWW which consisted of general visitors, school groups, community groups, and attendees for special exhibits, visiting authors and lecturers. An additional 4,000 adults and children were reached as part of the center's outreach efforts.

Table II.G.4-1 2013-2014 Fairmount Water Attendance

General FWW Visitors	16,354
School Groups, Camps and Recreational Center	7,316
Tours	3,467
Special Events	936
Outreach Efforts	3,098
Fiscal Year 2013 Total Visitors	**30,171**

PWD continues to encourage the efforts conducted by the FWW. More information has been provided in previous reports on the FWW programs; please refer to **SECTION II.G.4 EDUCATION PROGRAMS** on page 56 of the CSO-Stormwater FY 2012 Report.

II.G.5 Other Pollution Prevention Initiatives

Circular Free Program

Philadelphia residents or businesses that do not wish to receive hand delivered advertising circulars or handbills or local newspapers at their property can fill out a form for a "Circular Non-Delivery" decal to notify advertisement distributors to refrain from delivering advertisements to their property. Per Chapter 10-700 of the Philadelphia Code, the Department of Licenses and Inspections maintains a commercial handbill "Non-Delivery" list identifying all properties whose owners request non-delivery. If the property continues to receive circulars or advertisements from businesses, they can contact Department of Licenses and Inspections to fine violators. This helps prevent litter across the City by limiting the number of unwanted circulars from ending up in the street. During FY2014, 463 households registered to receive a "Circular Non-Delivery" decal. Since the inception of the program, a total of 9,255 households have signed up for the Circular Free Program.

Streets Department Litter Reduction Efforts

The Philadelphia Street Department conducts many programs to promote litter awareness to the public and provide numerous opportunities to ensure litter and trash is properly disposed of in the City.

Weekly Curbside Trash & Recyclable Pickup

The City continues to provide weekly curbside trash and recycling collections to residents throughout the entire year. Trash and recycling can also be dropped off at the City's three Sanitation Convenience Centers. Yard waste can be placed into trash receptacles and plastic bags and collected with residential trash, except during leaf season when it must be bagged separately in special biodegradable bags. Oversized items, such as refrigerators, washers, and dryers, must be taken to a Sanitation Convenience Center. Recyclables are also collected curbside, and the City has various recycling programs in place to encourage residents to recycle everything they can.

Recycling Rewards Program

The City partnered with Recyclebank to educate residents about more sustainable practices and provide incentives for recycling. Residents who enroll in the program can earn points that can be redeemed for discounts on groceries, entertainment, and gift cards. In order to participate, City residents must sign up for an account through Recyclebank's website. They then receive a sticker for their recycling bin that has a unique barcode that is scanned each time their curbside recycling is collected and points are deposited into the resident's account. The amount of points earned through recycling varies on the amount of recyclables the entire neighborhood produces such that there is an incentive to encourage other neighbors to recycle. Points can also be earned through educational activities available on Recyclebank's website. The program is offered to over 540,000 City residents and recently received the Outstanding Award in Public/Private Partnerships from the United States Conference of Mayors.

BigBelly™ Program

To assist in litter control, the City placed trash containers where the greatest accumulation of litter occurs: the downtown area and at most public parks. However, it became evident that at some locations, the trash containers were filling up quickly and often overflowed. Furthermore, recyclable items were mixed in with the regular waste due to the lack of separate receptacles. To address this issue, the City investigated potential solutions, eventually deciding on the BigBelly™ program. BigBelly™ trash bins are solar-powered trash compactors that take up no more sidewalk space than a regular outdoor trash container, but automatically compact the trash as it is thrown in, giving them more capacity. As of July 2014, there are now approximately 500 BigBelly™ trash bins in Center City, and another 460 in other commercial districts throughout the city. In addition there are over 600 standard wire baskets are also in place through the Philadelphia More Beautiful Committee (PMBC) Adopt-A-Basket program that provides block captains with wire waste baskets to distribute and manage across city neighborhoods. PMBC also organizes neighborhood cleaning events citywide. In the FY 2014 Clean Block season, 7,980 blocks were cleaned by 47,167 volunteers; 720 tons of trash were collected and removed.

Household Hazardous Waste Events

The Streets Department conducts Household Hazardous Waste (HHW) events several times throughout the city where people can properly dispose of used oil and other toxic materials. During FY 2014, the City of Philadelphia held 7 HHW Collection events, during which hazardous waste and computer material were collected and disposed of properly. These materials include oil, paint, and other toxic household substances. A summary of the collections over the last 8 fiscal years is provided below in **TABLE G.5-1**. More information on this program & other streets department programs including recycling and collection schedules are available to the public at http://www.philadelphiastreets.com/.

Table G.5-1 Household Hazardous Waste Collection Statistics (FY 2007 - 2014)

HHW Program Collection Summary	# of Attendees	Quantity Accepted (lbs)		
		HHW	Computers	Total
FY 2007 Total	3,358	240,198	59,660	299,858
FY 2008 Total	3,372	254,055	136,249	390,304
FY 2009 Total	3,711	250,903	237,270	488,173
FY 2010 Total	3,942	296,541	274,443	570,984
FY 2011 Total	3,803	256,337	338,181	594,518
FY 2012 Total	4,448	304,381	483,879	788,700
FY 2013 Total	4,852	287,003	571,995	858,998
FY 2014 Total	4,119	281,130,	652,185	933,315

FY 2014 Collection Event Details		# of Attendees	Quantity Accepted (lbs)		
Location	**Date**		**HHW**	**Computers**	**Total**
State Road and Ashburner	7/18/13	670	41,305	6,704	48,009
22nd & York	9/21/13	370	26,655	8,170	34,825
63rd Street	10/26/13	385	27,714	7,433	35,147
Delaware and Wheatsheaf	11/02/13	504	36,307	3,793	40,100
State Road and Ashburner	4/19/14	945	62,264	10,260	72,524
1st Highway Yard 4800 Parkside Ave	5/17/14	394	28,397	7,099	35,496
Domino And Umbria	6/14/14	850	58,488	8,726	67,214
Computers at Drop-off Sites (Estimated)	Year-wide			600,000	600,000
Total		**4,119**	**281,130,**	**652,185**	**933,315**

Philly Bagged Leaf Drive

During November and early December, the Philadelphia Streets Department hosts a Bagged Leaf Drive where, in addition to the regular weekly curbside pickup, curbside collection of bagged leaves is conducted throughout the entire City. Bagged leaves can also be dropped off at any of the three Sanitation Convenience Centers during this time. The leaves must be collected in biodegradable paper bag which can be purchased at nearby grocery stores and major home improvement retailers. The leaves and bags will be recycled and used for composting purposes like fertilizing gardens and nourishing trees. The use of the biodegradable paper bags reduces contamination in the recycling process, and allows crews to easily identify bags of leaves. Leaves set out in other bags or containers may be collected as rubbish. The collection and recycling of leaves helps reduce the amount of debris on streets and sidewalks, and conserves landfill space. This past year, the Philly Bagged Leaf Drive and Recycle Program was held from November 11 thru December 20, 2013.

Christmas Tree Recycling

Every January the Philadelphia Streets Department holds a two week event where bare, undecorated Christmas trees are collected at any of the City's three Sanitation Convenience Centers. The trees collected are composted or turned into mulch. In addition to the official services provided by the Philadelphia Streets Department, other community organizations across the City offer tree-cycling services. The tree collections reduce waste following the holiday season, and allow Christmas trees to be re-purposed instead of taking up space in landfills. This past year, Philadelphia residents were able to drop off their Christmas trees for recycling from January 6th through January 18th, 2014.

Tire Round-Up Program

In 1995, the Streets Department developed a Tire Round-Up Program to address the serious problem of illegally discarded tires in the city of Philadelphia. The program is designed to remove illegally discarded tires from the city streets, sidewalks, parks, alleys, and riverbanks. Registered volunteers participate in the program and receive a nominal reimbursement for the tires they collect and bring to designated drop-off sites. By collecting illegally discarded tires and properly disposing of them, it reduces the amount of materials that reach the waste stream. This effort also removes an unsightly and potentially hazardous material that contributes to the deteriorating conditions of our inner city neighborhoods.

Philly Spring Cleanup

Since 2007, the City of Philadelphia has implemented a city-wide volunteer campaign every spring to spruce up streets and parks. Dubbed "Philly Spring Cleanup", the campaign distributes supplies (trash bags, rakes, paint, gloves, brooms, and recycle bins) and enlists volunteers to assist with beautification projects and litter reduction. The Cleanup program also provides additional support to projects by assisting with planning, directing volunteers to organized sites, and collecting trash and recyclables at the conclusion of projects. The Philadelphia Streets Department initiated its 7th Annual Philly Spring Cleanup event on April 5th, 2014 where several clean-ups events are hosted at several locations in the City and Streets provides cleaning supplies to registered location. This year, 569 locations registered to take part in this event which included 14,225 volunteers; 65,000 trash & recycle bags; 4,000 brooms; 15,000 gloves; 3,100 shovels; 3,800 rakes and 1,000 gallons of paint. The 7th Annual Philly Spring Cleanup proved successful, as it was the largest event yet which resulted in 970,940 pounds of trash; 29,940 pounds of recyclables; 126,000 pounds of tires, distributing 3,200 recycle bins and cleaning 14 parks and recreational centers.

SWEEP Program

The efforts listed above are bolstered by Philadelphia's SWEEP program. SWEEP officers, employees of the Streets Department, work with residential communities to address locations with problematic amounts of litter and short dumping. . In cases of non-compliance, SWEEP officers will issue warnings and citations to the appropriate individuals. Between 2013 and 2014, over 29,000 tickets were issued.

Street Cleaning

Street cleaning conducted for the City has been discussed in further detail within the Stormwater portion of this report. For additional information on street cleaning and other public litter awareness, please refer to **SECTION F.8.D.II STREET AND INLET CLEANING PRACTICES** on page 125.

TTF Trash Force

Philadelphia's litter problem is a constant concern throughout the city, but in recent years, more targeted efforts have been initiated in the Tacony Creek watershed and its stream corridor. PWD gathered members of different City agencies including Streets and Philadelphia Parks and Recreation (PPR), as well as representatives from the TTF Watershed Partnership, SEPTA, United by Blue, and Keep America Beautiful, to initiate discussion and coordinate efforts to alleviate the litter problem and its impact on Tacony Creek.

The Task Force started by conducting neighborhood and park cleanups while an overall plan was being considered. The team decided to find a pilot study drainage area and outfall to assess, monitor and start exploring strategies for managing trash transport and accumulation in the area. After the outfalls and the corresponding drainage areas were investigated, the Task Force decided to invest into the T04 outfall drainage area, due to its small area drainage and diverse land use. Since December 2013, the Task Force contracted Temple University to conduct weekly surveys of trash accumulation in inlets, in the street, the park, and the stream in the T04 area. The goal of the study is to establish trash resources and transport methods and then experiment with trash management practices which can then be applied to other drainage areas.

The Task Force is continuing to research and explore methods for reducing the trash problem. PWD is currently developing a grant application for acquiring more street sweeping trucks and working with Streets, PPR, and the TTF Partnership to enhance the trash program by continuing to conduct trash cleanups, adding waste receptacles, maintenance, education and outreach, enforcement, and capture within the sewers or stream corridor. Trash management practices and regulations from other urban areas are being researched as well.

Community and Watershed Partnership Pollution Prevention Efforts

The pollution prevention efforts including public education events, park and stream clean-ups conducted by the City's community and watershed partnerships are important to the success of making the City a better place to live. For additional information on the City's Watershed Partnerships, please refer to **SECTION III.C WATERSHED BASED MANAGEMENT** on page 59.

II.H Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts (NMC 8)

PWD has developed and will continue to develop a series of informational brochures and other materials about its CSO discharges and the potential effects these discharges have on the receiving waters. In addition, PWD has enlisted watershed organizations and partnerships to assist in this endeavor to raise the level of citizen awareness about the function of CSO and stormwater outfalls through a variety of educational mediums.

II.H.1 Launch a Proactive Public Notification Program Using Numerous Media Sources

PWD is advancing a proactive public notification program that uses print, internet, outfall signage, and other media to distribute information on the locations of CSOs, information on hazards, and potential public actions.

CSO Outfall Signage

The CSO signage project was initiated to inform the public of the potential hazards of contact with the stream during combined sewer overflow events. The signs, placed at outfalls that are accessible by the public, let people know that during wet weather it is possible for polluted water to flow from the outfall and it would be hazardous to their health to contact the water during such events. They also request that PWD is informed of any overflows during dry weather and provide an emergency contact number. Additional information on outfall signage was provided in previous reports; please refer to **III.C.3.5 INTERPRETIVE SIGNAGE - CONTINUE TO IMPLEMENT INTERPRETIVE SIGNAGE** on page 125 of the CSO-Stormwater FY 2012 Annual Report

CSO Identification Signage

Signage was installed at each of Philadelphia's CSO outfalls, with the exception of 8 difficult to reach sites. The CSO outfalls now have identification signs displaying their outfall ID number. These signs allow for the identification of outfalls when the public is reporting a problem.

Additional information on this CSO identification signage was provided in previous reports; please refer to **III.C.3.5 INTERPRETIVE SIGNAGE - CONTINUE TO IMPLEMENT INTERPRETIVE SIGNAGE** on page 125 of the CSO-Stormwater FY 2012 Annual Report

Other Notification Measures

PWD continues to develop informational materials and maintain websites to educate the public about its CSO discharges and the potential effect on receiving waters. PWD has found that one of the best ways for public notification of CSOs is through the traditional public outreach programs described in NMC7: Pollution Prevention Program, please refer **SECTION II.G – POLLUTION PREVENTION** on page 32.

II.H.2 Expand the Internet-Based Notification System (RiverCast) to the Tidal Section of the Lower Schuylkill River

In order to expand the web-based water quality forecasting system for the Schuylkill River, RiverCast, PWD developed another internet-based notification system called CSOcast in 2008, which reports on the overflow status of outfalls in every CSO shed. The purpose of this notification system is to alert the public of possible CSOs from Philadelphia's combined sewer system outfalls. When a combined sewer outfall is overflowing, and for up to a period of 24 hours following a rainfall event, conditions may be unsafe for recreational activities in the water body due to possible pollutant contamination. The CSOcast notification system can be accessed through: http://www.phillywatersheds.org/what_were_doing/documents_and_data/live_data/csocast.

The website is built using the Google Maps API which allows for the dynamic loading of geographically referenced data that can be viewed with a familiar and user-friendly interface. The map is available 24 hours a day and displays the most up-to-date data available (shown in **FIGURE II.H.2-1**). PWD is constantly updating and improving the notification system as well as the flow monitoring network in order to deliver the best information possible to the public. During FY 2014, CSOcast reported on the 164 CSO outfalls twice a day and the CSOcast webpage has been viewed 5,307 times in FY 2014 by 2,179 unique visitors.

Occasionally the CSOcast site is brought down for maintenance, typically over a weekend. When known outages are anticipated or observed, a message is displayed on the website informing the public about the status of the CSOcast site. Although PWD's general message is that whenever there is a perceivable rainfall, the CSO outfalls may be discharging, and people should stay out of the Cobbs and Tacony-Frankford creeks during and immediately following rain storms. The CSOcast was developed to inform people of the locations of the CSOs while aiming to make sure that the basic messaging is understood in all of the affected stream systems.

For more information that has been provided in previous reports, please refer to **SECTION II.H.2 EXPAND THE INTERNET-BASED NOTIFICATION SYSTEM TO THE TIDAL SECTION OF THE LOWER SCHUYLKILL RIVER** on page 61 of the FY 2012 Annual Report.

II.I Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls (NMC 9)

II.I.1 Report on the Status and Effectiveness of Each of the NMCs in the Annual CSO Status Report

The CSO Annual Report, combined with the Stormwater Annual Report, will be submitted in September of each year, documenting the previous fiscal year activities.

III Implementation of the LTCP

III.A CSO LTCP Update - Report on the progress of the LTCP Update

The full Philadelphia Combined Sewer Overflow LTCPU report can be found at the following address: http://www.phillywatersheds.org/ltcpu.

An amended Consent Order & Agreement was signed by PWD and PADEP on June 1, 2011, amending *the Green City, Clean Waters* Program. For details on these amendments, please refer to **SECTION III.A CSO LTCUP UPDATE – REPORT ON THE PROGRESS OF THE LTCP UPDATE** on page 82 of the CSO-Stormwater FY 2011 Annual Report.

Please refer to **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** for an update on implementation progress.

III.B Capital Improvement Projects

The Capital Improvement's phase of the PWD's CSO strategy is focused on technology-based capital improvements to the City's sewerage system that will further increase its ability to store and treat combined sewer flow, reduce inflow to the system, eliminate flooding due to system surcharging, decrease CSO volumes and improve receiving body water quality. PWD will continue to operate CSO capital improvement projects that were planned during the previous permit cycle to increase the capture and treatment of combined sewage. **TABLE III.B-1** provides a status update on the 17 capital projects selected by PWD in the 1997 LTCP to provide significant CSO load reduction.

Table III.B-1: Summary of 1997 CSO LTCP Capital Projects

Project	Status
Real Time Control (RTC) Program	
RTC - Main Relief Sewer Storage (R-7 through R-12)	Complete
RTC - Tacony Creek Park Storage (T-14)	Complete
RTC - Rock Run Relief Sewer Storage (R-15)	Complete
Establish RTC Center	Complete
RTC & Flow Optimization (Southwest Main Gravity Interceptor, Cobbs Creek Cut-Off, and Lower Schuylkill West Side)	Complete
Targeted Infiltration/Inflow Reduction Programs	On-Going
Solids & Floatables Control Program	On-Going
85% CSO Capture Pennypack Watershed (P1 through P5)	Complete
Eliminate Outfalls: Dobson's Run Phase I	Complete
Eliminate Outfalls: Dobson's Run Phase II & III	Complete
Eliminate Main & Shurs Overflow (R-20)	Complete
Eliminate 32nd & Thompson Outfall (R-19)	Complete
Collection System Improvements	
Upgrade Frankford Siphon	Complete
Somerset Interceptor Sewer Conveyance Improvements	Complete
Cobbs Creek Low Level Conveyance Improvements	Complete
Cobbs Creek Low Level Control Project	Complete
Water Pollution Control Plant (WPCP) Wet Weather Treatment Maximization Program	Complete

III.B.1 On-going Capital Improvement Projects

III.B.1.1 Completion and Operation of the Real-time Control Center and Rehabilitate and Maintain the Monitoring Network

PWD has continued to maintain the RTC Center. Since the center was completed in 2003, PWD has connected to the RTC Center to collector system components, providing access to real time information and controls through the RTC telecommunication system. For information pertaining to this topic, please refer to **SECTION II.B.4 - FULLY INTEGRATE THE REAL-TIME CONTROL FACILITY INTO THE OPERATIONS OF PWD** on page 19 of this report.

PWD continues to maintain and, when necessary, rehabilitate the monitoring network. For details on FY 2014 maintenance of monitoring network, please refer to **SECTION II.B.2 - CONTINUE TO OPERATE AND MAINTAIN A NETWORK OF PERMANENT AND TEMPORARY FLOW MONITORING EQUIPMENT** on page 16 of this report.

III.B.1.2 WPCP Wet Weather Treatment Maximization (NE)

PWD has evaluated and implemented options listed within the January 2000 Stress Testing Report. The plant stress-testing project allowed for a determination of existing and future optimum flows, loads, and operations of the various unit processes. Modifications were made to each of the three WPCPs through Capital Improvement Projects (CIPs). This topic has been discussed in previous reports; for more information and additional details on the evaluation process and potential upgrade options, please refer to **SECTION III.B.1.2 WPCP WET WEATHER TREATMENT MAXIMIZATION (NE)** on page 66 of the CSO-Stormwater FY 2012 Annual Report.

III.B.1.2.1 Evaluate Stress Test Report Options in the LTCPU

PWD has completed an analysis of the Wet Weather Treatment Alternatives listed within the Stress Test Report for the three WPCPs in March of 2009. Several wet weather treatment technologies were evaluated, including Vortex Swirl Concentrators, Conventional Clarifiers, Chemically Enhanced Primary Treatment with Conventional Clarifiers, and Ballasted Flocculation. Section 8 option I-35 of the LTCPU document summarizes the wet weather expansion capacity at each of the WPCPs in more detail. These three reports conducted for each of the WPCPs were submitted as part of the LTCPU under the Supplemental Documentation Volumes 9 through 11, are available on-line at: http://www.phillywatersheds.org/ltcpu. Additional information has been provided in previous reports; please refer to **SECTION III.B.1.2.1 EVALUATE STRESS TEST REPORT OPTIONS IN THE LTCPU** on page 69 of the CSO-Stormwater FY 2012 Annual Report.

III.B.1.2.2 Implement Options 1, 2, and 4 from the Stress Test Report

Options 1, 2 and 4 have been completed as of January 2006, fulfilling all permit obligations on this portion of the project. For previously reported information, please refer to **SECTION III.B.1.3.2 IMPLEMENT OPTIONS 1, 2, AND 4 FROM THE STRESS TEST REPORT** on page 91 in the CSO-Stormwater FY 2010 Annual Report.

III.B.1.2.3 Plan, Design, and Construct Options 5 & 7 of the Stress Test Report to Increase the Secondary Plant Capacity to 435 MGD

Options 5 & 7 were completed and the modified conduits configurations are currently in service as of February and August 2012, respectively. Additional details on the implementation of these two options have been provided in previous reports; please refer to **SECTION III.B.1.2.3 PLAN, DESIGN, AND CONSTRUCT OPTIONS 2 & 6 FROM THE STRESS TEST REPORT** on page 70 in the CSO-Stormwater FY 2012 Annual Report.

III.B.1.2.4 Explore increasing the preliminary treatment, primary treatment, and final effluent disinfection treatment capacities in excess of the existing secondary treatment capacity at the NE WPCP

PWD has explored several options on increasing the preliminary treatment, primary treatment, and final effluent disinfection treatment capacities in excess of the existing secondary treatment capacity at the NE WPCP. These options were discussed in further detail, including design and construction performance standards within the NE WPCP Facility Concept Plan. This plan was originally submitted to the PADEP on June 1, 2013. The NE Facility Concept Plan was revised based on comments from PADEP and re-submitted on December 31, 2013. This plan is available on-line through the following website: http://phillywatersheds.org/doc/NE%20Facility%20Concept%20Plan%20-%20Final_FINAL.pdf

III.B.1.2.5 Initiate the Facility Planning and Design for the By-pass Conduit

On February 26, 2009, PWD submitted to the PADEP a letter documenting the evaluation of capturing an additional 100 MGD and greater of combined sewer wet weather flows at the Northeast plant by bypassing secondary processes when flows exceed secondary treatment capacity. The PADEP responded to this letter on April 1, 2009, approving the bypass of secondary treatment for 100 MGD of additional wet weather flow. The allowance of additional higher flows would be approved following a demonstration project for bypass flows in excess of 100 MGD. As described in the LTCPU, PWD committed to the expansion of the NE WPCP to include a 215 million gallon/day secondary treatment bypass. PWD proceeded with a design and the bypass of the plant secondary processes for total plant flows that exceed 435 MGD is currently under construction.

III.B.1.2.6 Report to the DEP the Status of these Projects in the Annual Status Reports when Major Work Elements are Completed

The CSO Annual Report continues to include information in the WPCP wet weather treatment maximization at the NE WPCP.

III.B.1.3 85% Capture (NE) - 85% Flow Capture Technical Report

PWD submitted a technical memo documenting the 85% capture in the Pennypack Watershed in August 2008. For previously reported details, please refer to **SECTION III.B.1.3 85% CAPTURE (NE)** on page 71 of the CSO-Stormwater FY 2012 Annual Report.

III.B.1.4 In-Line System Storage Projects (NE)

Information on PWD's in-line system storage projects have been collectively reported on in **SECTION II.B.5 OPERATE AND MAINTAIN IN-LINE COLLECTION STORAGE SYSTEM PROJECTS CONTAINED WITHIN THE LTCP** of this report, starting on page 20.

III.B.1.5 Real Time Control (RTC) and Flow Optimization for the Southeast Drainage (SE)

Since no project with this name exists, this may actually be referring to content contained within **SECTION III.B.1.7: REAL TIME CONTROL (RTC) AND FLOW OPTIMIZATION FOR THE SOUTHWEST DRAINAGE (SW)** which is discussed on page 55 of this report.

III.B.1.6 WPCP Wet Weather Treatment Maximization (SW)

III.B.1.6.1 Implementation of the Southwest Plant Stress Test Report Option 1

The December 2001 SW WPCP Stress Test identified 7 potential upgrade options at the Southwest WPCP. PWD has evaluated the upgrade options to determine which improvements are necessary to meet PWD's operation commitment to treat wet weather flow of 490 MGD to achieve the CSO control goals stated in the LTCPU and its supplements. Option 1, to inspect and repair leaking weirs and concrete surfaces in the final sedimentation tanks at the Southwest Plant, was completed in April of 2002. Option 1 and other improvements were also discussed in further detail within the Facility Concept Plan for the Southwest Water Pollution Control Plant that was submitted to the PADEP on June 1, 2013. This plan is available on-line through the following website: http://phillywatersheds.org/doc/SW%20Facility%20Concept%20Plan%20-%20Final_FINAL.pdf. Additional information on this permit commitment has been provided in previous annual reports; please refer to **SECTION III.B.1.6.1**

IMPLEMENTATION OF THE SOUTHWEST PLANT STRESS TEST REPORT OPTION 1 on page 74 of the CSO-Stormwater FY 2012 Annual Report.

III.B.1.6.2 Analyze wet weather treatment capacity expansion as part of LTCPU

Please refer to **SECTION III.B.1.2.1 "EVALUATE STRESS TEST REPORT OPTIONS IN THE LTCPU"** on page 52 of this report for information on how wet weather treatment capacity expansion was analyzed as part of the LTCPU.

III.B.1.7 Real Time Control (RTC) and Flow Optimization for the Southwest Drainage (SW) - Implementation of Projects for Real Time Control (RTC) and Flow Optimization for the Southwest Drainage District

A number of inter-related projects in the Southwest Drainage District (SWDD) were determined to enhance the operation of the high-level and low-level collection systems and consequently maximize capture and treatment of wet-weather flows at the SWWPCP. As of April 2010, PWD has completed several modifications to the SWDD collection system in order to improve capacity and reduce the frequency and volume of CSO discharges.

These modifications include enlarging the DWO pipe and raising the diversion dam at the C17 regulator, and modifying the operation of CSPS based on the level in the Cobbs Creek High Level (CCHL) interceptor. Additional modifications include opening of all the barrels from 70th & Dicks to the SW WPCP, and decreasing overflows in the LSWS interceptor by enlarging the S45 DWO pipe.

More information on these projects was provided in previous reports; please refer to **SECTION III.B.1.8 REAL TIME CONTROL AND FLOW OPTIMIZATION FOR THE SOUTHWEST DRAINAGE** on page 74 of the CSO-Stormwater FY 2012 Annual Report.

III.B.1.8 RTC/Main Relief Sewer Storage (SW) - Construction and Implementation of Main Relief Sewer Storage and Real-time Control

Please refer to **SECTION II.B.5.1 "MAIN RELIEF"** on page 20 of the CSO portion of the FY2014 Annual Report for information pertaining to this topic.

III.B.1.9 Eliminate CSO/Dobsons Run Project (SW) - Construction and Implementation of the Dobson's Run Project

Phase I (Stokely & Roberts – R22) of the Dobson's Run Reconstruction was completed in 1998. Phase II (Kelly Drive – S01T) of this project consisted of the sewer reach from Henry Ave. to Kelly Drive and eliminated branch sewer contributions of sanitary sewage from reaching temporary CSO S01T. Phase III eliminated all CSO discharge from occurring at S01T. Phases II & III were completed in February of 2011. Additional information on this project has been provided in previous reports; please refer to **SECTION III.B.1.10 ELIMINATE CSO/DOBSONS RUN PROJECT** on page 95 of the CSO-Stormwater FY 2011 Annual Report.

III.B.1.10 Eliminate CSO/Main and Shurs Off-Line Storage (SW) - Construction and Implementation of the Main and Shurs Off-line Storage Project

The Main Interceptor Sewer, which is located along the Schuylkill River adjacent to the Manayunk Canal in the northwest section of Philadelphia, conveys sewage from collection systems which serve the northwest section of the City. During extreme wet weather events, the Main Interceptor Sewer exceeds its capacity and overflows occur at relief point R20 into a storm sewer upstream of stormwater outfall S-052-5. To abate the hydraulic overload conditions in the Main Interceptor Sewer, PWD finished constructing a three million gallon offline storage tank in May of 2013, which will capture and store excess flows, eliminating surcharges and preventing overflow conditions at relief point R20. The three million gallon concrete storage tank, head house building, and a performing arts center are being constructed on Venice Island, an artificial island between the Manayunk Canal and the Schuylkill River created when the Manayunk Canal was dug out. The storage tank will accommodate sanitary sewer/combined sewer overflow (SSO/CSO) that currently averages approximately 10 million gallons of untreated wastewater each year and will return it to PWD's Southwest WWTP.

On November 5th 2013, the Venice Island Storage facility became fully operational. The basin has been utilized during seven storm events (11/27/2013, 12/29/2013, 4/30-5/1/2014, 5/16/2015 and 5/28/2014) storing a total estimated volume of 5.17 MG of sanitary wastewater. On only one occasion, 4/30/2014, did relief point R20 overflow following a significant storm event where the Schuylkill River flooded above the ground surface.

PWD is currently performing periodic grit surveys of the Upper Schuylkill East Side Interceptor, which feeds the Venice Island Storage Facility, in order to best understand grit type, accumulation frequency and how these factors will impact performance of the Venice Island Facility. By taking a proactive approach, PWD can schedule necessary flushing and sewer cleaning in order to maximize the Venice Island Facility's storage capacity.

During FY2014, the Performing Arts Center associated with this project was fully constructed. In addition, an athletic recreational area, a spray-park and new parking lot have been completed for this project.

III.B.2 New Capital Improvement Projects to be Included in LTCPU

III.B.2.1 Asset and Capacity Management Program - Implement a Comprehensive Geographic Information System (GIS) of the City sewer system, Implement a Comprehensive Sewer Assessment Program (SAP), and Continue to Institutionalize a Comprehensive Monitoring and Modeling Program

PWD maintains a comprehensive asset and capacity management program. Please refer to the following sections for more information on our programs.

Please refer to **II.A.1 – "IMPLEMENT A COMPREHENSIVE GEOGRAPHIC INFORMATION SYSTEM (GIS) OF THE CITY SEWER SYSTEM"** on page 13 for more information on the City's GIS program.

Please refer to **SECTION II.A.2 "IMPLEMENT A COMPREHENSIVE SEWER ASSESSMENT PROGRAM (SAP)""** on page 14 for more information on SAP.

Please refer to **II.B.1 – "CONTINUE TO INSTITUTIONALIZE A COMPREHENSIVE MONITORING AND MODELING PROGRAM"** on page 15 for more information on Monitoring and Modeling.

III.B.2.1.1 Inflow/Infiltration (I/I) Controls

PWD continues to evaluate our sewer system for instances of inflow and infiltration. PWD's approaches to I/I Controls have been discussed in the previous annual reports. Please refer to **SECTION III.B.2.2 INFLOW/INFILTRATION CONTROLS** on page 81 in the CSO-Stormwater FY 2008 Annual Report.

Tide Inflow

This program was completed in 1999, and PWD continues to inspect and maintain all tide gates to ensure their correct performance. For additional details on this program, please refer to **SECTION 2.1.2 CORRECTIVE ACTIONS – TIDE INFLOW** on page 28 of the 2001 CSO Annual Status Report.

Sewer Assessment Program

The SAP is one of the tools used to identify and remediate areas of I/I as well as guide the capital improvement program to ensure that the existing sewer systems are adequately maintained, rehabilitated, and reconstructed. Please refer to **SECTION II.A.2 "IMPLEMENT A COMPREHENSIVE SEWER ASSESSMENT PROGRAM (SAP)"** on page 14 of this report for more information on this program.

Infrastructure Assessments

As of FY2008, infrastructure assessments have been completed for all watersheds within the City, and PWD continues to monitor and inspect for problem areas. For additional details on these assessments, please refer to **SECTION III.B.2.2 INFRASTRUCTURE ASSESSMENTS** on page 82 of the CSO-Stormwater FY 2008 Annual Report.

Interceptor Relining

Planning and design is underway for the relining of the entire length of interceptor within Philadelphia in the Cobbs Creek and Tookany/Tacony-Frankford Watersheds. Additional details on the progress of interceptor relining occurring in the Cobbs Creek and Tookany/Tacony-Frankford Watersheds are discussed in the **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** on page 24.

PC-30 Parallel Relief Sewer

PWD constructed a parallel relief sewer to eliminate overflows at manhole PC-30 as per a Consent Order and Agreement (COA) issued by the PADEP in September of 2007. The overflows at PC-30 were caused by a combination of various factors which influence the hydraulic carrying capacity of the Poquessing Creek Interceptor during wet weather events. These factors include excessive wet weather flows discharged to the interceptor above manhole PC-30 from the municipalities located in Bucks and Philadelphia Counties in addition to insufficient peak wet weather carrying capacity in the interceptor. To abate hydraulic overflow conditions in the Poquessing Interceptor, PWD proposed measures to reduce I/I in the interceptor during wet weather events. The parallel relief sewer constructed in State Road is approximately two miles in length and will capture and convey extraneous wet weather flows to the Upper Delaware low-level interceptor. The project and all stipulations of the COA regarding the parallel relief sewer were completed on 12/27/11. As of July 2013, the parallel relief sewer and all appurtenances have been operating as designed.

During fiscal year 2014, there was one overflow event at manhole PC-0030. The overflow event occurred from April 30th to May 1st 2014. This event qualified as exempt based on the conditions as outlined in the design parameters of the system. Detailed information regarding this event can be found in the monthly report previously submitted to PADEP.

Numerous sewer lining projects were initiated from the COA for the PC-30 area in order to reduce infiltration and inflow. Sewer linings at Colman Rd, Colman Place, Colman Terrace, and Basile Roads were completed in FY2013. Sewer linings at London Road, Narcissus Road, Red Lion, Derry Terrace, Fairdale Road, Morning Glory, Academy and Comly Roads were completed in FY2014. A Derry Terrace sewer lining project has been identified and is expected to be completed within the next year.

For additional details on this project reported in previous reports, please refer to **SECTION III.B.2.1.1 PC-30 RELIEF SEWER** on page 80 of the CSO-Stormwater FY 2012 Report.

III.B.2.1.2 Sewer Separation

Sewer separation was studied and modeled as one of the options in the LTCPU and deemed cost prohibitive. No sewer separation projects have been identified or implemented during the reporting period.

III.B.2.1.3 New Storage Facilities

PWD is continuing to investigate opportunities to construct off-line CSO storage facilities to maximize existing sewer treatment capacity and increase the volume of CSO captured and treated. No new storage facility projects have been identified or implemented during the reporting period.

III.C Watershed-Based Management - Continue to Apply the Watershed Management Planning Process and Produce and Update the Watershed Implementation Plans

Watershed Alliance of Southeastern Pennsylvania

In 2013, PWD and its designated watershed partnership facilitator, the Pennsylvania Environmental Council (PEC), initiated the Watershed Alliance of Southeastern PA to unite the watershed partnerships in the Philadelphia area. The goal of the Alliance is to build upon the collective strength of municipal leaders to protect and restore quality of life through innovative stormwater management. Through this model, workshops and stakeholder outreach previously performed by individual partnerships have been united under the Alliance umbrella. This more centralized approach allows individual partnerships to convene only as needed. Through the Watershed Alliance of Southeastern PA, PEC has also combined resources with the William Penn Foundation's Delaware Watershed Protection Initiative, which includes an upstream Philadelphia Cluster. These efforts have yielded an implementation plan detailing both potential stormwater control projects as well as strategies for monitoring, modeling and outreach.

In FY 2014, PEC continued to promote the Alliance though education and outreach, water quality monitoring, financing for stormwater management and stormwater control measure programs. Approximately 530 stakeholders and municipal officials attended 31 events.

Tookany/Tacony-Frankford Watershed Partnership

In 2000, the PWD launched the Tookany/Tacony-Frankford Watershed (TTF) Partnership as an effort to connect diverse stakeholders as neighbors and stewards of the watershed. In 2005, under PWD's leadership, the Partnership formally incorporated as an independent 501(c)(3) non-profit organization. This partnership elects a Board of Directors each year and has received its tax exempt status as the first multi-municipal watershed partnership in the region. TTF hired its first Executive Director in 2007, with the current Executive Director joining the organization in 2011. It now has a full-time staff of six. In FY 2014, the TTF Watershed Partnership held 100 outreach events with approximately 4,000 participants in attendance. For previously reported information on this partnership, please refer to **SECTION III.C.1 TOOKANY/TACONY-FRANKFORD WATERSHED PARTNERSHIP** on page 86 of the CSO-Stormwater FY 2012 Report.

Darby – Cobbs Watershed Partnership

During the past fiscal year, the Partnership focused on outreach and education, to identify project opportunities and monitoring strategies through the William Penn Foundation's Delaware Watershed Protection Initiative. Additionally, the Partnership organized many activities during FY 2014, including various workshops, municipal meetings, and greening efforts. The main topics of focus were large landowner GSI outreach, rain gardens, Mowing to Meadows, citizen stream monitoring and MS4 permit compliance. The formation of a Friends of Cobbs Creek group, remained an ongoing project in FY 2014, aided by Philadelphia Parks and Recreation. For previously reported information on this partnership, please refer to **SECTION III.C1 DARBY-COBBS WATERSHED PARTNERSHIP** on page 87 of the CSO-Stormwater FY 2012 Report.

Pennypack Creek Watershed Partnership

The Partnership continues to organize activities to involve the community in improving the watershed. These efforts led to PA DEP's approval of the Pennypack Creek Watershed Act 167 Plan on July 22, 2013. In FY 2014, the partnership provided education and outreach on monitoring to identify potential projects under the William Penn Foundation's Delaware Watershed Protection Initiative. The partnership also conducted workshops on rain gardens, citizen steam monitoring, Mowing to Meadows and municipal MS4 compliance.

Poquessing Creek Watershed Partnership

The Poquessing Creek Watershed Partnership holds a range of public education and outreach activities and events every year for local residents. In FY 2014, the Partnership built upon their previous work on the Glen Foerd stream bank restoration project An additional 10 volunteers created a path through the restoration area, clearing invasive species. The Poquessing Partnership also participates in the Philadelphia Cluster of the William Penn Watershed Initiative developing programs for citizen monitoring and identification of stormwater projects in the watershed.

Delaware Direct Watershed Partnership

During FY 2014, the Partnership was focused on acquiring grant funding to support restoration projects throughout the watershed. The Kensington & Tacony Trail, an abandoned riverfront rail line, is a shoreline restoration and trail alignment project. Similarly, the partnership collaborated with PEC and Philadelphia Parks and Recreation on a shore restoration effort along the Bridesburg Waterfront. The partnership has also collaborated on outreach and education for the Spring Garden Greenway including public meetings and bike tours. Approximately 100 people participated in 11 events.

Wissahickon Creek Watershed Partnership

PWD continued to participate in the Wissahickon Partnership during FY 2013 in hopes that the Partnership will develop a watershed-wide restoration vision. The Partnership organized many activities during FY 2014, including various workshops, municipal meetings, and greening efforts. The main topics of focus were Act 167 Planning, TMDLs, MS4 Multi-Municipal Outreach, William Penn Foundation's Delaware Watershed Initiative, Rain Gardens, Mowing to Meadows and the Wissahickon Valley Watershed Association Committee. The draft of the Wissahickon Watershed Act 167 plan was completed and presented at a public meeting in Whitemarsh Township on June 16, 2014.

Schuylkill River Watershed Partnership (Philadelphia-Based Partnership)

PWD continues to support the Schuylkill Action Network (SAN), a regional watershed partnership dedicated to improving the water resources of the Schuylkill River Watershed through strategic implementation of protection measures. More information on the SAN can be found in **SECTION II.G.2.3** on page 34 of this Annual Report.

Implementation Planning - Development of Target Approach for Meeting Goals and Objectives

The culmination of the watershed management planning process often results in an Integrated Watershed Management Plan (IWMP), or a watershed-specific planning document. The process for developing watershed planning documents has evolved and depends on the interests of the partnerships. **TABLE III.C.1-2** contains the current status of the various plans in each of Philadelphia's watersheds. Information on the each of the watersheds and the completed plans can be found at www.phillywatersheds.org/your_watershed.

The Cobbs Creek IWMP was completed in October 2004 and can be accessed online through the following website:
http://www.phillywatersheds.org/doc/Darby_Cobbs_WMP.pdf .

The Tookany/Tacony Creek IWMP was completed in May 2005 and can be accessed online through the following website:
http://www.phillywatersheds.org/doc/Tacony_Frankford_WMP.pdf .

The watersheds in the MS4 section of the City have undergone a slightly different process. In these watersheds (Pennypack, Poquessing, and Wissahickon), the stakeholder goals and objectives were established through the development of Rivers Conservation Plans and Act 167 Plans. PWD has decided to work with the watershed partners through these existing watershed-based planning efforts. Details on the Act 167 Plans can be found in **SECTION III.C.3.7 BASIN-SPECIFIC STORMWATER MANAGEMENT PLANS (ACT 167)** on page 76. The Act 167 process has met PWD's goal to have watershed-wide commitment to the watershed planning process, and allows the process to be partner-driven and focus on implementation. Many of the recommended management options in the TTF and Cobbs Creek IWMPs have been institutionalized a city-wide basis and continue to be implemented.

Table III.C.1-2 - Planning being completed in each watershed

Watershed	Preliminary Reconnaissance	Watershed Monitoring Program	River Conservation Plan	Watershed Management Plan	Implementation Commitment Status
Delaware River (tidal, non-tidal)	Monitoring Only		Completed in 2011	PWD continues to work with watershed partners on implementing specific projects.	Philadelphia commitment documented in the LTCPU and its supplements.
Cobbs-Darby Creeks	2003	2003	Darby RCP completed in 2005 by Darby Creek Valley Association	Completed 2004	Philadelphia commitment documented in the LTCPU and its supplements.
Tacony-Frankford Creek	2000/2001	2004	Completed in 2004	Completed 2005	Philadelphia commitment documented in the LTCPU and its supplements..
Pennypack Creek	2002	2007-2008	Completed in 2005	Act 167 Stormwater Management Plan approved in July 2013	PWD is planning Stormwater Regulation changes to implement the Act 167 Plan.
Schuylkill River (tidal, non-tidal)	Monitoring Only		Completed in 2001 by the Academy of Natural Sciences, Natural Lands Trust, and the Conservation Fund	PWD continues to work with watershed partners on implementing specific projects.	Documented in the LTCPU and its supplements.
Poquessing Creek	2001	2008-2009	Completed in 2007	Act 167 Stormwater Management Plan approved August 28, 2013.	PWD is planning Stormwater Regulation changes to implement the Act 167 Plan.
Wissahickon Creek	2001	2005-2006	Completed in 2000 by FPC	Initiated in 2005, anticipated completion after the development of Act 167 plan and municipal TMDL commitments – (projected 2014).	PWD is planning Stormwater Regulation changes to implement the Act 167 Plan. A Wissahickon TMDL Implementation Plan was submitted in 2012. Implementation plan depends on watershed partnership support for a watershed-wide initiative.

III.C.1 LAND: Wet-Weather Source Control

Watershed management fosters the coordinated implementation of programs to control sources of pollution, reduce polluted runoff, and promote managed growth in the City and surrounding areas, while protecting the region's drinking water supplies, fishing and other recreational activities, and preserving sensitive natural resources such as parks and streams.

PWD is committed to a balanced "land-water-infrastructure" approach to achieve its watershed management and CSO control goals. Where appropriate, this method includes infrastructure-based approaches, but focuses on implementation of a range of land-based stormwater management techniques and physical reconstruction of aquatic habitats where appropriate. The ultimate goal of PWD's approach is to regain the resources in and around streams that have been lost due to urbanization, both within the City of Philadelphia and in the surrounding counties, while achieving regulatory compliance objectives in a cost-effective manner. Central to all of these planning programs is a commitment to greening, sustainability, open space, waterfront revitalization, outdoor recreation, and quality of life.

The wet-weather source controls have been formalized in the LTCPU and its supplements, including the Consent Order and Agreement signed on June 1, 2011, which formally approved the *Green City, Clean Waters* program.

Detailed information on the Land-based wet-weather source controls can be found in **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT.**

III.C.1.1 Ordinance and Regulations Modifications - Continue to review and revise stormwater management regulations for development and redevelopment

PWD's Stormwater Management Regulations became effective in Philadelphia on January 1, 2006, which provided PWD with an opportunity to ensure development/ redevelopment that protects our water resources, reduces neighborhood flooding, and improves the quality of life in our communities. The Stormwater Management Regulation is triggered by projects which involve earth disturbance 15,000 square feet or greater. PWD is considering additional ways to improve and strengthen its stormwater programs during the LTCPU process. Additional incentives are being considered to further stimulate innovative stormwater designs as described in **APPENDIX B - GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** on page 19.

The complete stormwater regulations for the City of Philadelphia can be found at http://pwdplanreview.org/WICLibrary/StormwaterRegulations.pdf

Please refer to **SECTION F.5.B "POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT"** on page 117 for more information on the Stormwater Management Regulations.

III.C.1.2 Conduct workshops on LID

PWD staff in charge of Stormwater Regulation implementation hold weekly walk-in hours. The development community is invited to discuss general and technical details about their projects. Guidance is given by PWD staff on stormwater management implementation.

III.C.1.3 Implementation of Stormwater BMPs and LID - Continue to implement best management and LID demonstration

PWD continues to implement stormwater BMPs and LID, now referred to as Green Stormwater Infrastructure (GSI) through the Green City, Clean Waters program. Please refer to **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** beginning on page 9 for a detailed description on the City's implementation of GSI during FY 2014.

III.C.1.4 Catch Basin Control Program - Continue to maintain the trapped inlets

PWD continues to maintain all City-owned inlets and catch basins to ensure they are clear and operating correctly. For a full description of the activities conducted by inlet cleaning programs during FY 2014, please refer to **SECTION II.F.1 "CONTROL THE DISCHARGE OF SOLIDS AND FLOATABLES BY CLEANING INLETS AND CATCH BASINS"** on page 27.

III.C.1.5 Impervious Cover Disconnection - Evaluate the feasibility of separating the stormwater runoff from large impervious land tracts for management and direct discharge

PWD is working to separate the stormwater runoff from large impervious land using many different approaches such as a parcel-based stormwater billing system, related incentives and plan review for new and redevelopment.

<u>Parcel-based Stormwater Billing</u>

Beginning July 1, 2010, PWD began a 4-year phase-in for parcel-based stormwater charges. Residential accounts pay a flat fee based on the average gross and impervious area of all residential properties in the city, and non-residential accounts pay a variable charge based on the property's specific gross area and impervious area. As of July 1, 2014, all accounts in the City have transitioned to the parcel-based method. To complement this new program, PWD offers a stormwater credits program where non-residential property owners may retrofit for stormwater management and receive a discount on their stormwater charges. Credits are available to owners who can disconnect their runoff from the City's sewer system and manage the stormwater on the property. **TABLE III.C.1.5-1** below provides information on the rates applicable to PWD's residential and non-residential customers through FY 2015.

Additional information on the transition to parcel-based stormwater billing has been provided in previous reports; please refer to **SECTION III.C.1.5 PARCEL-BASED STORMWATER BILLING** on page 105 of the CSO-Stormwater FY 2012 Annual Report.

Table III.C.1.5 – 1: Stormwater Billing Rates through Fiscal Year 2015

Fiscal Year	GA Charge / 500 sq.ft.	IA Charge / 500 sq.ft.	Residential Stormwater Charge	Residential Billing & Collection Charge	Non Residential Billing & Collection Charge
2014	$0.56	$4.50	$11.80	$1.65	$2.15
2015	$0.59	$4.75	$12.46	$1.69	$2.19

Stormwater Management Regulations

Under Philadelphia's Stormwater Regulations, development and redevelopment is helping to significantly reduce the amount of directly-connected impervious cover.

III.C.1.6 Reforestation - Work to implement reforestation demonstration projects to provide additional tree canopy

Green Stormwater Infrastructure Projects

Community greening and tree planting is a key component of green stormwater infrastructure and PWD's *Green City, Clean Waters* plan. PWD has been planting trees as part of the GSI projects. Please refer to **APPENDIX B – GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** for information on trees planted as part of GSI projects implemented in the City.

Street Tree Planting

As part of supporting the City's GreenWorks goals, PWD has partnered with PPR to conduct street tree plantings. PPR contracted trees to be planted in the right-of-way in front of properties and on public lands. During FY2014, 2,707 trees were planted through this contract.

TreePhilly Yard Tree Program

TreePhilly is a new greening initiative led by PPR, in partnership with Wells Fargo and the Fairmount Park Conservancy that directly engages all Philadelphians in improving their communities by planting and maintaining trees. Through TreePhilly's Yard Tree Giveaway program, Philadelphia residents can sign up for free yard trees for their private property (front, back, and side yards). In the Fall 2013 and Spring 2014 seasons, the program distributed approximately 3,000 yard trees.

Tree Vitalize and Pennsylvania Horticultural Society's Tree Plantings

PWD is an active partner and supporter of Tree Vitalize and PHS's other tree planting programs. Tree Vitalize was developed by the Pennsylvania Department of Conservation and Natural Resources to increase the tree canopy in the five-county Philadelphia area. Tree Vitalize partners with numerous community groups throughout this area in order to plant trees in neighborhoods lacking sufficient tree canopy. During Fall 2013 and Spring 2014, PHS tree planting events resulted in 2392 trees planted in Philadelphia.

Table III.C.1.6 -1 Pennsylvania Horticultural Society's Tree Plantings Events/ Activities

# of Trees Planted	Pennsylvania Horticultural Society's Tree Plantings Event
975	Philadelphia Tree Tenders Volunteer street tree plantings, including Mill Creek Community
30	NHL Draft Trees at Xfinity Live
250	Phillies "Home Runs for Trees"
86	Philadelphia Public Landscapes
391	Philadelphia Landcare Vacant Lands trees
35	Philadelphia International Airport trees
1459	Philadelphia Tree Vitalize Riparian Trees
7	Einstein Health System Campus yard trees
3,233 Trees	**Total**

III.C.2 WATER: Ecosystem Restoration and Aesthetics

III.C.2.1 Waterways Restoration Team - Continue the assignment of a dedicated clean-up team to remove cars, shopping carts, and other debris, from CSO receiving waters

During FY 2014, the Waterways Restoration Team has continued their program which includes removal of cars, shopping carts, and other debris from receiving waters. Please refer to **SECTION II.F.2 "CONTINUE TO FUND AND OPERATE THE WATERWAYS RESTORATION TEAM (WRT)"** on page 29 for information pertaining to the Waterways Restoration Team's activities during FY 2014.

III.C.2.2 Waterways Restoration Team - Evaluate the capabilities of this crew in performing minor stream bank and bed repair around outfall pipes and to remove debris at these outfalls

During FY 2014, the Waterways Restoration Team continued their program, which includes conducting minor stream bank and bed repairs around outfalls and removing debris around them. Please refer to **SECTION II.F.2 "CONTINUE TO FUND AND OPERATE THE WATERWAYS RESTORATION TEAM (WRT)"** on page 29 for information pertaining to the Waterways Restoration Team's activities during FY 2014.

III.C.2.3 Stream Habitat Restoration - Propose and implement demonstration projects to address habitat degradation by engineering the stream channels to modern day flows and directly reconstructing the aquatic habitat

PWD is currently employing natural stream channel design (NSCD) and associated stormwater management BMPs as a means to improve the health of aquatic communities in receiving waters with degraded flow and habitat alterations due to stormwater runoff. Additional information on PWD's NSCD technique has been provided in previous reports; please refer to **SECTION III.C.2.3 COBBS CREEK STREAM RESTORATION** on page 136 of the CSO-Stormwater FY 2011 Annual Report.

Cobbs Creek Stream Restoration

During the previous reporting period, PWD awarded a contract for NSCD of reaches 6-8. The scope of services provided included the design of bank stabilization, wetland creation, full scale stream restoration, trailheads and gateways to Cobbs Creek Park as well as green stormwater infrastructure along Cobbs Creek Parkway.

During FY 2014, PWD worked to address the property access and right of way issues associated with this project. The Cobbs Creek Reaches 6-8 are bracketed by Market Street at the northern boundary and a SEPTA railroad bridge roughly 8,000 feet downstream, and encompass portions of Philadelphia and Delaware County. Within the planned limits of disturbance, more than 20 properties could be impacted, either temporarily or permanently. The planning and negotiation associated with this issue has significantly delayed the project's design phase. Though no further design beyond the current 30% level has occurred, PWD's Public Affairs division has contracted with a real estate law specialist to engage landowners and develop the proper agreements. Upon securing agreements with the largest landowners within the project reach, PWD will reinitiate design of the stream channel and corridor improvements.

For additional information on this project reported in previous reports, please refer to **SECTION III.C.2.3 COBBS CREEK STREAM RESTORATION** on page 108 of the CSO-Stormwater FY 2012 Annual Report.

Tacony Creek Stream Restoration

PWD, in partnership with PPR, initiated plans to begin the design phase on multiple reaches of Tacony Creek in FY 2011. In FY 2012, PWD initiated a contract for design phase services for stream restoration, green stormwater management, and trail improvements in Reaches 4-5 of Tacony Creek. During FY 2013, PWD completed 30% design plans and initiated the permitting process with PADEP and USACE.

During FY 2014, the 60% design was completed. The Joint Permit Application was nearly completed and will be submitted early in FY2015. PWD is delaying the submission of the permit so that a mitigation bank draft prospectus for Tacony can be submitted and any USACE changes to the design can be included in the joint permit application. PWD plans to continue to finalize plans and specifications for this project and obtain the requisite permitting. When completed, this project will accomplish almost 8,000 feet of stream corridor restoration. For a full history on this project discussed in previous reports, please refer to **SECTION III.C.2.3 TACONY CREEK STREAM RESTORATION** on page 136 of the CSO-Stormwater FY 2011 Annual Report.

Indian Creek Stream Daylighting & CSO Storage Project

In FY 2013, PWD and USACE broke ground on this project and completed the majority of the stream daylighting portion of the project. During FY 2014, the infrastructure portions of the project were constructed and the overall project was completed. PWD will be installing ladder rungs at the manholes for maintenance access. The project construction is otherwise complete. PWD has initiated a monitoring plan that includes topographic survey, hydrologic and hydraulic modeling, sediment transport analysis, and photography. PWD will continue to monitor the site and generate a report to document the findings of the study. For a full history on this project discussed in previous reports, please refer to **SECTION III.C.2.4 INDIAN CREEK STREAM DAYLIGHTING & CSO STORAGE PROJECT** on page 146 of the CSO-Stormwater FY 2010 Report.

Wissahickon TMDL Stream Restoration Projects

As part of PWD's Wissahickon Sediment TMDL Implementation Plan, PWD has proposed and implemented multiple stream restoration projects. These projects include:

- Carpenter's Woods (Construction Completed in 2009)
- Cathedral Run (Construction Completed in 2006)
- Cresheim Creek at St. Martins (Construction Completed in 2011)
- Hartwell Lane (Construction Completed in 2009)
- Rex Avenue (Construction Completed in 2010)
- Bells Mill Run (Construction Completed in 2012)
- Wises Mill Run (Construction Completed in 2012)
- Gorgas Run (Design Completed in 2012)

Because these projects were completed as part of PWD's Wissahickon Sediment TMDL Implementation Plan, a more detailed description of the Department's efforts has been provided in **SECTION D.II - WISSAHICKON SEDIMENT TMDL MONITORING PLAN IMPLEMENTATION** on page 82.

III.C.2.4 Wetland Enhancement and Construction - Propose and implement wetland enhancement and construction projects to remove pollutants, mitigate peak flow rates, reduce runoff volume, and provide considerable aesthetic, and wildlife benefits

PWD has designed and implemented three stormwater treatment wetlands facilities to remove pollutants and mitigate peak flows, while providing aesthetic and ecological benefits. These projects are:

- Saylor's Grove (Construction Completed in 2006)
- Wise's Mill (Construction Completed in 2012)
- Cathedral Run (Construction Completed in 2012)

In total, these three facilities receive and treat stormwater from more than 300 acres of the MS4 service area. Because these projects were completed as part of PWD's

Wissahickon Sediment TMDL Implementation Plan, a more detailed description of the Department's efforts has been provided in **SECTION D.II - WISSAHICKON SEDIMENT TMDL MONITORING PLAN IMPLEMENTATION** on page 82.

<u>Watershed Mitigation Registry</u>

The Watershed Mitigation Registry (WMR) aims to provide environmental restoration and improvement projects to offset wetland and open water losses caused by development or redevelopment throughout the Philadelphia area. Environmental improvement projects could include restored or replacement wetlands, but also can include stream and riparian corridor restoration projects. PWD has drafted a Memorandum of Agreement in an effort to formalize PWD's role in the statewide In-lieu Fee (ILF) program. This document is still under review by PADEP. PWD continued to work evaluate its projects internally to determine how it may benefit from PADEP's potential statewide ILF program in FY 2014.

PWD has been consulting with the United States Army Corps Engineers (USACE) to develop a mitigation bank for the Tacony Creek Reaches 4 and 5 restoration project. PWD generated a mitigation bank draft prospectus which will be reviewed by USACE later this year. There is likely to be some adjustment to the design, but with USACE's approval PWD will have the first mitigation bank in southeastern Pennsylvania and will be able to sell mitigation credits to municipalities and/or private companies that need to fulfill mitigation requirements within the service area of the bank.

III.C.2.5 Fish Passage Projects - Evaluate the benefits of projects that improve migratory fish passage in a manner consistent with the watershed management plans

<u>Fish Passage on Cobbs Creek</u>

In 2008, PWD began to investigate alternatives for reestablishing fish passage on Cobbs Creek. With assistance from USACE, a fish passage at the Woodland Dam is being developed as of August 2009. In March 2013, PWD provided the USACE with technical guidance and recommendations for physical and hydrologic conditions that will maximize the potential of successful upstream dispersal of two indicator species (blueback herring and alewife). The technical document was based on biological criteria of the aforementioned species which included three critical attributes; (1) minimum depth requirements, (2) maximum velocity conditions, and (3) upstream distance dispersal increments. These minimum habitat requirements were established in conjunction with actual hydrologic conditions during spring flow to determine if the preliminary design (i.e., 30% design submittal) represented the most effective solution to the current conditions. During 2014, USACE revised its designs to include partial dam removal, natural stream channel design and in-stream habitat improvements. Presently, PWD and USACE are reviewing the construction feasibility (i.e., constructability) and associated costs to determine if the project is a viable and cost-effective solution for fish passage in the lower Cobbs Creek.

Additional information on the history of this project has been reported on in previous years. Please refer to **SECTION III.C.2.5 FISH PASSAGE ON COBBS CREEK** on page 118 of the CSO-Stormwater FY 2012 Annual Report.

<u>Fairmount Fish Ladder</u>

The Fairmount Dam Fishway located on the western side of the Fairmount Dam, was completed in 1979. Effects of time and natural forces damaged the fish ladder and the degradations severely limited the ladder's efficiency at passing migratory fish species. PWD has partnered with the USACE – Philadelphia District to improve and revitalize the Fairmount Dam Fishway, pursuant to Section 1135 of the Water Resources Development Act of 1986. Several improvements have been made in 2009 and 2010 to increase fish passage efficiency and resolve maintenance and operational issues. During FY 2014 however, the Fairmount Fishway experienced a full malfunction, rendering the entrance gate inoperable for the entire migration period. This gate acts like a control weir, modulating flow and decreasing turbulence during the rising and descending limbs of the tides. The overall goal of this system is to effectively push approximately 100 cfs of flow through the entrance in a manner that attracts American shad to the aperture. Without this attraction flow, turbulence from the dam and the lack of concentrated flow at the entrance channel has been shown to inhibit shad movement towards the fishway opening, significantly decreasing the number of fish passing through the chambers. Simply stated, the majority of American shad returning to the Schuylkill River for the annual spawning migration cannot physically find the fishway when the entrance gate is inoperable. As outlined in **FIGURE III.C.2.5 -1 CATCH-PER-UNIT-EFFORT (CPUE) AND FISH PASSAGE OF AMERICAN SHAD**, fish passage monitoring at the Fairmount Fishway in 2013 revealed that only 166 American shad successfully dispersed upstream through the fishway, a value similar to (and even less than) pre-restoration numbers. However, Catch-Per- Unit Effort (CPUE) average for 2013 was 6.69 fish/minute, a value similar to relative abundance numbers measured in 2009 and 2012 where total shad passage was 1485 and 2227, respectively.

Due to the critical environmental window of opportunity for successful shad migration, a complete systematic failure of the fishway not only has an immediate impact on the population, but can have a long-term negative effect on future cohorts. As such, PWD is taking action to address these operational emergencies by (1) building redundancy within the system through the procurement of replacement parts; (2) automated monitoring of mechanical components of the fishway and (3) efficient communications system between monitoring and operational personnel.

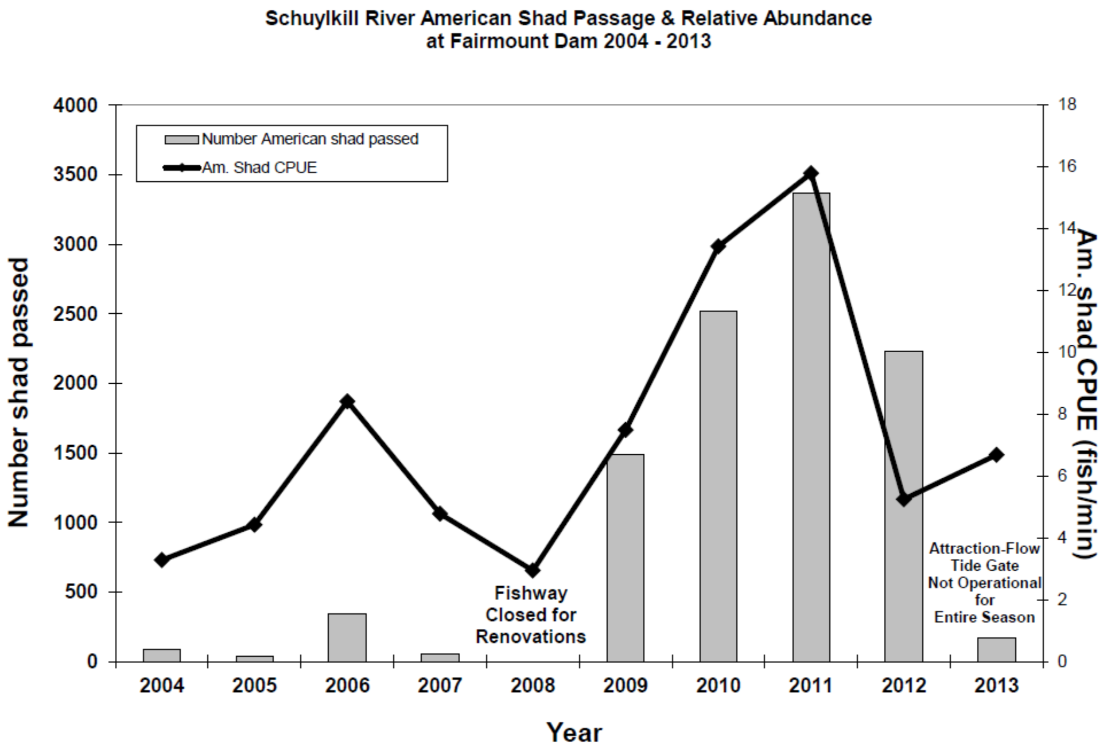


Figure III.C.2.5-1 Catch-Per-Unit-Effort (CPUE) and Fish Passage of American shad (2004-2013).

PWD Sanitary Line Natural Rock Ramp Fishway

A rock ramp fishway was constructed in Pennypack Creek in 2007 to raise the water surface elevation and provide fish passage at this site. PWD conduct rapid, qualitative fish surveys in the tidal Pennypack Creek by boat and tote barge electrofishing in 2012 and 2013. While a small number of anadromous and semi-migratory fish species have been collected, there is thus far no evidence of a spawning run of Hickory shad having been established in Pennypack Creek. However, in the spring of 2012, one adult American shad was found in Pennypack Creek above Rhawn Street, but below the Roosevelt Boulevard Dam. This finding was confirmed by state biologists and suggests that fish passage up to Roosevelt Boulevard is possible. PWD electrofishing surveys of the tidal Pennypack Creek have documented a spawning population of anadromous alewife and blueback herring. Both adult and juvenile striped bass have been collected in the tidal portion, but not above the rock ramp. The future of shad restoration in Pennypack Creek remains uncertain. No hickory shad fry were stocked in 2014. PWD will continue to monitor the fishway in FY2014. Additional information on the history of this project has been provided in previous reports; please refer to **SECTION III.C.2.5 PWD SANITARY LINE NATURAL ROCK RAMP FISHWAY** on page 121 of the CSO-Stormwater FY 2012 Annual Report.

Dam Removal Projects

Juniata Golf Course Dam Removal

The Juniata Dam is located on the Tacony Creek, approximately 700-feet upstream from the Castor Ave. bridge over Tacony Creek. Early research efforts conducted by the PWD suggest that the dam has a significant effect on water quality in this reach of Tacony Creek. The combination of the reduced flow velocity and nutrient-rich sediment supply are suspected of reducing the available dissolved oxygen in the water column. The height of the dam also presents a complete barrier to fish passage during the majority of flow conditions. Recent structural analysis suggests that the most cost effective means to removal the dam, while still fulfilling the project's goals, would be to remove the majority of the center portion of the dam between the left and right mid-channel bridge abutments. This portion of the structure would be demolished to a grade conducive to effective fish passage, while maintaining the structural integrity of the bridge. Natural stream channel design measures would be incorporated upstream of the remaining dam/bridge structure to restore a more natural stream plan form. The primary goals of this project are to improve water quality and aquatic habitat, and provide fish passage. A secondary goal of the project is to reduce overbank flooding onto Juniata Golf Course, thereby allowing full play of the course.

In June 2013, PWD completed the review of the 30% Design Plans and Specifications. Over the next fiscal year the PWD plans to continue to move forward with design plans.

Woodland Dam Removal

The Woodland Dam is located in Fairmount Park near the intersection of Woodland Ave and Cobbs Creek Parkway. The 100 foot dam is the first impediment to fish passage on Cobbs Creek and serves as the demarcation between the tidal and non-tidal influences along the creek. In 2003, the PWD's biologists performed multiple surveys along the tidal and non-tidal portions of Cobbs Creek to determine the numbers and types of fish present. Biologists collected nineteen species above the dam and identified forty three species in the tidal portions of Cobbs Creek. The project will provide access to approximately four miles of spawning and rearing habitat for migrating fish with benefits to populations that historically spawned and foraged in the Cobbs Creek and its tributaries. The project will involve investigating, selecting, designing, and constructing the best alternative to re-establish fish passage along Cobbs Creek. The most effective method of restoring fish passage is to remove the stream impediment and restore the channel using natural channel design. However, existing conditions such as the historical and cultural aspects of the dams, the chemical composition of built-up sediment behind the dam and the potential for increased downstream flood hazard risk may influence the selection of a recommended plan. PWD will be partnering with the U.S. Army Corps of Engineers (USACE), Philadelphia District on the design and construction of the project. After selection of a recommended type of fish passage design, concurred by both the Corps and PWD, the project will progress to plans and specifications, and construction contingent on the availability of funds.

In August 2013, PWD received the USACE draft re-submission of the 90% design plans. PWD provided comments to the USACE on their design and met with them on discussing future work items such as the specifications and erosion and sediment control measures. PWD had serious concerns regarding some key elements in the design including the positioning of the low flow channel.

III.C.2.6 Riparian Buffer Creation and Enhancement - Continue programs for the restoration and protection of the natural lands that buffer each of the area waterways to reduce pollution, prevent erosion of the banks, provide wildlife food and cover, and shade the adjacent water, moderating temperatures for aquatic species

<u>Environment, Stewardship & Education Division</u>

PWD continues to support PPR, which undertakes a broad range of environmental restoration activities throughout the park system. Restoration activities have been ongoing since 2008. These efforts have been discussed in previous years; for more details and a full list of these activities, please refer to **SECTION III.C.2.6 ENVIRONMENT, STEWARDSHIP & EDUCATION DIVISION** on page 121 of the CSO-Stormwater FY 2012 Annual Report.

<u>Riparian Buffer component of Stream Restorations</u>

Riparian buffer enhancement will be evaluated in all stream restorations that are completed. Typically, riparian buffer enhancement activity includes invasive species management, live-stake planting, tree and shrub planting, and native seed mix application. Invasive species management usually begins one to two years prior to construction. Once the construction of the stream restoration project is complete, a landscaping plan is implemented which includes all of the applications mentioned above. Please refer to **SECTION III.C.2.3 STREAM HABITAT RESTORATION** on page 66 and **SECTION III.C.2.4 WETLAND ENHANCEMENT AND CONSTRUCTION** on page 68 in this report for more information on these topics.

<u>Natural Lands Team</u>

The Natural Lands Team, initiated in 2011, is a group comprised of members from PWD's Ecological Restoration Unit, Waterways Restoration Team, Public Affairs, PWD Design Branch and staff from Philadelphia's Department of Parks and Recreation. Bi-monthly meetings are held to coordinate a wide range of projects that affect the City's stream corridors and natural areas. Through centralizing the myriad of ongoing and upcoming projects, this group works to improve efficiency and communication. Projects include but are not limited to stream restoration, wetland creation, stormwater management, infrastructure protection and invasive species management. During FY2014, the Natural Lands Team convened five times to discuss upcoming projects and potential issues that could be addressed by the team members.

III.C.3 Other Watershed Projects

III.C.3.1 River Conservation Plan - Continue to work in partnership with local partners to complete and implement River Conservation Plans (RCPs)

All River Conservation Plans (RCPs) are available for viewing at: **http://www.phillywatersheds.org/your_watershed** under each respective watershed's key documents.

Darby Creek RCP

This RCP was completed in 2005. For more information on the plan, please refer to **SECTION III.B.3.4.1 DARBY RCP** on page 121 of the CSO-Stormwater FY 2008 Annual Report.

Tacony-Frankford RCP

This RCP was completed in 2004. For more information on this plan, please refer to **SECTION F.2 TOOKANY/TACONY-FRANKFORD WATERSHED** on page 74 of the FY 2005 Stormwater Annual Report.

Pennypack RCP

This RCP was completed in 2005. For more information on this plan, please refer to **SECTION III.B.3.4.1 PENNYPACK RCP** on page 122 of the CSO-Stormwater FY 2008 Annual Report.

Poquessing RCP

This RCP was completed in 2007. For more information on this plan, please refer to **SECTION III.C.2.6 POQUESSING RCP** on page 155 of the CSO-Stormwater FY 2010 Report.

Delaware Direct RCP

This RCP was completed in 2011. For more information on this plan, please refer to **SECTION III.C.3.1 DELAWARE DIRECT RCP** on page 151 of the CSO-Stormwater FY 2011 Annual Report.

III.C.3.2 Watershed Information Center - Create a website to serve as a Watershed Information and Technology Center

The City maintains several websites that provide information on our watersheds and activities within them, please refer to **SECTION II.G.2 "CONTINUE TO MAINTAIN WATERSHED MANAGEMENT AND SOURCE WATER PROTECTION PARTNERSHIP WEBSITES"** on page 32 and **SECTION II.H.2 "EXPAND THE INTERNET-BASED NOTIFICATION SYSTEM (RIVER CAST) TO THE TIDAL SECTION OF THE LOWER SCHUYLKILL RIVER"** on page 49 for additional information on the websites.

III.C.3.3 Integrated Water Use Status Networks - Pilot a communication and water quality monitoring network that supports the identification and analysis of water quality events

PWD has two communication and water quality monitoring networks. RiverCast supports the identification and analysis of water quality events to support recreational water use status decisions (swimming, triathlons, rowing, etc.) and makes this information available in real time to the public. EWS is used to monitor water quality and notify water utilities about such events as hazardous substance spills or sudden changes in water quality.

Please refer to **SECTION II.G.2 "CONTINUE TO MAINTAIN WATERSHED MANAGEMENT AND SOURCE WATER PROTECTION PARTNERSHIP WEBSITES"** on page 32 for details about these communication and water quality monitoring systems.

III.C.3.4 Integrated Water Use Status Networks - Evaluate the technical and fiscal needs to expand the network into additional receiving waters where recreational uses are taking place.

In order to expand RiverCast, PWD developed another internet-based notification system called CSOcast, which reports on the overflow status of outfalls in every CSO shed.

Please refer to **SECTION II.H.2 "EXPAND THE INTERNET-BASED NOTIFICATION SYSTEM (RIVERCAST) TO THE TIDAL SECTION OF THE LOWER SCHUYLKILL RIVER"** on page 49 for information pertaining to this topic.

III.C.3.5 Interpretive Signage - Continue to implement interpretive signage

Green Stormwater Infrastructure and Restoration Locations Signage

PWD is working with a signage contractor to develop *Green City, Clean Waters* signage for green stormwater infrastructure projects implemented throughout the City as part of the *Green City, Clean Waters* program. In previous years, PWD installed signage at the Saylor Grove Stormwater Wetland, Columbus Square Park Rain Garden and Stormwater Planters, Bodine High School Stormwater Planters, and Womrath Park Rain Garden. PWD is committed to educating the public on the benefits of these projects and constantly evaluates better methods to convey information via signage. More details on these projects have been provided in previous reports; please refer to **SECTION III.C.3.5 GREEN STORMWATER INFRASTRUCTURE AND RESTORATION LOCATIONS SIGNAGE** on page 153 of the CSO-Stormwater FY 2011 Annual Report. Additional information on the *Green City, Clean Waters* Signage Program can be found within **APPENDIX B- GREEN CITY, CLEAN WATERS FY 2014 ANNUAL REPORT** on page 38.

III.C.3.6 Interpretive Centers - Continue to support existing educational interpretive centers to educate citizens about their community and the water environment

PWD supports several existing educational centers including FWW and many public outreach efforts conducted by partners. Please refer to **SECTION II.G.3 CONTINUE TO PROVIDE ANNUAL INFORMATION TO CITY RESIDENTS ABOUT PROGRAMS VIA TRADITIONAL PWD PUBLICATIONS** on page 37 and **SECTION II.G.4 "CONTINUE TO SUPPORT THE FAIRMOUNT WATER WORKS"** on page 43 for more information on activities done in FY 2014 by the FWW and partner sponsored events.

III.C.3.7 Basin-Specific Stormwater Management Plans (ACT 167) - Continue to support the State Act 167 Stormwater Management Planning process and integrate the results of these efforts into the watershed management plans and implementation plans

Act 167 provides for the regulation of land and water use for flood control and stormwater management purposes. It imposes duties, confers powers to the PADEP, municipalities and counties, and provides for enforcement and appropriations.

The City of Philadelphia signed a Phase 1 Agreement with PADEP in July, 2008 committing to the completion of a City-wide Act 167 planning process. This City-wide Act 167 will account for the City of Philadelphia Stormwater Regulations and will lay the groundwork for additional watershed-basin specific planning to follow. A Phase 2 agreement was conformed in April, 2009 which helped to outline a schedule for completing basin specific Act 167 plans for each of the watersheds that drain to the City, including (note: the Schuylkill and Delaware River drainage areas of the City will be covered by the county-wide implementation of the Act 167 program): Cobbs Creek, Darby Creek, Pennypack Creek, Poquessing Creek, Tacony/Frankford Creek, and Wissahickon Creek.

Darby-Cobbs Creek

An Act 167 Stormwater Management Plan was completed for the Darby-Cobbs Watershed in January 2005. The completed plan can be viewed at the Delaware County Planning Department's website at: www.co.delaware.pa.us/planning/watersheditems

Tookany/Tacony-Frankford Creek

The development of the Act 167 Plan for this watershed was jointly led by PWD and the Montgomery County Planning Commission. The plan was completed March 2008 and can be viewed at:
www.phillywatersheds.org/what_were_doing/documents_and_data/watershed_plans_reports.

Pennypack Creek

The Act 167 Stormwater Management Plan for this watershed was completed in June of 2011. A public hearing was held on June 14, 2011. The plan was adopted by the Bucks County Commissioners on June 20, 2012 followed by the Montgomery County Commissioners in July 19, 2012. PA DEP approved the Pennypack Act 167 Plan on July 22, 2013.The Pennypack Creek Act 167 plan is available for download at: http://www.csc.temple.edu/research/Act167.htm

Poquessing Creek

In the fall of 2009, PWD initiated an Act 167 Stormwater Management Plan for this watershed. PWD is acting as municipal lead for plan development, and has partnered with the Bucks County Planning Commission in order to complete the plan.

A public hearing was held on July 10, 2012. The Montgomery County Commissioners adopted the plan on July 19, 2012 and Bucks County Commissioners adopted the plan on September 19, 2012. PA DEP approved the plan on August 28, 2013. The plan is available for download at:
http://www.phillywatersheds.org/doc/PoquessingAct167.pdf

Wissahickon Creek

In the fall of 2010, PWD initiated an Act 167 Stormwater Management Plan for this watershed. PWD is acting as municipal lead for plan development, and has partnered with the Montgomery County Planning Commission in order to complete the plan. A WPAC has been convened in order to help guide the process. The draft plan has been completed and a public hearing was held on June 16, 2014.

III.C.3.8 Sewage Facility Planning - Continue to review sewage facility planning modules and downstream sewage conveyance and treatment facilities to ensure that adequate capacity exists within these systems to accommodate flow

During FY 2014, PWD reviewed 663 "Sewage Facilities Planning Module Application Mailers" for projects requiring building permits within Philadelphia County. During the same period, PWD issued 68 sanitary sewer capacity certifications for projects in tributary municipalities. Additional information on sewage facility planning activities conducted by PWD has been discussed in the previous reports; please refer to **SECTION III.C.3.8 SEWAGE FACILITY PLANNING** on page 130 of the CSO-Stormwater FY 2012 Annual Report.

III.C.4 Monitoring and Assessment

III.C.4.1 NPDES – Quarterly Special Discharge Monitoring Report

PWD is committed to submitting the Quarterly Special Discharge Monitoring Report (DMR) documenting the Department's CSO discharges during the specified time periods. This report is due 45 days after the end of each quarter, thus a report is submitted 4 times a year by February 15, May 15, August 15, and November 15. PWD is working to switch to eDMRs. During FY 2014, PWD submitted four DMRs within the 45 day timeframe; these reports are also referred to as Quarterly Combined Sewer Overflow Status Reports.

III.C.4.2 NPDES - Annual CSO Status Report

Monitoring and characterization of CSO impacts from a combined wastewater collection and treatment system are necessary to document existing conditions and to identify water quality benefits achievable by CSO mitigation measures. The tables included in **APPENDIX D** and other information provided within this annual report represent the average annual CSO overflow statistics for period July 1 2013 – June 30 2014 as required in the NPDES Permit. Please refer to **TABLE 1 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on page 2 for a listing of all CSO permitted outfalls. The tables have been reorganized to present overflows by the specific receiving water into which the CSOs from a given interceptor system discharge. In order to be consistent, the column headings are presented in the same format found in the System Hydraulic Characterization (SHC) and NMC Documentation.

a. Annual summary of the frequency and volume of CSO discharges

Please refer to **TABLE 2 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on page 12 for the annual summary of the frequency and volume of CSO discharges during FY 2014.

b. Update of the CSO frequency and volume for a typical hydrologic year

Please refer to **TABLE 3 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on page 17 for an updated CSO frequency and volume for a typical hydrologic year.

c. Summary of the in-stream impacts and effectiveness of CSO controls and restoration projects.

Discharges resulting from combined sewer overflows can have negative biological and physical impacts on streams. CSOs tend to diminish water quality decreasing both the number and diversity of fish and macro invertebrate species. In addition, the excessively high flows resulting from CSOs tend to produce degrading, incised stream channels that do not readily access the floodplain.

As CSO controls and stream restoration projects are implemented, PWD expects improvement of existing biological and physical stream impairments. The extent of these improvements will be measured through regular monitoring to establish the overall effectiveness of these interventions.

d. An annual summary of the information provided in the Special Discharge Monitoring report including:

i. Rainfall data - total inches (to the nearest 0.01 inch) that fell each day and month for the period of the reports.

Please refer to **TABLES 4-28 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on pages 22-46 for daily and monthly rainfall totals for FY 2014.

ii. The total number of regulator inspections conducted during the period of the report.

Please refer to page 4 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT** for the total number of regulators inspected during the reporting period.

iii. A list of blockages (if any) corrected or other interceptor maintenance performed, including location, date and time corrected, and any discharges to the stream observed.

Please refer to page 5 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT** for a listing of blockages reported and corrected during the reporting period.

e. *Dry-weather overflows - for all dry weather overflows, indicate the location, date and time discovered, date and time corrected/ceased, and action(s) taken to prevent their re-occurrence.*

Please refer to page 17 of **APPENDIX C – 2014 CSO MAINTENANCE PROGRAM ANNUAL REPORT** for a detailed listing of Dry-Weather Discharges.

f. Wet-weather overflows - using calibrated models of the combined sewer system, provide a summary of the annual CSO frequency, volume, and percent capture of combined sewer flows.

This section heading is similar to Section A - *Annual summary of the frequency and volume of CSO discharges* above and will refer to the same table. Please refer to **TABLE 2 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on page 12 for the list of wet-weather overflows for the estimated average annual frequency and volume statistics for the past fiscal year.

g. Chronic or continuous discharges - Provide the status and corrective actions taken at all sites identified as being chronic or continuous discharges, including an estimate of flow and duration.

The only previously known chronic discharges were Main and Shurs and PC-30. For information on corrective actions, please refer to **SECTION III.B.1.10 'ELIMINATE CSO/MAIN AND SHURS OFF-LINE STORAGE (SW) - CONSTRUCTION AND**

IMPLEMENTATION OF THE MAIN AND SHURS OFF-LINE STORAGE PROJECT" on page 56 and **SECTION III.B.2.1.1 "INFLOW/INFILTRATION (I/I) CONTROLS-PC-30 RELIEF SEWER"** on page 57. Please refer to **TABLE 29 IN APPENDIX D – NPDES – FY 2014 CSO STATUS REPORT** on page 47 for the list of discharges that occurred at Main and Shurs and PC-30 during the fiscal year.

h. Documentation showing the continued implementation of the Nine Minimum Controls.

Please refer to **SECTION II IMPLEMENTATION OF THE NINE MINIMUM CONTROLS (NMCS)**' of this report on page 13**.**

i. Long Term Control Plan Implementation - The permittee shall submit information that describes the efforts to update and implement the CSO LTCP. The permittee shall continue to update implementation schedules as part of the Annual CSO status report."

Please refer to **SECTION III.A "CSO LTCP UPDATE - REPORT ON THE PROGRESS OF THE LTCP UPDATE"** on page 50 for information on the status of the LTCPU.

III.C.4.3 Rotating Basin Approach to Watershed Monitoring - Continue to implement a rotating basin approach to watershed monitoring in CSO receiving waters in order to characterize the impact of CSO discharges and other pollutant/pollution sources and the efficacy of CSO controls and watershed restoration practices.

The Rotating Basin Approach has been replaced with a "Comprehensive Watershed Monitoring Program", a 2010-2016 monitoring strategy developed by the PWD to comply with both the City's stormwater and CSO permit requirements and to assist with the Sourcewater Protection Program's objectives.

Please refer **SECTION F.2.STEP 1.B – PRELIMINARY PHYSICAL, CHEMICAL AND BIOLOGICAL QUALITY ASSESSMENT** on page 92 for information about Comprehensive Watershed Monitoring Program.

STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

Section A Applicability And Limitations On Coverage

The City will comply with the permit language on what are authorized and what are unauthorized stormwater discharges.

Section B Legal Authority

The City maintains adequate legal authority to enforce the Stormwater Management Program, in accordance with the National Pollutant Discharge Elimination System (NPDES) regulations 40 Code of Federal Regulations CFR122.26(D)(2)(i). Legal authority to operate and maintain the Stormwater Management Program includes various ordinances, regulations, and policies enforced by City departments. Philadelphia Code Section 13-603 was specifically enacted to ensure that the City had the proper authority necessary to implement the federal SW program. The actual language of this ordinance and other city ordinances can be found at http://www.phila.gov/philacode/. In addition, PWD has passed supplementary regulations to the city provision; they include Sections 500.0 to 500.6 which requires the abatement of cross connections and PWD Sections 600.14 & 600.15 which prohibits stormwater discharges. A copy of PWD's regulations can be obtained at the following website: http://www.phila.gov/water/pdfs/pwd_regulations.pdf

Furthermore, several ordinances have been implemented which are not directly related to the federal NPDES SW program, but support our goals and missions for the City. These include Philadelphia Code Section 14-1603.1 which requires stormwater management controls for new development and PWD regulation Section 600.0 to 600.13 which allows for Stormwater regulations for new development and redevelopment.

This Annual Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) and the US EPA, in accordance with requirements of the City of Philadelphia's NPDES Stormwater Management Permit No. PA 0054712. This Report is a compilation of the progress made on the Stormwater Management Program, during the reporting period from July 1, 2013 to June 30, 2014.

Section C Effluent Limitations

The City will comply with the permit language on effluent limitations and stormwater discharges covered under this permit.

Section D Sediment Total Maximum Daily Load (TMDL) for Wissahickon Creek

PWD has developed and implemented a program designed to achieve the goals of the sediment TMDL, which requires the City "to establish baseline data on the City's contribution of sediment loading and flow variations" and "evaluate and implement BMPs".

D.1. Conduct a Wissahickon Sediment TMDL Feasibility study and submit report

PWD initiated a feasibility study in October of 2005 in order to evaluate pollutant loads at MS4 outfalls and tributaries to the Wissahickon Creek (within Philadelphia) that cause an adverse impact to in-stream habitats as a result of transport of sediment and/or stream-bank erosion. The study also evaluates which outfalls and tributaries have the greatest potential for improvement through implementation of BMPs and/or other methods. Upon completion of the study, the City has designed and implemented a monitoring plan for Total Suspended Solids (TSS) and flow at selected MS4 outfalls, as well as at the confluence of selected tributaries to the Wissahickon Creek during various flow events (low flow, normal flow, and storm flow). The monitoring plan incorporates modeling results. A report documenting the findings of the feasibility study was submitted in September of 2009, a follow-up report on the monitoring effort was submitted in 2010. PWD has provided additional details on this study in previous reports; please refer to **SECTION D.i SUMMARY OF SEDIMENT AND STREAM RESTORATION FEASIBILITY STUDY** on page 201 of the CSO-Stormwater FY 2010 Annual Report.

D.2. Wissahickon Sediment TMDL Monitoring plan implementation

<u>Wissahickon Sediment TMDL Monitoring plan implementation and outline submission</u>

PWD's commitment to meeting the Wissahickon Sediment TMDL was initiated in 2005 through detailed monitoring and assessment of the Wissahickon Creek Watershed. The goal of PWD's implementation is to reduce the amount of sediment reaching the Wissahickon Creek using a multi-faceted approach. In addition to continuing street sweeping and stormwater management regulations, the PWD has implemented three stormwater wetland facilities and seven stream restoration and stabilization projects. During the previous reporting year (FY2014), PWD completed the Sediment TMDL Baseline Monitoring Report (**APPENDIX E)** in November 2013 based on the previously submitted TMDL Monitoring Plan. The baseline monitoring report documents the data collected following the implementation of the stormwater wetland facilities and stream restoration projects. This information will be used to measure sediment reductions as a result of the implemented projects. The initial phase of this effort included baseline monitoring to measure the effectiveness of the stream restoration and stormwater treatment wetland facilities projects in meeting the targeted sediment reductions required by the US EPA's sediment TMDL for Wissahickon Creek. This effort includes H&H modeling and topographic survey monitoring as a means to confirm sediment reduction estimates presented in PWD's Implementation Plan. These modeling and topographic survey efforts are accompanied by regular photo and video-monitoring, as well as formal site inspections of the stormwater treatment wetland facilities.

Section E Pollutant Minimization Plan (PMP) for Polychlorinated Biphenyls (PCBs) in the City's Municipal Separate Storm Sewer System (MS4)

PWD has polychlorinated biphenyl (PCB) Pollutant Minimization Plans in effect under each of the three Water Pollution Control Plants individual NPDES permits which set forth more stringent plans than what is requested within PWD's MS4 NPDES Permit.

E.1 City PMP Contact Information:

Keith Houck, Manager
(215) 685 - 4910
Industrial Waste Unit
Aramark Tower, 4th Floor
1101 Market Street
Philadelphia, PA 19107

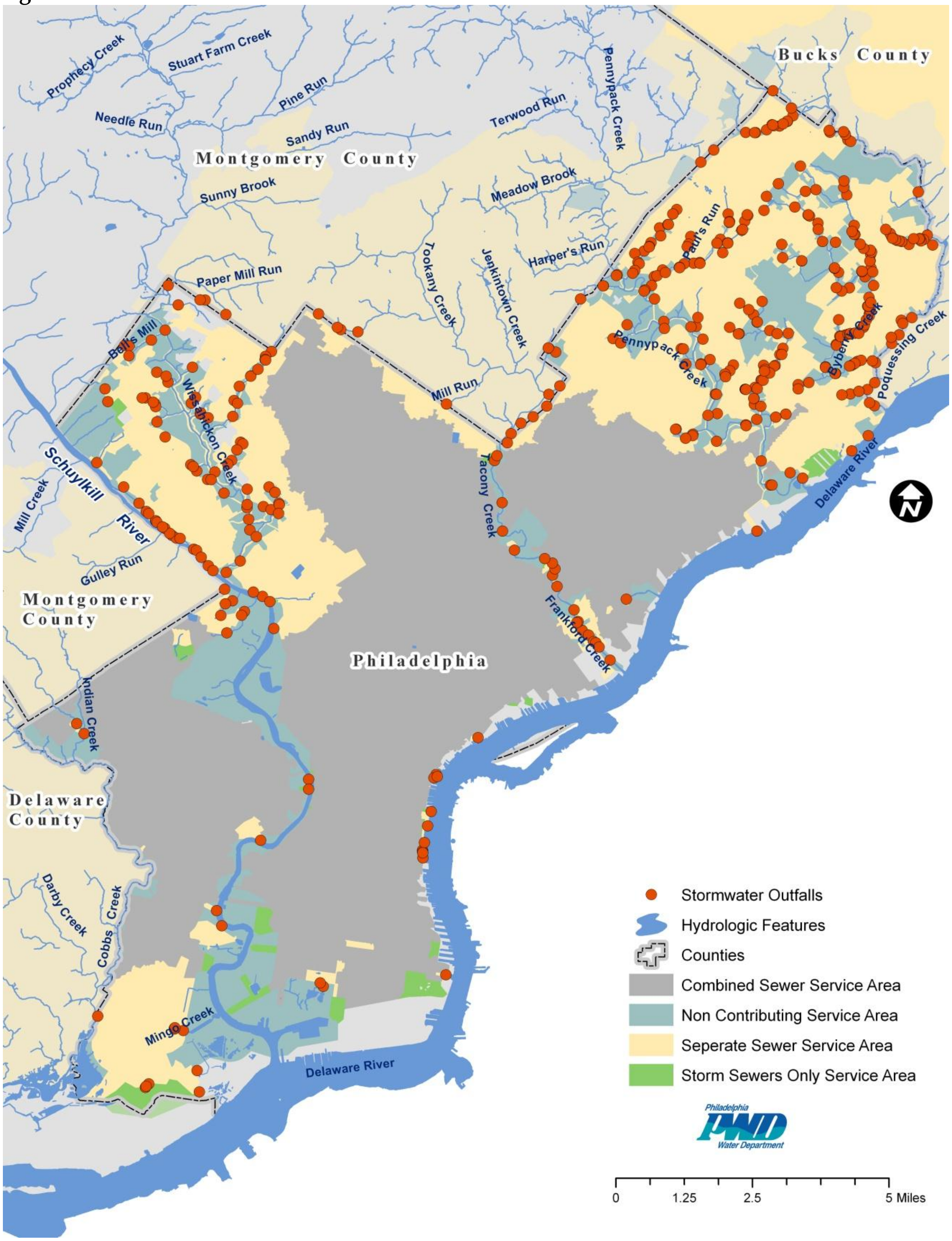
E.2 City of Philadelphia MS4 Service Area

The City's municipal sanitary separate sewer system (MS4) comprises about 40% of Philadelphia County and also accepts some water from surrounding communities. The MS4 includes the 434 permitted stormwater outfalls. A map of the MS4 service area referencing all outfalls is shown in **FIGURE E-1**.

E.3 / E.4 Investigation of Suspected Locations of PCB Releases/Containments

PWD has compiled a list of suspected current and historic locations of PCB material, equipment, processes, soil area, or facilities. During this permit cycle, PWD has attempted to visit all sites from the list of suspected PCB sources. The results of these investigations found that many of the sites no longer house PCB discharging devices, or the current owner has employed additional safety mechanisms to prevent any discharges. The details of these investigations and additional information on the PCB site selection process have been provided in previous reports; please refer to **SECTION E.3/E.4 - INVESTIGATION OF SUSPECTED LOCATION OF PCB RELEASES/CONTAINMENTS** on page 143 of the CSO-Stormwater FY 2012 Annual Report.

Figure E-1 MS4 with all SW outfalls



E.5 In- stream PCB sampling

PWD collected and analyzed twelve (12) in-stream samples for PCBs during the spring of 2009. No future sampling events are planned. PWD has submitted results from the sampling to the DRBC, at their request, for further analysis. Additional information regarding this In-stream Sampling has been provided in previous reports; please refer to **SECTION E.5 IN-STREAM PCB SAMPLING** on page 143 of the CSO-Stormwater FY 2012 Annual Report.

E.6 Develop Report on Control of PCB Discharges

PWD has created a protocol to investigate possible PCB sources within the City that may require control measures to reduce its discharge of PCBs. This process and the plan of action are described within the PCB PMP, located in **APPENDIX E** of the CSO-Stormwater FY 2009 Annual Report**.**

E.7 Work with DRBC to Create PMP Template

As of July 2014, PWD has not received any communication from the DRBC on creating a PMP Template.

E.8 Annually Document PCB PMP Compliance

PWD has completed its obligations to the PCB PMP in FY 2012. Following the PCB source trackdown and inspection that was performed throughout the permit cycle, PWD discovered that of the 399 records on the original listing created in 2005, only 344 were legitimate sources; the 55 records removed were due to blanks, duplication, and non-locatable addresses. Of the 344 sites, only 74 are in use, 36 occur in the MS4 area and 35 have been retrofilled with a non-PCB material. During the 2013 calendar year, 49 sites listed by EPA or other agencies as housing PCB-containing devices were inspected, results of these inspections are listed below in **TABLE E-1**.

Table E-1 2013 PCB-Containing Device Inspection Results

2013 Inspection Results	Number of Sites
Good Condition, No Leaks	19
Secure	2
Pretreatment System	5
Retrofilled	2
Condition of Concern	10
No Drains Near Equipment	4
Secondary Containment	4
No Notes Provided	3

Additionally during the 2013 calendar year, wet weather and dry weather samples were taken at the three Water Pollution Control Plants (WPCPs) and entered into the DRBC PCB database. The 2013 wet-weather PCB sampling and analysis of the three Water Pollution Control Plants' effluent were compared to data from 2007 to 2012. PWD believes that there are visible reductions in WPCP effluent PCB loadings over the course of the PMP (7 Years). Overall, cumulative reductions in loadings of PCBs in milligrams per day from baseline data ranged from 75.2-79.6% at the Northeast WPCP, 62.9-65.6% at the Southeast WPCP, and 66.5-72.3% at the Southwest WPCP. **FIGURES E-2 AND E-3** show Total PCBs (pg/l) and Penta-PCBs (pg/l) from 2007-2013 for the Northeast, Southeast, and Southwest WPCPs.

For additional information on these 2013 investigations, please refer to **APPENDIX F – PCB POLLUTANT MINIMIZATION PLAN : SEVENTH ANNUAL REPORT**.

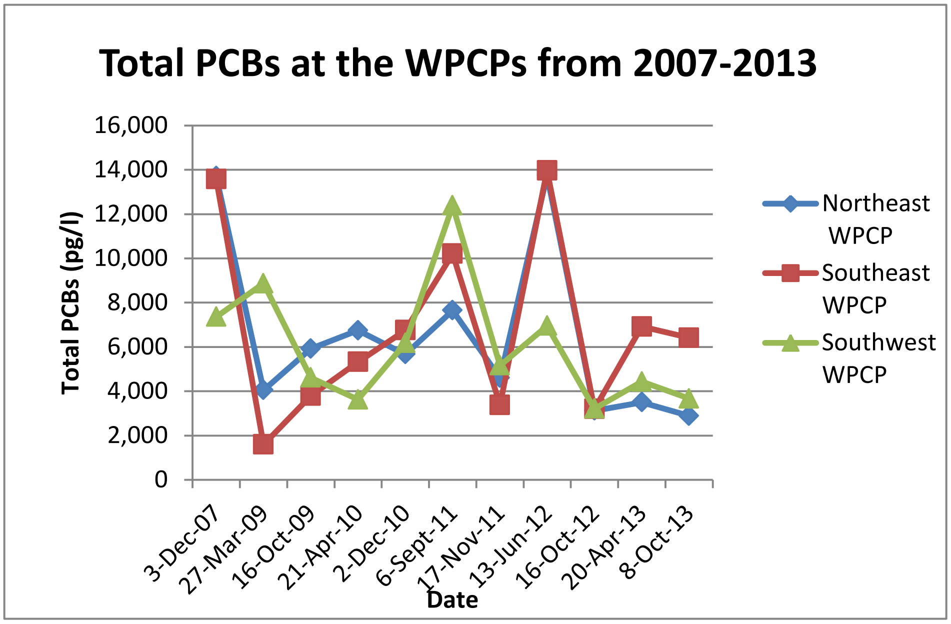


Figure E- 2 Total PCBs at the WPCPs from 2007-2013

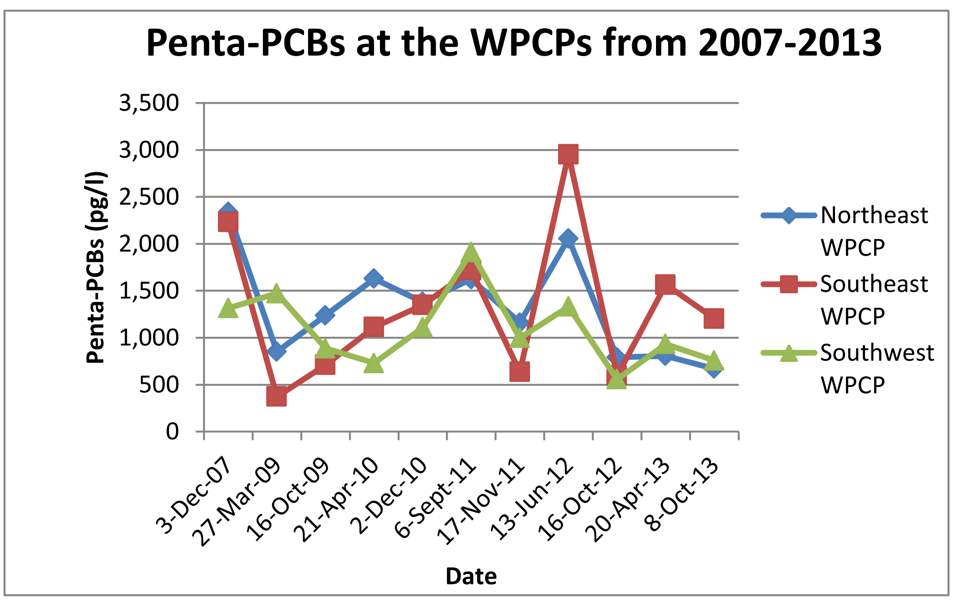


Figure E-3 Penta-PCBs at the WPCPs from 2007-2013

Section F Stormwater Management Program

F.1. Source Identification

The following table presents a description of PWD's MS4 system, including; stormwater outfalls, lengths of sanitary sewer, and lengths of stormwater sewer within Philadelphia. These areas are depicted in **FIGURE F.1-1** on the following page.

Table F.1-1 Description of MS4 Infrastructure

Watershed	Drainage Area (Square Miles)	Miles of Pipe			MS4 Outfalls Count	
		Stormwater	Sanitary	Total MS4	PWD Owned	Other
Darby-Cobbs	-	1.02	0.81	1.82	3	-
Delaware Direct	3.15	79.81	52.68	132.49	18	122
Pennypack	11.67	234.93	234.03	468.96	130	14
Poquessing	8	154.71	156.52	311.23	141	19
Schuylkill	8.48	153.43	156.82	310.26	45	47
Tacony	2.47	54.46	59.02	113.48	34	1
Wissahickon	5.79	95.18	104.86	200.03	63	2
Total	**39.56**	**773.53**	**764.74**	**1538.27**	**434**	**205**

GIS Data Layers listed in **TABLE F.1-2** have been submitted within a geodatabase, **PWD_ANNUAL_REPORT_GIS_DATA_2014.MDB** which can be found on the **SUPPLEMENTAL CD.** The GIS Data Feature class filenames within the geodatabase are provided in **TABLE F.1-2.**

Table F.1-2 GIS Data Feature Classes within Geodatabase named - FY14_GISlayers.mdb

• All_PWD_Monitoring_FY14 • FY14_IWU_Pollution_Migration_Events • FY14_Sanitary_Infiltration_Events • FY14_GSI_Projects • FY14_PD_Active_Construction • FY14_PD_Citywide_Retrofit_Regulation • FY14_PD_TA_Approvals • Hydro_Line • Hydro_Poly • Land_Use_PCPC_2014 • PCB_Locations_Known_Historical • Permitted_Dischargers	• Philadelphia_Detention_Basins • Philadelphia_Impervious • Philadelphia_Major_Watersheds • Philadelphia_only_Major_Watersheds • Philadelphia_Sewer_Sheds_2014 • PhiladelphiaBlocks2010 • Stormwatersheds_Pennypack_2014 • Stormwatersheds_Poquessing_2014 • Stormwatersheds_Wissahickon_2014 • Stormwater_Outfalls • Wissahickon_Point_Source

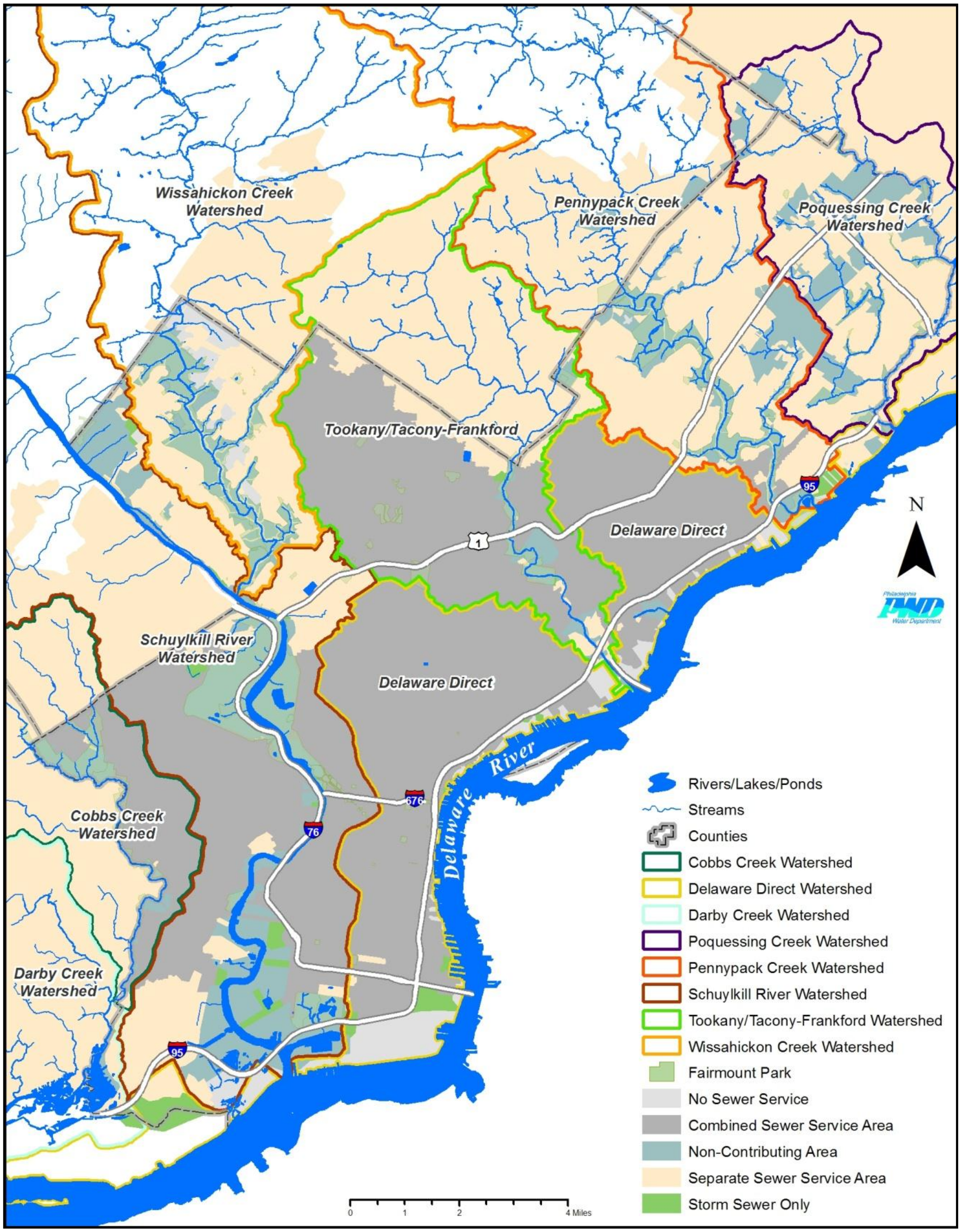


Figure F.1-1 Philadelphia Infrastructure System Areas

Descriptions of the GIS layers referenced in **TABLE F.1-2** are provided below:

All_PWD_Monitoring_2014
This layer presents the locations of PWD's chemical, fish, macroinvertebrate, and algae sampling sites. The contents of this feature class are discussed in **SECTION F.2.STEP.1.B** on page 92.

FY14_GSI_Projects
This layer presents the locations of existing and planned green stormwater infrastructure projects sorted by their current status (Complete and Planned) within Philadelphia County.

FY14_ PD_Active_Construction
This layer presents the locations of active construction private development projects within Philadelphia in FY 2014. The contents of this layer are discussed in **SECTION F.5 –MONITOR AND CONTROL STORMWATER FROM CONSTRUCTION ACTIVITIES** on page 112.

FY14_ PD_Citywide_Retrofit_Regulation
This layer presents the locations of verified private development projects, either retrofit projects or development projects subject to stormwater regulations within Philadelphia in FY 2014. The contents of this layer are discussed in **SECTION F.5 – MONITOR AND CONTROL STORMWATER FROM CONSTRUCTION ACTIVITIES** on page 112.

FY14_PD_TA_Approvals
This layer presents the locations of projects issued post construction stormwater management technical approvals by PWD in FY 2014. The contents of this layer are discussed in **SECTION F.5.B - POST CONSTRUCTION STORMWATER MANAGEMENT** on page 117.

FY14_IWU_Pollution_Migration_Events
This layer presents the locations of spills documented by PWD Industrial Waste Unit within Philadelphia in FY 2014. The contents of this layer are discussed in **SECTION F.7.A – POLLUTANT MIGRATION/INFILTRATION** on page 122.

FY14_Sanitary_Infiltration_Events
This layer presents the locations of Sewage Pollution Incidents documented by PWD within Philadelphia in FY 2014.The contents of this layer are discussed in **SECTION F.8.G. – INVESTIGATE, REMEDIATE, AND REPORT SANITARY INFILTRATION** on page 129.

Hydro_Line
This layer presents the boundaries of Philadelphia County and surrounding watershed hydrology in a polyline based feature class.

Hydro_Poly
This layer presents the boundaries of Philadelphia County and surrounding watershed hydrology in a polygon based feature class.

Land_Use_PCPC_2014
This layer presents Philadelphia land use as ascribed to individual parcel boundaries or units of land. Land use is the type of activity occurring on the land such as residential, commercial or industrial. Each unit of land is assigned to one of nine major classifications of land use (2-digit codes) and where possible more narrowly defined into one of 70 sub-classifications (3-digit codes).

PCB_Locations_Known_Historical
This layer presents the location of all known and historical PCB locations within Philadelphia. The contents of this layer are discussed in **SECTION E – POLLUTANT MINIMIZATION PLAN FOR PCBS** on page 83.

PermittedDischargers
This layer presents the location within Philadelphia of all permitted Discharger. The contents of this layer are discussed in **SECTION F.2.STEP 1.C** on page 100**.**

Philadelphia_Detention_Basins
This layer presents the location of all stormwater detention basins within Philadelphia County.

Philadelphia Impervious
This layer presents percent imperviousness and the amount of impervious area in Philadelphia County.

Philadelphia_Major_Watersheds
This layer presents the delineation of the Philadelphia County and surrounding counties' watershed boundaries including Darby-Cobbs, Delaware-Direct, Pennypack, Poquessing, Schuylkill, Tacony-Frankford, and Wissahickon watersheds.

Philadelphia_only_Major_Watersheds
This layer presents the delineation of the Philadelphia County's watershed boundaries including Darby-Cobbs, Delaware-Direct, Pennypack, Poquessing, Schuylkill, Tacony-Frankford, and Wissahickon watersheds.

Philadelphia Sewersheds_2014
This layer presents the boundaries of the MS4, combined sewer, un-sewered, non-contributing, and stormwater only areas within Philadelphia County and the neighboring contributing areas.

PhiladelphiaBlocks2010
This layer presents the results of the 2010 Census in Philadelphia County on a block level.

Stormwater_Outfall
This layer presents locations of all permitted stormwater outfalls within Philadelphia County and the neighboring contributing areas.

Wissahickon_Point_Sources
This layer presents permitted Point source locations within the Wissahickon Watershed.

GIS Stormwater Data Conversion Geodatabase Layers
The City has previously submitted additional GIS data layers that will not be included this year. These layers include outfalls, manholes, inlets, and various pipe as listed in **TABLE F.1-3**. The reason for their removal is the City's policy to not release these data layers to the general public due to concerns over redistribution and security. These data layers would be made available for viewing by the Department, should it be necessary.

Table F.1-3 GIS Data Feature Classes within Geodatabase named - StormwaterDataConversion.mdb

DataConv_GISAD_stBasin	DataConv_GISAD_stInletPipe
DataConv_GISAD_stBoring	DataConv_GISAD_stMeterChamber
DataConv_GISAD_stCasin	DataConv_GISAD_stOffsetAccess
DataConv_GISAD_stChamber	DataConv_GISAD_stOpenChannel
DataConv_GISAD_stCulvert	DataConv_GISAD_StormNetwork_Junctions
DataConv_GISAD_stDisconnectedInlet	DataConv_GISAD_stOutfall
DataConv_GISAD_stFitting	DataConv_GISAD_stPointFeature
DataConv_GISAD_stFlare	DataConv_GISAD_stPump
DataConv_GISAD_stForceMain	DataConv_GISAD_stRainGauges
DataConv_GISAD_stGravityMain	DataConv_GISAD_stStructure
DataConv_GISAD_stHostPipe	DataConv_GISAD_stTunnel
DataConv_GISAD_stManhole	DataConv_GISAD_stVentPipe
DataConv_GISAD_stManholeOther	DataConv_GISAD_stVirtualLink
DataConv_GISAD_stInlet	DataConv_GISAD_stVirtualNo

F.2. Discharge Management, Characterization, and Watershed-Based Assessment And Management Program

F.2.Step 1. Preliminary Reconnaissance: Permit Issuance Through End of Year 2

F.2.Step 1.a. Pennypack, Poquessing, Wissahickon WMP preliminary reconnaissance - Land use and resource mapping

PWD has conducted extensive mapping of information relevant to stormwater management planning. Previously discussed in **SECTION F.1 – SOURCE IDENTIFICATION** of this document on page 87, the GIS files include MS4 outfalls and contributing drainage areas, land use, population, monitoring locations, and other relevant layers. The maps and supporting GIS layers are included in the **SUPPLEMENTAL CD.**

F.2.Step 1.b. Pennypack, Poquessing, Wissahickon WMP preliminary reconnaissance - Preliminary physical, chemical, and biological quality assessment

Comprehensive Watershed Monitoring Program

Comprehensive assessment of our waterways is integral to planning for the long-term health and sustainability of our water systems. By measuring all factors that contribute to supporting fishable, swimmable, and drinkable water uses, appropriate management strategies can be developed for each watershed land area that Philadelphia shares.

PWD has carried out extensive sampling and monitoring programs to characterize conditions in seven local watersheds, both within the county boundaries and outside counties/municipalities. From 1999 to 2014, PWD has implemented a comprehensive watershed assessment strategy, integrating biological, chemical and physical assessments to provide both quantitative and qualitative information regarding the aquatic integrity of the Philadelphia regional watersheds. This information is published in Comprehensive Characterization Reports (CCRs) and used to plan improvements to watersheds in the Southeast Region of Pennsylvania.

Monitoring Timeline Strategy

Prior to the creation of PWD's Comprehensive Watershed Monitoring Program, baseline assessments were conducted in all of the Philadelphia regional watersheds to assess the degree, location and type of impairments occurring within each system. Baseline assessments, encompassing benthic, fish, habitat and discrete water quality monitoring, were routinely completed on a watershed within one year. With the addition of continuous and wet-weather water quality monitoring, periphyton assessments, and specialized physical assessment programs (*e.g.*, FGM assessments), CCRs were typically accomplished on a two-year timeline.

PWD conducted benthic macroinvertebrate, fish, and physical habitat monitoring activities in the Tookany/Tacony/Frankford Watershed in spring and summer 2013. This data will be processed and analyzed with results presented in an Integrated Watershed Management Plan indicator status update in 2014. Assessments targeting tributaries in the Wissahickon Creek Watershed were completed in spring of 2014 **(TABLE F.2.STEP 1.B-1).**

As described in PWD's *Comprehensive Watershed Monitoring Program: Proposed Strategy 2010-2015*, the scale of watershed stressors is so expansive and the BMP program is still in its introductory phase that full implementation is limited but will increase once the program is established. Therefore, PWD is focusing its monitoring efforts at maintaining a "sentinel" monitoring presence in each of the City's watersheds rather than dedicating monitoring efforts to individual watersheds. This regional monitoring approach has been greatly enhanced through a partnership with USGS. Continuous water quality data are collected from 11 USGS gaging stations, and quarterly baseflow water samples are analyzed for microbial and nutrient parameters of concern. PWD also continues to assess performance of stormwater BMP projects as they are constructed.

Table F.2.Step1.b-1 Overview of PWD Proposed Watershed Monitoring Activities 2010-2016

Watershed/Geographic Area	Activity	Period
PWD/USGS Gages	Continuous Water Quality Monitoring	2010-2015
PWD/USGS Gages	Quarterly Water Quality Grab Samples	2010-2015
Philadelphia Area Watersheds	Stormwater BMP Monitoring	2010-2015
Philadelphia Area Watersheds	Stream Restoration Project Monitoring	2010-2015
Cobbs Creek Watershed	Watershed-wide Comprehensive Assessment	2012-2013
Tookany-Tacony/Frankford Watershed	Watershed-wide Comprehensive Assessment	2013-2014
Wissahickon Creek Watershed	Tributary Assessment*	2014-2015
Wissahickon Creek Watershed	Watershed-wide Comprehensive Assessment	2015-2016

Monitoring Timeline 2010-2016

Allowing 10 years before re-assessment will potentially allow for a greater number of projects to be implemented. It allows PWD to focus monitoring efforts on evaluating the performance of stormwater BMPs and restoration projects, as well as the tidal Schuylkill and Delaware Rivers (which have not been assessed), as well as smaller wadeable streams. As described in the *Comprehensive Watershed Monitoring Program: Proposed Strategy 2010-2015*, PWD's current proposed strategy for watershed assessments also includes a less intense, but ongoing monitoring effort within each watershed, primarily through a partnership with the USGS. It should be noted that although the monitoring plan nominally covers 2010-2015, the assessment of the Wissahickon Creek Watershed spans 2015-2016 and is thus included here.

The proposed strategy for watershed assessments 2010-2016 includes resuming watershed-scale bioassessment activities at several stations within targeted watersheds. This program resumed in Tookany/Tacony-Frankford Watershed in 2013 and continued in the Wissahickon Creek Watershed in 2014. (**TABLE F.2.STEP 1.B-2 PROPOSED WATERSHED MONITORING TIMELINE 2008-2016)**. These watershed scale re-assessment and subsequent indicator status update reports should complement the "adaptive management" approach favored by the IWMP implementation process, and allow for the locations and methods of assessment to be changed, depending upon the number of projects implemented and their spatial distribution within the watershed. It is hoped that these data will be useful as a long-term record of water quality changes in the region, more appropriate for assessing the goals of a City-wide distributed green infrastructure program than an approach that focuses on individual watersheds.

Table F.2.Step1.b-2 Proposed Watershed Monitoring Timeline 2010-2016

Watershed	Program Components	2010				2011				2012				2013				2014				2015				2016			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Cobbs	BMP Monitoring																												
	Quarterly WQ Grab sampling																												
	Continuous WQ Monitoring																												
	Annual WQ Summary																												
	Bioassessment																												
	Bioassessment Data Analysis																												
	IWMP Indicator Status Update																												
Tacony-Frankford	BMP Monitoring																												
	Quarterly WQ Grab sampling																												
	Continuous WQ Monitoring																												
	Annual WQ Summary																												
	Bioassessment																												
	Bioassessment Data Analysis																												
	IWMP Indicator Status Update																												
Wissahickon	BMP Monitoring																												
	Quarterly WQ Grab sampling																												
	Continuous WQ Monitoring																												
	Annual WQ Summary																												
	Tributary Assessment																												
	Tributary Data Analysis																												
	Bioassessment																												
	Bioassessment Data Analysis																												
	IWMP Indicator Status Update																												

Water Quality Sampling and Monitoring

Guiding Principles of Urban Water Chemistry Assessment

PWD's water quality assessment strategy has been designed to facilitate separate analyses of dry weather (i.e., baseflow) and wet weather water quality conditions. This program has evolved over time, as personnel and technological improvements have improved our abilities to collect more data from an increasing number of sampling locations in a more efficient manner. Automated sampling, in particular, has greatly increased the temporal resolution of stormwater sampling at multiple sampling locations for a single storm event.

In order to comply with the State-regulated stormwater permit obligations, PWD worked with USGS to record continuous water quality data at 10 gage stations in the Philadelphia region from July 2013 through November 2013 and March 2014 through June 2014. The sampling and monitoring sites are presented in **APPENDIX G - MONITORING LOCATIONS**. Four types of sampling were performed as discussed below. Parameters were chosen based on state water quality criteria, or because they are known or suspected to be important in urban watersheds.

Discrete Water Chemistry Assessment

In order to characterize conditions throughout the Philadelphia region and build a long-term record of water quality, PWD initiated a quarterly baseflow water quality sampling program at 10 USGS gage stations. Each USGS/PWD cooperative monitoring gage site was sampled once during the course of a few hours, to allow for travel time and sample processing/preservation. Samples are collected during dry weather and parameters were chosen based on the conclusions from baseline sampling that indicated dry weather problems are primarily related to bacteria and nutrients. Results of samples collected to date are presented in **APPENDIX H- PWD QUARTERLY DRY WEATHER WATER QUALITY MONITORING PROGRAM.** Previous annual reports describe PWD's extensive surface water grab sampling efforts dating back to 2002.

Grab samples were also collected from seven locations in the Delaware Estuary and three locations in the tidal Schuylkill by boat July 2013-June 2014. Samples are collected at low tide to ensure that water samples adequately represent spatial variability in water quality that may be present. PWD plans to sample the Delaware and Schuylkill locations on a monthly basis until at least two years of data (approximately 24 samples) have been accumulated for each river. Results from quarterly dry weather grab sampling thus far are generally similar to data collected during the CCR data collection periods. For this reason, PWD will re-evaluate whether additional water quality sampling is needed to characterize water quality in targeted watersheds on a case-by-case basis.

Continuous Water Quality Assessment

In order to characterize conditions throughout the Philadelphia region and build a long-term record of water quality, PWD initiated a continuous water quality monitoring program at 10 USGS gage stations. Each USGS/PWD cooperative monitoring gage site records water quality data for dissolved oxygen, temperature, flow, pH, and specific conductance. Selected locations are also instrumented for turbidity, precipitation and photosynthetically active radiation (PAR). These data are made available to the public in near real-time on the internet at http://pa.water.usgs.gov/pwd/. The monitoring results from FY 2014 are presented in **APPENDIX I - PWD-USGS COOPERATIVE WATER QUALITY MONITORING PROGRAM ANNUAL SUMMARY.**

In addition to continuously monitoring water quality at USGS gaging stations, PWD continued deployments of *in situ* self-contained data logging continuous water quality monitoring sondes (YSI Inc. Models 6600, 6600 EDS, 600XLM) in the tidal Schuylkill River and Frankford Creek from April-November 2013. Tidal sondes were deployed again in April 2014, with the intention of collecting data through November 2014.

Long-term continuous monitoring for TMDL compliance and building a long-term water quality data record for the aforementioned watersheds will be accomplished in 2010-2015 through a partnership with the USGS. Results from City-wide continuous monitoring thus far are generally similar to data collected during the CCR data collection periods. For this reason, PWD will re-evaluate whether additional water quality sampling is needed to characterize water quality in targeted watersheds on a case-by-case basis. Continuous water quality instruments will also be utilized in evaluating the performance of certain stormwater BMPs and assessing conditions in tidal portions of the Schuylkill and Delaware Rivers as well as Frankford Creek.

Groundwater Monitoring

A City-wide groundwater level monitoring network will provide long-term monthly data documenting current water levels and trends in groundwater elevations throughout the City, helping to track the impacts of widespread implementation of stormwater management practices (SMPs) and global climate change. Data from the groundwater monitoring network will also be used to calibrate a Philadelphia groundwater model and update the USGS groundwater contour map of Philadelphia (Paulachok 1984).

PWD and USGS identified existing wells that would be suitable for the network and obtained permission for site access. Once wells were identified and accessible, well condition and suitability for inclusion in the monitoring network were investigated by continuous water level monitoring and remote video camera inspection when accessible. Wells that met acceptance criteria were added to the monitoring network. After examining readily available information about existing wells, PWD elected to drill additional wells in order to provide better spatial distribution of wells in the monitoring network. Current status of the groundwater monitoring network and a summary of data collected through June 30, 2014 are presented in **APPENDIX J – PWD/USGS GROUNDWATER MONITORING PROGRAM**.

Biological Monitoring

The biological monitoring protocols employed by PWD are based on methods developed by the US EPA (Barbour *et al*. 1999) and the PADEP. These procedures are as follows:

- Rapid Bioassessment Protocol III (Benthic Macroinvertebrate Sampling)
- Rapid Bioassessment Protocol V (Fish Sampling)
- Periphyton Assessment (Algae Monitoring)

Macroinvertebrate Assessments

As described in the PWD *Comprehensive Watershed Monitoring Program: Proposed Monitoring Strategy 2010-2015*, PWD's approach is intended to be a compromise, recognizing not only the benefits of collecting data from randomly selected sites but also the importance of maintaining a monitoring effort at consistent locations over time. This plan is based on a similar monitoring program that USGS has implemented in Chester County (Reif 2002, Reif 2004). The plan reflects the manpower constraints of collecting and processing samples with the PADEP ICE protocol. It is hoped that this approach will achieve some of the benefits of a randomized approach, while providing periodic re-evaluation of our watersheds required to inform the watershed planning process and comply with environmental mandates. Targeted watershed assessments resumed in Tookany/Tacony Creek Watershed in spring 2013. (**TABLE F.2.STEP 1.B-3 PROPOSED BENTHIC INVERTEBRATE MONITORING TIMELINE 2010-2015)**.

Table F.2.Step 1.b-3 Proposed Benthic Invertebrate Monitoring Timeline 2010-2015

Period	Monitoring Activity (number of samples*)
2010	Stream Restoration Monitoring (3)
2011	USGS gage samples (9); Randomly selected sites (16)
2012	Cobbs Creek (6**); USGS gage samples (9); Random (10)
2013	Tookany/Tacony Creek (10**) USGS gage samples (9); Random (6)
2014	Wissahickon Creek Tributaries*** (11) USGS gage samples (9); Random (5)
2015	Wissahickon Creek (12**)USGS gage samples (9); Random (4)

* Number of samples estimated, actual number of samples may vary
** Number of monitoring sites excludes 2 USGS gage sites in target watershed
*** See section 7 for more information on Wissahickon Creek tributary samples

During March and April 2013, PWD conducted Rapid Bioassessment Protocols (RBP III) at 25 (n=25) locations within Philadelphia area watersheds. Sampling was conducted at eight USGS gages in the PWD/USGS Cooperative Monitoring program, 10 sites in Tookany/Tacony Creek Watershed, and seven randomly selected sites. These data are presented in **APPENDIX K – PWD WADEABLE STREAMS BENTHIC MACROINVERTEBRATE AND PHYSICAL HABITAT ASSESSMENTS.** Results of the Tookany/Tacony Creek assessments will be presented in a Tookany/Tacony Creek Watershed Integrated Watershed Management Plan Indicator Status Update in 2014. In spring 2014, PWD sampled nine USGS gages, 11 tributary sites in Wissahickon Creek Watershed, and five randomly chosen sites.

Fish Assessments
Targeted watershed assessments resumed in June and July 2013 when fish assessments were conducted at 8 sites within the Tookany/Tacony Creek Watershed. Because 2014 monitoring efforts focused on Wissahickon tributaries, fish assessments were not performed in 2014. (**TABLE F.2.STEP 1.B -4 PROPOSED FISH MONITORING TIMELINE 2010-2015)**. All surveys were conducted using electrofishing gear as described in EPA RBP V (Barbour, et al. 1999). Results of these fish assessments will be presented in a Tookany/Tacony Creek Watershed Integrated Watershed Management Plan Indicator Status Update in 2014.

Table F.2.Step 1.b-4 Proposed Fish Monitoring Timeline 2010-2015

Period	Monitoring Activity (number of samples*)
2012	Cobbs Creek Watershed Assessment (4)
2013	Tookany/Tacony Creek Watershed Assessment (8)
2015	Wissahickon Creek Watershed Assessment (10)

* Number of samples estimated, actual number of samples may vary

Algae Assessments
Algal biomass and nutrient ratio data may be used to provide information for the parameterization of water quality models. Beginning in 2011, PWD began collecting monthly phytoplankton samples from three monitoring locations on the Delaware River. Grab samples are taken at sites DR8190 (Commodore Barry Bridge), DR10016 (Ben Franklin Bridge), and DR 11011 (Baxter Water Treatment Plant Intake). Beginning in 2012, PWD began collecting phytoplankton samples from monitoring location SC470 (Navy Yard) on the Schuylkill River. Samples are delivered to the Patrick Center of the Academy of Natural Sciences of Philadelphia, phycology section, for taxonomic identification of diatoms and soft algae, as well as the determination of intracellular nutrient (C, N, P) concentrations.

Physical Monitoring

Physical Habitat Assessments
Habitat assessments are conducted along with benthic macroinvertebrate monitoring and thus the habitat assessment strategy is described under the heading **BIOLOGICAL MONITORING - MACROINVERTEBRATE ASSESSMENTS,** above**.** PWD assesses stream physical habitat condition using PADEP Instream Comprehensive Evaluation (ICE) protocols. During 2013, PWD conducted physical habitat assessments at 25 locations within Philadelphia area watersheds. Sampling was conducted at eight USGS gages in the PWD/USGS Cooperative Monitoring program, 10 sites in the targeted Tookany/Tacony Creek Watershed, and seven randomly selected sites. These data are presented in **APPENDIX K – PWD WADEABLE STREAMS BENTHIC MACROINVERTEBRATE AND PHYSICAL HABITAT ASSESSMENTS.** Results of the Tookany/Tacony Creek assessments will additionally be presented in a Tookany/Tacony Creek Watershed Integrated Watershed Management Plan Indicator Status Update in 2014. In spring 2014, PWD sampled nine USGS gages, 11 tributary sites in the Wissahickon Creek Watershed, and four randomly chosen sites.

Habitat Suitability Index (HSI)
In addition to habitat assessments, Habitat Suitability Index (HSI) models, developed by the U.S. Fish and Wildlife Service (USFWS), have been incorporated into the monitoring program. Based on empirical data and supported by years of research and comprehensive review of scientific literature, these models present numerical relationships between various habitat parameters and biological resources, particularly gamefish species and species of special environmental concern. To date, HSI have applied to Darby-Cobbs, Tookany/Tacony-Frankford, Wissahickon, and Pennypack Creek Watersheds. The Poquessing Creek Watershed CCR approach attempted to simplify the application of fish habitat suitability analysis to generalized guilds, as described below.

Fluvial Geomorphologic (FGM) / Infrastructure Analysis
Fluvial Geomorphologic (FGM) studies establish the physical attributes of the stream, identify areas of concern, and provide recommendations for rehabilitation of the stream corridors and floodplains. To date, FGM analysis has been conducted on the Darby-Cobbs, Tookany/Tacony-Frankford, Wissahickon, Pennypack, and Poquessing Creeks. Analysis was conducted in order to characterize channel morphology, disturbance, stability, and habitat parameters as well as to provide a template for hydrologic and hydraulic modeling and serve as a baseline for assessing channel bank and bed changes. Data provided from the FGM analyses will also serve to develop reach rankings within each watershed in order to prioritize restoration strategies. During FY 2014, PWD completed final drafts of the Pennypack FGM Report and the Poquessing FGM Report. This successional assessment for the Poquessing study was accomplished by resurveying cross-sections established during the initial study conducted in FY 2008 and conducting a Unified Stream Assessment Method reach characteristic assessment.

Summary of Monitoring Locations
Biological, physical and chemical monitoring locations are based on 3 criteria: 1) appropriate habitat heterogeneity; 2) access availability; and 3) proximity to USGS stream gaging stations and PADEP 305b monitoring sites. In general, the number of monitoring sites is proportional to the size of the drainage and the watershed's link magnitude (*i.e.*, number of 1st order streams). Maps of assessment sites by watershed and program (biological, chemical, or physical), which are also available as GIS data, are presented in **APPENDIX G – MONITORING LOCATIONS.**

Quality Assurance/Quality Control (QA/QC) and Data Evaluation
PWD has planned and carried out an extensive sampling and monitoring program to characterize conditions in Pennypack and Poquessing-Byberry Creek Watershed. Sampling and monitoring follow the Standard Operating Protocols (SOPs) and Quality Manual as maintained by PWD's BLS. These documents cover the elements of quality assurance, including field and laboratory procedures, chain of custody, holding times, collection of blanks and duplicates, and health and safety.

They are intended to help the program achieve a level of quality assurance and control that is acceptable to regulatory agencies. More information regarding Standard Operating Procedures (SOPs) for chemical and biological assessments is available from BLS.

F.2.Step 1.c. Pennypack, Poquessing, Wissahickon WMP preliminary reconnaissance - Inventory of Point and Non-Point sources

There are 142 NPDES permitted dischargers in Philadelphia, as shown in **APPENDIX L – FY2014 NPDES PERMITTED DISCHARGERS**. This listing was downloaded from the EPA Integrated Compliance Information System- NPDES (ICIS-NPDES) as accessed through the Enforcement & Compliance History Online (ECHO) website (http://www.epa-echo.gov/echo/compliance_report_water_icp.html). Only 50 of these dischargers are located in MS4 areas, with the remaining dischargers located in the CSO areas or areas of direct drainage to a waterway.

PWD is also actively involved in developing estimates of non-point source pollutants. The results of this analysis are described in the hydrologic models in **SECTION G ASSESSMENT OF CONTROLS** on page 132.

F.2.Step 1.d Pennypack, Poquessing, Wissahickon WMP preliminary reconnaissance - Preliminary problem assessment

CCRs were completed for the Wissahickon, Pennypack and the Poquessing Creek Watersheds. These reports include analysis of data collected over the monitoring period and present a characterization of problems within the watershed. The reports for each watershed are available to the public through the internet at the following address: http://www.phillywatersheds.org/what_were_doing/documents_and_data/watershed_plans_reports

F.2.Step 2. Watershed Plan Development: Permit issuance through end of year 4

The Act 167 Plans for the Pennypack and Poquessing Creek Watersheds were completed and submitted to the PADEP in December 2012. The Pennypack Creek Watershed Act 167 Plan was approved by the PADEP in July 2013. The Wissahickon Act 167 Plan has been completed and is currently in the approval process. For more information on the status of the Act 167 plans, please refer to **SECTION III.C.3.7 BASIN-SPECIFIC STORMWATER MANAGEMENT PLANS (ACT 167**) on page 76.

F.2.Step 3. Watershed Plan Implementation and Performance Monitoring: Permit issuance through expiration

F.2.Step 3.a. Pennypack, Poquessing, Wissahickon - Watershed Plan Implementation and Performance Monitoring - Dry Weather Water Quality and Aesthetics

F.2.Step 3.a.i. Operate the Defective Lateral Program

Over the last permit year, PWD has continued to successfully operate its Defective Lateral Program. A detailed discussion of this program is provided within this report in **SECTION F.3 - DETECTION, INVESTIGATION, AND ABATEMENT OF ILLICIT CONNECTIONS AND IMPROPER DISPOSAL** on page 106.

F.2.Step 3.a.ii. Debris removal from waterways impacted by stormwater discharges

PWD continues to employ the WRT to remove debris and conduct small scale stream restoration projects within the City's waterways. Please refer the CSO portion of the Annual Report **SECTION II.F – CONTROL OF SOLID AND FLOATABLE MATERIALS** on page 28 for information about debris removal from waterways impacted by stormwater discharges.

F.2.Step 3.a.iii. Lincoln Drive sewer relining

PWD completed the Lincoln Drive sewer relining in 2004. Additional information on this project was reported in previous reports; please refer to **SECTION F.2.3.a.iii LINCOLN DRIVE SEWER RELINING** on page 261 of the FY 2010 CSO-Stormwater Annual Report.

F.2.Step 3.a.iv. Stormwater outfall dry weather flow inspections

The City maintains a stormwater outfall monitoring system in compliance with the MS4 permit issued by the Department. All 434 of the City's permitted stormwater outfalls are routinely inspected such that all outfalls are inspected at least once per permit cycle as part the Permit Inspection Program. Those with dry weather discharges are sampled for fecal coliform and fluoride analysis. The results of these samples are reported on a quarterly basis and summarized in this annual report.

During FY 2014, only 6 outfalls were inspected and 6 were sampled due to observed dry-weather flow under the permit inspection program. In addition, 45 outfalls were inspected and 40 sampled due to observed dry-weather flow under the Priority Outfall quarterly sampling program during FY 2014. These samples are used to evaluate priorities for the Defective Lateral Detection and Abatement Program. A summary table (**TABLE F.2.Step 3.A.IV-1)** of the progress of the Defective Lateral Detection and Abatement Program from FY 2005 - FY 2014 as well as a synopsis of the work in the priority areas is provided below. The test results of these samples can be found in **APPENDIX M – FY 2014 DEFECTIVE LATERAL QUARTERLY REPORTS.**

Table F. 2.Step 3.a.iv-1: Stormwater Outfall Inspection Program

	Permit Inspection Program		Priority Outfall Program	
	Inspections:	Samples:	Inspections:	Samples:
FY 2005	73	69	83	74
FY 2006	97	56	90	81
FY 2007	46	33	46	31
FY 2008	56	30	30	30
FY 2009	8	8	56	56
FY 2010	237	121	44	44
FY 2011	79	39	43	43
FY 2012	24	20	44	40
FY 2013	2	2	45	40
FY 2014	6	6	45	40
Total	604	364	482	439

F.2.Step 3.a.v. Defective Lateral Program priority outfalls sampling

Outfalls are prioritized for investigative work by the Defective Lateral and Abatement Program. In addition, outfalls identified as priority outfalls under the MS4 permit are sampled quarterly and summarized annually.

PWD also investigates all potential reports of an illicit discharge from the stormwater system.

T-088-01 (7th & Cheltenham Avenue)

As of June 30, 2014, 2,831 properties have had complete tests as defined by the MS4 permit in this priority outfall area. Of these properties, 132 (4.7%) have been found to have defective laterals and all have been abated.

The locations of dry weather diversion devices, the number of inspections, blockages, and discharges found in FY 2014 are listed below:

Table F.2.Step 3.a.v-1 Dry Weather Diversion Device Installation Locations

Location	ID#	Inspections	Blockages	Discharges
Plymouth Street, West of Pittville Ave.	CFD-01	29	6	0
Pittville Avenue, South of Plymouth St.	CFD-02	27	2	0
Elston Street, West of Bouvier Street	CFD-03	23	1	0
Ashley Street, West of Bouvier Street	CFD-04	19	0	0
Cheltenham Ave, East of N. 19 Street	CFD-05	21	0	0
Verbena Street, South of Cheltenham Ave.	CFD-06	16	0	0
IFO 600 W Cheltenham Ave.	CFD-07	38	12	0
IFO 6819 N 07th Street	CFD-08	33	4	0

Fecal coliform sampling at this outfall continues quarterly. Results for the outfall samples during FY 2014 are listed below:

Table F.2.Step 3.a.v-2 T-088-01 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
8/20/13	1210
11/5/13	3448
1/9/14	>2420
5/14/14	565

W-060-01 (Monastery Avenue)

As of June 30, 2014, 611 properties have had complete tests as defined by the MS4 permit in this priority outfall area. Of these properties, 16 (2.6%) have been found to have defective laterals. All 16 have been abated.

Additionally, two (2) dry weather diversion devices were installed to intercept contaminated flow within the storm system and redirect the flow into the sanitary system. These devices are inspected regularly by the City's Collector System Flow Control Unit. The locations of these devices and the number of inspections, blockages, and discharges in FY 2014 are listed below:

Table F.2.Step 3.a.v-3 W-060-01 Inspections

Location	ID#	Inspections	Blockages	Discharges
Jannette Street, West of Monastery Ave.	MFD-01	13	0	0
Green Lane, North of Lawnton Street	MFD-02	13	0	0

Fecal coliform sampling at this outfall continues quarterly. Results for the outfall samples are listed below:

Table F.2.Step 3.a.v-4 W-060-01 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
8/20/13	1450
11/20/13	Dry – No Sample Taken
1/9/14	20
4/22/14	31

Monoshone Creek Outfalls

As of June 30, 2014, 2,744 properties have had complete tests as defined by the MS4 permit in this priority outfall area. Of these properties, 93 (3.4%) have been found to have defective laterals and all have been abated.

Significant reductions were achieved in fecal coliform concentrations and loadings in outfall W-068-04/05 as a result of defective lateral abatements, sewer relining, and the Saylor Grove Stormwater Wetland BMP. The entire Monoshone Creek Study and additional information on the area was provided in FY 2012, please refer to **SECTION F.2.STEP 3.A.V. DEFECTIVE LATERAL PROGRAM PRIORITY OUTFALL SAMPLING** on page 182 of the FY 2012 CSO-Stormwater Annual Report.

Fecal coliform sampling at these outfalls continues quarterly. A listing of the results for the W-068-05 outfall samples in FY 2014 are listed below:

Table F.2.Step 3.a.v-5 W-068-05 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
8/20/13	64,880
11/20/13	32,600
1/9/14	19,863
4/22/14	9,804

Manayunk Canal Outfalls

Of the 13 stormwater outfalls that discharge into the Manayunk Canal, the City is focusing on 7 that have recorded dry weather flow with some amount of fecal contamination. The results of FY 2014 fecal sampling at these are listed below:

Table F.2.Step 3.a.v-6 Manayunk Canal Outfall Fecal Sampling Results

Outfall	Outfall Fecal Colonies per 100 mL			
	9/19-30/13	12/26/13	3/11/14	6/16/14
S-058-01	63	51	52	573
S-059-01	437	>2,420	2,613	10,462
S-059-02	41,100	173,290	12,997	173,290
S-059-03	308	>2,420	1,421	670
S-059-04	1,730	31	1076	581
S-059-05	270	62	471	336
S-059-09	NF	NF	NF	NF

As of June 30, 2014, 2,478 properties have had complete tests as defined by the MS4 permit in the areas surrounding these 7 outfalls. Of these properties, 61 (2.5%) have been found to have defective laterals and all have been abated.

P-090-02 (Sandyford Run)

As of June 30, 2014, 5,814 properties have had complete tests as defined by the MS4 permit in this priority outfall area. Of these properties, 87 (1.5%) have been found to have defective laterals and all have been abated.

PWD has previously installed a dry weather diversion device to intercept contaminated flow within the storm system and redirect the flow into the sanitary system. This device is inspected regularly by PWD and continues to function properly. During FY 2014, there were 71 inspections of this site, and 2 blockages and 0 discharges were reported in total.

Franklin and Hasbrook Outfall (T-089-04)

As of June 30, 2014, 1,016 properties have had complete tests as defined by the MS4 permit in this priority outfall area. Of these properties, 46 (4.5%) have been found to have defective laterals and all have been abated.

PWD has previously installed a dry weather diversion device to intercept contaminated flow within the storm system and redirect the flow into the sanitary system. This device is inspected regularly by PWD and continues to function properly. During FY 2014, there were 88 inspections of this site, and 11 blockages and 3 discharges were reported in total.

Please refer to **SECTION F.3 - DETECTION, INVESTIGATION, AND ABATEMENT OF ILLICIT CONNECTIONS AND IMPROPER DISPOSAL** on page 106 for additional information on activities conducted for the Defective Lateral Program.

F.2.Step 3.a.vi. Priority Outfall Closure Testing

Investigation will continue within each particular outfall area (sewershed) until the priority outfall status may be closed. Closure of the defective laterals effort in a certain outfall area shall be as provided in the "Framework for Screening, Finding, and Abating Stormwater Pollution." During FY 2014, no outfalls were removed from the priority area designation; therefore no priority outfall closure testing was conducted.

Please reference **SECTION F.3 - DETECTION, INVESTIGATION, AND ABATEMENT OF ILLICIT CONNECTIONS AND IMPROPER DISPOSAL** on page 106 for a more detailed discussion of this subject.

F.2.Step 3.b. Healthy Living Resources

F.2.Step 3.b.i. Develop integrated stormwater management plans

PWD develops integrated stormwater management plans for all of the City's watersheds. Please refer to the CSO portion of the Annual Report in **SECTION III.C.3.7 - BASIN-SPECIFIC STORMWATER MANAGEMENT PLANS (ACT 167)** on page 76 for a detailed discussion on the City's watersheds stormwater management plans.

F.2.Step 3.b.ii. Assess the benefits of implementing a Natural Stream Channel Design (NSCD) and effectiveness of the NSCD restoration approach

PWD has conducted several projects that have been designed with Natural Stream Channel Design concepts in mind. As each of PWD's NSCD projects are constructed, PWD realizes the importance of the extensive monitoring and O&M that accompanies such projects. Each project provides the opportunity to learn about what techniques do and do not work in their respective hydrologic and hydraulic regimes. In order to assess the effectiveness of these NSCD projects, PWD conducts post implementation monitoring at each site that includes the measurement of relevant biological, habitat, and physical parameters to be used in comparison to pre-construction conditions. Additional information on NSCD has been provided in previous reports; please refer to **SECTION E.3.3.2 MONITORING EFFECTIVENESS OF NSCD** on page 228 of the CSO-Stormwater FY 2008 Annual Report.

F.2.Step 3. c. Wet Weather Water Quality and Quantity

F.2.Step 3.c.i Implement various types of stormwater BMP projects

Implement several BMP projects

PWD and its partners have implemented many BMP projects throughout the City including GSI, stream restoration, and wetland creation projects. For a complete listing of both completed and current GSI projects, please refer to the **APPENDIX B GREEN CITY, CLEAN WATERS 2014 ANNUAL REPORT APPENDICES 1 AND 2**. For a description of activities conducted for PWD's stream restoration, and wetland creation projects, please refer to the **SECTIONS III.C.2.3 STREAM HABITAT RESTORATION AND III.C.2.4 WETLAND ENHANCEMENT AND CONSTRUCTION** starting on page 66.

Monitor three demonstration BMPs

PWD is currently monitoring multiple stormwater BMP project types such as stormwater tree trenches, stormwater planters, and porous pavement in order to develop monitoring protocols and assess the performance of individual BMPs. Monitoring activities for PWD's green stormwater infrastructure projects during FY2014 are documented within **APPENDIX B GREEN CITY, CLEAN WATERS 2014 ANNUAL REPORT SECTION 6.1** on page 36.

PWD is committed to ensuring stormwater BMPs owned and operated by the City are maintained. This commitment is often evaluated through monitoring of these sites. PWD has detailed activities conducted during FY 2014 for PWD's stream restoration, and wetland creation projects in a section above; please refer to the **SECTIONS III.C.2.3 STREAM HABITAT RESTORATION AND III.C.2.4 WETLAND ENHANCEMENT AND CONSTRUCTION** starting on page 66. Maintenance activities during FY 2014 on PWD's GSI projects can be found in **APPENDIX B GREEN CITY, CLEAN WATERS 2014 ANNUAL REPORT SECTION 3.1** on page 9.

F.3. Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal

F.3.a. Prevention of Illicit Discharges

F.3.a.i. Sewer and Lateral Inspections

The City requires plumbing permits for connections to the municipal sewer system. The permit affords the property owner an inspection of the plumbing work performed. Corrections of defective connections are confirmed to ensure that the ultimate discharge to the receiving waters does not contain sanitary waste. As part of PWD's Defective Lateral Program, 2,625 dye tests were completed in FY 2014. This number includes the 58 that resulted in abatements FY 2014. In addition, PWD reviewed 642 new sewer and storm connections during FY 2014. These numbers include connections that occur in the storm, sanitary and /or combined sewers. A single project or permit may also have one connection or multiple connections.

F.3.b. Investigation of Illicit Discharge Sources

F.3.b.i. Rank the MS4 outfalls according to their priority for corrective actions

PWD maintains a stormwater outfall monitoring system in compliance with the MS4 permit issued by the PADEP. All 434 of the City's permitted stormwater outfalls are routinely inspected such that all outfalls are inspected at least once per permit cycle. Those with dry weather discharges are sampled for fecal coliform and fluoride analysis. Outfalls are prioritized for investigative work by the Defective Lateral and Abatement Program. PWD is currently using the priority list generated on 3/31/13. The latest priority list has been included in **APPENDIX N –SW OUTFALL PRIORITY SCORE – 03-31-13**. Outfalls identified as priority outfalls under the MS4 permit are sampled quarterly.

F.3.b.ii. Investigate dry weather flow to identify sewer lateral defects

During FY 2014, PWD staff performed 2,625 dye tests. Of these tests, 2,576 were unique connections and the remaining dye tests were revisits to certain connections. Of those connections, 49(1.9 %) were found defective and resulted in 58 abatements being completed. The total cost for the 58 abatements performed in FY 2014, both residential and commercial, was $442,113.77. Results of this fiscal year's program can be observed in **TABLE F.3.B.II-1**.

Table F.3.b.ii-1 Cross Connection Repair Program

Quarter	2013-3	2013-4	2014-1	2014-2	FY '14
Date Coverage	Jul13-Sep13	Oct13-Dec13	Jan14-Mar14	Apr14-Jun14	Total or Average
Completed Tests *	645	649	604	727	2,625
Confirmed Connections	631	639	593	713	2,576
Cross Connection Identified	14	10	11	14	49
% of Defective Connections	2.2%	1.5%	1.8%	1.9%	1.9%
Abatements **	16	14	14	14	58
Average # of days to abate	24.3	31.8	29.9	27.4	27.6

*Completed Tests includes revisits of connections

**Cross connections abated may have been identified in the prior fiscal year

PWD also investigates all potential reports of an illicit discharge from the stormwater system through either the Industrial Waste Unit or the Sewer Maintenance Unit. During FY 2014, PWD investigated 20 reported sewage discharges. A listing of the reported sewage discharges from FY 2014 can be observed in **TABLE F.3.B.II-2**.

Table F.3.b.ii-2 FY2014 Reported Sewage Discharges

Location	Date	Outfall	Resolution
7th Street and Cheltenham Avenue, Mill Run	7/9/2013	T-088-01	PWD investigated a reported discharge after a rain event. No active discharge observed.
Rennard Street Pumping Station 11064 Rennard Street, Huntingdon Valley Creek	8/19/2013	P-116-01	PWD flushed 10′′ diameter sanitary sewer upstream of PS causing approximate 14 gpm discharge. Minor debris also removed from sewer. Storm sewer flushed with dechlorinated water. Affected area of stream cleaned.
Bleigh Avenue and I-95, Delaware River	8/20/2013	D-074-01	PWD found a PennDOT contractor incorrectly bypass pumping from sanitary manhole # UDLL-B0630 to storm manhole # D074-01-0052. Contractor moved pump discharge into the correct sanitary manhole. No visible cleanup required at outfall.
Bustleton Avenue and Ambassador Street, Tremont Creek	8/20/2013	P-105-06	PWD flushed 10′′ diameter sanitary sewer causing approximate <1 gpm discharge. Storm sewer flushed with dechlorinated water.
9200 Bustleton Avenue, Tremont Creek	8/26/2013	P-105-06	PWD flushed 12′′ diameter sanitary sewer causing approximate <1 gpm discharge from sanitary manhole # P105-06-S0075 and outfall. Affected area around manhole cleaned. Rainfall flushed creek.
Hasbrook Street and Unruh Avenue, unnamed tributary of Tacony Creek	9/12/2013	T-089-02	PWD flushed 10′′ diameter sanitary sewer causing approximate <1 gpm discharge. Storm sewer flushed with dechlorinated water.
Gorgas Lane and Henry Avenue, unnamed tributary of Wissahickon Creek	9/30/2013	W-067-01	PWD investigated an apparent approximate <1 gpm discharge. No choked sewer identified. Discharge dissipated during the investigation.
Greene and West Duval Streets, Monoshone Creek	11/5/2013	W-068-05	PWD flushed 12′′ diameter sanitary sewer causing approximate <1 gpm discharge
Rhawn Street at Pennypack Creek, Pennypack Creek	11/14/2013	P-091-05	PWD investigated a reported approximate <1 gpm discharge. A failed 10′′ diameter sanitary sewer and sifted manhole were identified. Bypass pumping setup. The manhole was removed and the damages section of sewer was replaced with ductile iron pipe. Stream bank was restored. A new manhole will be installed approximately 15′ from the creek bank.
Location Not Available	12/5/2013	N/A	PWD identified and corrected a minor problem with the bypass pumping equipment causing approximate 1 gpm discharge. Lime placed for odor control.
West Rittenhouse and Morris Streets, Monoshone Creek	11/15/2013	W-060-10	PWD investigated a reported <1 gpm discharge. Blockage identified in PWD sewer reconstruction contractor's bypass on 12′′ diameter sanitary sewer. Contractor cleared blockage and improved bypass setup.
Pelham Road and Quincy Street, Monoshone Creek	12/4/2013	W-068-05	PWD flushed 10′′ discharge sanitary sewer causing approximate <1 gpm discharge. Debris removed from manhole. Storm sewer flushed with dechlorinated water.

Location	Date	Outfall	Resolution
300 West Mt. Pleasant Avenue, Monoshone Creek	1/2/2014	W-068-05	PWD flushed 10'' discharge sanitary sewer causing water in the property.
East Godfrey Avenue and Crescentville, Road Tacony Creek	1/14/2014	N/A	PWD investigated a reported <1 gpm discharge during wet weather. Sewer lining contractor closed malfunctioning ball valve on 36'' diameter intercepting sewer.
Detention Center- 8201 State Road, Tacony Creek	1/25/2014	N/A	PWD flushed sanitary sewer drain causing water in the property.
Stenton and Northwestern Avenues, Wissahickon Creek	1/28/2014	W-095-02	PWD investigated a reported discharge. No active sewer system problem found.
Bustleton and Haldeman Avenues, Paul's Run	2/27/2014	P-109-04	PWD flushed 12'' diameter sanitary sewer causing approximate 2 gpm discharge. Storm sewer flushed with dechlorinated water.
Adams Avenue and Crescentville Road, Tacony Creek	4/23/2014	N/A	PWD investigated a reported <1 gpm discharge to ground surface. Sewer lining contractor replaced damaged section of bypass pump hose and completed minor clean up.
Erdenheim Street and Wissahickon Creek, Wissahickon Creek	5/1/2014	W-095-02	PWD investigated a <1 gpm surcharged manhole # WLL-0675 during wet weather. Affected area cleaned and limed
Wissahickon and Lincoln Drive (Historic Rittenhouse Town), Monoshone Creek	5/20/2014	N/A	PWD investigated a <1 gpm surcharged manhole # WHL-B0850 caused by water main flushing activities

F.3.b.iii. Update the SOP for illicit connections detection and identification is updated as necessary

The Standard Operating Procedure/Methods (SOP) for illicit connection detection and identification required no updates during FY 2014.

F.3.c. Definitions used in this section

Definitions have been removed in this report; please refer to page 14 of **2005 NPDES MS4 PERMIT NO. PA0054712** for definitions provided within this section.

F.3.d. Abatements

F.3.d.i. Written notice about sewer lateral defects

58 Notices of Defect for the Cross Connections were issued to the property owners in FY 2014. In addition to these letters, other customer communications (follow-up letters, telephone or on-site conversations) may have been made in reference to the sewer lateral defects. During FY2014, approximately 4,147 customer notifications or correspondence were made via these other customer communications.

Abatements of Cross Connections

In the past ten reporting periods, PWD has abated 669 cross connections at a cost of $3,632,597.38. (**TABLE F.3.D.I -1**)

Table F.3.d.i-1 Summary of Abatement FY 2005-FY 2014

	# Cross Connections Abated		Total Cost of Abatements
	Residential	**Commercial**	
FY 2005	48	5	$169,955.00
FY 2006	66	3	$333,094.00
FY 2007	78	0	$388,844.00
FY 2008	45	8	$ 187,539.00
FY 2009	88	13	$395,249.00
FY 2010	42	5	$280,970.00
FY 2011	74	9	$527,984.50
FY2012	51	11	$389,249.61
FY 2013	59	6	$517,598.50
FY 2014	47	11	$442,113.77
Total	598	71	$ 3,632,597.38

F.3.d.ii. Residential Properties Cross Connections abatement

Abatement of Residential Cross Connections

The City requires abatement of all residential defective connections upon discovery. During the FY 2014 reporting period, PWD funded abatement of 47 residential cross connections at an average cost of $8,407.19, for a total cost of $395,137.77.

F.3.d.iii. Commercial and industrial properties Cross Connections abatement

Abatement of Commercial and Industrial Cross Connections

PWD requires prompt abatement of all commercial and industrial defective connections upon discovery, and maintains the legal authority to take administrative action to cease the pollution condition. During the FY 2014 reporting period, PWD funded abatement of 11 commercial cross connections at an average cost of $4,270.55, for a total cost of $46,976.00.

F.3.d.iv. Residential Properties Cross Connections abatement schedule

When PWD goes out to a property to perform a dye test where a cross connection result is found, this information (location, date, and site description) is entered into an electronic database which later used to notify the property owner of defect. All defects are expected to be completed within 120 days of notice. During FY 2014, there were 10 properties that exceeded the 120 day requirement.

F.3.d.v. Cross Connections abatement confirmation testing

All abatements conducted during FY 2014 had confirmation testing showing abatement were installed properly.

F.3.e. Defective Connection Program Reporting

F.3.e.i. Illicit connection program quarterly report

Defective Lateral Quarterly Reports are submitted four times a year to Andrew Sinclair at PADEP as part of the reporting requirements of the City of Philadelphia NPDES Stormwater Management Permit No. PA 0054712. The report covers three-month periods staring in January, April, July, and October which are submitted no later than 45 days from the end of the reporting period. The Quarterly reports were submitted as required during FY 2014, and **APPENDIX M – FY 2014 DEFECTIVE LATERAL QUARTERLY REPORTS** contains all of these reports.

F.3.e.ii. Illicit connection program quarterly report contents

The report content within the illicit connection program quarterly reports have not changed in FY 2014. Please refer to **SECTION F.3.e.ii ILLICIT CONNECTION PROGRAM QUARTERLY REPORT CONTENTS** on page 275 of the CSO-Stormwater FY 2010 Annual Report to view the complete description of report contents.

F.4. Monitor and Control Pollutants from Industrial Sources

F.4.a. Applications/Permits

The City obtains NPDES permits/discharge information from industries if they contribute significant amounts stormwater into the City's sewer system. Industries that contribute stormwater directly into a waterway or discharge non-industrial waste into the system usually coordinate directly with the Department. A list of NPDES permits that involve stormwater associated with industrial activities in the City were obtained from the Department's website and are listed in **APPENDIX L – NPDES PERMITTED DISCHARGERS**.

F.4.b. Inspections

F.4.b.i. Industrial inspections

The Philadelphia Local Emergency Planning Committee (PLEPC) is the entity tasked with meeting the responsibilities of SARA Title III. Under PLEPC, the Fire Department representative is the individual that carries out the inspections. Philadelphia Fire Department (PFD) personnel inspect SARA facilities to ensure that information mentioned within their Tier II report is accurate, which includes a visual on-site inspection, verifying the facility has a PPC plan and reviewing any other information contained within the Tier II report. PFD also monitored and managed Regulatory Compliance of facilities within the City of Philadelphia that fall within the regulatory purview of SARA Title III and PA Act 165.During FY2014, PFD personnel inspected 178 facilities of the 473 SARA reporting facilities that submit Tier II status reports. This effort varies each year depending on staffing and the number of SARA Tier II reports that are submitted. Typical violations encountered during these FY2014 inspections include missing or no signage where hazardous materials are stored, chemical that meets reportable quantity not being reported on the Tier II, no document container with MSDS sheets, site plan, emergency response plan of facility; incompatible chemical storage; emergency contact has changed.

F.4.b.ii. Update industrial waste inspection forms

The Industrial Waste Inspection Form was updated in 2006, a copy of the form can be found in previous reports; please refer to **APPENDIX O** of the CSO-Stormwater FY 2009 Annual Report**.**

F.4.c. Monitoring/Enforcement

F.4.c.i. Industrial DMR submission

When necessary, the City shall request DMRs or additional sampling from the Department for surrounding industries to ensure compliance with NPDES effluent limitations.

F.4.c.ii. NPDES permits enforcement

Should PWD personnel observe a violation of NPDES permit terms and conditions, PWD will report the violation immediately and notify the interested and downstream parties, including PADEP. To date, PWD has never reported a NPDES violation conducted by another NPDES permit holder to PADEP.

F.5. Monitor and Control Stormwater From Construction Activities

Stormwater runoff is a concern both during and after construction. The role of PWD in the plan review process has provided vastly improved oversight of site controls during earth disturbance activities and will assist in improving water quality. Additionally, post-construction stormwater management plan review now extends beyond peak rate control and encompasses water quality and water quantity technical requirements for more frequent storm events. Efforts continue to be focused on improving plan review for both Erosion & Sedimentation (E&S) as well as post-construction stormwater management. The following discussion documents the progress made so far in terms of stormwater runoff from construction activities including the collaboration between City Departments as well as between the City and State agencies.

During FY 2014, PWD performed numerous tasks in direct compliance with the NPDES Permit as well as tasks supporting continuance and improvement of a growing stormwater management program and watershed program. Some of the FY 2014 activities include the following:

- Continued coordination efforts with multiple City departments, including Department of Public Property and Parks and Recreation, to help streamline review and ensure cost effective project designs.
- Continued coordination efforts with Philadelphia Licenses and Inspections (L&I) regarding permit review and issuance for private development projects applicable to the Stormwater Regulations. At a minimum, the L&I issuance of a Zoning, Demolition, Foundation, and Building permit was coordinated appropriately between the two agencies.
- Worked with PADEP to better formalize coordination between the two agencies as well as document a communication strategy. Hold bi-annual coordination meetings with PADEP NPDES permit review staff to facilitate collaboration between the two review programs. Attend quarterly meetings with PADEP and southeast regional conservation districts where information is shared regarding active projects as well as various permit and regulatory requirements.
- Held applicant project meetings to discuss upcoming projects and active projects. Items discussed include project status, project applicability, technical requirements and questions, as well as key dates in the project timeline.
- Scheduled and held coordination meetings with local universities and other large landowners to discuss upcoming or current development projects as well as identify ways to strengthen communication and streamline the review process.
- Continued to hold quarterly Development Services Committee meetings to gather feedback from the development community regarding improvements to the stormwater plan review program. In FY 2014, focus was placed on both process improvements as well as changes to policy and technical requirements. The goal is to implement changes to support transparency and flexibility for a business-friendly process and promote development in the City and to maximize stormwater management.
- Updated plan review website content, including new and revised forms as well as detailed technical guidance, in an effort to provide more resources to the applicant to support quality submittals and efficient reviews.

In addition to the above, similar tasks were performed as were reported in FY 2012. PWD continued to conduct reviews of stormwater management plans, hold weekly walk-ins review hour for applicants and maintain the website to allow online submittal of plans.

A summary of all plan review activities in FY 2014 is presented in **TABLE F.5-1**.

Table F.5-1 Summary of Plan Review Activities throughout FY 2014

	Jul.	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*Jun.*	*FY 14 Total*
Conceptual Review Stage													
Approvals	14	3	9	14	10	12	8	11	18	9	12	6	126
Rejections	53	29	40	30	34	31	23	30	31	31	33	30	395
Reviews	67	32	49	44	44	43	31	41	49	40	45	36	521
New Project Submittals	29	24	21	37	26	23	26	25	35	25	25	36	332
Average Review Time (days)	4.2	2.9	3.3	7.4	8.9	5.2	3.4	4.0	4.4	6.5	3.5	3.0	4.7
Post Construction Stormwater Management Plan Review Stage													
Administrative Screenings	6	13	6	11	14	9	3	4	12	24	6	10	118
Technical Approvals Issued	5	9	9	9	8	5	5	9	5	8	4	9	85
Rejections	30	31	18	28	29	31	22	16	20	18	33	14	290
Full Technical Reviews	50	63	47	54	57	53	43	39	43	35	53	44	581
New Project Submittals Received	14	17	20	18	20	14	16	21	16	18	15	23	212
Average # of Reviews per Approval	4.2	4.1	3.7	5.1	4.8	4.4	4.2	5.3	4.8	4.6	4.0	3.7	4.4
Average Approval Time (days)	103	108	112	392	160	86	107	316	192	173	362	338	211
Acres of Earth Disturbance Approved	4.3	95.1	21.4	16.3	18.4	5.3	12.9	14.4	9.6	53.7	3.7	30.2	285.3
Acres of Green Roofs Approved	0.1	0.1	1.1	0.6	0.2	0.4	0.1	0.4	0.0	1.2	0.0	0.2	4.4
Acres of Porous Pavement Approved	0.0	0.1	0.8	0.3	0.1	0.0	0.1	1.7	0.5	0.4	0.0	2.8	6.8
DEP Reviews													
New Coordinated Reviews	5	6	3	4	2	4	7	5	8	11	8	10	73
Erosion and Sedimentation Plan Review													
Defer to DEP	0	1	1	0	0	2	1	1	1	2	0	5	14
Approved	6	8	7	7	8	5	3	4	4	7	5	7	71
Rejected	15	11	6	12	9	10	11	8	9	9	11	6	117
Not Applicable	17	14	9	8	10	15	11	10	12	10	12	11	139
Total Inspections													
New Sites Inspected	130	25	42	17	54	12	7	10	14	17	8	42	378
Total Inspections	310	271	255	285	278	184	215	186	271	310	286	337	3188
Active Construction Inspections at Project Sites with MS4 Sewers	108	92	51	81	63	52	70	60	85	98	78	94	932
Post Construction Inspections at Project Sites with MS4 Sewers	11	22	8	12	10	3	1	1	1	3	8	12	92
Total Inspections at Project Sites with MS4 Sewers	119	114	59	93	73	55	71	61	86	101	86	106	1024
Active Construction Inspections at Project Sites with Combined Sewers	136	114	129	141	105	92	101	87	117	145	135	121	1423
Post Construction Inspections at Project Sites with Combined Sewers	11	6	30	4	53	10	3	2	6	5	10	38	178
Total Inspections at Project Sites with Combined Sewers	147	120	159	145	156	102	104	89	123	150	145	158	1598

Please note: In FY09, PWD changed the Technical Screening to more of an administrative check to better mirror the DEP's administrative check. PWD Screenings are no longer included in the Technical Review count.

F.5.a. Construction Site Runoff Control

PWD reviews E&S Plans for sites disturbing between 15,000 square feet and one acre of earth while following policies and practices as provided within the PADEP E&S Control Manual. As a result of plan review and coordination with the State, scheduled site inspections as well as timely responses to active construction site complaints have continued as part of the stormwater management program during FY 2014. The E&S process, including inspections, has been described in detail in previous reports; please refer to **SECTION F.5.A. CONSTRUCTION SITE RUNOFF CONTROL** in the CSO-Stormwater FY 2012 Annual Report on page 198.

Based upon the FY 2014 inspections, the major compliance issues continue to include improper use of silt fences, inadequate or lack of inlet protection and construction entrances, contractor not following the onsite E&S Plan and a complete absence of E&S controls. The sites visited cover all of Philadelphia including both separate storm sewer areas and combined sewer areas as depicted in **FIGURE F.5.A-1**.

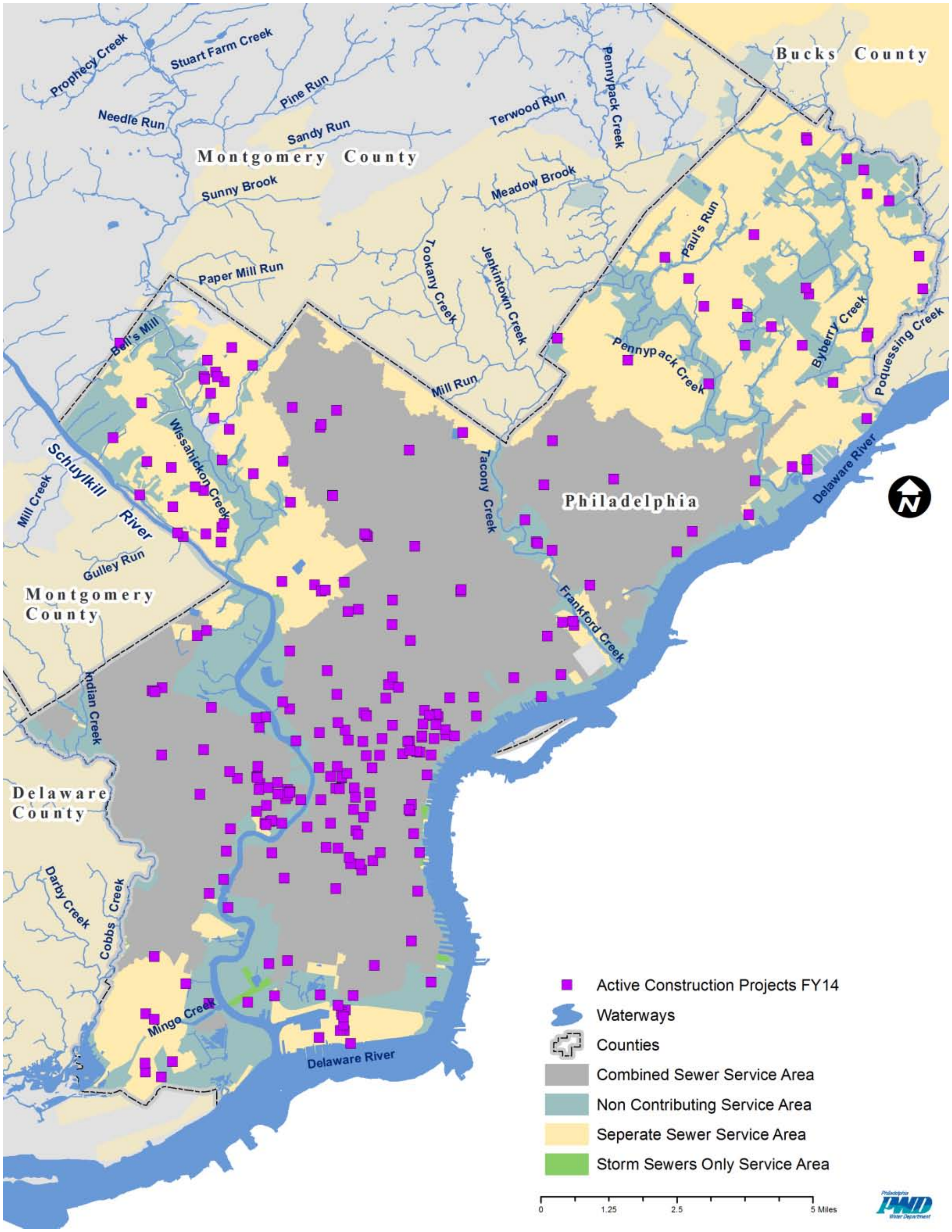


Figure F.5.a-1 Active Construction Site Inspections

F.5.b. Post-Construction Stormwater Management in New Development and Redevelopment

The adoption of the Philadelphia Stormwater Regulations on January 1, 2006 enabled Philadelphia to review plans for both new and redevelopment sites ensuring that water quality and quantity are part of the management plan. Details on the technical components of the Stormwater Regulations have been provided in previous years; please refer to **SECTION F.5.b POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT** on page 200 of the CSO-Stormwater FY 2012 Annual Report. The Philadelphia Stormwater Regulations are available online at:
http://www.phila.gov/water/PDF/PWDRegulationsRev02.07.14.pdf.

Implementation of the Stormwater Regulations will continue to improve stormwater quality and quantity impacts as redevelopment and development continues across the City. PWD is tracking the stormwater management practices implemented by private development to address the regulations.

F.5.c. Applications/Permits

During FY 2014, 332 unique projects were submitted to PWD for conceptual review through the program's website.

PWD approved 85 full technical plans during FY 2014. It should be noted that this number does not include plans re-submitted for review, some of them multiple times. The distribution of development projects that submitted post-construction stormwater management plans for review is presented in **FIGURE F.5.C-1, TABLE F.5.C-1 & 2.**

Since the beginning of FY 2014, there have been 73 coordinated permit applications submitted to PADEP that are undergoing a joint stormwater management review as shown in **TABLE F.5-1**.

Table F.5.c-1 Approved Stormwater Plan Location Summary by Contributing Area

Drainage Type	Number of Locations
Combined Sewer Area	55
Non-Contributing Area	14
Separate Sewer Area	16
Total	85

Table F.5.c-2 Approved Stormwater Plan Location Summary by Watershed

Drainage Watershed	Number of Locations
Delaware River	33
Poquessing Creek	2
Pennypack Creek	2
Schuylkill River	371
Tacony/Frankford Creek	6
Wissahickon Creek	5
Darby-Cobbs Creek	0
Total	85

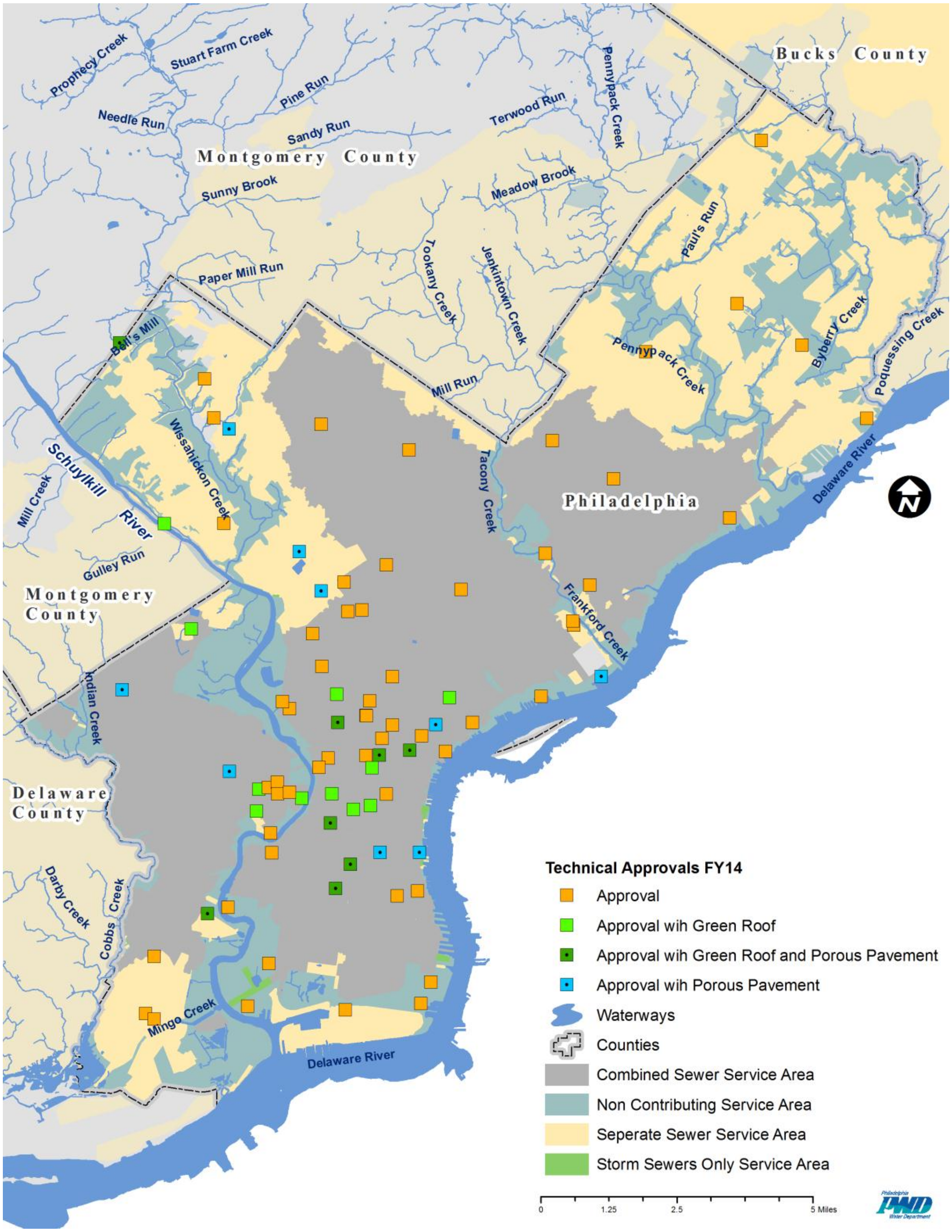


Figure F.5.c-1 Locations of Approved Post-Construction Stormwater Management Plans

F.5.d. Inspections

PWD stormwater plan review inspectors conducted 2,908 active construction site inspections in FY2014. Development projects were inspected for compliance with appropriate E&S controls and proper construction and installation of post construction stormwater management practices. Many sites were visited multiple times to ensure compliance with appropriate requirements **(TABLE F.5.D-1).**

Table F.5.d-1 Erosion and Sedimentation Inspection Site Location Summary

Drainage Type	Number of Locations
Combined Sewer Area	1423
Non-Contributing Area	553
Separate Sewer Area	932
Total Locations	2908

F.5.e. Monitoring/Enforcement

In FY 2014, a total of three sites were issued Stop Work Orders for E&S violations. One site was issued a Stop Work Order for starting construction without an approval. PWD also coordinates with the Department of Licenses & Inspections to hold the building Certificate of Occupancy for any projects where major issues are identified during the construction process.

F.5.f. NPDES Permit Requests

PWD continues to serve as the Conservation District for the City of Philadelphia for NPDES Construction Permitting Requirements and Chapter 102 Regulations relating to Erosion Control. PWD continues to receive notifications and coordinate reviews for permitting. For more information and full details on this process described in previous reports; please refer to **SECTION F.5.f NPDES PERMIT REQUESTS** on page 204 of the CSO-Stormwater FY 2012 Annual Report.

F.5.g. Stormwater BMP handbook and Construction Site BMP Sediment & Erosion Control Checklist

The Stormwater Management Guidance Manual was developed in 2006 to accompany the new Stormwater Regulations that went into effect the same year. The manual is intended to be a dynamic document allowing updates as needed with the most recent version available for electronic download at http://www.PWDPlanReview.org/StormwaterManual.aspx.

F.6. Watershed, Combined Sewer Overflow (CSO), and Source Water Protection Programs

PWD manages and operates three waste pollution control plants, three drinking water treatment plants, and miles of underground distribution and collection infrastructure. However, PWD is not just a provider of drinking water and wastewater treatment. PWD, through the Planning and Environmental Services Division (PESD), strives to reduce the amount of point and non-point discharges entering regional waterways and improve the environmental health of the region so that all waters are fishable and swimmable. The main programs within PESD, in addition to the Stormwater Management Program, that work together to improve regional ecological health, water quality, and sustainability are: EWS, SAN, CSO Management Program, Watershed Planning, Source Water Protection Program, and Wetlands Mitigation Registry. The Watershed Planning Program is presently explained in detail throughout **SECTION III.C.1** on page 63 of this report.

Source Water Protection Program

PWD's Source Water Protection Program embodies PWD's multi-barrier approach to ensuring the safety and quality of Philadelphia's drinking water, whose sources consist of the Schuylkill and Delaware Rivers. The Source Water Program staff work closely with PWD treatment plant managers and operators to anticipate and respond to emergencies and challenges to conventional treatment techniques. PWD continues to support the Source Water Protection Program, and has discussed it in full detail in the past. For more information on this program, please refer to **SECTION F.6 SOURCE WATER PROTECTION PROGRAM** on page 288 of the CSO-Stormwater FY 2010 Report.

Schuylkill Action Network

Please refer the CSO portion of the Annual Report **SECTION II.G.2.3 – SCHUYLKILL ACTION NETWORK** on page 34 for information about this topic.

Delaware Valley Early Warning System

Please refer the CSO portion of the Annual Report **SECTION II.G.2.4 – EARLY WARNING SYSTEM** on page 35 for information about this topic.

RiverCast

Please refer the CSO portion of the Annual Report **SECTION II.G.2.2 – RIVERCAST** on page 33 for information about RiverCast.

Combined Sewer Overflow Management Program

The Combined Sewer Overflow management program works to implement technically viable, cost-effective improvements and operational changes that mitigate the impacts of combined sewer overflows. Please refer to **SECTION I "MANAGEMENT AND CONTROL OF CSOs"** on page 13 in the CSO section of this document for additional information.

<u>Watershed Mitigation Registry</u>
Please refer to the CSO portion of the Annual Report **SECTION III. C.2.4 – WETLAND ENHANCEMENT AND CONSTRUCTION** on page 68 for information about the Watershed Mitigation Registry

F.7. Miscellaneous Programs and Activities

F.7.a. Pollutant Migration/Infiltration to the MS4 System

PWD responds to all citizen complaints of liquid, solid, or gaseous pollutants within Philadelphia. A list of all pollutant migration events in FY 2014 is presented in **APPENDIX O - POLLUTANT MIGRATION/INFILTRATION TO THE MS4**.

F.7.b. Public Education and Awareness

F.7.b.i. Public Education Literature

The City takes an active role in providing information and education to the public and our community. Several events and programs are conducted each year in which the City provides numerous amounts of literature to the public. Please refer to the CSO portion of the Annual Report **SECTION II.G – POLLUTION PREVENTION** on page 32 for information about this topic.

F.7.c. Pesticides, Herbicides, and Fertilizer Controls

F.7.c.i. Integrated Pest Management protocol

The majority of the City does not use pesticides or conduct any practices that require the use of the Integrated Pest Management (IPM) protocol. The City is currently focusing on invasive plant management through the use of herbicide to remove invasive plants.

The Philadelphia Health Department uses larvicides, Bacillus Sphaericus (brand name Vectolex), Methoprene (Altosid), and Spinosad (Natular), to prevent mosquito breeding . These larvicides are approved for use in the stormwater catch basins and are applied as such. The IPM protocol is followed when using the larvicides by inspecting the catch basins before treatments, using the least toxic or non-toxic product, and submitting a request for repairs when necessary. PWD and the Department of Public Health work closely together. This collaboration has resulted in the Health Department receiving maps with locations of the City's stormwater inlets and the PWD having improved access to refer concerns of pests in the water collections systems for treatment by Health Department staff.

All associated Philadelphia Health Department staff are certified pest control applicators in accordance with PA Department of Agriculture. In order to maintain this certification, on-going training is required. The Philadelphia Health Department holds several on-site trainings per year for staff.

F.7.c.ii. Education materials to private pesticide users

The Philadelphia Health Department provides educational materials to organizations, companies and/or individuals upon request. Often private exterminators, especially companies that handle pest control work for City facilities, request this information since most buildings in the City contract out for pest control work through the individual Departments. Health Department Sanitarians (Inspectors) have this information available to provide to the public.

F.7.d. Snow Management Plan

The City faces winter storms that bring potentially dangerous accumulations of ice, sleet, freezing rain, and snow. Such events carry the potential to virtually paralyze the metropolitan area. In order to mitigate the impact of these storms, the Streets Department has prepared a Snow and Ice Removal Operations Plan which provides a detailed outline of the City's response to adverse winter weather conditions. The Streets Department updated its Snow and Ice Removal Operations Plan for Winter 2013-2014, a copy of this plan is provided in **APPENDIX P - WINTER 2013-2014 - SNOW AND ICE REMOVAL OPERATIONS PLAN.**

F.7.e. Municipal/Hazardous Waste, Storage, Treatment, and Processing Facilities

PWD conducted inspections of the facilities in 2010, and the inspection form used by PWD staff was altered to fit inspection protocol more appropriately. Following these inspections of the three City-owned Municipal Waste Facilities in 2010, PWD has satisfied the MS4 NPDES permit obligation; please refer to **SECTION F.7.e MUNICIPAL/HAZARDOUS WASTE, STORAGE, TREATMENT, AND PROCESSING FACILITIES** on page 212 of the CSO-Stormwater FY 2012 Annual Report for more information on these inspections.

F.8. Best Management Practices (BMPs)

The City will continue to conduct a program to evaluate the effectiveness of BMPs that are implemented.

F.8.a. Storm Sewer Discharge Ordinance

F.8.a.i. Submit storm sewer discharge ordinance

The Storm Sewer Discharge Ordinance was submitted during FY 2006. In support of the policy change, PWD has added documentation and notifications to a website (http://www.phila.gov/water/pdfs/pwd_regulations.pdf) in order to provide the development community a means of accessing the most recent stormwater management information. Additional information on activities to support the sewer discharge ordinance has been provided in previous reports; please refer to **SECTION F.8.a STORM SEWER DISCHARGE ORDINANCE** on page 297 of the CSO-Stormwater FY 2010 Annual Report for more information on this topic.

F.8.b. Commercial and Residential Source Controls

F.8.b.i. Mingo Creek Surge Basin

PWD is currently working with the Philadelphia International Airport (PHL), as part of the Green Airport Committee, to enhance the water quality of the stormwater discharges generated from the 28% of the Mingo Creek Surge Basin drainage area owned by PHL. During the Fall of 2013, PWD conducted a Bethymetric Survey to evaluated storage potential and its effects on the upstream stormwater conveyance system. PWD is still in the process of evaluating results from that survey. The Basin was last dewatered in August of 2012 to inspect the sediment levels. The basin sediment appears to have not changed since its last inspection in 2009; therefore no further accumulation has been occurring. For more information on this project, please refer to **SECTION F.8.b.i MINGO CREEK SURGE BASIN** on page 214 of the CSO-Stormwater FY 2012 Annual Report.

F.8.b.ii. Existing privately owned structural controls

Developers who construct new stormwater structural controls to meet the Regulations are required to execute and submit an Operations & Maintenance (O&M) Agreement. Since the Regulations were enacted, over 355 O&M Agreements have been recorded against the land deed of the developed properties.

PWD requires a pre-construction meeting prior to commencement of earth moving activities. In FY 2014, PWD conducted 90 pre-construction meetings for development projects. During the pre-construction meeting, both the Erosion and Sedimentation Pollution (E&S) Control Plan and the Post Construction Stormwater Management Plan (PCSMP) are discussed. The inspection program continued to grow during FY 2014 by conducting inspections of stormwater structural controls on private development sites during active construction. PWD stormwater plan review inspectors conducted site visits for 253 active projects during FY 2014. Technical plan review staff was also on-site to verify construction of the stormwater management practices (SMPs) was completed in accordance with the approved plan. In the case that concerns are identified regarding SMP installation during construction, the technical plan reviewer will discuss the necessary corrective actions for the project with the PWD inspector and the on-site contractor. During FY 2014, PWD assigned five full time inspectors to the task of inspecting the installation of SMPs during the course of active construction for private development. As a result, PWD was able to maintain its presence in the field by conducting over 3,100inspections on over 378 sites.

PWD conducted an extensive inspection in 2009 of stormwater structural controls; please refer to **SECTION F.8.b.ii STORMWATER BASINS INSPECTION PROGRAM** on page 299 of the CSO-Stormwater FY 2010 Annual Report for more information on these inspections.

F.8.b.iii. Structural controls impact

The City maintains all city-owned structural controls, which presently consists of the Mingo Creek Surge Basin. Information about the Mingo Creek Surge Basin can be found in **SECTION F.8.B.I MINGO CREEK SURGE BASIN** on page 124 of this report.

F.8.c. Development plans review

PWD and the City Planning Commission provide review of drainage plans for new and redevelopment. The drainage plans address both flood control and potential stormwater pollutants under the authority of the Philadelphia Code. Please refer to **SECTION F.5 – MONITOR STORMWATER FROM CONSTRUCTION ACTIVITIES** on page 112 for additional information. .

F.8.d. Operate and maintain public roadways

F.8.d.i. Deicing Practices and Salt Storage

The Streets Department has an established snow category system that defines the response to winter storms based on severity and accumulations. There are 5 snow categories, ranging from an event of sleet and freezing rain to an event of 12 inches of snow or more. Depending on the event, the response can include brine application, salting of roadways (with a mix of salt and anti-skid material), plowing, and snow-lifting operations that include storage of snow on city property or melting of snow at stormwater inlet locations pre-arranged with the Water Department. The Streets Department updated its Snow and Ice Removal Operations Plan for Winter 2013-2014, a copy of this plan is provided in **APPENDIX P - WINTER 2013-2014 - SNOW AND ICE REMOVAL OPERATIONS PLAN.** More information about this topic can be found in **SECTION F.7.d** on page 125 of this report.

F.8.d.ii. Street and Inlet Cleaning Practices

<u>Require weekly cleaning of commercial, conduct annual cleaning of residential streets and inlets</u>

During FY 2014, the Streets Department continued its street cleaning programs that target street debris and litter. With its fleet of mechanical sweepers, the Streets Department provides nightly street cleaning in Center City and weekly cleaning on major arteries and commercial corridors throughout the city. In FY 2014 the Streets Department also began monthly street sweeping operations on routes along the Tookany / Tacony Frankford, Wissahickon, Cobbs Creek and Pennypack watersheds within the city on the first Friday of every month. In FY2014, a total of 29,279 miles were cleaned. Furthermore, in 2012, the Streets Department launched a collaborative effort to clean up parks and other vacant lands near city streams and creeks removing over 529 tons of debris and over 47 tons of tires.   In 2013 this initiative removed 2,672 tons of debris removed total in FY2013, and 13.65 tons in FY14 (up to April). Since the beginning of the first Friday creek cleanup program in April 2014, 45 warnings and 103 Code Violation Notices (CVNs) were issued for Tacony Creek alone and 30.43 tons/205 miles total have been removed/cleaned in all four creeks.

In addition, the Center City District (CCD) and University City District (UCD) conducts sidewalk cleaning. Heavily-trafficked commercial streets and areas receive daily sweeping with pans and brooms and mechanical cleaning. Other areas with a high density are cleaned at least twice weekly with machines (some areas are cleaned daily). Sidewalks also get a monthly power washing, except in winter, to remove accumulated stains, gum and grime. Through a variety of fee-for-service arrangements, CCD crews clean several adjacent commercial and residential areas and provide a 24-hour deployment to clean the three and a half mile long underground subway concourse and Center City's two regional rail stations. More information regarding the City's street maintenance programs has been provided in previous years; please refer to **SECTION F.8.d.ii STREET AND INLET CLEANING PRACTICES** on page 303 of the CSO-Stormwater FY 2010 Annual Report.

<u>Public awareness of litter</u>

The City promotes, develops, and implements litter reduction programs in an effort to increase public awareness of litter as a source of stormwater pollution. There are about 500 solar-powered, compaction litter receptacles in Center City, and another 460 in other commercial districts throughout the city. Over 600 standard wire baskets are also in place through the Philadelphia More Beautiful Committee (PMBC) Adopt-A-Basket program, that provides block captains with wire waste baskets to distribute and manage across city neighborhoods. PMBC also organizes neighborhood cleaning events citywide. In the FY 2014 Clean Block season, 7,980 blocks were cleaned by 47,167 volunteers; 720 tons of trash were collected and removed. Such cleaning efforts are bolstered every April by the Philly Spring Clean Up, a citywide anti-litter event partnering various city agencies and neighborhood community groups, now in its sixth year. These efforts are bolstered by Philadelphia's SWEEP program. SWEEP officers, employees of the Streets Department, work with residential communities to address locations with problematic amounts of litter and short dumping. . In cases of non-compliance, SWEEP officers will issue warnings and citations to the appropriate individuals. Between 2013 and 2014, over 29,000 tickets were issued.

The City (PWD, Streets, and PPR) and partners, from the Tookany / Tacony Watershed Partnership to Cheltenham Township jointly applied to the Pennsylvania Department of Environmental Protection for a Growing Greener grant to fund weekly street sweeping of routes adjacent to city creeks, monitor sites for short dumping, increase staff and maintenance within Tookany / Tacony Frankford watershed, and increase community outreach to neighboring communities.

More information on litter control has been provided in previous reports, please refer to page 44 of this report and **SECTION 7 - POLLUTION PREVENTION PROGRAMS** on page 7-1 of the Updated Nine Minimum Controls Report submitted to the PADEP on June 1, 2013 which is available on-line at http://phillywatersheds.org/doc/Updated%20NMC%20Report.pdf.

F.8.d.iii. Maintain all city-owned storm sewer inlets

PWD continues to maintain all city-owned storm sewer inlets. Please refer to the CSO portion of the Annual Report **SECTION II. F.1 – CONTROL OF DISCHARGE OF SOLIDS AND FLOATABLES BY CLEANING OF INLET AND CATCH BASINS** on page 28 for information on this program and activity conducted during FY 2014.

F.8.e. Animal Waste and Code Enforcement

F.8.e.i. Educational material regarding control of animal waste

The City of Philadelphia actively enforces code which covers the regulation of animal waste. The Philadelphia Code and Charter Chapter 10.100 – Animals and Chapter 10.700 – Refuse and Littering address the proper clean-up of pet waste and applicable fines and penalties. In addition, signs advertising said penalties are displayed city-wide in an effort to prevent residents from violating this statute. The City of Philadelphia also provides the text of this code online at http://municipalcodes.lexisnexis.com/codes/philadelphia/.

PWD provides additional information on pet waste to the public including how it affects stormwater and why to pick it up through its website located at the following site: http://www.phillywatersheds.org/whats_in_it_for_you/residents/pet-waste

Dog Waste Control Program
PWD launched an innovative approach to address dog waste in targeted neighborhoods in July of 2010. Through a pilot project in the Delaware Watershed, the Partnership for the Delaware Estuary found that many dog-owners are unaware of the connection of dog waste to water pollution. Over the past couple of years, thousands of "Bags on Board" and educational tip cards were produced and purchased for distribution at the FWWIC and various public events. The "Bags on Board" is a roll of 15 dog waste collection bags that conveniently clips onto a dog leash. Refills are available at most local pet shops.

PWD launched a "Spokesdog" competition to find two eco-friendly dogs and their caretakers to help educate their bark park buddies on keeping Philadelphia's waterways clean. In FY 2014 one dog was chosen from each of two source water protection neighborhoods, Fitler Square (31 contestants) and University City (21 contestants) to represent the city's efforts on dog waste control. During the second half of the fiscal year the program was launched in Juniata and Lower Moyamensing neighborhoods with over 22 dogs competing. Messages about the competition and runoff pollution caused by dog waste were featured in multiple articles in local newspapers, magazines and on television, reaching tens of thousands of Philadelphians. Also, PWD's website, which hosted the Spokesdog Competition information, registration and online voting, received close to 14,710 hits. More information can be found at the following website: http://www.phillywatersheds.org/spokesdog. The competition has been discussed fully in the past as well; please refer to **SECTION F.8.e.i EDUCATIONAL MATERIAL REGARDING CONTROL OF ANIMAL WASTE** on page 305 of the CSO-Stormwater FY 2010 Report.

F.8.f. Flood Management and Flood Control Devices

F.8.f.i. Structures built within the floodplain

All structures including buildings and infrastructure such as piping and roads built within or close to the 100 Year Flood Plain area that require a Zoning Permit or a Building Permit or both should be reviewed to determine if Floodplain Regulations apply. The City's Licenses and Inspection (L&I) department will send all applicants with properties located in or close to the 100 Year Flood Plain to the Philadelphia City Planning Commission (PCPC) for review. If the property is determined to be within the Floodway or Floodway Fringe, structures built on the allowable property will be built at least one-foot above the Base Flood Elevation (BFE) or floodproofed such that plan complies to 14-1606 and any special Building Code requirements. In calendar year 2013, there were two zoning permits and two building permits issued for one property – 3701 Island Ave.

F.8.f.ii. Evaluate new and existing structural drainage controls

Our evaluation of structural drainage controls was discussed in further detail in **SECTION F.8.B.II** under "Existing Privately Owned Structural Controls" on page 127 of this report.

Work is being done on sections of the city that have chronic flooding to eliminate or reduce these occurrences; please refer to **SECTION II. B.3.3 – STORM FLOOD RELIEF** on page 17 for more information about the SFR projects and details on evaluating structural drainage controls.

F.8.f.iii. Streambank Restoration and Wetland Enhancement

Please refer to the CSO portion of the Annual Report **SECTION III. C.2.3 – STREAM HABITAT RESOTRATION** on page 66 for information pertaining to streambank restoration.

Please refer to the CSO portion of the Annual Report **SECTION III.C.2.4 – WETLAND ENHANCEMENT AND CONSTRUCTION** on page 68 for information pertaining to wetland enhancement.

F.8.g. Sanitary Infiltration Controls

F.8.g.i. Limit sanitary infiltration

As part of the Cross Connection Repair Program, PWD has conducted 1,304 abatements to correct cross connection in sewer laterals since 1994; 58 abatements were completed in FY 2014 alone. PWD also has in place twelve (12) dry weather diversion devices which divert sanitary flow back into the sanitary sewer but still allow stormwater to pass through during wet weather events. We estimate that these abatements and dry weather diversion devices have prevented over 183 million gallons of contaminated flow from entering our waterways since the inception of the program and about 8.1 million gallons during FY 2014. Please refer to **SECTION F.3 – DETECTION, INVESTIGATION AND ABATEMENT OF ILLICIT DISCHARGES** on page 97 for more information on the Cross Connection Repair Program.

In addition as part of PWD's Sewer Maintenance Program, sewer relining are routinely conducted on both sanitary and storm sewers. Relining sewers helps to reinforce, seal and rehabilitate the existing sewers, specifically preventing inflow and infiltration (I/I) to allow the full pipe capacity to be reserved for sanitary and storm flow. Apart from those being done under consent orders, there are several sewer lining projects in the City that originate from sewer maintenance issues like street cave-ins, depressions, backups, as well as sewer assessment meetings.

As a part of PWD's commitment to improvement of water quality and aesthetics in dry weather, a large relining project began on the entire length of an interceptor within Philadelphia in the Tookany/Tacony-Frankford and Cobbs Creek Watersheds. Additionally, efforts are underway to coordinate sewer relining with Cheltenham Township for the entire sewershed to be relined. Please refer to **APPENDIX B GREEN CITY, CLEAN WATERS 2014 ANNUAL REPORT** in **SECTION 3.3 INTERCEPTOR REHABILITATION PROGRAM** on page 24 for more information on the interceptor relining project.

Construction of a storage tank upstream of relief sewer manhole R-20, located at Main Street and Shurs Lane (Main & Shurs), to capture and store excess flows was completed during November of 2013. The consent order requirement for sewer relinings to be done around regulator R-20 in an effort to reduce inflow and infiltration has been completed. Please refer to **CSO SECTION III.B.1.10– CONSTRUCTION AND IMPLEMENTATION OF THE MAIN AND SHURS OFF-LINE STORAGE PROJECT** on page 58 for more information on the Main and Shurs Off-line Storage Project and efforts to reduce inflow and infiltration at R-20.

PWD constructed a parallel relief sewer in December of 2011to eliminate overflows at manhole PC-30 as per a consent order issued by the DEP. The overflows at PC-30 are caused by a combination of various factors which influence the hydraulic carrying capacity of the Poquessing Creek Interceptor during wet weather events. In FY2014, PWD continued to monitor the effectiveness this relief sewer. There are also several sewer lining projects being done under the consent order for PC- 30 area in conjunction with the relief sewer being constructed. Please refer to **CSO SECTION III.B.2.1.1 – PC-30 RELIEF SEWER** on page 58 for more information on the PC-30 Relief Sewer.

F.8.g.ii. Inspection and remediation of on-lot septic/disposal systems

During the FY 2014, 3 complaint of malfunctioning On-Lot Sewage Disposal Systems were investigated, of those complaints three have been mitigated, one is currently on-going and requires enforcement hearings to resolve non-compliance. Also during FY2014, 13 applications were received and issued for the installation of on-lot sewage disposal systems, of those applications, 10 permits were approved and 245 portable toilet permits were issued. PWD continues to support the inspection and remediation of these systems. Additional information has been provided in previous reports; please refer to **SECTION F.8.g.ii INSPECTION AND REMEDIATION OF ON-LOT SEPTIC/DISPOSAL SYSTEMS** on page 307 of the CSO-Stormwater FY 2010 Annual Report.

F.8.g.iii. Investigate, remediate, and report sanitary infiltration

PWD responds to all citizen complaints of liquid, solid, or gaseous pollutants within Philadelphia. A database called the Sewage Pollution Incident & Location Log (SPILL), which stores information about unintentional sanitary discharges including the date reported, problem location, spill type, description, and abatement date, is maintained. Detailed information on the events found on the SPILL database of reported sewage pollution incidents in FY 2014 are found within in **APPENDIX Q – FY2014 SANITARY INFILRATION EVENTS**.

F.8.h. Spill Prevention and Response

The City’s response plan to respond to and contain harmful spills that may discharge to the municipal separate storm sewer system is managed by the Philadelphia Local Emergency Planning Committee. PWD is represented on this committee. The plan for spill response in Philadelphia is the Citywide Hazmat Response Plan - Annex F to the City's Emergency Operations Plan, found in **ADDITIONAL DOCUMENTS FOLDER IN THE SUPPLEMENTAL CD.**

In order to protect PWD’s structures and treatment processes, PWD staff respond to oil and chemical spills and other incidents that have the potential to threaten the water supply or impact the sewer system, twenty-four hours per day, seven days per week. PWD responds to all incidents that can impact the sewer system or endanger PWD employees. This includes both the sanitary sewer system and the storm sewer system. PWD supervises cleanup activities and assesses environmental impact. PWD inspectors also investigate various other types of complaints. Please refer to **SECTIONS F.7.A** on page 125 for information regarding the nature of spill prevention responses during FY 2014.

F.8.i. Public Reporting of Illicit Discharges, Improper Disposal

The City encourages public citizens to report the occurrence of illicit discharges that may impact the sewer system and water bodies. To facilitate the timely reporting of such events, PWD operates a Municipal Dispatcher 24 Hours/Day, 7 Days/Week to handle reports from the public. In addition, a customer service hotline (215 686-6300) is also operated that provides the ability to connect to the Dispatcher. This information is distributed in mailings, as well as online at http://www.phila.gov/water/contact_us.html.

Upon the reporting of such an incident, a PWD inspector is immediately dispatched to the site to investigate and determine the source of the discharge, as well as the extent of impact on the receiving water body. Each incident is logged into an electronic database that enables tracking of the details of each occurrence.

PWD received over 225,000 phone calls which lead to 24,351 service requests being conducted during FY 2014. Currently PWD does not track phone calls specifically related to illicit discharges and improper disposals in the MS4 area, but instead tracks much broader topics including sewage backup, flooding, street cave-ins and water service disruptions. Any calls related to illicit discharges and improper disposals are forwarded to appropriate staff, and in FY 2014 PWD responded to 20 illicit discharges / improper disposals related events.

Philly 311
Philly311 was created to help eliminate the need to sort through the numerous phone numbers and hotlines available to contact the City government. A customer service specialist will connect the user to the information and services they may need either by calling 3-1-1, asking a question on the website or through Twitter @philly311. A Philly311 mobile app is available for iPhone, Android, or Blackberry devices to report issues such as graffiti, potholes, litter and more. For more information on uses of Philly311, please visit: http://www.phila.gov/311/. During FY2014, Philly 311 received a total of 12,019 PWD-related calls, of those calls 4,532 were transferred to Customer Service Call Center which handles emergency related calls, which then resulted in 1,605 service requests being initiated.

F.8.j. Used Oil and Toxic Material Disposal

The City continues to facilitate the proper disposal of used oil and other toxic materials. This program includes collections events, distribution of educational materials, the operation of a website, and a hotline accessible to the public.

F.8.k. Stormwater Inlet Labeling/Stenciling

PWD has kits of storm drain marking supplies available for volunteers to help educate the public about reducing stormwater runoff pollution. To date, over 400 volunteer groups have participated in this program marking an estimated total of over 11,000 storm drains. During FY 2014, over 450 stormwater inlet labels were distributed. PWD continues to support stormwater inlet labeling program and encourages communities to get involved each year. More information on this program has been provided in previous years; please refer to **SECTION F.8.k STORMWATER INLET LABELING/STENCILING** on page 312 of the CSO-Stormwater FY 2010 Annual Report.

Section G Assessment of Controls

Annually estimate pollutant loadings & reductions from stormwater management plan

The City of Philadelphia has implemented multiple BMPs, technologies, plan review methods, and watershed planning efforts in order to achieve the goals of the NPDES Permit. The goals of the permit aim to improve the quality of stormwater runoff, and to reduce the quantity and rate of stormwater reaching the MS4 system and receiving waters.

Each section of this Annual Report presents not only the projects and activities of the Stormwater Management Program, but also the effectiveness and success of the multiple BMPs, technologies, planning efforts, and miscellaneous programs in order to track the progress of the Stormwater Management Program.

PWD's approach to resolving impacts of stormwater discharges is one part of a carefully developed approach to meeting the challenges of watershed management in an urbanized setting. Pollutant loads for stormwater outfalls in the Pennypack, Poquessing and Wissahickon Watersheds have been estimated using NetSTORM, results of these models are described in **STORMWATER LOADS ESTIMATES MEMOS** which were provided in previous reports; please refer to **APPENDIX K – STORMWATER LOAD ESTIMATES** from the CSO-Stormwater FY 2009 Annual Report.

Section H Fiscal Resources

H.1 Maintain adequate program funding

During FY 2014, the City provided fiscal resources needed to support operation and maintenance of the Stormwater Management Program as outlined in **TABLE H.1-1** below. The table presents fiscal year budgets for both the reporting year as well as the upcoming fiscal year.

Table H.1-1 Fiscal Resources

Program	FY 2014 Budget	FY 2015Budget
Office of Watersheds	$12.50 Million	16.08 Million
Collector Systems Support	$0.71 Million	$0.81 Million
Sewer Maintenance and Flow Control	$24.02 Million	$23.45 Million
Inlet Cleaning	$4.51 Million	$4.39 Million
Abatement of Nuisances	$8.66 Million	$8.66 Million
Sewer Reconstruction	$34.40 Million	$30.10 Million
Public Affairs and Education	$10.58 Million	$11.48 Million
Total	**$95.38 Million**	**$94.97 Million**

H.2 Annually submit fiscal analysis

The conditions of the NPDES permit are able to be achieved through appropriate budget planning supporting the projects and assessments critical to a successful program. Any funding changes will be included as part of subsequent annual reports.

APPENDIX A –
FLOW MONITORING

Page

Table 1 - Summary of All Monitors

	# of Permanent Monitors	# of Temporary Monitors	# of Unknown Monitors
Combined/Separate Sewer Monitors	535	118	-
Outlying Community Monitors	110	16	3
Pumping Stations	82	-	-
Rain Gages	35	-	-
Total	762	134	3

Table 2 - Listing of Monitored Outlying Community Connections

Site ID	Connection Type	Township	Measurement Name	Measurement Type
MA_1	STD	Abington	TEMPORARY	FLOW
MA_2	MTR	Abington	METERING CHAMBER FLOW	FLOW
MA_2	MTR	Abington	METERING CHAMBER LEVEL	LEVEL
MA_2	MTR	Abington	METERING CHAMBER VELOCITY	VELOCITY
MA_3	STD	Abington	TEMPORARY	FLOW
MA_4	STD	Abington	TEMPORARY	FLOW
MAx1	STD	Abington	TEMPORARY	FLOW
MB_1	MTR	Bucks Co.	METERING CHAMBER FLOW	FLOW
MBE_01	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_01	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_01	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_02	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_02	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_02	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_03	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_03	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_03	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_04	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_04	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_04	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_05	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_05	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_05	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_06	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_06	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_06	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_07	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_07	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_07	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_08	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_08	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_08	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_09	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_09	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_09	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_10	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_10	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL

Site ID	Connection Type	Township	Measurement Name	Measurement Type
MBE_10	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_11	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_11	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_11	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_12	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_12	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_12	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_13	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_13	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_13	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_14	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_14	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_14	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_15	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_15	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_15	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_16	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_16	MTR	Bensalem	METERING CHAMBER LEVEL	LEVEL
MBE_16	MTR	Bensalem	METERING CHAMBER VELOCITY	VELOCITY
MBE_17	STD	Bensalem	TEMPORARY	FLOW
MC_1	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MC_1	MTR	Cheltenham	METERING CHAMBER LEVEL	LEVEL
MC_1	MTR	Cheltenham	METERING CHAMBER VELOCITY	VELOCITY
MC_2	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MC_2	MTR	Cheltenham	METERING CHAMBER LEVEL	LEVEL
MC_2	MTR	Cheltenham	METERING CHAMBER VELOCITY	VELOCITY
MC_3	MTR	Abington	METERING CHAMBER FLOW	FLOW
MC_3	MTR	Abington	METERING CHAMBER LEVEL	LEVEL
MC_3	MTR	Abington	METERING CHAMBER VELOCITY	VELOCITY
MCx_1	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_1	MTR	Cheltenham	METERING CHAMBER LEVEL	LEVEL
MCx_1	MTR	Cheltenham	METERING CHAMBER VELOCITY	VELOCITY
MCx_2	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_2	MTR	Cheltenham	METERING CHAMBER LEVEL	LEVEL
MCx_2	MTR	Cheltenham	METERING CHAMBER VELOCITY	VELOCITY
MD_1	MTR	Delaware Co.	METERING CHAMBER FLOW	FLOW
ML_1	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_1	MTR	Lower Merion	METERING CHAMBER LEVEL	LEVEL

Site ID	Connection Type	Township	Measurement Name	Measurement Type
ML_1	MTR	Lower Merion	METERING CHAMBER VELOCITY	VELOCITY
ML_2	STD	Lower Merion	TEMPORARY	FLOW
ML_3	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_3	MTR	Lower Merion	METERING CHAMBER LEVEL	LEVEL
ML_3	MTR	Lower Merion	METERING CHAMBER VELOCITY	VELOCITY
ML_4	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_5	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_5	MTR	Lower Merion	METERING CHAMBER LEVEL	LEVEL
ML_5	MTR	Lower Merion	METERING CHAMBER VELOCITY	VELOCITY
ML_6	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_6	MTR	Lower Merion	METERING CHAMBER LEVEL	LEVEL
ML_6	MTR	Lower Merion	METERING CHAMBER VELOCITY	VELOCITY
ML_7	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_7	MTR	Lower Merion	METERING CHAMBER LEVEL	LEVEL
ML_7	MTR	Lower Merion	METERING CHAMBER VELOCITY	VELOCITY
MLM_1	MTR	Lower Moreland	METERING CHAMBER FLOW	FLOW
MLM_1	MTR	Lower Moreland	METERING CHAMBER LEVEL	LEVEL
MLM_1	MTR	Lower Moreland	METERING CHAMBER VELOCITY	VELOCITY
MLM_2	MTR	Lower Moreland	METERING CHAMBER FLOW	FLOW
MLM_2	MTR	Lower Moreland	METERING CHAMBER LEVEL	LEVEL
MLM_2	MTR	Lower Moreland	METERING CHAMBER VELOCITY	VELOCITY
MLM_3	STD	Lower Moreland	TEMPORARY	FLOW
MLM_4	STD	Lower Moreland	TEMPORARY	FLOW
MLM_5	STD	Lower Moreland	TEMPORARY	FLOW
MLM_6	UNKNOWN	Lower Moreland	UNKNOWN	UNKNOWN
MLM_7	UNKNOWN	Lower Moreland	UNKNOWN	UNKNOWN
MPNBC_1	NO	PIDC - PNBC	METERING CHAMBER FLOW	FLOW
MS_1	STD	Springfield	TEMPORARY	FLOW
MS_2	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_2	MTR	Springfield	METERING CHAMBER LEVEL	LEVEL
MS_2	MTR	Springfield	METERING CHAMBER VELOCITY	VELOCITY
MS_3	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_3	MTR	Springfield	METERING CHAMBER LEVEL	LEVEL
MS_3	MTR	Springfield	METERING CHAMBER VELOCITY	VELOCITY
MS_4	STD	Springfield	TEMPORARY	FLOW
MS_5	STD	Springfield	TEMPORARY	FLOW
MS_6	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_6	MTR	Springfield	METERING CHAMBER LEVEL	LEVEL

Site ID	Connection Type	Township	Measurement Name	Measurement Type
MS_6	MTR	Springfield	METERING CHAMBER VELOCITY	VELOCITY
MS_7	UNKNOWN	Springfield	UNKNOWN	UNKNOWN
MS_8	STD	Springfield	TEMPORARY	FLOW
MSH_1	MTR	Southampton	METERING CHAMBER FLOW	FLOW
MSH_1	MTR	Southampton	METERING CHAMBER LEVEL	LEVEL
MSH_1	MTR	Southampton	METERING CHAMBER VELOCITY	VELOCITY
MSH_2	STD	Southampton	TEMPORARY	FLOW
MSHX_1	STD	Southampton	TEMPORARY	FLOW
MSHX_2	STD	Southampton	TEMPORARY	FLOW
MUD_1	MTR	Upper Darby	METERING CHAMBER NEG FLOW N	FLOW
MUD_1	MTR	Upper Darby	METERING CHAMBER NEG FLOW S	FLOW
MUD_1	MTR	Upper Darby	METERING CHAMBER POS FLOW N	FLOW
MUD_1	MTR	Upper Darby	METERING CHAMBER POS FLOW S	FLOW
MUD_1O	MTR	Upper Darby	METERING CHAMBER FLOW	FLOW
MUD_1O	MTR	Upper Darby	METERING CHAMBER LEVEL	LEVEL
MUD_1O	MTR	Upper Darby	METERING CHAMBER VELOCITY	VELOCITY

*STD – temporary flow monitor

**MTR/NO – Permanent monitor

Table 3 - Listing of Combined/Separate Sewer Monitors

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
C_01	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_01	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_02	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_02	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_04	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_04	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_04A	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_04A	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_05	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_05	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_06	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_06	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_07	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_07	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_09	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_09	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_10	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_10	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_11	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_11	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_12	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_12	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_13	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_13	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_14	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_14	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_15	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_15	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_16	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_16	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_17	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_17	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_18	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_18	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_19	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_19	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_20	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_20	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_21	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_21	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_22	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_22	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_23	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
C_23	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_24	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_24	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_25	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_25	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_26	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_26	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_27	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_27	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_28A	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_28A	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_29	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_29	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_30	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_30	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_31	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_31	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_32	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_32	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_33	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_33	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_34	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_34	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_35	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_35	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_36	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_36	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_37	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_37	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
CSPS	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL N	LEVEL
CSPS	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL S	LEVEL
D_02	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_02	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_02	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_02	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_02	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_03	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_03	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_04	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_04	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_05	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_05	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_07	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_07	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_07	Upper Delaware Low Level	Delaware River	SWO GATE POSITION 1	POSITION
D_07	Upper Delaware Low Level	Delaware River	SWO GATE POSITION 2	POSITION
D_07	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_07	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_08	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_08	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_09	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_09	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_11	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_11	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_12	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_12	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_13	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_13	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_15	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_15	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_17	Somerset	Delaware River	SWO LEVEL	LEVEL
D_17	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_18	Somerset	Delaware River	SWO LEVEL	LEVEL
D_18	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_19	Somerset	Delaware River	SWO LEVEL	LEVEL
D_19	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_20	Somerset	Delaware River	SWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_20	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_21	Somerset	Delaware River	SWO LEVEL	LEVEL
D_21	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_22	Somerset	Delaware River	SWO LEVEL	LEVEL
D_22	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_23	Somerset	Delaware River	SWO LEVEL	LEVEL
D_23	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_24	Somerset	Delaware River	SWO LEVEL	LEVEL
D_24	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_25	Somerset	Delaware River	SWO LEVEL	LEVEL
D_25	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_37	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_37	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_38	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_38	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_39	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_39	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_40	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_40	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_41	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_41	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_42	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_42	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_43	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_43	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_44	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_44	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_45	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_45	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_46	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_46	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_47	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_47	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_48	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_48	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_49	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_49	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_50	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_50	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_51	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_51	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_51A	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_52	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_52	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_53	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_53	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_54	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_54	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_58	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_58	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_61	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_61	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_62	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_62	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_63	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_63	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_64	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_64	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_65	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_65	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_66	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_66	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_67	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_67	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_68	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_68	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_69	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_69	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_70	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_70	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_71	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_71	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_72	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_72	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_73	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_73	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
F_03	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_03	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_04	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_04	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_05	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_05	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_06	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_06	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_07	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_07	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_08	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_08	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
F_09	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_09	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_10	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_10	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_11	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_11	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_12	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_12	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	DWO LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_14	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_14	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_21	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_21	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_23	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_23	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_24	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_24	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_25	Lower Frankford Creek	Frankford Creek	DWO GATE POSITION	POSITION
F_25	Lower Frankford Creek	Frankford Creek	SWO GATE POSITION 1	POSITION
F_25	Lower Frankford Creek	Frankford Creek	SWO GATE POSITION 2	POSITION
F_25	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_25	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
H_29		Schuylkill River	DWO LEVEL	LEVEL
H_29		Schuylkill River	SWO LEVEL	LEVEL
H_29		Schuylkill River	TRUNK LEVEL	LEVEL
H_35		Schuylkill River	BLOWER 1 RUN	EVENT
H_35		Schuylkill River	BLOWER 2 RUN	EVENT
H_35		Schuylkill River	DAM AIR PRESSURE	PSI
H_35		Schuylkill River	DWO GATE POSITION	POSITION
H_35		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
H_35		Schuylkill River	SWO GATE POSITION	POSITION
H_35		Schuylkill River	SWO LEVEL	LEVEL
H_35		Schuylkill River	TRUNK LEVEL	LEVEL
I_BYH09		Byberry Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC07	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC12	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC13	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC14	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC17	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC18	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC34	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLH18	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
I_CCLLC19	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC20	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC22	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC24	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC26	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLH01	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_COHOH16		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESH11	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESH15	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS09	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS14	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS17	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS26	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSSSH15	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CVBH08		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_FHLH03	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FHLTT08	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FHLTT15	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FLLH03	Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LDLLD43	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD45	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD47	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD53	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD62	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD69	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD70	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LFCH07	Lower Frankford Creek	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFCH19	Lower Frankford Creek	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFLLF08	Lower Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFLLF10	Lower Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LSESH15	Lower Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSESS36	Lower Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSH01	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS33	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS38	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS45	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_MRH21	Main Relief Sewer	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_OH12		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PASYH13		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PDRLH01		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PDRLH02		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PENRH02		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PH04	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PH05	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
I_PH06	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PH10	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PMPFH03		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PP02	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PP04	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PP05	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PQH09	Poquessing	Poquessing Creek	INTERCEPTOR LEVEL	LEVEL
I_PRH10		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SD19	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SD21	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SD25	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SH03	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SRH05		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGCH LH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGEH LH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH17	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH20	Southwest Main Gravity	Schuylkill River	C GATE POSITION	POSITION
I_SWMGH20	Southwest Main Gravity	Schuylkill River	E GATE POSITION	POSITION
I_SWMGH20	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH20	Southwest Main Gravity	Schuylkill River	W GATE POSITION	POSITION
I_SWMGS28	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS34	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS43	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS47	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS50	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGWH LH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_UDLLD04	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLD08	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH03	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH04	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH07	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH14	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_WBH06		Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL
I_WHLH08	Wissahickon High Level	Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
I_WLLH11	Wissahickon Low Level	Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL
P_01	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_01	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_02	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_02	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_03	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_03	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_04	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_04	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_05	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_05	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
R_01	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_01	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_01A	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_01A	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_02	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_02	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_03	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_03	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_04	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_04	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_05	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_05	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_06	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_06	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_07	Main Relief Sewer	Schuylkill River	SWO LEVEL	LEVEL
R_07	Main Relief Sewer	Schuylkill River	TRUNK LEVEL	LEVEL
R_08	Main Relief Sewer	Schuylkill River	SWO LEVEL	LEVEL
R_08	Main Relief Sewer	Schuylkill River	TRUNK LEVEL	LEVEL
R_09	Main Relief Sewer	Schuylkill River	SWO LEVEL	LEVEL
R_09	Main Relief Sewer	Schuylkill River	TRUNK LEVEL	LEVEL
R_10	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_10	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_11	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_11	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_11A	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_11A	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_12	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_12	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_13	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_13	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
R_13A	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_13A	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
R_14	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_14	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
R_15	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
R_15	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
R_16	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_16	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
R_17	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_17	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
R_18	Frankford High Level	Tacony Creek	INTERCEPTOR LEVEL	LEVEL
R_18	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
R_19	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_19	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_20	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
R_20	Central Schuylkill East Side	Schuylkill River	STORMWATER LEVEL	LEVEL
R_24	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_24	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_25	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_25	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_01	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_01	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_02	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_02	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_03	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_03	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_04	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_04	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_05	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_05	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_06	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_06	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_07	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_07	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_08	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_08	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_09	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_09	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_10	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_10	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_11	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_11	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_12	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_12	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_12A	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_12A	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
S_13	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_13	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_14	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_14	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_15	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_15	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_16	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_16	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_17	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_17	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_18	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_18	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_19	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_19	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_20	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_20	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_21	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_21	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_22	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_22	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_23	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_23	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_24	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_24	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_25	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_25	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_26	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_26	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	DWO LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_28	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_28	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_30	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_30	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
S_31	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_31	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_32	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_32	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_33	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_33	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_34	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_34	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_35	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
S_35	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_36	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_36	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_36A	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_36A	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_37	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_37	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_38	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_38	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_39	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_39	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_40	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_40	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_42	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_42	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_42A	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_42A	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_43	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_43	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_44	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_44	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_45	Lower Schuylkill West Side	Schuylkill River	DWO LEVEL	LEVEL
S_45	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_45	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_46	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_46	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_47	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_47	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_50	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_50	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
S_51	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_51	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
T_01	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_01	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_03	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_03	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_04	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_04	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_05	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_05	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_06	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_06	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_07	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_07	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
T_08	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_08	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_09	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_09	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_10	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_10	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_11	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_11	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_12	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_12	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_13	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_13	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_14	Frankford High Level	Tacony Creek	DWO GATE 1	POSITION
T_14	Frankford High Level	Tacony Creek	DWO GATE 2	POSITION
T_14	Frankford High Level	Tacony Creek	SWO CREST GATE	POSITION
T_14	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_14	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_15	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_15	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL

Table 4 - Listing of all Rain Gages (7/1/2012 - 6/30/2013)

Rain Gage	Location	Percent Working
RG_1	70th and Essington Ave	100%
RG_2	66th and Regent St	75%
RG_3	Fox Chase Rd. and Castor Ave	100%
RG_4	State Rd and Pennypack St	86%
RG_5	3rd and Mifflin St	98%
RG_6	Cardinal Ave and City Line Ave	100%
RG_7	G St. and E Annsbury St	100%
RG_8	N Water St. and E Clarkson Ave	99%
RG_9	54th and Lancaster Ave	99%
RG_10	Pine Rd and Susquehanna Rd	92%
RG_11	Rising Sun Ave and Lardner St	94%
RG_12	Pattison Ave and Columbus Blvd	98%
RG_13	Glendale Ave and Algon Ave	100%
RG_14	Delaware Ave and Lewis St	98%
RG_15	E Montgomery Ave and Thompson St	100%
RG_16	19th and Wood St	100%
RG_17	Saul St. and Benner St	96%
RG_18	Fox St. and Roosevelt Blvd	98%
RG_19	Chew Ave and Sharpnack St	98%
RG_20	Woodhaven Rd and Knights Rd	87%
RG_21	Shawmont Ave and Eva St	90%
RG_22	N 67th and Callowhill St	91%
RG_23	Penrose Ave and Mingo Ave	100%
RG_24	Lockart Rd and Lockart Ln	92%
RG_25	24th and Wolf St	79.98%
RG_26	621 Lehigh Ave	86.79%
RG_27	Grant Ave and Ashford Rd	94.72%
RG_28	1350 Southampton Rd	74.87%
RG_29	Springfield Way and PaperMill Rd	68.82%
RG_30	7609 Montgomery Ave	91.73%
RG_31	Valley Rd and Old Valley Rd	94.76%
RG_32	Rozel Ave and Crushmore Rd	89.91%
RG_33	Jackson St and E Broadway Ave	92.52%
RG_34	Lawrence Rd and Chester Ave	91.64%
RG_35	Hagysford Rd and Tower Lane	93.83%

Table 5 – Listing of All Pumping Station Monitors

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_26VA	Storm Water	PUMP 1 RUN	EVENT	26th and Vare Ave
PS_26VA	Storm Water	PUMP 2 RUN	EVENT	27th and Vare Ave
PS_26VA	Storm Water	WET WELL LEVEL	LEVEL	28th and Vare Ave
PS_42ST	Waste Water	PUMP 1 RUN	EVENT	761 S 43rd St
PS_42ST	Waste Water	PUMP 2 RUN	EVENT	762 S 43rd St
PS_42ST	Waste Water	PUMP 3 RUN	EVENT	763 S 43rd St
PS_42ST	Waste Water	WET WELL LEVEL	LEVEL	764 S 43rd St
PS_BANK	Waste Water	PUMP 1 RUN	EVENT	15 S Bank St (Bank & Elbow Ln)
PS_BANK	Waste Water	PUMP 2 RUN	EVENT	16 S Bank St (Bank & Elbow Ln)
PS_BANK	Waste Water	WET WELL LEVEL	LEVEL	17 S Bank St (Bank & Elbow Ln)
PS_BELD	Waste Water	PUMP 1 RUN	EVENT	751 S Manatawna St (Belfry & Steeple)
PS_BELD	Waste Water	PUMP 2 RUN	EVENT	752 S Manatawna St (Belfry & Steeple)
PS_BELD	Waste Water	WET WELL LEVEL	LEVEL	753 S Manatawna St (Belfry & Steeple)
PS_BLVD	Storm Water	PUMP 1 RUN	EVENT	4251 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 2 RUN	EVENT	4252 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 3 RUN	EVENT	4253 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 4 RUN	EVENT	4254 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	WET WELL LEVEL	LEVEL	4255 N Broad St (Broad & Roosevelt Blvd)
PS_CSPS	Waste Water	N GATE POSITION	POSITION	600 University Ave (34th St Bridge & University)

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_CSPS	Waste Water	N SIPHON LEVEL	LEVEL	601 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	N SIPHON LEVEL	LEVEL	602 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	N WET WELL LEVEL	LEVEL	603 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 1 RUN	EVENT	604 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 2 RUN	EVENT	605 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 3 RUN	EVENT	606 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 4 RUN	EVENT	607 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 5 RUN	EVENT	608 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 6 RUN	EVENT	609 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	S GATE POSITION	POSITION	610 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	S WET WELL LEVEL	LEVEL	611 University Ave (34th St Bridge & University)
PS_FORD	Waste Water	PUMP 1 RUN	EVENT	3800 Ford Rd (Across from West Park Hospital)
PS_FORD	Waste Water	PUMP 2 RUN	EVENT	3801 Ford Rd (Across from West Park Hospital)
PS_FORD	Waste Water	WET WELL LEVEL	LEVEL	3802 Ford Rd (Across from West Park Hospital)
PS_HOGI	Waste Water	PUMP 1 RUN	EVENT	3 Hog Island Rd (east of Airport control tower)
PS_HOGI	Waste Water	PUMP 2 RUN	EVENT	4 Hog Island Rd (east of Airport control tower)
PS_HOGI	Waste Water	WET WELL LEVEL	LEVEL	5 Hog Island Rd (east of Airport control tower)
PS_LIND	Waste Water	PUMP 1 RUN	EVENT	5200 Linden Ave (Linden & Milnor)
PS_LIND	Waste Water	PUMP 2 RUN	EVENT	5201 Linden Ave (Linden & Milnor)
PS_LIND	Waste Water	WET WELL LEVEL	LEVEL	5202 Linden Ave (Linden & Milnor)

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_LOCK	Waste Water	PUMP 1 RUN	EVENT	10778 Lockart Rd (Lockart St & Locart Ln)
PS_LOCK	Waste Water	PUMP 2 RUN	EVENT	10779 Lockart Rd (Lockart St & Locart Ln)
PS_LOCK	Waste Water	WET WELL LEVEL	LEVEL	10780 Lockart Rd (Lockart St & Locart Ln)
PS_MILN	Waste Water	PUMP 1 RUN	EVENT	9647 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	PUMP 2 RUN	EVENT	9648 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	PUMP 3 RUN	EVENT	9649 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	WET WELL LEVEL	LEVEL	9650 Milnor St (between Grant Ave & Eden St)
PS_MING	Storm Water	BASIN LEVEL	LEVEL	7000 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 1 RUN	EVENT	7001 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 2 RUN	EVENT	7002 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 3 RUN	EVENT	7003 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 4 RUN	EVENT	7004 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 5 RUN	EVENT	7005 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 6 RUN	EVENT	7006 Penrose Ave (Schuylkill River under Platt Bridge)
PS_NEIL	Waste Water	PUMP 1 RUN	EVENT	4000 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	PUMP 1 RUN	EVENT	4001 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	PUMP 3 RUN	EVENT	4002 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	WET WELL LEVEL	LEVEL	4003 Neill Dr (Neill Dr & Falls Rd)
PS_P120	Waste Water	PUMP 1 RUN	EVENT	
PS_P120	Waste Water	PUMP 2 RUN	EVENT	
PS_P120	Waste Water	WET WELL LEVEL	LEVEL	
PS_P542	Waste Water	PUMP 1 RUN	EVENT	
PS_P542	Waste Water	PUMP 2 RUN	EVENT	

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_P542	Waste Water	WET WELL LEVEL	LEVEL	
PS_P603	Waste Water	PUMP 1 RUN	EVENT	2000 Langley Ave (PNBC)
PS_P603	Waste Water	PUMP 2 RUN	EVENT	2001 Langley Ave (PNBC)
PS_P603	Waste Water	WET WELL LEVEL	LEVEL	2002 Langley Ave (PNBC)
PS_P648	Waste Water	PUMP 1 RUN	EVENT	PNBC
PS_P648	Waste Water	PUMP 2 RUN	EVENT	PNBC
PS_P648	Waste Water	WET WELL LEVEL	LEVEL	PNBC
PS_P796	Waste Water	PUMP 1 RUN	EVENT	4801 S 13th St (PNBC)
PS_P796	Waste Water	PUMP 2 RUN	EVENT	4802 S 13th St (PNBC)
PS_P796	Waste Water	PUMP 3 RUN	EVENT	4803 S 13th St (PNBC)
PS_P796	Waste Water	WET WELL LEVEL	LEVEL	4804 S 13th St (PNBC)
PS_POLI	Waste Water	PUMP 1 RUN	EVENT	
PS_POLI	Waste Water	PUMP 2 RUN	EVENT	
PS_POLI	Waste Water	WET WELL LEVEL	LEVEL	
PS_RENN	Waste Water	PUMP 1 RUN	EVENT	11064 Rennard St (Philmont Shopping Center)
PS_RENN	Waste Water	PUMP 2 RUN	EVENT	11065 Rennard St (Philmont Shopping Center)
PS_RENN	Waste Water	WET WELL LEVEL	LEVEL	11066 Rennard St (Philmont Shopping Center)
PS_SPLA	Waste Water	PUMP 1 RUN	EVENT	9021 Buttonwood Pl (Spring Lane Meadows)
PS_SPLA	Waste Water	PUMP 2 RUN	EVENT	9022 Buttonwood Pl (Spring Lane Meadows)
PS_SPLA	Waste Water	WET WELL LEVEL	LEVEL	9023 Buttonwood Pl (Spring Lane Meadows)

Table 6 - Listing of all Temporary Flow Monitors Deployed by Projects

Site Name	Start	End	Maintained By	Project
F06-000025	5/29/2013	7/8/2013	CSL	CSO model calibration
S06-000045	6/5/2013	7/8/2013	CSL	CSO model calibration
W075-01-S0018	5/30/2013	7/10/2013	CSL	I/I
W095-01-S0020	6/5/2013	7/19/2013	CSL	I/I
USE-0660	7/12/2012	8/5/2013	CSL	I/I
S50-S00030	8/28/2013	9/25/2013	CSL	CSO model calibration
C07-000010	10/19/2013	10/23/2013	CSL	CSO model calibration
S052-05-0015	8/24/2012	11/4/2013	CSL	
S14-000025	8/26/2013	12/16/2013	CSL	CSO model calibration
PR-B0405	12/10/2012	1/6/2014	CSL	I/I
T088-01-S0220	12/10/2012	1/6/2014	CSL	I/I
F21-000375	12/11/2012	1/6/2014	CSL	CSO model calibration
P090-02-S0865	12/10/2012	1/7/2014	CSL	I/I
D25-017280	12/11/2012	1/7/2014	CSL	CSO model calibration
F21-000255	12/11/2012	1/7/2014	CSL	CSO model calibration
C17-000095	12/12/2012	1/8/2014	CSL	CSO model calibration
S43-000035	12/12/2012	1/8/2014	CSL	CSO model calibration
S42A-001880	12/12/2012	1/8/2014	CSL	CSO model calibration
C17-006120	12/13/2012	1/8/2014	CSL	CSO model calibration
THL-B0705	12/10/2012	1/9/2014	CSL	I/I
D39-012645	12/12/2012	1/9/2014	CSL	CSO model calibration
S50-006935	12/17/2012	1/9/2014	CSL	CSO model calibration
W060-01-S0045	5/29/2013	1/9/2014	CSL	I/I
S059-01-S0010	12/11/2012	1/10/2014	CSL	I/I
S50-017310	11/21/2013	1/16/2014	CSL	CSO model calibration
MSHX_2	2/13/2013	3/5/2014	CSL	Outlying Community
MAX1	2/15/2013	3/5/2014	CSL	Outlying Community
MBE8	2/15/2013	3/5/2014	CSL	Outlying Community
MA3	2/13/2013	3/7/2014	CSL	Outlying Community
D45-000080	1/23/2014	3/14/2014	CSL	CSO model calibration
F03-000055	3/8/2013	3/17/2014	CSL	CSO model calibration
F04-000015	3/8/2013	3/17/2014	CSL	CSO model calibration
F11-000015	3/8/2013	3/17/2014	CSL	CSO model calibration
PC-B1360	3/8/2013	3/17/2014	CSL	I/I

Site Name	Start	End	Maintained By	Project
PP-B1035	3/8/2013	3/17/2014	CSL	I/I
PP-B0790	3/13/2013	3/17/2014	CSL	I/I
CV-0145	3/7/2013	3/26/2014	CSL	I/I
D39-007000	5/31/2013	6/1/2014	CSL	CSO model calibration
P090-02-S0090	5/29/2013	6/2/2014	CSL	I/I
P099-01-S0025	5/29/2013	6/2/2014	CSL	I/I
T11-000010	5/31/2013	6/2/2014	CSL	CSO model calibration
S22-000025	5/30/2013	6/3/2014	CSL	CSO model calibration
S26-000010	5/30/2013	6/3/2014	CSL	CSO model calibration
S18-000010	5/31/2013	6/3/2014	CSL	CSO model calibration
WHL-0110	5/29/2013	6/5/2014	CSL	I/I
WLL-0100	5/29/2013	6/5/2014	CSL	I/I
C17-000040	5/30/2013	6/5/2014	CSL	CSO model calibration
Q110-17-S0015	5/30/2013	6/6/2014	CSL	I/I
M-0045	5/31/2013	6/6/2014	CSL	I/I
W067-01-S0060	5/31/2013	6/6/2014	CSL	I/I
D25-004970	5/31/2013	6/16/2014	CSL	CSO model calibration
S31-000010	5/30/2013	6/19/2014	CSL	CSO model calibration
PP-0215	6/5/2013	6/20/2014	CSL	I/I
S05-000012	3/30/2011	Present	CSL	CSO model calibration
P083-03-S0050	10/11/2011	Present	CSL	I/I
S45-001110	10/13/2011	Present	CSL	CSO model calibration
D63-000035	10/14/2011	Present	CSL	CSO model calibration
BC-0055	11/30/2011	Present	CSL	I/I
C17-003360	12/13/2011	Present	CSL	CSO model calibration
IALL-B0355	12/13/2011	Present	CSL	I/I
PC-0010	1/30/2012	Present	CSL	I/I
T14-013875	1/30/2012	Present	CSL	CSO model calibration
M005-07-0070	9/27/2012	Present	CSL	Eastwick Level Monitoring
M005-07-0140	9/27/2012	Present	CSL	Eastwick Level Monitoring
UDLL-0270	10/4/2012	Present	CSL	CSO model calibration
BC-B0755	12/10/2012	Present	CSL	I/I
P090-02-S0590	12/10/2012	Present	CSL	I/I
Q109-07-S0025	12/10/2012	Present	CSL	I/I
D47-000065	12/12/2012	Present	CSL	CSO model calibration

Site Name	Start	End	Maintained By	Project
F21-000145	12/12/2012	Present	CSL	CSO model calibration
S10-000030	12/13/2012	Present	CSL	CSO model calibration
WHL-0065	3/7/2013	Present	CSL	I/I
WLL-0565	3/7/2013	Present	CSL	I/I
S01-000045	5/30/2013	Present	CSL	CSO model calibration
S50-011535	5/30/2013	Present	CSL	CSO model calibration
S50-003755	5/31/2013	Present	CSL	CSO model calibration
USE-0020	8/12/2013	Present	CSL	Temperature Monitoring
S24-000045	8/26/2013	Present	CSL	CSO model calibration
S01-000477	8/29/2013	Present	CSL	CSO model calibration
S20-000012	8/29/2013	Present	CSL	CSO model calibration
PC-0040	1/21/2014	Present	CSL	I/I
211-1-1_OW2*	10/17/2013	Present	CSL	GSI Level Monitoring
231-3-1_OW1**	10/17/2013	Present	CSL	GSI Level Monitoring
231-3-1_OW2**	10/17/2013	Present	CSL	GSI Level Monitoring
PP-0065	1/24/2014	Present	CSL	I/I
UDLL-0125	1/24/2014	Present	CSL	CSO model calibration
T08-000015	1/27/2014	Present	CSL	CSO model calibration
D22-000190	1/29/2014	Present	CSL	CSO model calibration
D21-000035	1/30/2014	Present	CSL	CSO model calibration
D21-000100	1/31/2014	Present	CSL	CSO model calibration
S50-011300	2/7/2014	Present	CSL	CSO model calibration
D45-000085	3/14/2014	Present	CSL	CSO model calibration
S11-000080	4/2/2014	Present	CSL	Pre GSI monitoring
D45-000015	5/8/2014	Present	CSL	Design Support
LDLL-0115	5/15/2014	Present	CSL	Design Support
F07-000010	5/22/2014	Present	CSL	CSO model calibration
S046-06-S0025	5/23/2014	Present	CSL	I/I
S50-0021195	5/24/2014	Present	CSL	CSO model calibration
M005-05-S0050	5/25/2014	Present	CSL	I/I
WBR-0375	5/26/2014	Present	CSL	I/I
WBR-B0585	5/27/2014	Present	CSL	I/I
C11-000030	5/27/2014	Present	CSL	CSO model calibration
T08-002245	5/27/2014	Present	CSL	CSO model calibration
S33-000070	5/27/2014	Present	CSL	CSO model calibration

Site Name	Start	End	Maintained By	Project
LFLL-0015	5/28/2014	Present	CSL	CSO model calibration
T14-003035	5/28/2014	Present	CSL	CSO model calibration
LSE-0015	5/29/2014	Present	CSL	CSO model calibration
UDLL-0045	5/29/2014	Present	CSL	CSO model calibration
UFLL-0010	5/29/2014	Present	CSL	CSO model calibration
USE-0365	5/29/2014	Present	CSL	CSO model calibration
USE-0400	5/29/2014	Present	CSL	CSO model calibration
SOM-0040	5/30/2014	Present	CSL	CSO model calibration
S024-01-0020	6/5/2014	Present	CSL	I/I
F25-001135	6/5/2014	Present	CSL	CSO model calibration
D25-001285	6/20/2014	Present	CSL	CSO model calibration
SWMG-B0265	6/24/2014	Present	CSL	CSO model calibration
UDLL-0085	6/25/2014	Present	CSL	CSO model calibration
SOM-0220	6/26/2014	Present	CSL	CSO model calibration

*211-1-1_OW2 - Green infrastructure level monitor at Shepard Recreation Center
**231-3-1_OW1 – Green infrastructure level monitors at Daroff Samuel School

Table 7 - Listing of Outlying Community Contract Limits

Metered	**Contract Limits**					
Standardized	**Instantaneous**		**Daily Max**	**Township Total**		
Site ID	**CFS**	**MGD**	**MGD**	**Inst. CFS**	**Inst. MGD**	**Daily Max MGD**
MA1						
MA2						
MA3	0.185	0.12				
MA4	0.602	0.389				
MAx1	0.185	0.12				
Abington Total				9.247	5.976	4.453
MB1				74.26	47.996	33
Bucks Total						
MBE1						
MBE2						
MBE3						
MBE4						
MBE5			0.282			
MBE6			1.327			
MBE7			0.412			
MBE8						
MBE9						
MBE10						
MBE11						
MBE12						
MBE13						
MBE14						
MBE15						
MBE16						
Bensalem Total				11.74	7.588	6.133
MC1	2.75	1.777				
MC2	18	11.634				
MC3						
MCx1	8	5.171	Combined total for all the MCx#			
MCx2						
MCx3						
MCx4						
MCx5						
MCx6						

Metered	Contract Limits					
Standardized	Instantaneous		Daily Max	Township Total		
Site ID	CFS	MGD	MGD	Inst. CFS	Inst. MGD	Daily Max MGD
MCx7						
Cheltenham Total				20.75	13.411	13.380
MD1	155	100.179	50	155	100	50
ML1			5.474			
ML2			1.48			
ML3						
ML4			10.264			
ML5			1.848			
ML6			0.252			
ML7			0.84			
Lower Merion Total				31.57	20.404	14.5
MLM1						
MLM2	6.19	4.00	2.00	6.19		2.00
MLM3						
MLM4						
MLM5						
MLM6						
MLM7						
Lower Moreland Total	10.52		3.40	8.97	5.797	1.45
MS1						
MS2						
MS3						
MS4						
MS5						
MS6						
MS7						
MS8						
Springfield Total				6.53	4.22	4.2
MSH1						38566
MSH2						
MSHX_1						
MSHX_2						
Southampton Total				15.79	10.205	7.14
MUD-N	35	22.621	17			

Metered	**Contract Limits**					
Standardized	**Instantaneous**		**Daily Max**	**Township Total**		
Site ID	**CFS**	**MGD**	**MGD**	**Inst. CFS**	**Inst. MGD**	**Daily Max MGD**
MUD-S	combined total for all Upper Darby Connections					
MUD-O						
MUD-1						
Upper Darby Total				35	22.621	17

APPENDIX B

Green City, Clean Waters

2014 Annual Report

The Third Annual Report for the City of Philadelphia's Consent Order and Agreement on *Green City, Clean Waters*

Reporting period July 1, 2013 – June 30, 2014

Submitted to

The Commonwealth of Pennsylvania

Department of Environmental Protection

and The United States Environmental Protection Agency

By the Philadelphia Water Department

September 30, 2014

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Appendix 2: Planned Public Green Stormwater Infrastructure Projects

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Appendix 4: Green Stormwater Infrastructure Monitoring Status Report

Glossary of Acronyms

ADCP	Acoustic Doppler Current Profiler
ADA	Americans with Disabilities Act
AOCC	Administrative Order for Compliance on Consent
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CCLL	Cobbs Creek Low Level
City	City of Philadelphia
CMP	Comprehensive Monitoring Plan
COA	Consent Order and Agreement
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
DO	Dissolved Oxygen
DPP	Department of Public Property
ECA	Energy Coordinating Agency
GA	Greened Acre
GIS	Geographic Information Systems
GSI	Green Stormwater Infrastructure
IAMP	Implementation and Adaptive Management Plan
L&I	Department of Licenses and Inspection
LTCP	Long Term Control Plan and its supplemental documents
LTCPU	Long Term Control Plan Update
MOU	Memorandum of Understanding
MOTU	Mayor's Office of Transportation and Utilities
MS4	Municipal Separate Storm Sewer System
NMCs	Nine Minimum Controls
NOAA	National Oceanic and Atmospheric Association
NPDES	National Pollutant Discharge Elimination System
PADEP	Pennsylvania Department of Environmental Protection
PCPC	Philadelphia City Planning Commission
PDE	Partnership for the Delaware Estuary
PEC	Pennsylvania Environmental Council
PennDOT	Pennsylvania Department of Transportation
PHA	Philadelphia Housing Authority
PIDC	Philadelphia Industrial Development Corporation
PPR	Philadelphia Parks and Recreation
RDA	Redevelopment Authority
RFI	Request for Information
RFP	Request for Proposal
RTC	Real Time Control
RTP	Rebuilding Together Philadelphia
SDP	School District of Philadelphia
SEPTA	Southeastern Pennsylvania Transportation Authority
SMED	Stormwater Management Enhancement District
SMIP	Stormwater Management Incentive Program
SMP	Stormwater Management Practice
SOD	Sediment Oxygen Demand
SRT	Simulated Runoff Testing

Streets Department	Philadelphia Streets Department
SSES	Sanitary Sewer Evaluation Survey
SWMM	Stormwater Management Model
TIGER	Transportation Investment Generating Economic Recovery
TPL	Trust for Public Land
TTF	Tookany/Tacony-Frankford Watershed
USEPA	United States Environmental Protection Agency
WASP	Water Quality Analysis Simulation Program
Water Department	Philadelphia Water Department
WPCP	Water Pollution Control Plant
WQBEL	Water Quality-Based Effluent Limit
ZCC	Zoning Code Commission

1.0 Introduction

The Consent Order and Agreement (COA) signed by the City of Philadelphia (City) and the Pennsylvania Department of Environmental Protection (PADEP), and the Administrative Order for Compliance on Consent (AOCC) with the United States Environmental Protection Agency (USEPA), formalized the regulatory approval of the *Green City, Clean Waters* program and amended the 2009 CSO Long Term Control Plan Update. This is the third Annual Report submitted under the requirements of the COA. The 2014 reporting year covers the City's *Green City, Clean Waters* implementation progress activities that occurred between July 1, 2013 and June 30, 2014.

1.1 Water Quality Based Effluent Limit (WQBEL) Performance Standards

The City's Combined Sewer Overflow (CSO) Long Term Control Plan Update (LTCPU) and its supplements are based on compliance with the National CSO Policy and with the water quality requirements of the Clean Water Act and the Pennsylvania Clean Streams Law. The City will construct and place into operation the controls described as the selected alternative in the LTCPU and its supplements to achieve the elimination of the mass of pollutants that would otherwise be removed by the capture of 85% by volume of the combined sewage collected in the Combined Sewer System (CSS) during precipitation events on a system-wide annual average basis. The Water Quality-Based Effluent Limits (WQBEL) implementation performance standards are defined in the COA.

1.2 First Five-Years of Deliverables to PADEP

The COA requires twelve deliverables and two reports due between December 1, 2011 and June 1, 2015 (**Table 1-2)**. Two deliverables and one report were submitted to PADEP and the USEPA during the reporting period from July 1, 2013 to June 30, 2014:

> **The Tributary Water Quality Model for Dissolved Oxygen** was submitted to the PADEP and USEPA on May 30, 2014. This report describes the methods and results of a receiving water quality model for Dissolved Oxygen (DO) in the nontidal extents of Tacony-Frankford Creek and Cobbs Creek. Extensive field monitoring data were used to develop and validate the model, which simulates existing DO conditions and underlying stream processes in the receiving waters.
>
> **The first edition of the Green Infrastructure Maintenance Manual** was submitted to the PADEP and USEPA on May 30, 2014. The Manual describes the operation and maintenance of the full range of types of green stormwater infrastructure projects. The Manual is designed to be used by anyone with the responsibility for performing maintenance of green stormwater infrastructure.

The Sanitary Sewer Evaluation Survey (SSES) was submitted to the PADEP and USEPA on June 1, 2014. This report is described in **Section 6.2.**

Table 1-1: COA Deliverables

	Deliverable Name	Deliverable Date	Status
I	Implementation and Adaptive Management Plan	December 1, 2011	Approved
II	Green Infrastructure Maintenance Manual Development Process Plan	June 1, 2012	Approved
III	Comprehensive Monitoring Plan	December 1, 2012	Approved
IVa	Facility Concept Plan for NE WPCP	June 1, 2013	Submitted
IVb	Facility Concept Plan for SE WPCP	June 1, 2013	Submitted
IVc	Facility Concept Plan for SW WPCP	June 1, 2013	Submitted
V	Updated Nine Minimum Controls Report	June 1, 2013	Submitted
VI	Tributary Water Quality Model – Bacteria	June 1, 2013	Submitted
VII	Tributary Water Quality Model - Dissolved Oxygen	June 1, 2014	Submitted
VIII	Green Infrastructure Maintenance Manual - First Edition	June 1, 2014	Submitted
Required	Sanitary Sewer Evaluation Survey Report	June 1, 2014	Submitted
IX	Tidal Waters Water Quality Model - Bacteria	June 1, 2015	In Development
X	Tidal Waters Water Quality Model - Dissolved Oxygen	June 1, 2015	In Development
Required	Outlying Communities Report	June 1, 2015	In Development

2.0 Implementation Tracking, Reporting, and Management Adaptive

2.1 Reporting Implementation Progress

Paragraph 3d of the COA requires the City to provide information regarding the implementation of CSO Controls, including the Nine Minimum Controls from the National CSO Policy, the Capital Projects from the 1997 Long Term Control Plan, and the CSO program elements discussed in the Approved LTCPU. Information regarding the implementation of the Nine Minimum Controls and the 1997 LTCP Capital Projects can be found in Sections II and III.B, respectively, of the Combined Sewer Management Program Annual Report on pages 12 and 42.

2.2 *Green City, Clean Waters* Program Tracking System

During the 2014 reporting year, several milestones were achieved in the development of the *Green City, Clean Waters* program tracking system. Documentation of the existing systems and program tracking needs led to the formation of a steering committee for the initiative, composed of key stakeholders such as database managers, users, and employees from the Water Department's Information and Technology division. A project manager was selected to develop a scope for development of the system and working groups were formed to define the business requirements and identify data clean-up tasks for the existing databases slated for integration within the program tracking system.

Currently the existing databases and systems track program implementation and support data requests for internal and external reporting. The development of the *Green City, Clean Waters* program tracking system will integrate this data from the existing Water Department systems to streamline the process. The system will track green stormwater infrastructure planning initiatives, project design and construction, and post-construction inspection and maintenance activities. Once business requirements have been finalized, a data architect will address data migration issues and develop data dictionaries to ensure the integration of currently unrelated databases and sources.

The Water Department continues to update existing databases and systems that will be integrated within the program tracking system and will enhance the Water Department's ability to track data and report information. Status updates on the existing databases and systems are provided in **Table 2-1**.

Table 2-1: Status updates for existing databases and systems used for program tracking

Component Systems	Status
PlanIT	The Water Department's tracking system that stores information from site evaluations conducted on locations throughout Philadelphia. All sites must undergo an initial evaluation to determine the feasibility of green infrastructure before they can be transferred to GreenIT to begin conceptual design. PlanIT is now undergoing updates to better match the existing planning process
GreenIT	The Water Department's tracking system for all public green stormwater infrastructure projects from the concept through construction phases, GreenIT (Version 1.0), tracks designated compliance metrics.
Plan Review Database	The Water Department's tracking system that stores metrics related to private development project reviews for compliance with the Philadelphia Stormwater Regulations, including the status of conceptual and technical reviews, record drawing reviews, and detailed as-built SMP data.
CAPIT	The Water Department's Capital Project Tracking System will be upgraded to meet the Water Department's growing needs. A request for proposals was issued in May 2014 and responses were received in July 2014
Geographic Information System (GIS) Asset Tracking	A GIS is used to track all Water Department assets. The effort to code all green stormwater infrastructure assets in the GIS continued in this past year. All green stormwater infrastructure projects and associated components were separated from the existing stormwater network and transferred to a new network solely for green stormwater infrastructure. This change allows for the display of individual GIS layers for each SMP type and highlights components with attributes specific to green infrastructure. The additional component detail will now be readily available and supplied on maintenance tear sheets for use in the field.
Maintenance Management Systems	Progress was made to formalize the inclusion of green stormwater infrastructure maintenance activities into the Water Department's Cityworks work order management system, which is linked to the City's GIS and provides tools to track and manage work performed on the

Component Systems	Status
	Water Department's assets such as fire hydrants, inlets, water mains, sewers, and green stormwater infrastructure. Training for Water Department employees and contractors on use of the new system in the field was conducted during the reporting period, and green infrastructure maintenance crews will begin using the system in the fall of 2014.

2.2.1 Reporting Metrics

The information in GreenIT is used to produce compliance reporting outputs for the completed and planned project tables as described in **Appendices 1 and 2** of this Report. The reporting format is illustrated in **Table 2-2** and metric definitions are included. Information from the Plan Review Database is used to produce reporting outputs for the private complete projects as described in **Appendix 3**.

Table 2-2: Project Tracking Metrics and Reporting Format

Project Tracking Metrics										
Project Name	Status	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost	Partner(s)	Watershed

Project Name

For Water Department initiated and/or a public property project, the project name typically is the name of the associated school, park, playground, or streets.

Status

Current project status. Statuses include: In Concept/ Planning, In Design, In Projects Control (Under Contract Management), In Construction, and Construction Complete.

Storage Volume

The volume of runoff managed by the system. For infiltration systems, the entire depth of the system is counted. In detention/slow-release systems, only the depth above the orifice elevation is counted.

New trees

Total number of new trees planted in association with a system. This number also includes non-SMP trees, which are trees planted as part of a project but are not part of a stormwater management system.

Drainage Area

Area, in square footage, of impervious and/or pervious surface(s) flowing into a system(s) and SMP(s).

Greened Acres (GAs)

Greened Acres is a metric that accounts for the conversion of a highly impervious urban landscape through the implementation of projects that reduce storm water runoff. A Greened Acre is described as an acre of impervious cover connected (tributary) to a combined sewer that subsequently is reconfigured to utilize green stormwater infrastructure to manage all or a portion of the storm water runoff from that acre.

Stormwater Management Practice (SMP) Type

A Stormwater Management Practice is a technique that controls the rate and volume of stormwater runoff and/or improves runoff water quality. Multiple SMP types can be grouped together in a larger GSI system. The SMP types were originally defined in Table 2-1 of the IAMP. Updated definitions are included in **Table 2-3**.

Table 2-3: SMP Definitions

SMP Type Definitions	
Field/Metric	**Definition/Purpose**
Stormwater Tree Trench	A stormwater tree trench is a subsurface infiltration/storage trench that is planted with trees. These practices typically are constructed between the curb and the sidewalk and are designed to detain and release stormwater runoff and/or infiltrate where feasible.
Rain Garden	A rain garden is a shallow vegetated area designed to detain and release stormwater runoff and/or infiltrate where feasible. Rain gardens may also be referred to as bio-infiltration basins and bio-retention basins. They are typically integrated into landscape features (e.g. median strips) and are non-mowed areas.
Stormwater Planter	A stormwater planter is a structure filled with soil media and planted with vegetation or trees. It is designed to detain and release stormwater runoff and/or infiltrate where feasible. Planters can be designed below street grade or above grade and often contain curb edging as the structure surrounding the planter.
Stormwater Bump-out	A stormwater bump-out is a vegetated curb extension that intercepts gutter flow. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Infiltration/Storage Trench	An infiltration/storage trench is a subsurface structure designed to detain and release stormwater runoff and/or infiltrate where feasible.

SMP Type Definitions	
Pervious Paving	Pervious paving is a hard permeable surface commonly composed of concrete, asphalt or pavers It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Stormwater Wetland	A stormwater wetland is a vegetated basin designed principally for pollutant removal. It typically holds runoff for periods longer than 72 hours and may include a permanent pool. Wetlands can also detain and release stormwater runoff.
Cistern/Rain Barrel	A cistern/rain barrel is a tank or storage receptacle that captures and stores runoff and can thereby reduce runoff volume. The stored water may be used to serve a variety of non-potable water needs (e.g. irrigation).
Green Roof	A green roof is a vegetated surface installed over a roof surface. Green roof are effective in reducing the volume and rates of stormwater runoff.
Swale	A swale is a channel designed to convey stormwater. It can be designed to attenuate and/or infiltrate runoff where feasible.
Stormwater Basin	A stormwater basin is a basin or depression that is vegetated with mowed grass. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Disconnection (impervious to pervious)	Disconnection is when runoff from an impervious area is directed to available adjacent pervious area.
Stormwater Tree	A stormwater tree is a tree that has stormwater runoff directed to its pit. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Non-SMP Tree	A non-SMP tree is a planted tree that does not have stormwater directed to it.

Program

Current programs which a green project can be assigned to include:

- Alleys/Driveways
- Campuses
- Facilities
- Industry and Business
- Open Space
- Parking
- Schools
- Stormwater Planning Districts
- Streets
- Vacant Land

Construction Cost

Projects with a status of Construction Complete will have a finalized cost of construction provided.

Partner(s)

External entities involved in a project.

Watershed

The City of Philadelphia watershed where the project is located. Four of the City's seven watersheds fall at least partially within the combined sewer area. These watersheds are:

- Cobbs Creek Watershed
- Delaware Direct Watershed
- Tookany/Tacony-Frankford Creek Watershed
- Schuylkill River Watersheds

3.0 Capital Projects

This section describes the programs that make up each of the components of the *Green City, Clean Waters* program that had progress in the 2014 reporting year. The projects described include those associated with public and private property green stormwater infrastructure, waterfront disconnection and interceptor rehabilitation.

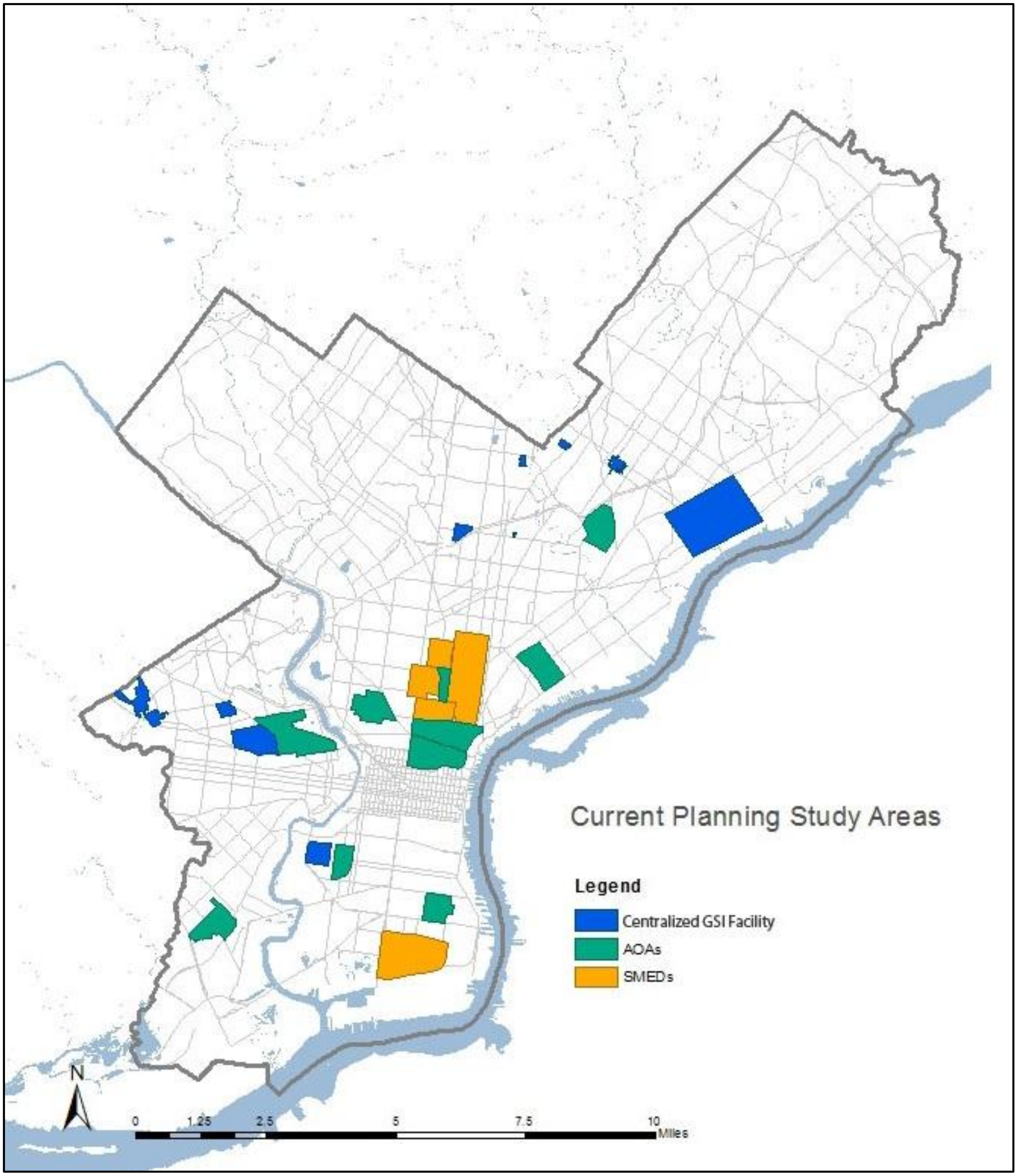
3.1 Public Green Stormwater Infrastructure

The *Green City, Clean Waters* programmatic strategies for achieving public Greened Acres is benchmarked in three phases: planning, design, and construction. The following three sub sections describe the progress made during the 2014 reporting year for each of these phases. **Table 3-1** summarizes Public GSI projects and Greened Acres in the three phases for the 2014 reporting year.

3.1.1 Planning Approaches for Green Stormwater Infrastructure Implementation

Over the past year the Water Department has developed a variety of planning approaches to facilitate the identification and implementation of GSI projects. The Water Department has built upon the lessons learned from the Stormwater Management Enhancement District (SMED) process and has begun to develop a strategic planning approach that can be applied city wide. In addition to following project opportunities as they arise with partners, the GSI planning group has focused their analysis in 3 main areas: the SMED process; the Area Opportunity Analysis (AOA) process; and Area Wide Disconnection to Centralized GSI Facility process. An overview of these approaches and their uses to-date is discussed below. The SMED, AOA, and Centralized GSI Facility study areas are shown in **Figure 3-1.**

Figure 3-1: Current Public Green Stormwater Infrastructure Planning Study Areas



Stormwater Planning Districts (SMEDs)

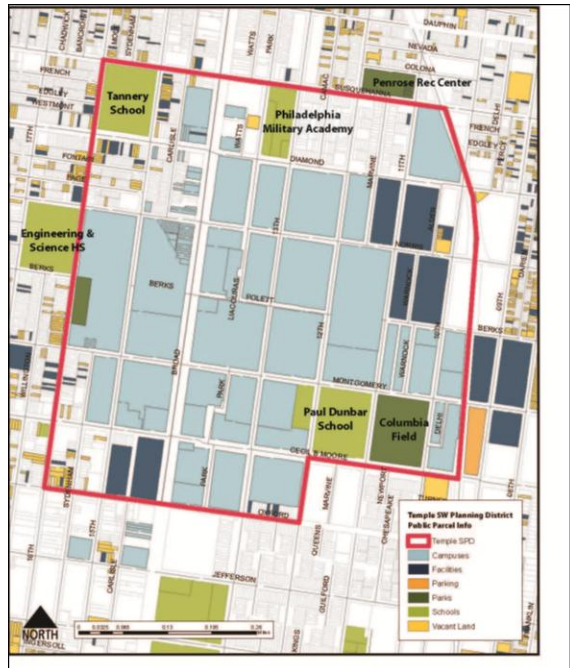
In the second annual report, the Water Department provided an update on the 5 SMED studies that were underway: Temple University, American Street, Village of Arts and Humanities, Yorktown/Ludlow, and the Stadium District. Detailed location descriptions of these 5 SMEDs can be found in the Second COA Annual Report (2013 Section 3.0.) Discussed below are the 2014 status updates for each of the 5 SMEDs. Three of the five projects have completed the planning phase in the past year. Even though stormwater analysis was completed there are still long term coordination pieces that will continue to be developed through early action projects and pilots.

Temple University

Watershed: Delaware

Total Acreage of Study Area: 240 (72% impervious)

Status Update



Last year, Temple University began crafting a new vision plan – Visualize Temple – that has adjusted the academic and development priorities for the campus master plan. The Water Department worked closely with the Landscape MasterPlan team to incorporate creative stormwater management solutions into these planning efforts. During this time, the Water Department also has identified several early action projects adjacent to the campus that are in various stages of implementation. Over the coming year the goal is to develop this partnership and think creatively about GSI implementation, credits, banking/trading, and research opportunities together. Short term/early action and signature projects identified on or surrounding campus include:

1) **Edberg Olson Field** (complete)
   Temple upgraded a practice field on campus and oversized their system to also capture right-of-way drainage area through the Stormwater Management Regulations.
2) **Columbia Field** (in design)
   Park site adjacent to campus being utilized by St Joe's as a practice field was undergoing renovations. The Water Department was able to review plans and upsize their systems to be able to accommodate the capture of right-of-way runoff in the future.
3) **SEPTA Greenway project** (planning – off campus)
   The Water Department will coordinate with SEPTA, Temple, and other partners to integrate GSI into proposed improvements along Berks Street.
4) **Tanner Duckrey School, Philadelphia Military Academy/Lot 5, and Paul Dunbar School** (planning – off campus)
   The Water Department will be working closely with the school district, community partners, and Temple to develop a greening approach for these schools.

American Street

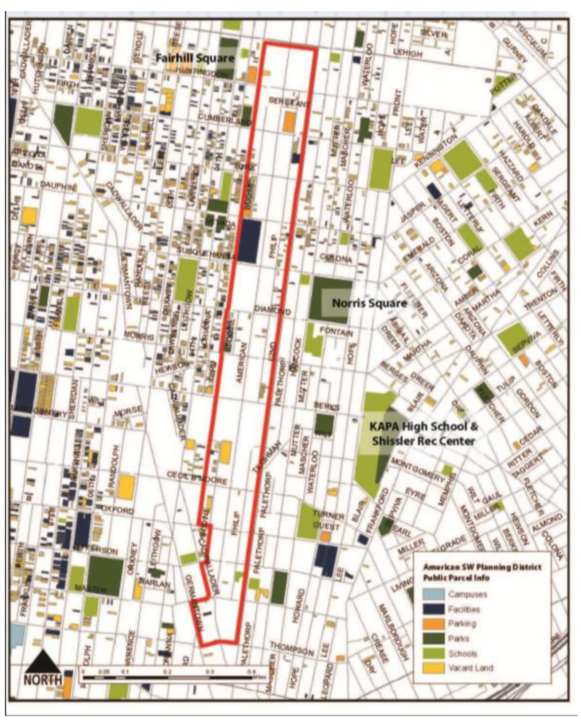
Watershed: Delaware

Total Acreage of Study Area: 109 (67% impervious)

Status Update

The Water Department has been working to finalize multiple strategies for implementing GSI in the area and is conducting a full detailed analysis of the area. The Water Department has begun discussions with other city agencies that are interested in making corridor improvements along American Street in the next few years. The different approaches under consideration for the area include:

1) **Vacant Lot Utilization**
   Manage right-of-way and nearby non-residential runoff on existing vacant parcels in the Northern portion of the study area
2) **Redevelopment partnerships**
   Work with developers to manage on and off-site impervious areas within the Southern portion of the study area
3) **Schools and Parks**
   Retrofit existing schools and parks to manage nearby impervious areas
4) **Sidewalk Bioretention**
   In the right-of-way practices to manage over-widened sidewalks throughout the study area
5) **Green Corridor**
   Create a roadside bioretention system within the over-widened corridor in coordination with other city agencies goals.



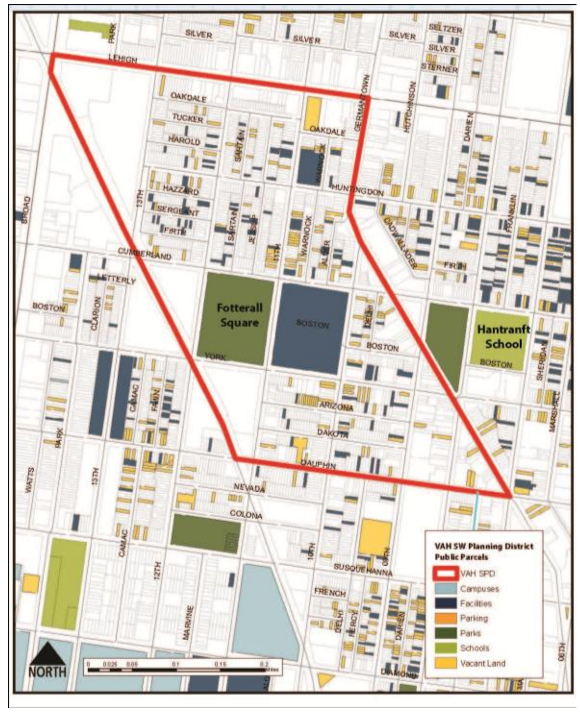
Village of Arts & Humanities

Watershed: Delaware

Total Acreage of Study Area: 84 (69% impervious)

Status Update

The Water Department has chosen to focus efforts in the short term around a neighborhood park project in this district. The design of multiple street projects have been initiated in this area in coordination with a partnership project with Parks and Rec. Longer term strategies for the area will continue to be developed in coordination with the active stakeholder groups in the neighborhood as well as neighboring Temple University.



Yorktown Ludlow

Watershed: Delaware

Total Acreage of Study Area: 195 (68% impervious)

Status Update

The Water Department has prioritized potential projects that were identified through the SMED process. Several street projects have been recommended as short term opportunities. Piloting the disconnection of private residential rooftops will be part of the work completed in this area. In the long term several partnership project opportunities will be finalized as leveraging opportunities become available.

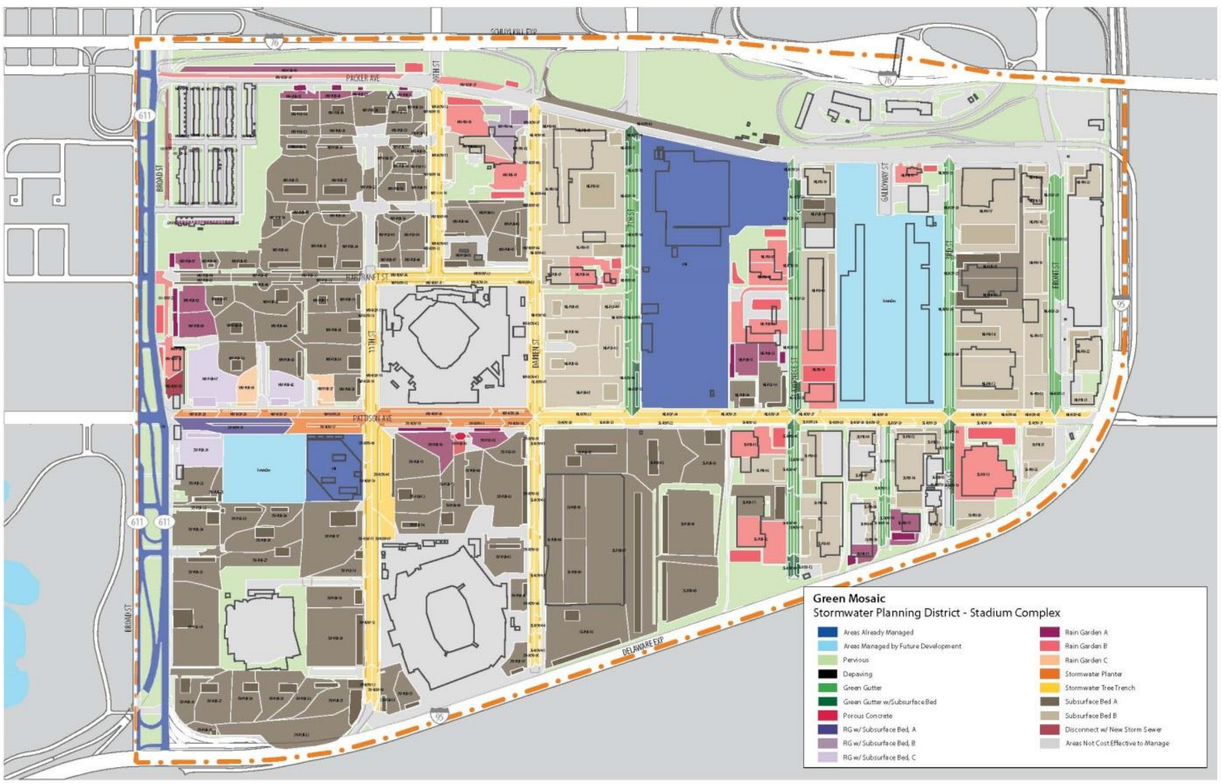
Stadium District

Watershed: Delaware

Total Acreage of Study Area: 622 acres (77% impervious)

Status Update

The Water Department has been developing a series of implementation alternatives for the Stadium area seeking to maximize cost-effectiveness, visibility, and partner interests. With the significant acreage and highly impervious area, this will likely result in a multi-year phased implementation initiative.



Area Opportunity Analysis (AOAs)

The purpose of the AOA is to evaluate areas of varying size using a planning and engineering process that identifies opportunities for implementing stormwater infrastructure improvements. Study areas will be identified across the city where opportunity exists for implementing GSI. Taking an area wide approach to analysis and implementation will allow the Water Department to make concentrated and/or interconnected investments in GSI while also providing greater potential for leveraging coordination and cost sharing.

AOAs focus on areas with clusters of publicly owned land and potentially large drainage area capture. Each study results in a list of potential projects to be implemented in the short and long term.

To date, the Water Department has 11 AOAs that have been initiated bringing 2,761 acres of the City in to this evaluation process. This process will continue to feed the design queue.

Area Wide Disconnection to GSI Centralized Facility Evaluation

Through GIS analysis conducted over the last few years the Water Department has identified unique opportunities for larger scale projects centered on strategically located public parcels. A few large open park areas are situated at an ideal elevation in comparison to surrounding streets and neighborhoods where they may be able to be utilized for centralized storage/infiltration facilities. The Water Department has completed planning level studies to pilot this concept in the design phase. If these pilots prove to be successful, additional opportunities of this kind will be evaluated.

3.1.2 Standardization of Green Stormwater Infrastructure Design

In January of 2014 the Green Streets Design Manual was released. The Manual provides design standards for several types of green street applications including stormwater trees and tree trenches, stormwater planters, stormwater bump-outs, and various porous pavements. It also describes the process through which a green street will be reviewed and permitted when a private party is interested in constructing one. The publication of this manual has standardized the procedure to obtain approval for typical green street construction projects.

In the past year, the Water Department has been working to standardize and advance tools for streamlining GSI Design processes. One large effort was the development of AutoCAD standards for the construction documents for GSI projects. Having AutoCAD standards allows the Water Department staff to work more easily with multiple partners and consultants while producing consistent documentation of projects. The Water Department has also created a committee to advance the development of the set of master specifications for green infrastructure work.

3.1.3 Construction of Public Green Stormwater Infrastructure

The Water Department's designers, inspectors, and construction contractors have learned numerous lessons as the number of GSI projects installed has increased. In an effort to help document and disseminate these lessons the Water Department has begun hosting a GSI Contractor Seminar series. There have been two formal seminars to date: One introducing the general principles of GSI design and the Green Streets Design Manual and the second focused on best practices for GSI construction. More informal classes have also been provided on topics such as proper tree tagging and installation. Completed public green stormwater infrastructure projects are displayed in **Figure 3-2**.

Table 3-1: 2014 Summary of Water Department-Initiated and Public Works Green Stormwater Infrastructure

Project Phase	In Planning	In Design	In Contract Development	In Construction	Completed
Number of Projects	91	107	9	29	97
Potential Number of Greened Acres*	TBD	TBD	8.0	56.8	97.3

*Potential number of Greened Acres is subject to change as projects go through the design process

3.2 Green Stormwater Infrastructure on Private Property

3.2.1 Philadelphia Stormwater Management Regulations

The City's Stormwater Management Regulations were revised in January of 2006, providing the foundation of the private sector's role in the *Green City, Clean Waters* program. Post Construction Stormwater Management Plans are reviewed for compliance with the Stormwater Management Regulations and the installations of SMPs are inspected during construction. During the 2014 reporting year, the Water Department conducted 1,423 inspections during active construction in the combined sewer area.

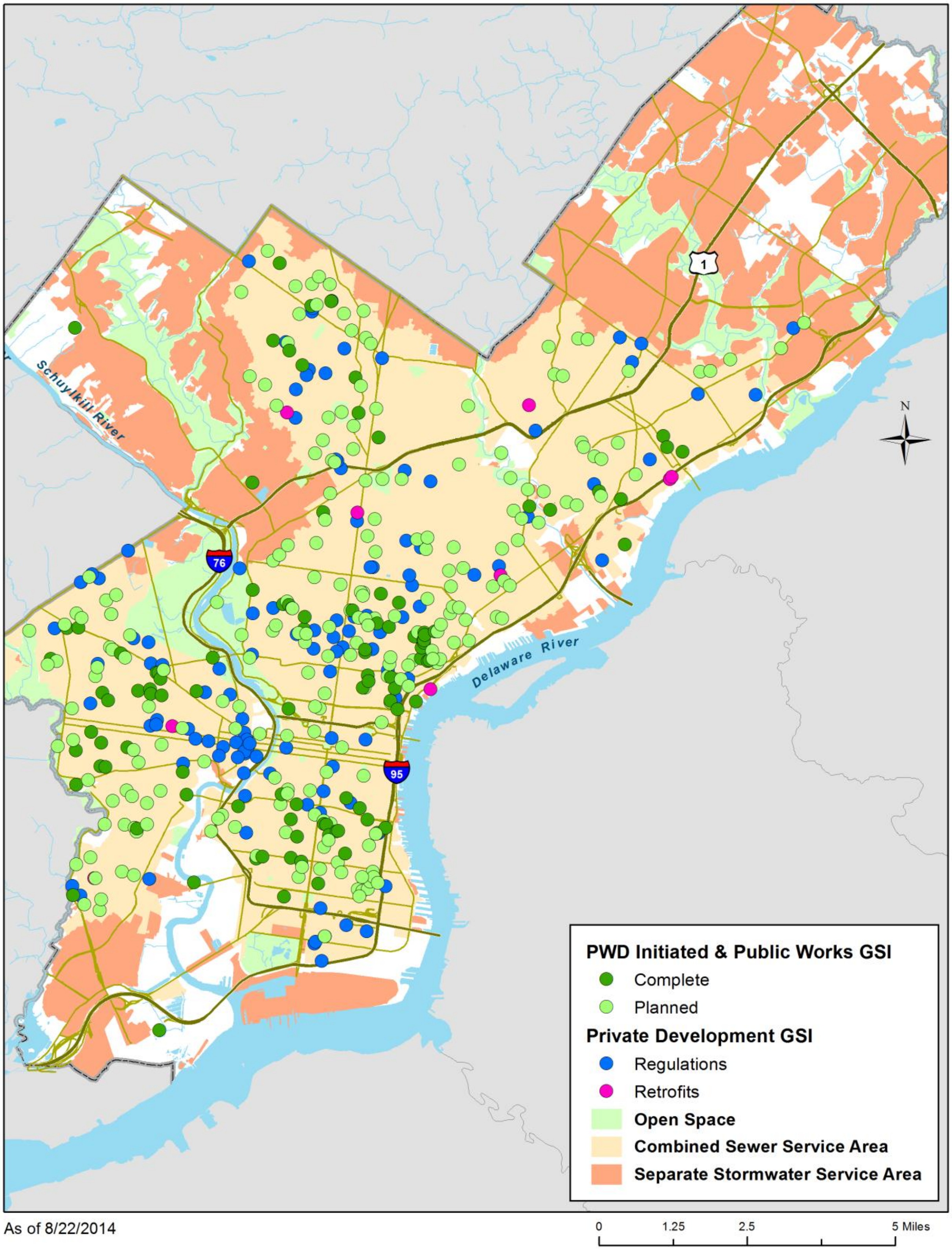
Table 3-2 summarizes private development and SMIP/Retrofit projects included in this year's Greened Acre total that were derived from constructed projects in the combined sewer area. A full list of complete private development and SMIP/Retrofit projects can be found in **Appendix 3**.

Table 3-2: 2014 Summary of Greened Acres by Watershed from Private Development and SMIP/Retrofit Green Stormwater Infrastructure

Watershed	Darby-Cobbs	Delaware	Pennypack	Tookany-Tacony/ Frankford	Schuylkill	Total
Private Development Greened Acres	5.7	96.7	3.7	30.2	102.7	237.1
SMIP/Incentives Greened Acres	0	57.3	0	0.4	0.6	58.3

The Water Department is undertaking a verification process for projects constructed between 2006 and 2011 to assess each project prior to counting Greened Acres toward compliance totals. In the past year, the Water Department continued its inspection verification initiative to gather documentation of all approvals that have not otherwise been verified. The Water Department uses survey equipment, closed circuit TV, and standardized inspection checklists to verify the compliance of constructed projects. A focus of this effort will be on the creation of record drawings to document the constructed conditions of the project sites. The record drawings allow the Water Department to verify SMP installation and function. Complete Stormwater Management Regulations and Retrofit green stormwater infrastructure projects are displayed in **Figure 3-2**.

Figure 3-2: Green Stormwater Infrastructure Projects in Philadelphia County



3.2.2 Incentives for Private Property Owners to Implement Green Stormwater Infrastructure

Stormwater Management Incentives Program

The Water Department offers incentives to private property owners to implement stormwater management best practices on existing properties through a grant program administered by the Philadelphia Industrial Development Corporation. In January 2012, the Philadelphia Industrial Development Corporation and the Water Department launched the Stormwater Management Incentives Program (SMIP) to provide assistance to non-residential customers in achieving credits on their stormwater bills and to facilitate the implementation of Greened Acres on private property. **Table 3-3** is a summary table of SMIP awards made during the 2014 reporting year. SMIP projects that are completed are listed in Table 2 of **Appendix 3**. A summary of completed SMIP projects private development Greened Acres by watershed are listed in Table **3-2.**

Table 3-3: 2014 Reporting Year SMIP Awardees

Project	Grant Amount	Proposed GAs
LaSalle University	$952,600	12.00
Dependable Distribution/W&W Realty	$2,720,700	30.13
Revolutionary Recovery	$185,000	2.32
Case Paper	$144,500	1.78
Segal Group/Jomar Textiles	$145,000	1.52
Morton McMichael/Drexel University	$147,000	1.49
Aspira-Antonia Pantoja Charter School	$101,430	1.13
Yards Brewing	$64,000	0.71
The Enterprise Center	$59,000	0.84
Grace Epiphany Church	$15,000	0.15
Total	**$4,534,230**	**52.07**

Stormwater Design Assistance

Since July 2009, the Water Department has offered site evaluation and concept planning services at no cost to customers interested in retrofitting properties for stormwater management. This assistance provides preliminary concept plans and helps the property owner understand the types of stormwater management practices suitable for their property. At the close of this reporting year, planning and design assistance has served 250 customers.

Stormwater Credits

Non-residential property owners can obtain stormwater credits, which are a direct reduction to their monthly stormwater charge. Stormwater credits can be earned as a result of the construction, operation, and maintenance of privately owned stormwater management practices that reduce a parcel's contribution of stormwater to the City's sewer systems. Retrofit and development projects are eligible for credits against their stormwater charge upon completion of construction, and owners must reapply every 4 years to keep their credits. The Water Department approved or renewed 261 stormwater billing credit applications during the reporting period.

Green Project Review

The Water Department provides an expedited review for development projects able to disconnect 95% or more of the post-construction Directly Connected Impervious Area (DCIA) by utilizing features such as green roofs, porous pavement, and new tree canopy. Projects that are eligible for a Green Project Review will receive a review response from the Water Department within 5 days, instead of the typical 15 calendar day review time. In fiscal year 2014, 13 projects qualified for an expedited Green Project Review.

3.3 Waterfront Disconnection

Delaware River Waterfront Stormwater Planning

The target area for stormwater planning along the Delaware River is bounded roughly by the Pennypack Creek to the north, the Philadelphia Naval Yard to the south, I-95 to the west, and the Delaware River to the east. Stormwater management planning for the target area incorporates three components: 1) disconnection of stormwater from the combined sewer system; 2) ensuring that redevelopment occurs in a manner consistent with the Philadelphia Stormwater Management Regulations; and 3) installation of green stormwater infrastructure (GSI) in the public street right-of-way.

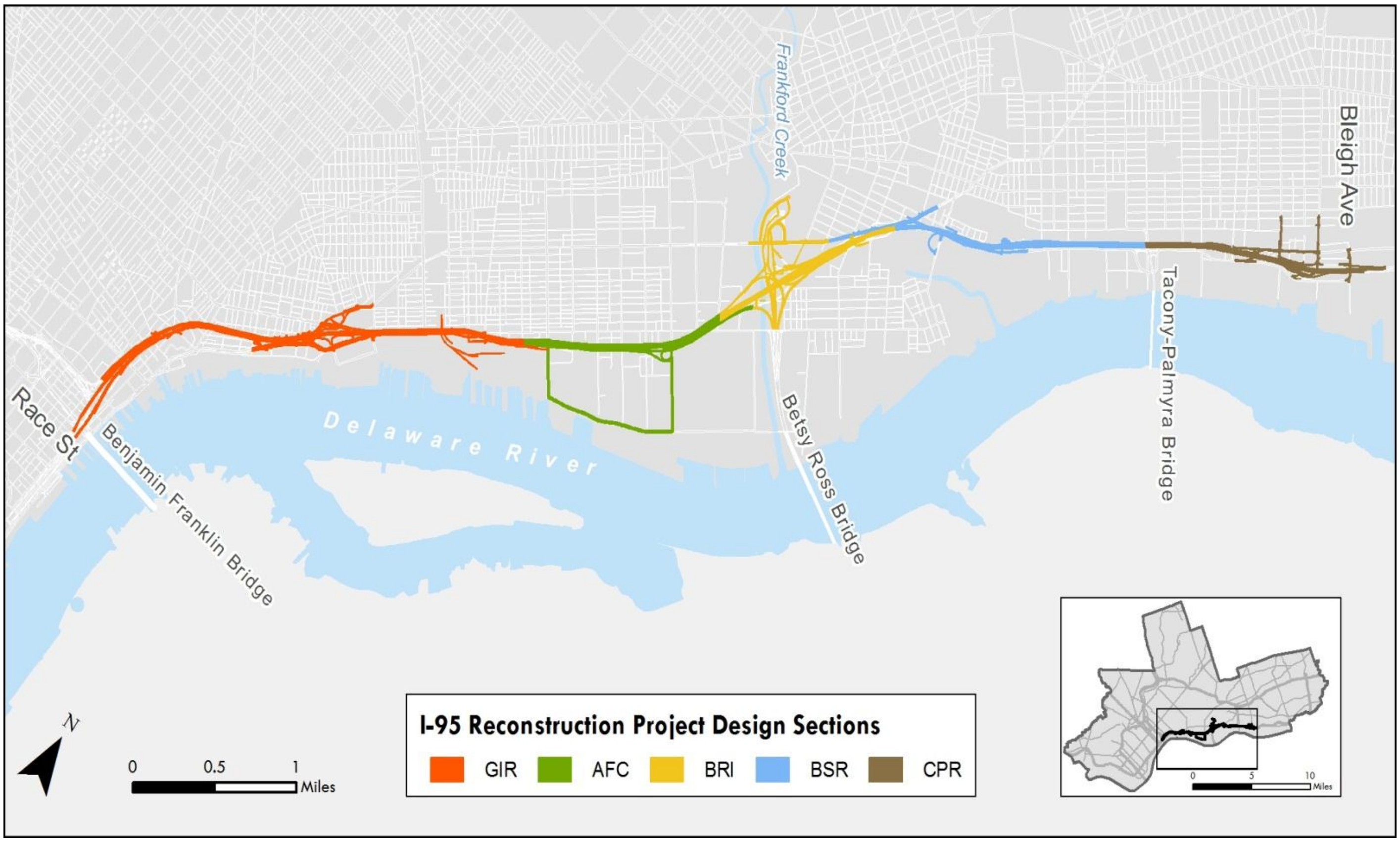
Throughout much of the duration of the Consent Order and Agreement period, the Pennsylvania Department of Transportation (PennDOT) will be performing reconstruction and expansion work on Interstate 95 (I-95) in phases between Bleigh Avenue and Race Street. This reconstruction project offers a partnership opportunity to address large-scale, incremental stormwater disconnection and installation of GSI. Connection of properties adjacent to the separated sewers, and other means of stormwater management that are consistent with the Philadelphia Stormwater Regulations, will occur concurrently with redevelopment in the target area. During the 2014 reporting year, an internal coordination process has been established to ensure stormwater management is accounted for in planned and scheduled projects in the target area.

3.3.1 I-95 Reconstruction Project

I-95 Reconstruction Sections

The I-95 Reconstruction Project is divided into five (5) major design sections, moving from south to north: GIR, AFC, BRI, BSR, and CPR. Each of these sections is further subdivided into a total of 17 construction subsections. A map of the I-95 Reconstruction Project Design Sections is featured below in **Figure 3-3**.

Figure 3-3: I-95 Reconstruction Project Design Sections



The project limits and completion dates for the design and construction subsections are summarized in **Table 3.4**. Sections with significant design or construction progress in the 2014 reporting year are discussed in detail below.

Table 3-4: I-95 Construction Section Limits and Expected Completion Dates

SECTION	LIMITS	EXPECTED YEAR OF COMPLETION
GIR	**Race Street to Ann Street**	
GR0	I-95 NB between Delaware Avenue and York Street; I-95 SB near Girard Avenue	Completed, 2010
GR1	Richmond Street from Schirra Drive to Ann Street; Girard Avenue Bridge over Aramingo Avenue	2016
GR2	I-95 NB/SB between Shackamaxon Street and Columbia Avenue	2015
GR3	I-95 NB from Columbia Avenue to Ann Street; Delaware Avenue between Columbia and Aramingo Avenues	2018
GR4	I-95 SB from Columbia Avenue to Ann Street	2022
GR5	I-95 NB/SB from Race to Shackamaxon Streets	2023
AFC	**Ann Street to Frankford Creek**	
AF1	Allegheny, Delaware, and Castor Avenue east of I-95	2022
AF2	I-95 SB from Ann Street to Wheatsheaf Lane	2025
AF3	I-95 NB from Ann Street to Wheatsheaf Lane	TBD
BRI	**Frankford Creek to Margaret Street**	
BR0	Portions of Betsy Ross Interchange	2018
BR2	Portions of Betsy Ross Interchange; Aramingo Avenue between Frankford Creek and Duncan Street	2022
BR3	I-95 NB/SB between Wheatsheaf Lane and Margaret Street	2023
BSR	**Margaret Street to Levick Street**	
BS1	I-95 NB/SB between Carver and Levick Streets	2020
BS2	I-95 NB/SB between Margaret and Carver Streets	2021
BS3	Aramingo Avenue between Duncan Street and Amtrak overpass	2024
CPR	**Levick Street to Bleigh Avenue**	
CP1	I-95 NB/SB between Levick Street and Bleigh Avenue	Completed, 2013
CP2	Cottman and Princeton Avenues, State Road, Milnor Street	2017

Section GIR (Girard Avenue Interchange Area)

GR0

Storm sewer systems and swales were constructed in conjunction with the temporary improvements; however, portions will be removed or adjusted during later phases of construction. A net increase in impervious coverage (and runoff volume) was avoided by re-grading, seeding, and stabilizing areas where pavement was removed along northbound Aramingo Avenue.

GR1

The drainage from the relocated Richmond Street will be separated by connecting it downstream of the intercepting chambers at Dyott, Somerset, and Cumberland Streets, and some stormwater will be directed to the rehabilitated Lehigh Street sewer. Stormwater management enhancements include vegetated swales and restored and re-vegetated landscaped areas using native meadow seeding and the installation of stormwater tree vaults.

GR2

The elevated portion of I-95 in this section will manage stormwater using rain gardens and bioswales in the areas along the highway. This project was required to meet the Flood Control requirement by controlling the peak rate of runoff to meet pre-development conditions for the standard Water Department design storms.

GR3

Two separate sewer outfalls will be constructed. The Dyott Street portion of the project will be constructed in two phases: runoff from GR3 will connect downstream of the regulator, and it is anticipated that GR4 will construct a new outfall directly to the river. The design consultant is evaluating extending outfalls to connect below the regulating chamber, separating stormwater runoff from the Target Area to the CSO system.

Stormwater will be managed in GR3 using bioretention basins, rain gardens, infiltration basins, and detention basins. The basins are designed to manage the water quality volume.

GR4

Stormwater will be managed in GR4 using biorentention basins, rain gardens, infiltration basins, and detention basins. The basins are designed to manage the water quality volume.

Section BRI (Betsy Ross Interchange Area)

BR0

Final design for this section was completed in June 2014. Water Department sanitary and storm sewer culverts will be relocated. Stormwater runoff from the reconstructed portions of the highway and ramps is being treated through the use of under-drained bioretention and water quality units then directly discharged to the Frankford Creek, removing the drainage area from the CSO system.

Section CPR: (Cottman-Princeton Ramp Area)

CP1

This section was exempt from meeting the Philadelphia Stormwater Regulations because it was designed before the regulations went into effect. Approximately 60 street trees were planted along Princeton Avenue between Torresdale Avenue and State Road as part of this phase.

CP2

Six new separate stormwater outfalls are planned, under construction, or completed. Pipes have been completed in Cottman, Princeton, and Magee Streets; work is underway in Unruh and Disston Streets; and work is planned for Bleigh Avenue. The stormwater pipes are designed to accept the drainage from the highway as well as the area in between the highway and the Delaware River as development occurs.

3.3.2 Water Department Storm Flood Relief Projects

Two Water Department storm flood relief projects will support disconnection in the target area. During the 2014 reporting year progress on the planning of the Moore Street storm flood relief project continued and construction of the 20'" and 48" pipes are approximately 70% complete in the Northern Liberties storm relief project.

3.4 Interceptor Rehabilitation Program

The WQBEL Performance Standards requires 2 miles of interceptor lining by the end of year 5 (2016). As of July 2014, the Water Department is well ahead of that target with 6.2 miles completed, 4.3 miles in construction or in projects control, and 4.6 miles in design (**Table 3-5**).

Table 3-5: Interceptor Lining Status Update

Project Name	Status	Extents	Length (Miles)
60th and Cobbs Creek Parkway to 75th and Wheeler Sewer Lining	Construction Complete	60th and Cobbs Creek Parkway to 75th and Wheeler	2.2
Cobbs Creek Park to 63rd and Market Sewer Lining	Construction Complete	Cobbs Creek Park to 63rd and Market	0.5
Cobbs Creek Interceptor Phase 1 CIPP Lining	Construction Complete	63rd and Market to 62nd and Baltimore	1.6
Cobbs Creek Intercepting Sewer Lining Phase 2	In Projects Control	61st and Baltimore to 60th and Warrington	1
Cobbs Creek Interceptor Lining Phase 3	In Projects Control	City Avenue to D R/W in former 67th Street	1.7
Cobbs Creek Intercepting Sewer Lining Phase 4 (Indian Creek Branch)	In Projects Control	City Avenue to D R/W in former 67th Street	1.6

Project Name	Status	Extents	Length (Miles)
Tacony Creek Intercepting Sewer Lining Phase 1	Construction Complete	Chew & Rising Sun to I & Ramona	1.9
Tacony Creek Intercepting Sewer Lining Phase 2	Under Construction, 80% Complete	2nd St & 64th Ave to Chew & Rising Sun; DRW Mascher to Tacony Interceptor; Cheltenham Ave to Crescentville& Godfrey	1.3
Tacony Creek Intercepting Sewer Lining Phase 3	Design 30% Complete	I & Ramona to O & Erie	1
Upper Frankford LL Collector/Tacony Intercepting Sewer Lining Phase 4	Design 30% Complete	Castor & Wyoming to Frankford/Hunting Park	1.1
Upper Frankford Creek LL Collector/Tacony Intercepting Sewer Lining Phase 5	Design Started	Frankford/Hunting Park to Luzerne & Richmond	1.2

4.0 Streamlining

To achieve Performance Standards included in the WQBEL, the Water Department has developed partnerships with external agencies to coordinate and collaborate on stormwater management projects.

4.1 Tracking Federal and State Policy Developments

The Water Department conducts ongoing analyses and tracking of federal, state and local legislation and regulation that affect *Green City, Clean Waters* goals. This protocol requires a periodic review of policies, regulations, guidance, bills, and reports from a number of priority sources including governments, advocacy organizations, non-profits, and news sources. All legislative and regulatory developments that are relevant to the Water Department are reviewed and then imported into a policy tracking database.

4.2 Coordination with other City and Non-City Agencies to Achieve Policy Goals

The Water Department utilizes a pilot-based approach to coordination with partners in the implementation of the *Green City, Clean Waters* program. By embarking on partnership projects with unique characteristics, policy issues regarding project management responsibilities, project review workflows, cost shares, maintenance responsibilities, land access and project permanency can be negotiated and formally recorded. Often multiple pilot projects take place with each partner, because there are variables such as project lead, funding source, and external partner involvement which lead to a variety of project scenarios. As these pilots are accomplished, the Water Department documents and codifies the policies established as templates that can be applied to all future projects of the same type. The primary agency partnerships are described below.

4.2.1 Green Streets Program Development

The Water Department has advanced development of the Philadelphia Green Streets Program through the continued integration of planning and partnerships with the Streets Department, SEPTA, the Mayor's Office of Transportation and Utilities, PennDOT and others.

In the past year, the Water Department coordinated several green stormwater infrastructure projects with current projects led by either the Water Department or partners. Working with partners in the Streets Department, the Water Department has integrated stormwater infrastructure into major projects to be funded by the federally-funded Transportation Improvement Program (TIP). The Water Department and Streets are working together to integrate green stormwater infrastructure into the design and construction of the American Street Streetscape and the Island Avenue Signal Upgrade, two TIP-funded projects. Partnering with SEPTA, the Water Department has identified and developed three pilot projects that will serve as the basis for ongoing collaborative projects.

Policy and strategic planning improvements continue to make coordinating the design and construction of such projects more feasible. During the 2014 reporting period the Water Department published the Green Streets Design Manual as well as Green Infrastructure Maintenance Manual, both of which ensure that private developers and public partners are aware of the green streets design and maintenance standards and processes. To continually improve green street design and review processes to meet the needs of the Water Department, Streets and other partners and to integrate green stormwater infrastructure into transportation investments citywide, the Water Department has launched the Green Streets Committee. Serving on the Committee are representatives of the Streets and Water Departments, as well as representatives from SEPTA, the Mayor's Office of Transportation and Utilities and the Commerce Department. The Water Department is also developing memorandums of understanding with SEPTA and the Streets Department to formalize many of the processes developed in conjunction with the Green Streets Committee.

4.2.2 Schools

The Water Department is collaborating with the School District of Philadelphia and private and charter school operators to implement green stormwater infrastructure projects on school property. The Water Department has moved forward with a pilot-based approach to coordination, which has focused on three models of project implementation:

The Water Department Initiated Model follows the Water Department's capital projects procedures where the Water Department manages design and construction. The George Nebinger School is the first test case for this coordination model.

The Philadelphia Water Department, the US Environmental Protection Agency, the Partnership for the Delaware Estuary and the School District of Philadelphia, among numerous other partners, teamed up to develop this model for stormwater management and educational programming at the George W. Nebinger School. Efforts at Nebinger School focus on using green stormwater infrastructure as a classroom, field and laboratory tool as well as demonstration opportunity for students and the community.

The Water Department completed construction of the green stormwater infrastructure systems at Nebinger in September of 2013. The GSI systems at Nebinger, including a swale, rain garden, with an edge of porous play surface, and a below-ground basin under the parking lot with pervious pavers. The Friends of Nebinger group applied to receive an Adoption Program grant from the Water Department, to support their efforts in providing light surface maintenance and trash removal for the GSI systems. Three additional school projects have been in development for the Water Department Initiated Model at the following schools: Horatio B. Hackett, W.D. Kelley, and William McKinley. The Water Department worked with each school to apply for Community Design Collaborative grants to undergo a master planning process that would integrate green stormwater infrastructure with existing and future amenities. All three schools completed their master plans in spring of 2014. The school community, community groups, and most importantly SDP were intimately involved in this process. The Water Department has begun the design phase for the green stormwater infrastructure for each school. Stormwater from each school yard and some adjacent street drainage areas will be managed by rain gardens at Hackett, McKinley, as well as for Kelley, which will also potentially include a stormwater tree.

The School Initiated Model goes through a school's capital improvement process and is funded via the SMIP Grant program. The Water Department had been piloting this model with both public and private school operators.

The School District of Philadelphia was awarded a first round SMIP Grant to build green stormwater infrastructure at five school sites. The five schools selected were Lowell Elementary School, Martin Luther King High School, Mayfair Elementary School, Samuel Powel Elementary and Warren G. Harding Middle School. The Water Department has worked closely with the School District to develop concept plans that reduce stormwater runoff both on the school sites and in the surrounding public right of way, maximizing the Water Department's investment. The School District is in the planning process for all five schools. The School District will be utilizing a variety of stormwater management practices, including rain gardens and porous pavers. The Water Department has also worked with a two private schools, Greene Street Friends and Settlement Music School, to fund the design and construction of GSI on their properties. The Greene Street Friends project was constructed in the 2013 reporting year. The Settlement Music School project is still in the planning phases. The plan is to disconnect both the roof and surface impervious area into a large rain garden to be built on a former parking lot. The construction of the stormwater management practices will help to resolve ongoing standing water.

The Third Party Model employs interested non-profits to manage design and construction on behalf of the Water Department and the School operator. It allows the third party to leverage the Water Department's investment to fundraise for other schoolyard improvements. The Water Department has been piloting this model with a number of entities, including the Trust for Public Land (TPL), through the Green2015 Partnership and by awarding SMIP grants to school-related non-profits for schoolyard green stormwater infrastructure projects.

The Water Department partnered with the TPL at the William Dick School, where a large rain garden was built in conjunction with comprehensive playground improvements. This coupling of improvements, allowed for a total site transformation, and provided a unique educational opportunity for the students of William Dick. TPL utilized a collaborative design process, where the elementary school students were educated about the benefits of stormwater management and students helped to site and select the playground elements.

Additionally, the Water Department has funded two other public school projects via school related non-profit organizations. The nonprofit group, Friends of Chester Arthur was awarded a SMIP Grant to construct stormwater management features at the Chester Arthur School, as part of their larger school yard master plan effort. Friends of Chester Arthur School is still in the planning stages for the project, but the construction of a large rain garden is anticipated. The rain garden will be fully integrated with the other playground elements and serves as an educational tool for staff, students and the community.

The Water Department also provided a SMIP Grant to the West Philly Coalition for Neighborhood Schools to design and construct green stormwater infrastructure at the Lea School. The concept plan proposes to build a large rain garden and underground detention system, which would capture both roof and surface runoff. Similar, to the Friends of Chester Arthur project, the stormwater improvements will be incorporated into a larger renovation of the school yard. The stormwater improvements will compliment new playground amenities and serve as an educational tool. In addition to the development of the three partnership models described above, the Water Department has also taken steps to formalize its partnership with the School District. Monthly meetings have been established with key District staff that serve to advance the numerous green school projects and has helped to streamline communication between the agencies.

4.2.3 Parks and Recreation

In addition to the coordination work involved in Green2015, the Water Department and the Philadelphia Department of Parks and Recreation continue to work together to prioritize and address challenges to comprehensive green stormwater infrastructure implementation on parks land. Emphasis is on the implementation and refinement of processes for site prioritization, project design and construction, and coordinated public outreach. Additionally, finalization of policies for cost share and maintenance of green infrastructure is a priority.

4.2.4 Vacant Lots

The Water Department continued its pilot initiatives on vacant lands, via analysis of both public and private vacant lots, and continued partnership development to implement its vacant lands program. Specifically, the Water Department has continued to build relationships with the Department of Public Property, Philadelphia Redevelopment Authority, City Council, Pennsylvania Horticultural Society, and similar stakeholders to streamline the process to utilize vacant lots for green stormwater infrastructure systems. Staff has met with key Council members to identify and implement GSI on key vacant lots. Staff is also working with the newly established Land Bank to investigate means to acquire private lots with stormwater management opportunities.

Initial tools that have been developed in the past year include a finalized initial workflow, criteria of physical attributes, established process of review for economic and environmental conditions that affect a vacant lot, promotional materials and program goals. The vacant land team has advanced the vacant land identification and review process, including a review of historic land uses to determine any possible environmental concerns of a site. The Water Department is analyzing site investigation and remediation options, including brownfield funding and partnerships, for lots with areas of contamination concern.

The Water Department has three early pilot sites going to construction in 2015, with other vacant lots under review. The three pilot vacant lot sites include a rain garden covering a traffic triangle that was formerly a gas station site and had been remediated by the City; a rain garden covering a vacant lot that had formerly had been tended to by the Tookany/Tacony-Frankford Watershed Partnership; and a vacant lot where a councilmember has been working with the community to develop a public green space including seating areas and a community garden.

During this year, the Water Department has focused on the simplest acquisition and development of GSI on vacant land with the goal of completing key vacant parcel projects as 'success stories' encouraging expansion with key partners and Council. Most of these early sites consist of City-owned lots upon which the green stormwater infrastructure system utilizes most (if not all) of the vacant land.

5.0 Operation and Maintenance

In order to ensure the function and sustainability of stormwater management infrastructure investments, the Water Department continues to develop Operation & Maintenance Agreements and protocols.

5.1 Public Green Stormwater Infrastructure Maintenance Program

The Water Department completed the Green Stormwater Infrastructure Maintenance Manual in June of 2014 and will issue new versions of the Manual as new practices are implemented. In addition, the Water Department has created several tools intended to relay lessons learned in the field to entities responsible for the design and construction of GSI. In the spring of 2014, the Water Department drafted an internal guidance document entitled the "PWD Inspector's Planting Manual" which was aimed at providing Water Department Construction Inspectors as well as contractors additional guidance with regards to planting trees, shrubs and herbaceous vegetation. The document also provides guidance on identifying issues and factors that should prompt inspectors to reject vegetation delivered from nurseries should they not meet the Water Department standards and specifications. The release of this internal document was followed with tree planting and corrective pruning demonstrations by the Water Department's GSI maintenance staff.

The Water Department's GSI maintenance program operates through three types of maintenance activities in order to adequately address the maintenance needs of the Water Department's GSI. These are "Surface Maintenance", "Subsurface Maintenance" and "Aesthetic Maintenance". The three maintenance activities are defined below:

Routine surface maintenance tasks include activities such as plant care (e.g., pruning, watering, vegetation control, replanting, etc.), cleaning (e.g., trash/ sediment/ organic debris removal), structural upkeep and repairs (e.g., winterizing, concrete and masonry repair, replacement of grates, access covers etc.). The frequency of maintenance and the tasks performed at green stormwater infrastructure projects are dependent on the type of SMPs implemented at a given location. Green stormwater infrastructure projects with abundant herbaceous vegetation such as rain gardens, stormwater planters, basins, swales and stormwater bump-outs are maintained throughout the growing season to ensure plant health and survival and overall optimal system function. Other SMP types that lack herbaceous vegetation, such as tree trenches and infiltration/storage trenches require a more intermittent routine maintenance schedule. Pervious pavement maintenance has been folded into the surface maintenance regime and those SMPs are maintained twice a year. Pervious pavement maintenance consists of vacuuming pervious surfaces to remove fine sediment and other debris using regenerative air technologies.

Routine subsurface maintenance activities include tasks such as jet-rodding, high-pressure flushing and vacuuming of sediment, trash and debris within inlets and control structures, as well as distribution and underdrain pipe elements. During subsurface maintenance, debris is also removed from pretreatment devices and sediment, trash and debris are removed from the curb gutter. Routine maintenance of all subsurface components associated with constructed SMPs (i.e. pipes and inlets) is performed at a minimum of once per year; however, some SMP's are subject to high sediment, trash and debris loading and are thus maintained at more frequent intervals.

Aesthetic Maintenance consists of sediment, debris and trash removal from planting beds and conveyance structures such as swales, stone conveyance channels and trench drains. Aesthetic maintenance activities are often initiated in response to tour requests or to maintain optimal site aesthetics in between surface maintenance events - particularly at SMP's with abundant herbaceous vegetation. Aesthetic maintenance has emerged as a key undertaking with respect to keeping plantings beds in an aesthetically pleasing state - a factor which has emerged as key to garnering public acceptance of GSI.

Average maintenance cycles and tasks by SMP type have been developed through observation of field data over many maintenance seasons to maintain safe and effective SMPs. The frequency of certain maintenance are subject to change based on various factors that are evaluated as sites begin to mature and further experience is gained. As an example, SMP's with abundant herbaceous vegetation are often kept "off-line" for all or portions of the first growing season to ensure that all vegetation establishes viable root systems. Prior to receiving the full design flows, conveyance to systems via curb cuts, trench drains, end walls or inlets is restricted until Water Department staff determines the SMP has well-established vegetation. Similarly, systems with very well established vegetation (i.e. 2-3 years post-construction) are taken off of a watering regiment given these systems tend to be less sensitive to seasonal drought conditions. Modifications to maintenance protocols can also include an increase in the frequency of maintenance events in order to address specific needs (i.e. public events, follow-up maintenance actions, pre or post-storm maintenance).

PowerCorps PHL Aesthetic Maintenance Program

Over the past decade, the Water Department has created, tested and implemented new strategies to promote the economic and social growth of the City and meet environmental, ecological and business missions. In support of these initiatives, and to augment the Water Department's GSI aesthetic maintenance responsibilities, the Water Department entered a three year strategic partnership with PowerCorpsPHL, an innovative AmeriCorps initiative designed to address environmental stewardship, workforce development and violence prevention for at-risk youth in Philadelphia.

Through the implementation of the *PowerCorps GSI Aesthetic Maintenance Program*, PowerCorps members are helping to grow Philadelphia's GSI maintenance community and provide new career pathways for local youth. Since March 2014, PowerCorps members have been working alongside Water Department staff, receiving training and education in GSI maintenance practices, the Water Department's *Green City, Clean Waters* program and the City's sustainability goals.

Integral to the GSI Aesthetic Maintenance Program, PowerCorps members learn how to maintain GSI across the City to maximize systems functionality and aesthetics. Their efforts in the removal of trash, sediment and debris from GSI sites, as well as reporting site observations during their efforts, have increased the Water Department's capacity to maintain GSI systems and help to educate residents on the roles they can play in preserving our watersheds. **Table 5-1** summarizes the type and amount (in pounds) of material collected by PowerCorps PHL in the 2014 reporting year.

Table 5-1 PowerCorps PHL Trash Removal in the 2014 Reporting Year

Type of material collected	Amount collected in pounds
Residential garbage	13,419
Leaves and organic debris	5,360
Construction/commercial debris	3,564

5.1.1 2014 Water Department GSI Maintenance Summary

As the GSI maintenance program continues to expand its scope, the number and complexity of SMP's continues to increase. Table 5-2 provides a list of SMP types and the total number currently maintained by the Water Department.

Table 5-2: The Water Department SMP Types Maintained in the 2014 Reporting Year

SMP Type	SMP's Maintained by the Water Department
Stormwater Tree Trench	182
Stormwater Planter	29
Stormwater Bump-out	16
Rain Garden	39
Stormwater Basin	1
Stormwater Trees	86
Infiltration/Storage Trench	36
Pervious Pavement	11
Swale	1
Green Roof	1
Total Number of SMP's	402

Maintenance events associated with surface maintenance, aesthetic maintenance and subsurface maintenance are summarized in **Table 5-3**.

Table 5-3 Summary of Maintenance Events by Type in the 2014 Reporting Year

SMP Maintenance Type	Number of Events FY2014
Surface	473
Aesthetic	428
Subsurface	274

5.2 Maintenance of Private Facilities

To ensure ongoing SMP maintenance of private facilities through the Stormwater Management Regulations the Water Department continues to utilize two effective tools: executing Operation & Maintenance Agreements and conducting post-construction maintenance inspections.

An Operation & Maintenance Agreement is notarized and recorded to the property land deed prior to the issuance of a Post Construction Stormwater Management Plan Approval by the Water Department. These agreements outline the SMP(s) on the private site and stipulate maintenance requirements. The agreements also include language granting the Water Department the right to inspect on-site SMPs and even perform maintenance on behalf of the property owner if necessary. Opportunities to improve the agreement process were evaluated in the past year, and improvements were introduced in the 2014 reporting year that streamlines the execution process.

Post-construction maintenance inspections continued through the reporting period. The Water Department has applied techniques learned from the pilot effort towards post construction inspection protocols and guidance. The inspections conducted to date have identified the most effective methods and technologies, including closed-circuit television, surveys of critical system elevation points, confined space and wet weather inspections. The Department will continue to evaluate and refine these post-construction inspection protocols.

6.0 Data Collection and Analysis

Proposed methodologies for the *Green City, Clean Waters* monitoring program were outlined in both the draft Comprehensive Monitoring Plan (CMP) submitted December 1, 2012, and in a comment response sent to PADEP and the USEPA on July 31, 2013. A revised CMP was submitted on January 10, 2014 and approved on May 28, 2014 by PADEP. Status updates, including activities, programs, and projects related to the Water Department's implementation of the GSI Monitoring components of the CMP are included in Sections 6.1, below and **Appendix 4** GSI Monitoring Status Report. Other components of the CMP and the associated 2014 reporting year updates can be referenced in **Section F.2Step 1.b. page 95 of the Stormwater Management Program Annual Report.**

6.1 Green Stormwater Infrastructure Monitoring

Monitoring and testing green stormwater infrastructure is essential to evaluate its effectiveness in managing stormwater and reducing combined sewer overflows. The Water Department uses post-construction monitoring and post-construction testing at the SMP and system levels to evaluate the performance of stormwater management practices and to provide information for improvements to design and maintenance. Since November 2012, the Water Department has monitored 45 stormwater management systems. As requested by the PADEP and USEPA through the CMP comment/comment response negotiations, a Green Stormwater Infrastructure Monitoring Status Report is included in **Appendix 4**.

6.1.1 Green Stormwater Infrastructure Pilot Program

The Water Department has selected 128 sites to be included in the green stormwater infrastructure pilot program. Information on the selected sites and their associated variables can be found in the Green Stormwater Infrastructure Monitoring Status Report in **Appendix 4**.

USEPA Science to Achieve Results (STAR) Grant

In September 2012, USEPA solicited applications for proposals to conduct research on and demonstrate the performance and effectiveness of green stormwater infrastructure practices to address combined sewer overflows in the City of Philadelphia. Research agreements were signed with5 universities: Swarthmore College, Villanova University, Temple University, The University of Pennsylvania, and The University of New Hampshire. Since grants were awarded in January 2014, Water Department staff has worked closely with grant awardees to try to focus their efforts on tasks of high value to the Water Department, provide data and coordinate site selection for instrumentation of GSI systems and SMPs. It is expected that these monitoring partnerships will provide valuable data complementing monitoring results from the Water Department's own monitoring programs. The following is a brief summary of each university's research focus:

- **Swarthmore College:** Subsurface monitoring of the Water Department GSI sites; multi-objective, spatial optimization model for GSI placement
- **Villanova University:** Monitoring and analysis of the Water Department GSI to develop "next generation" GSI focused on infiltration, evaporation, and transpiration
- **Temple University:** Surface and subsurface monitoring of installations in and around the Temple campus
- **University of Pennsylvania:** Analysis of financial and economic factors affecting decisions in the private sector, and development of tools that may facilitate better stormwater management in the private sector
- **University of New Hampshire:** Possible assistance to neighborhood groups seeking to implement GSI; possible controlled experiments on GSI installations built to the Water Department specifications

6.2 Sanitary Sewer Evaluation Survey (SSES) Report

The Sanitary Sewer Evaluation Survey (SSES) Report was submitted to the PADEP on June 1, 2014. The report describes the results of analyses performed using the USEPA Sanitary Sewer Overflow Analysis and Planning Toolbox on flow metering data collected in the areas of the city served by separate sanitary sewers. The primary goal of the SSES is to address inflow and infiltration, in the separate sewer areas of the City, by quantifying and characterizing monitored wastewater flows. The results characterize the base wastewater flows, the groundwater infiltration, and the rainfall-derived infiltration and inflow conditions within these portions of the City.

6.2.1 Outlying Community Report

The Water Department began work on the Outlying Community Report. This report, part of the Sanitary Sewer Evaluation Survey, will document the results of dry and wet weather flow analyses performed using the USEPA Sanitary Sewer Overflow Analysis and Planning Toolbox on the metering data from outlying community connection points to Philadelphia's waste water collection system. The report will identify outlying community sanitary sewer connections with relatively high estimated groundwater and rainfall inflow and infiltration. The Outlying Community Report is on schedule for submittal by June 1, 2015.

6.3 Tidal Waters Water Quality Model for Bacteria and Dissolved Oxygen

The Water Department is developing hydrodynamic and water quality models for the tidal Schuylkill River and tidal Delaware River. In the case of the latter, the domain of the model spans 73 river miles from Trenton, NJ to Delaware City, DE to fully represent the extent within and beyond the influence of the City's CSO discharges. Data acquisition for the contemporary period is still underway with a major effort to collect current data using acoustic Doppler current profiler technology and a sediment oxygen demand monitoring program conducted by the

Woods Hole Group, the Academy of Natural Sciences, the University of Delaware, and Chesapeake Biogeochemical Associates.

Water quality data from other agencies, discharge monitoring records and data on other NPDES discharges continue to be compiled into a comprehensive database for model input and calibration. In addition, water quality surveys were conducted in the model domain measuring nutrient and biological oxygen demand parameters and nitrification rates at different locations to further calibrate the model. As of July 2014 developments on the Hydrodynamic and Water Quality model are on target for the June 1, 2015 COA deliverable date.

7.0 Public Outreach and Participation

The Water Department continues to strive to develop the best methods and preferred tools for engaging a broad range of stakeholders. In the 2014 reporting year, the Water Department engaged approximately 47,656 residents through a variety of public outreach and participation initiatives. The following includes updates on current programs and projects.

7.1 Green Stormwater Infrastructure (GSI) Notification & Outreach Process for Green Programs

Public outreach that helps increase public acceptance and support of green stormwater infrastructure should occur over the course of a project, from site identification to design and from construction to post- construction. The Water Department's multi-layer notification process will evolve as new areas are greened. Tasks vary depending on the land use where the GSI is located, but they may include outreach to property owners and site users; meetings with partners and presentations at community meetings and events; solicitation of design feedback (at times); coordination of public education and resources (i.e., environmental education curriculum in classroom or during after care at recreation center); event planning for ribbon-cuttings (for select sites); partnership development with users of the site, civics and other partners; coordination for adoption opportunities and more.

Over the past fiscal year, outreach for green stormwater infrastructure in Philadelphia's neighborhoods was conducted through various communication tools, such as notification letters and flyers to promote events, and community meetings. During this past fiscal year, approximately 730 representatives participated in community meetings related to green infrastructure projects at schools, parks, streets, and vacant lands in their neighborhoods.

Furthermore, approximately 7,330 program attendees participated in the following education and outreach events that featured *Green City, Clean Waters* content.

- Environmental education programming offered by PWD educators and contractors
- Environmental education programming offered by PP&R educators
- PWD ribbon cutting events and partner ribbon cutting events
- *Green City, Clean Waters* Information Sessions
- *Uncover the Green* Unveiling & Celebration
- Park(ing) Day
- Citizens Planning Institute presentation
- Earth Day events
- Eco-Camp Hackathon
- *ECA Sustainable Energy Conference*
- *Energy Awareness Fest*
- *Greenbuild*

- *Climate SmART Panel*
- Friends of Baltimore Sustainability Conference
- Sea Grant National Convention
- LID Conference

It should be noted that Rain Check, Rain Barrels, Soak It Up Adoption and Infill Soak It Up are reported on in Section 7.2 of this report and therefore the number of participants for these programs are not reflected above

7.2 Public Education and Outreach Programs

Green City, Clean Waters Partners Master List

The *Green City, Clean Waters* Partners Master List is a distribution list of email addresses that gets updated after collecting contact information at public events and meetings hosted by the Water Department. As of July, 2014, there are 2,581 active live entries on the list. This number reflects the number of individuals confirmed through the email management system as participants with accurate contact information and those specifically interested in receiving email updates and, e-newsletters, regarding *Green City, Clean Waters* and/or other Water Department special initiatives and events. The number is lower than last year as the Water Department has cleaned up its database and moved to opt-in registration.

Green City, Clean Waters Signage

The Water Department finalized the design of the *Green City, Clean Waters* permanent interpretive signage and identified targeted sites for the interpretive signage. The Water Department also developed *Green City, Clean Waters* pre-construction and construction temporary signage that has been used on construction sites and sites that are planned for construction throughout the city. Photos of signage may be accessed at https://www.flickr.com/photos/philadelphiawater/sets/72157644843295366/

Online Community Input Form

The Water Department continues to encourage the public to submit locations for consideration through the Community Input Form, an on-line tool that accepts community input on the identification of potential green stormwater infrastructure projects at schools, recreation centers, parks, public spaces, parking lots, vacant lots and on streets. The Water Department is also accepting neighborhood-wide submissions for potential green stormwater infrastructure opportunities. Submissions of input do not guarantee that a project will be selected for implementation, however, each submission is reviewed and submitters are notified of the results of the review of their project within a six week period. The community input form may be accessed at www.philllywatersheds.org/CIF.

Stormwater Art

The Water Department uses art as a communication and education tool. Sample projects that the Water Department has previously completed include yarn bombing (temporary knitted yarn art) of stormwater tree trenches; rain barrel wrap original designs created by local students; and a temporary public art community project with Stacy Levy that highlights water in our neighborhoods.

In the 2014 reporting year, the Water Department and the Mural Arts Program developed *Uncover the Green* - the City's 1st medallion and manhole cover design competition. *Uncover the Green* targeted undergraduate and graduate art students at local universities in Philadelphia. The goal was to raise public awareness of green stormwater infrastructure in the City while securing medallion designs and manhole cover designs to help the Water Department brand GSI on the City's sidewalks and streets. The competition required the submission of two designs, specifically: one design to celebrate green stormwater infrastructure for an inset medallion marker and an accompanying design that recognizes the City's waterways and the strength of the infrastructure beneath the City for a manhole cover that the Water Department hopes to place near GSI. *Uncover the Green* included bringing together two rounds of judges for the selection of the top eight designs and then the winning designs. A detailed brief was developed to guide the competition participants. A celebratory event where the winner was announced and the winning designs were unveiled was also held at the Fairmount Water Works. Forty-two submissions passed the brief guidelines and made it into the final pool of submissions. Approximately sixty-five attendees participated in the event. Photos of the *Uncover the Green* design competition may be accessed at https://www.flickr.com/photos/philadelphiawater/sets/72157644135458109/

During this reporting year, the Water Department also researched temporary art applications and started to develop designs for a temporary art stencil to be used at green stormwater infrastructure sites.

Infill: Soak It Up

The 18-month partnership between the Water Department, the Community Design Collaborative and the USEPA focused on accelerating the adoption, adaptation and implementation of green stormwater management in Philadelphia, a program that spanned two fiscal years. The program initiative involved a series of design centered programs where the culmination was a national green stormwater infrastructure design competition that awarded the three winning teams with cash prizes. In the 2014 reporting year, three more Infill: Soak It Up exhibition exhibits took place, with additional Infill: Soak It Up receptions, a GRID Alive event and conferences. As a result, 21,133 participants attended this final phase of Infill: Soak It Up.

Soak It Up Adoption

Soak It Up Adoption is a pilot program designed to support civic organizations interested in helping to monitor and care for Water Department green stormwater infrastructure in their neighborhoods. The program is funded by the Water Department and administered by the Pennsylvania Environmental Council in partnership with the Philadelphia Industrial Development Corporation. Civic associations and other interested non-profit community organizations can apply for small grants to become adoptees. Pilot phase grant recipients will be asked to participate in introductory training, monitor green stormwater infrastructure, collect trash and provide feedback about the site and their experience for one year. The Soak It Up adoption grant pilot program aims to go above and beyond the Water Department's routine maintenance program by engaging civic organizations in helping to ensure that their communities know about and care for green stormwater infrastructure, keeping the sites litter free and attractive. In Spring 2013, nine organizations were accepted to participate in the program. A total of approximately 60 civic representatives participated in the year-long program. Of those applicants, seven civic associations successfully completed the approval process and received grants. Photos from Soak It Up events may be accessed at https://www.flickr.com/photos/philadelphiawater/sets/72157633302940925/

Table 7-1: Provides metrics used by the Water Department to track the Soak It Up Adoption in the first year of the pilot program. These figures track the amount and variety of GSI that has been adopted as well as provide a measurement for the amount of trash collected.

Table 7-1: Soak It Up Adoption Pilot Program Metrics for the 2014 Reporting Year

Adoptee	Type of GSI Adopted	Amount of Residential Waste in pounds collected in FY'14
New Kensington CDC	3 Rain Gardens, 5 Stormwater Tree Trenches & 3 Stormwater Trees	202
East Falls Development Corporation	6 Stormwater Bumpouts	105
Frankford CDC	1 Rain Garden with Swale	737
JASTech Development Corp	1 Bumpout, 1 Swale w/Rain Garden & 1 Stormwater Tree Trench	156
NorthEast Treatment Center	6 Rain Gardens	152
Northern Liberties Neighbors Association	1 Infiltration Trench, 1 Stormwater Bumpout; 2 Stormwater Tree Trenches & 2 Stormwater Planters	232
Passyunk Square Civic Association	2 Stormwater Tree Trenches, 1 Rain Garden & 6 Stormwater Planters	0*
TOTAL	50 SMPs Adopted	1584

*Adoptee has outstanding reporting from FY'14

Philadelphia Watershed and Stormwater Tours

The Water Department and its partners offer tours several times a year to explore the natural history of a watershed to better understand the buried streams beneath us or to visit model green stormwater infrastructure projects throughout the City and beyond. By recognizing and showcasing green stormwater infrastructure projects, the Water Department hopes to inspire others to replicate similar stormwater management projects. An online green tour alternative is underway. Features, such as podcasts and interactive mapping tools are also being explored for the online tour. During the reporting period, the Water Department led thirteen Green Infrastructure tours catered to diverse audiences, including municipal managers, scientists, program directors, foresters, environment and sustainability institutes, and local schools. Approximately 229 tour attendees participated in stormwater tours over the past year.

Green City, Clean Waters Art Contest

The Partnership for the Delaware Estuary and the Water Department sponsored an art contest for Philadelphia public, private and home-schooled students, grades K-12. The theme was originally "Protect Philadelphia's Hidden Streams," but was changed to "*Green City, Clean Waters*." The contest initially was intended to help educate schoolchildren about stormwater runoff pollution, polluting Philadelphia's hidden, underground streams, the Schuylkill and

Delaware Rivers, and the Delaware Bay. The contest still strives to educate school children about stormwater runoff pollution, but also provides City residents with information on how to protect waterways and about the Water Department's new initiatives. Students are asked to create an original piece of artwork that shows how Philadelphians can help prevent stormwater runoff pollution. Alternatively, participants can create an original 30-second video showcasing what pet waste does to our water and how pet owners can help by picking up after their pets. Winning artwork is used to promote pollution prevention messages on SEPTA buses and in a calendar. Along with the drawings, the calendar contains monthly tips to help prevent water pollution. Winning videos are posted on the Partnership for the Delaware Estuary YouTube channel, and can be accessed at: http://www.youtube.com/user/DEESTUARY. The 2013 contest brochure was distributed to over 750 schools, libraries, teachers, and miscellaneous informal educators and educational institutions. Over 700 entries were received! New to this year 4 of the winning drawings were made into large street stickers that will be placed throughout the City of Philadelphia.

Urban Waters Curriculum & GreenSTEM Network

GSI features hold a unique potential for enhancing students' access to the natural world. To harness this potential, The Fairmount Water Works, the Water Department's watershed education center, worked closely with principals and class leaders to create an Urban Waters curriculum guide. The curriculum guidelines contextualize water and sustainability related concepts, throughout the school year before and after the construction of the GSI project. The Fairmount Water Works and the Water Department are continuing to work with schools by developing the greenSTEM network, which connects students to the environment by monitoring and mining data from gardens and various types of GSI. To continue this work, the Fairmount Water Works applied for a William Penn grant to offer teacher fellowships and continue to develop the Urban Waters curriculum.

7.3 Green Homes Initiatives

Green Homes Technical Evaluation and Improvement

The Water Department is piloting, monitoring and evaluating residential green tools and tracking technology improvements for these tools.

Downspout Planter Technology Improvements

The Water Department is working with Shift Design to improve on a prototype design of a pre-fabricated downspout planter. The goal is to create a downspout planter that is aesthetically appealing to homeowners and has a "do-it-yourself" assembly style. Several prototypes have been designed and fabricated and are currently undergoing testing at Water Department facilities and the homes of Rain Check participants. Improvements to the design this year will include easier assembly and installation, better drainage, increased soil depth for plants and more flexible materials.

Philadelphia Water Department Facility Residential Pilot Projects

Installation, inspection, maintenance, and evaluation of downspout planters and other pilot residential tools are conducted at Water Department facilities. This project also provides an opportunity to strengthen communication between Water Department employees.

Pilot stormwater tools are located at the following Water Department facilities:

- Belmont – Lumber downspout planters and Aqualock ground level bioswales
- Queen Lane –Shift Design prototype downspout planters
- Fox Street – Lumber downspout planters

Rebuilding Together Philadelphia Downspout Planters

The Water Department has worked with Rebuilding Together Philadelphia since 2010 to conduct "Block Builds" in underserved neighborhoods in the combined sewered section of Philadelphia. These Block Builds involve completing critical home repairs, adding energy efficient upgrades, and home modifications for multiple homeowners at a time – generally on a block scale. Exterior work, such as tree planting, sidewalk remediation and block cleanups, is also completed throughout the participating blocks to tie the residential projects together and to further galvanize the community to continue improvements. Rebuilding Together Philadelphia offers downspout planters and the installation of the planters free of charge during Block Builds.

During the 2014 reporting year, there were 29 downspout planters were built and installed through Block Builds by Rebuilding Together Philadelphia, including 13 in the Mantua neighborhood, 8 in Wynnfield, 5 in Frankford, 2 in Eastern North Philadelphia and 1 in South Kensington.

Rain Check Pilot Program

The Water Department improved and expanded Rain Check during the second year of the pilot program. Rain Check, which was established by the Water Department in June 2012, is a pilot program designed to incentivize homeowners to install landscape improvements that manage stormwater. The program has three broad objectives: first, to educate Philadelphia homeowners about the importance of stormwater management and the value of implementing the *Green City, Clean Waters* plan; second, to evaluate the use of incentives to motivate residential customers to manage stormwater on their properties; and third, to determine the feasibility of managing large amounts of stormwater runoff through residential green infrastructure.

Through Rain Check, the Water Department provides free stormwater property assessments and shares the cost of implementing one of four stormwater management tools on a participant's property. The four stormwater tools available during the 2014 reporting year were downspout planters, rain gardens, pavement removal, and permeable paving. The Water Department also provided job training for stormwater assessments and stormwater tool installations.

During this reporting year, the Water Department expanded the number of participants and the number of green stormwater installations. The Water Department will use ongoing tracking to evaluate the effectiveness of using these public outreach efforts to achieve Greened Acres and meet our COA commitments. **Table 7-2** provides metrics that the Water Department uses to track the progress of the Rain Check program.

Table 7-2: Rain Check Program Metrics for the 2013 and 2014 Reporting Years

	FY 13	FY 14
Total Sign Ups	245	541
Assessments Completed	232	322
Installations Completed	47	87
Downspout Planters	33	65
Rain Gardens	7	7
Permeable Paving	6	10
Depaving	1	4
Ended Participation	81	69
No tool wanted	21	23
No tool feasible	21	15
High installation cost	17	5
Other	22	26

Definition of Metrics

Total Sign-ups:

This represents the total number of people who signed up for the program. After signing up for the program, some people decided not to participate or didn't respond to our calls. This explains the difference between the total sign-ups and the number of properties assessed. In this past reporting year, the Water Department allowed participants to sign up on a rolling basis. Some people who signed up will be assessed in the 2015 reporting year.

Assessments Completed:

This is the number of properties for which the Water Department provided a free stormwater property assessment. The assessment process is valuable to the Water Department even if a participant doesn't install a stormwater tool. Through the assessment process, the Water Department identifies if any stormwater tools are feasible on a property and if so, what tools might work. The Water Department uses this as an opportunity to educate people about stormwater management and *Green City, Clean Waters*, and to gather data on the square footage of impervious area, the feasibility of managing water on the property and the conditions of the drains, gutters, risers, downspouts, etc.

Installations Completed:

The Water Department installed 87 stormwater tools by the conclusion of the reporting year. For some participants who signed up this year, the installation of their tools is still in progress. Downspout planters were by far the most popular tool for two reasons: a) they are physically feasible on most properties and b) they were less expensive than most other tools.

Participation Ended:

People stop participating in the Rain Check program for a variety of reasons. On some properties no tool was physically feasible. On other properties people weren't interested in installing the tools that were feasible. For others the cost was too high, or much higher than they originally expected. There were also several participants that became non-responsive following the property assessment and an installation could not be coordinated.

More information on the program can be found at the following site: http://www.phillywatersheds.org/raincheck.

Rain Barrel Program

The Water Department implemented a Rain Barrel program to educate the public about stormwater and its contributions to the occurrences of CSOs. Rain barrels create de-centralized storage which helps create more capacity in the sewer system and also gives the property owner access to this water for their own use such as plant watering and car washing. Since the start of this program, approximately 4,500 rain barrels have been distributed and installed throughout Philadelphia by the Water Department or the program partner, the Energy Coordinating Agency. Rain barrels are offered free of charge to residents who participate in Water Department-sponsored rain barrel workshops, where they have the opportunity to learn about the benefits of managing stormwater runoff and techniques for rain barrel usage. A total of twenty-three rain barrel workshops were held through-out the City. To ensure proper installation, the rain barrels are installed by the Energy Coordinating Agency or their partners. Over the past year, approximately 700rain barrels were distributed and installed throughout Philadelphia by the Energy Coordinating Agency on behalf of the Water Department. More information on the Water Department's Rain Barrel program and upcoming workshops can be found at the following website: http://www.phillywatersheds.org/rainbarrel.

Appendix 1

Completed Public Green Stormwater Infrastructure Projects

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Ogden St and Ramsey St (West Mill Creek Recreation Center)	1/1/2006	755	5	17345	0.208	Stormwater Tree Trench, Pervious Paving	Streets	Partner-project, no capital investment by the PWD	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, Philadelphia Department of Recreation	Schuylkill	☐
West Mill Creek Farm Swales	5/1/2006	360	4	13942	0.099	Rain Garden, Swale	Streets	$58,000	Pennsylvania Department of Environmental Protection, Philadelphia Water Department, Pennsylvania Horticulture Society	Schuylkill	☐
Mill Creek Playground Basketball Court	6/2/2006	1870	0	9350	0.515	Pervious Paving	Open Space	$414,000**	Councilwoman Blackwell, Pennsylvania Department of Environmental Protection, Philadelphia Department of Recreation	Schuylkill	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
47th & Grays Ferry	4/1/2007	1260	7	19200	0.347	Rain Garden	Vacant Land	$16,000	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, University City Green	Schuylkill	☐
Cliveden Park	10/1/2007	4378	0	52355	1.206	Rain Garden	Open Space	$175,000	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, Philadelphia Department of Recreation	TTF	☐
Clark Park Basketball Court	11/1/2007	3080	0	32517	0.848	Infiltration Storage Trench	Open Space	Cost not available	Pennsylvania Department of Environmental Protection, Pennsylvania Department of Conservation & Natural Resources, Philadelphia Department of Recreation	Schuylkill	☐
McMahon St (Waterview Recreation Center)	7/1/2008	2021	8	13368	0.56	Stormwater Tree Trench, Stormwater Planter, pervious Paving	Streets	$50,000	Pennsylvania Horticulture Society, Philadelphia Department of Recreation	TTF	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Liberty Lands	6/1/2009	849	24	8000	0.23	Rain Garden	Open Space	Partner-project, no capital investment by the PWD	Pennsylvania Horticulture Society, Pennsylvania Department of Environmental Protection, Northern Liberties Neighborhood Association	Delaware	☐
Sepviva St from Susquehanna Ave to Dauphin St	1/27/2010	962	0	27425	0.265	Infiltration Storage Trench, Other	Streets	$1,158,000**		Delaware	☐
Columbus Square	5/26/2010	730	0	7854	0.201	Stormwater Planter, Infiltration Storage Trench, Pervious Paving	Streets	$175,000	Department of Public Property, Department of Recreation, Friends of Columbus Square	Delaware	☐
Shissler Playground	10/10/2010	4190	9	17600	1.15	Stormwater Tree Trench	Open Space	$50,000	Department of Recreation, New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Lancaster Ave from N 58th St to N 63rd St	11/1/2010	11282	6	76689	3.11	Stormwater Tree Trench, Stormwater Bumpout, Swale	Streets	Partner-project, no capital investment by the PWD	Philadelphia Department of Commerce, Philadelphia Industrial Development Corporation, Environmental Protection Agency	Schuylkill	☐
7th St, 8th St, and Cumberland St (Hartranft School)	11/10/2010	2970	6	44524	0.82	Stormwater Tree Trench, Infiltration Storage Trench	Streets	$402,000	Pennsylvania Horticulture Society	Delaware	☒
Palmer St from Frankford Ave to Blair St (Shissler Playground)	11/10/2010	1203	5	9250	0.33	Stormwater Tree Trench	Streets		New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☒
16th St between Passyunk Ave and Jackson St	11/10/2010	439	8	14735	0.12	Stormwater Tree Trench	Streets			Schuylkill	☒
Rockland St	4/8/2011	5542	41	178850	1.527	Infiltration Storage Trench	Streets	$3,476,000**		TTF	☐
Bureau of Laboratory Services	5/14/2011	1290	6	13408	0.36	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench	Streets	$704,000		TTF	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Benjamin Franklin Parkway from 21st St to 23rd St	6/1/2011	3561	0	29605	0.98	Infiltration/ Storage Trench	Streets	Partner-project, no capital investment by the PWD	Fairmount Park Commission	Schuylkill	☐
Percy St from Catharine St to Christian St	7/18/2011	657	0	4740	0.181	Pervious Paving	Streets	$992,000		Delaware	☐
Belfield Ave from Chew Ave to Walnut Ln	9/23/2011	5573	24	68465	1.535	Stormwater Tree Trench	Streets	$313,000	Tookany/Tacony-Frankford Watershed Partnership	TTF	☒
Blair St (Shissler Playground)	11/4/2011	0	5	0	0	Other	Streets	$173,000	Department of Recreation, New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☒
Hewson St from Blair St to Trenton Ave (Shissler Playground)	11/4/2011	0	0	0	0	Other	Streets		Department of Recreation, New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Montgomery Ave, Shissler Playground	11/4/2011	1146	0	23739	0.32	Stormwater Tree Trench, Infiltration Storage Trench	Streets		Department of Recreation, New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☒
Reese St	11/5/2011	621	4	4829	0.17	Stormwater Tree Trench	Streets	Partner-project, no capital investment by the PWD	Pennsylvania Horticulture Society	Delaware	☐
Earl St (Hetzell Playground)	11/5/2011	627	4	6930	0.17	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☐
8th St	11/5/2011	896	4	9361	0.25	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☐
Front St	11/5/2011	868	6	9476	0.24	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☐
9th St	11/5/2011	845	4	9421	0.23	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☐
Diamond St	11/5/2011	1148	4	12538	0.32	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☐
Madison Memorial Park	12/16/2011	401	13	7015	0.11	Infiltration Storage Trench	Open Space	Partner-project, no capital investment by the PWD	City Play, Digsau, Northern Liberties Neighborhood Association	Delaware	☐
Eadom Parking Lot	5/2/2012	47455	20	85827	3.225	Rain Garden	Parking	All done in house by PWD Crews, No bid costs	Department of Public Property	Delaware	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Womrath Park	9/27/2012	3270	7	81380	0.9	Rain Garden, Infiltration Storage Trench, Swale	Open Space	$540,000	Tookany/Tacony-Frankford Watershed Partnership, Philadelphia Department of Parks & Recreation, Frankford Civic Association	TTF	☒
Herron Playground Basketball Court	10/2/2012	5927	0	14480	1.633	Infiltration Storage Trench, Pervious Paving	Open Space	$50,000	Philadelphia Capital Program Office, Philadelphia Department of Recreation	Delaware	☐
Baltimore Ave Island from S 60th St to Wharton St	11/23/2012	3044	4	22684	0.84	Stormwater Tree Trench	Streets	$952,000	Pennsylvania Environmental Council	Cobbs-Darby	☒
52nd St, 53rd St, Pine St, and Osage St (Samuel B. Huey Elementary School)	11/23/2012	4055	15	35044	1.12	Stormwater Tree Trench	Streets		Pennsylvania Environmental Council	Cobbs-Darby	☒
Christian St, Webster St, 56th St (Christy Recreation Center)	11/23/2012	50067	19	43093	1.4	Stormwater Tree Trench	Streets		Department of Recreation, Pennsylvania Environmental Council	Cobbs-Darby	☒
William Harrity School	11/23/2012	2776	11	19554	0.76	Stormwater Tree Trench	Streets			Cobbs-Darby	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
60th St, 61st St, Cedar Ave, and Hazel Ave (Bryant Elementary School)	11/23/2012	4675	16	39432	1.29	Stormwater Tree Trench	Streets		Pennsylvania Environmental Council	Cobbs-Darby	☒
Harper's Hollow Park	12/4/2012	3296	0	65027	0.91	Stormwater Basin	Open Space	$474,000		TTF	☒
Wakefield Park	12/4/2012	5192	55	68362	1.43	Rain Garden	Open Space			TTF	☒
21st St from Venango to Pacific	12/6/2012	1420	6	15237	0.385	Stormwater Tree Trench	Streets	Partner-project, no capital investment by the PWD		Delaware	☐
58th St, 59th St, and Walnut St (Sayre High School)	12/13/2012	6889	23	64720	1.9	Stormwater Tree Trench, Infiltration Storage Trench	Streets	$1,659,000	Pennsylvania Environmental Council	Cobbs-Darby	☒
Haverford Ave, 57th St and Vine St (Shepard Recreation Center)	12/13/2012	7994	27	64162	2.2	Stormwater Tree Trench, Stormwater Planter, Stormwater Bumpout	Streets		Pennsylvania Environmental Council	Cobbs-Darby	☒
Pine St, Frazier St, and 57th St (Andrew Hamilton School)	12/13/2012	3626	14	44332	1	Stormwater Tree Trench	Streets		Pennsylvania Environmental Council	Schuylkill	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
56th St, 57th St, Race St, and Vine St (Daroff School)	12/13/2012	8524	40	79396	2.35	Stormwater Tree Trench, Stormwater Planter, Stormwater Bumpout, Pervious Paving	Streets		Pennsylvania Environmental Council	Cobbs-Darby	☒
Belgrade St and Marlborough St	12/20/2012	1263	0	14700	0.348	Infiltration Storage Trench	Streets	$2,114,000**		Delaware	☐
Norris St, Van Pelt St, and Berks St (Frederick Douglass Elementary School)	12/24/2012	4442	34	32100	1.224	Stormwater Tree Trench	Streets			Delaware	☒
Philadelphia Military Academy	12/24/2012	2114	25	20275	0.582	Stormwater Tree Trench	Streets	$611,000		Delaware	☒
22nd St, Cecil B Moore Ave (Martin Luther King Recreation Center)	12/24/2012	6248	10	42040	1.721	Stormwater Tree Trench	Streets			Delaware	☒
Berks, Mascher (Towey Recreation Center)	12/24/2012	3722	8	20800	1.025	Stormwater Tree Trench	Streets		Fairmount Park Commission, Pennsylvania Horticulture Society	Delaware	☒
58th St Connector(Bartram's Garden, Francis Myers Rec, Cobbs Creek Park)	1/15/2013	4825	12	46000	1.329	Stormwater Tree Trench, Rain Garden	Streets	$200,000		Cobbs-Darby	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
4th St and Cambridge St (Bodine High School)	4/23/2013	2541	11	33496	0.7	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench	Streets	$408,000	City Play, Mural Arts Program, Northern Liberties Neighborhood Association	Delaware	☒
3rd St and Fairmount Ave Intersection	4/23/2013	1307	7	15630	0.36	Stormwater Tree Trench, Stormwater Bumpout	Streets		Northern Liberties Neighborhood Association	Delaware	☒
Welsh School	4/23/2013	2069	7	23419	0.57	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench	Streets	$818,000	Pennsylvania Horticulture Society	Delaware	☒
Wakisha Charter School	4/23/2013	2904	12	31812	0.8	Stormwater Tree Trench	Streets		Department of Recreation	Delaware	☒
Diamond St from 25th St to Stillman St	4/23/2013	944	4	9178	0.26	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☒
Poplar St from 8th St to Franklin St	4/23/2013	726	4	8242	0.2	Stormwater Tree Trench	Streets		Pennsylvania Horticulture Society	Delaware	☒
10th St and Jefferson St (Dendy Recreation Center)	4/23/2013	2250	7	24057	0.62	Stormwater Tree Trench	Streets		Department of Recreation	Delaware	☒
22nd, Carpenter, Montrose (Julian Abele Park)	5/16/2013	2458	9	22487	0.677	Stormwater Tree Trench	Streets	$1,336,000	Department of Public Property	Schuylkill	☒
Oakford, 30th (Donald Finnegan Playground)	5/16/2013	3352	24	29513	0.923	Stormwater Tree Trench	Streets			Schuylkill	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
24th St and Wolf St (Smith Playground)	5/16/2013	7476	19	55510	2.06	Stormwater Tree Trench	Streets			Schuylkill	☒
23rd St, 24th St, and Jackson (E.H. Vare Middle School)	5/16/2013	3952	20	32228	1.089	Stormwater Tree Trench	Streets			Schuylkill	☒
Stephen Girard School	5/16/2013	1377	6	9315	0.379	Stormwater Tree Trench	Streets			Schuylkill	☒
Southwark School	5/16/2013	1869	4	16658	0.515	Stormwater Tree Trench	Streets			Delaware	☒
Woolston Ave, Walnut Ln, Rodney St (Simons Recreation Center)	5/21/2013	6918	43	61647	1.906	Stormwater Tree Trench	Streets	$1,503,000	Department of Recreation	TTF	☒
Morris Leeds Middle School	5/21/2013	27191	83	229748	7.491	Stormwater Tree Trench	Streets			TTF	☒
Philadelphia Zoo	5/29/2013	6347	5	58573	1.748	Stormwater Planter, Rain Garden, Infiltration Storage Trench	Streets	$400,000	Philadelphia Department of Parks & Recreation, Philadelphia Zoo	Schuylkill	☐
33rd & Dauphin SEPTA Bus Stop Loop	7/31/2013	455	0	3750	0.13		Streets		Southeastern Transportation Authority	Schuylkill	☐
George W. Nebinger School	9/8/2013	6730	10	46815	1.854	Rain Garden, Infiltration Storage Trench, Pervious Paving, Swale	Schools	$280,000	Environmental Protection Agency	Delaware	☐

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Preston St, 41st St, Brown St, and Aspen St (Belmont School)	9/9/2013	4841	29	47758	1.334	Stormwater Tree Trench	Streets	$1,550,000		Schuylkill	☒
49th St, Parrish St, and Ogden St (James Rhoads School)	9/9/2013	2676	13	24384	0.737	Stormwater Tree Trench	Streets			Schuylkill	☒
Sister Clara Muhammad School	9/9/2013	2578	15	26407	0.71	Stormwater Tree Trench	Streets			Schuylkill	☒
47th St, 48th St, Wyalusing Ave (Muhammed Square)	9/9/2013	5132	39	57043	1.414	Stormwater Tree Trench	Streets			Schuylkill	☒
53rd St and Peach St (Mastery Charter School)	9/9/2013	2466	4	23751	0.679	Stormwater Tree Trench	Streets			Schuylkill	☒
Kenmore Rd, Haddington St, and Atwood Rd (Cassidy Elementary School)	9/9/2013	4381	9	42141	1.207	Stormwater Tree Trench	Streets			Cobbs-Darby	☒
62nd St and Lebanon (Overbrook Elementary)	9/9/2013	2446	3	26530	0.674	Stormwater Tree Trench	Streets			Schuylkill	☒
Old Cathedral Cemetary	9/9/2013	2144	12	25301	0.591	Stormwater Tree Trench	Streets			Schuylkill	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
12th St and Reed St (Columbus Square)	9/17/2013	2033	0	19690	0.56	Rain Garden	Streets	$878,000	Department of Recreation, Passyunk Square Civic Association	Delaware	☒
12th St from Dickinson St to Tasker St	9/17/2013	2432	5	24020	0.67	Stormwater Tree Trench, Stormwater Planter	Streets		Passyunk Square Civic Association	Delaware	☒
10th St from Wilder St to Reed St	9/17/2013	1089	5	9400	0.3	Stormwater Tree Trench	Streets		Department of Recreation, Passyunk Square Civic Association, South Philadelphia Older Adult Center	Delaware	☒
18th St, 19th St, Ellsworth St, and Washington Ave (Chew Playground)	9/17/2013	4719	13	41940	1.3	Stormwater Tree Trench, Stormwater Bumpout	Streets		Department of Recreation	Delaware	☒
Passyunk Ave from Dickinson St To Reed St	9/17/2013	1452	3	11980	0.4	Stormwater Planter, Infiltration Storage Trench	Streets		Department of Recreation, Passyunk Square Civic Association, South Philadelphia Older Adult Center	Delaware	☒
Thompson St and Columbia Ave	9/20/2013	3511	4	34905	0.967	Stormwater Tree Trench, Stormwater Bumpout	Streets	$581,000	New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
Trenton Ave and Norris St	9/20/2013	2647	3	30943	0.729	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench	Streets		New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware	☐
Bridesburg Recreation Center/ Bridesburg School	9/30/2013	6961	3	51638	1.918	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench	Streets	$1,786,000	Philadelphia Department of Parks & Recreation, Tacony Civic Association	Delaware	☒
White Hall Commons/Carmella Playground/ Gambrell Recreation Center/Warren G Harding School	9/30/2013	9744	76	88542	2.684	Stormwater Tree Trench	Streets		Tacony Civic Association	Delaware,TTF	☒
Hegerman St, Magee Ave, and Hellerman St (Dorsey Playground)	9/30/2013	3702	35	35604	1.02	Stormwater Tree Trench	Streets		Tacony Civic Association	Delaware	☒
Hellerman St, Cottage St, and Levick St (Roosevelt Playground)	9/30/2013	6084	42	55435	1.676	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench	Streets		Roosevelt Playground Park Advisory Council, Tacony Civic Association	Delaware	☒
Magnolia Cemetary	9/30/2013	1729	9	11861	0.476	Stormwater Tree Trench	Streets		Tacony Civic Association	Delaware	☒

Project Name	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (sq. ft)	Greened Acres (acre-inch)	SMP Type	Program	Construction Cost*	Partner (s)	Watershed	PENNVEST Project
18th St, 19th St, and Bigler St (Barry Playground)	10/14/2013	10208	14	110367	2.812	Stormwater Tree Trench	Streets	$945,000	Department of Recreation	Schuylkill	☒
13th St, Porter St, and Moyamensing Ave (A.S. Jenks School)	10/22/2013	2415	18	22520	0.665	Stormwater Tree Trench	Streets	$1,129,000	Lower Moyamensing Civic Association	Delaware	☒
4th St, 5th St, Federal St, and Washington Ave (Sacks Playground)	10/22/2013	5936	13	47775	1.635	Stormwater Tree Trench	Streets			Delaware	☒
Smith Elementary School	10/22/2013	2645	20	23700	0.729	Stormwater Tree Trench	Streets			Schuylkill	☒
St Thomas Aquinas School	10/22/2013	4307	19	42170	1.187	Stormwater Tree Trench	Streets			Schuylkill	☒
Franklin St from Diamond St to Norris St	10/24/2013	5959	22	62625	1.642	Stormwater Tree Trench	Streets	$1,911,000**		Delaware	☐
Blue Bell Inn Triangle Park	10/31/2013	2189	6	25911	0.603	Rain Garden	Open Space	$278,000	Fairmount Park Commission, Pennsylvania Horticulture Society	Cobbs-Darby	☒
William Dick Elementary	6/13/2014	6686	0	54714	1.842	Rain Garden	Schools	$207,000	Philadelphia School District, Philadelphia Department of Parks & Recreation, Trust for Public Land	Delaware	☒

*Projects are grouped for bidding purposes therefore project construction costs are based on groups of projects.
** GSI projects were added to water/sewer projects and there is no current mechanism to separate the total cost of the GSI component of the project.

Appendix 2

Public Planned Green Stormwater Infrastructure Projects

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Rockland St and Greene St	TTF	Streets	In Planning	Not Yet Known		TBD	2018	TBD
McCall, General George A.	Delaware	Schools	In Planning	Not Yet Known	School District of Philadelphia, McCall Home & School Association	TBD	2018	TBD
Burke Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
East Poplar Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Fishtown Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Wister Playground	TTF	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
Hissey Center	Delaware	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
8th and Diamond Playground	Delaware	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
McIlvain Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
McPherson Square	Delaware	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
Finley Playground	TTF	Open Space	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
6900 COBBS CREEK PKY	Darby-Cobbs	Vacant Land	In Planning	Not Yet Known	Pennsylvania Horticultural Society	TBD	2018	TBD
Stadium SMED	Delaware, Schuylkill	SMEDs	In Planning	Not Yet Known		TBD	2018	TBD
American Street SMED	Delaware	SMEDs	In Planning	Not Yet Known	Multiple city agency partners	TBD	2018	TBD
11th & Venango	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
61st & Pine St SEPTA Bus Loop	Darby-Cobbs	Facilities	In Planning	Not Yet Known	Mayor's Office of Transportation and Utilities	TBD	2018	TBD
61st & Pine St SEPTA Bus Loop Off-site DA	Darby-Cobbs	Facilities	In Planning	Not Yet Known	Mayor's Office of Transportation and Utilities	TBD	2018	TBD
Rising Sun Ave and Olney Ave SEPTA Bus Loop	TTF	Facilities	In Planning	Not Yet Known	Mayor's Office of Transportation and Utilities	TBD	2018	TBD
Mascher St from Thompson St to Master St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Ridge Avenue Focus Area	Delaware, Schuylkill	Streets	In Planning	Not Yet Known	Philadelphia City Planning Commission	TBD	2018	TBD
Lanier Playground	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
West Mill Creek Recreation Center	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Fotterall Square Streets	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Morris Park	Darby-Cobbs	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
East Park (3rd & Cecil B Moore Ave)	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Saratoga St on Oxford St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
13th St from Oxford to Jefferson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Dondill St on Jefferson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Oxford St from 12th St to Jefferson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
13th St from Jefferson St to Master St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Betsy Ross from Dondill St to Jefferson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Kings St from Master St to Lafayette St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Lafayette St from Kings St to Thompson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Thompson St from Patrick Henry St to 13th St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
13th St from Thompson St to Flora St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Curtis St on 12th St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Patrick Henry St on Thompson St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Moore St from 34th St to 35th St	Schuylkill	Streets	In Planning	Not Yet Known		TBD	2018	TBD
2ND ST btwn Jackson and Wolf	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
4TH ST btwn Jackson and Ritner	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Burke Streets - Jackson, Philip, 2nd, Jackson	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
FRONT ST from Jackson to Porter	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
SEPTA Temple University Station	Delaware	Facilities	In Planning	Not Yet Known		TBD	2018	TBD
SEPTA 33rd and Dickinson Bus Loop	Schuylkill	Facilities	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
SEPTA FTC Complex	Delaware	Facilities	In Planning	Not Yet Known		TBD	2018	TBD
SEPTA 63rd and Malvern Bus Loop	Schuylkill	Facilities	In Planning	Not Yet Known		TBD	2018	TBD
Thouron Ave and Cliveden St Alley	Delaware	Alley/ Driveway	In Planning	Not Yet Known		TBD	2018	TBD
Westmoreland, C, D, Ontario (Mckinley Playground)	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Chew Ave, Slocum St (Pleasant Playground)	TTF	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Carroll Park	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Vernon Park	TTF	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Fotterall Square	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
37th & Mt Vernon Playground	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Kingsessing Recreation Center		Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Francis Myers Recreation Center	Darby-Cobbs	Open Space	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Northern Liberties Recreation Center	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Bainbridge Green	Delaware	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
Hagert Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Reno at 5th St Alley	Delaware	Alley/ Driveway	In Planning	Not Yet Known		TBD	2018	TBD
7th St from Poplar St to Girard Ave	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Franklin St from Thompson St to Master St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Bureau of Laboratory Services Parking Lot	TTF	Parking	In Planning	Not Yet Known		TBD	2018	TBD
Adaire, Alexander	Delaware	Schools	In Planning	Not Yet Known	School District of Philadelphia, New Kensington Community Development Corporation	TBD	2018	TBD
Dunbar, Paul Laurence	Delaware	Schools	In Planning	Not Yet Known		TBD	2018	TBD
Meredith, William M.	Delaware	Schools	In Planning	Not Yet Known	School District of Philadelphia	TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Olney Elementary	TTF	Schools	In Planning	Not Yet Known		TBD	2018	TBD
Cruz Recreation Center	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Veterans Park	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Stokley Playground	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Tustin Playground	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Vandergrift Park	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Wharton Square Playground	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Dendy Recreation Center	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Duckrey Playground	Delaware	Open Space	In Planning	Not Yet Known	Philadelphia Parks and Recreation	TBD	2018	TBD
East Poplar Field	Delaware	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
SEPTA Germantown Garage	TTF	Facilities	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
SEPTA Southern Depot	Schuylkill	Facilities	In Planning	Not Yet Known		TBD	2018	TBD
SEPTA Berridge Shop	TTF	Facilities	In Planning	Not Yet Known		TBD	2018	TBD
Fairmount Park Gateway	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Point Breeze Ave Corridor	Schuylkill	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Roosevelt Mall Streetscape	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Catharine Thorn Park	Schuylkill	Open Space	In Planning	Not Yet Known		TBD	2018	TBD
Fairmount Ave from Franklin St to 7th St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Brown St from Franklin St to 7th St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Marshall St from Parrish St to Poplar St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Hoffman Pl from Brown St to Parrish St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
5th St from Myrtle St to Poplar St	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
8th St from Poplar St to Girard Ave	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
Darien St from Poplar St to Girard Ave	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
2nd street Headhouse	Delaware	Streets	In Planning	Not Yet Known		TBD	2018	TBD
8th & Berks Vacant Lot	Delaware	Vacant Land	In Planning	Not Yet Known		TBD	2018	TBD
John F Kennedy Blvd from 30th St to 32nd St	Schuylkill	Streets	In Design	Stormwater Tree Trench	Drexel University, University of Pennsylvania, University City District	TBD	2017	TBD
Tacony Creek Reaches 4/5	TTF	Open Space	In Design	Rain Garden	Tookany/Tacony-Frankford Watershed Partnership, Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Atlantic, Tioga (Kenderton Field Park)	Delaware	Streets	In Design	Stormwater Tree Trench	Fairmount Park Commission, Pennsylvania Horticulture Society	TBD	2017	TBD
Sedgley Ave, 22nd St (Cecil B Moore Recreation Center, Reyburn Park)	Delaware	Streets	In Design	Stormwater Tree Trench, Stormwater Bumpout	Fairmount Park Commission, Pennsylvania Horticulture Society	TBD	2017	TBD
16th St, Sydenham St, and Cumberland St (HM Stanton School)	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Germantown Ave SFR - Phase 6 - 3rd St, Germantown Ave, and Master St	Delaware	Streets	In Design	Infiltration Storage Trench		TBD	2017	TBD
Hunting Park from Old York Rd to Roosevelt Blvd	TTF	Streets	In Design	Rain Garden		TBD	2017	TBD
Ingersoll Commons Park	Delaware	Open Space	In Design	Rain Garden	Community Ventures, Department of Public Property, Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Drexel College of Media Arts & Design	Schuylkill	Streets	In Design	Stormwater Tree Trench	Drexel University	TBD	2017	TBD
29th & Cambria PWD Facility Employee Parking Lot	Delaware	Streets	In Design	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench		TBD	2017	TBD
Marshall St from Hunting Park Ave to Cayuga St	TTF	Streets	In Design	Infiltration Storage Trench, Pervious Paving		TBD	2017	TBD
Mole St from Fitzwater to Catharine St and Webster St from 16th to 17th	Delaware	Streets	In Design	Pervious Paving		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Windrim Ave from Wayne Ave to Germantown Ave	TTF	Streets	In Design	Stormwater Bumpout, Infiltration Storage Trench	Philadelphia Planning Commission, Southeastern Transportation Authority, Nicetown Community Development Corporation	TBD	2017	TBD
Taggert School	Delaware	Streets	In Design	Stormwater Tree Trench	Community Design Collaborative	TBD	2017	TBD
Wayne Ave and Abbottsford Ave	TTF	Streets	In Design	Infiltration Storage Trench		TBD	2017	TBD
Clearview and Washington	TTF	Vacant Land	In Design	Rain Garden, Stormwater Basin, Infiltration Storage Trench	Tookany/Tacony-Frankford Watershed Partnership	TBD	2017	TBD
Adams Ave from Ruan to Factory	TTF	Streets	In Design	Stormwater Tree Trench, Stormwater Bumpout, Infiltration Storage Trench		TBD	2017	TBD
Federal St, Wharton St, Columbus Square	Delaware	Streets	In Design	Stormwater Tree Trench, Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
40th and Baltimore	Schuylkill	Streets	In Design	Stormwater Tree Trench	Southeastern Transportation Authority, University City District	TBD	2017	TBD
Ruscomb, 17th, Ogontz (Logan School)	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Haverford Triangle	Schuylkill	Vacant Land	In Design	Rain Garden, Infiltration Storage Trench, Swale		TBD	2017	TBD
Sedgwick Station	TTF	Streets	In Design	Stormwater Bumpout, Infiltration Storage Trench	Southeastern Transportation Authority	TBD	2017	TBD
Woodcrest, Graham, Malvern, 59th (Beeber Middle School)	Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Ridgewood - 55th to 54th	Cobbs-Darby	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Marston St, Eyre St, and Taney St	Schuylkill	Streets	In Design	Pervious Paving		TBD	2017	TBD
20th, Limekiln, Ridley, and 65th (Kinsey School)	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
National Cemetery	TTF	Streets	In Design	Swale		TBD	2017	TBD
19th, Haines (Rowen William School)	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Wagner Louis Middle School	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Chelten Hills Cemetery	TTF	Streets	In Design	Stormwater Tree Trench, Stormwater Bumpout, Infiltration Storage Trench, Swale		TBD	2017	TBD
Ivy Hills Cemetery	Wissahickon	Streets	In Design	Swale		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Thouron Ave, Mohican St, Rugby St, W Washington Ln (Pennypacker School)	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Mercer, Indiana, Ann, Almond (Powers Park)	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Thompson, Elkhart, Edgemont, Indiana (Stokley Playground)	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Westmoreland and Tulip	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Wolf St (Sharswood School and Our Lady of Carmel School)	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
St. Monica Manor	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Frankford from Placid to Ellie	Pennypack	Streets	In Design	Stormwater Tree Trench, Rain Garden	Philadelphia Planning Commission	TBD	2017	TBD
St. Dominic School	Pennypack	Streets	In Design	Stormwater Tree Trench	Philadelphia Planning Commission	TBD	2017	TBD
Pine, Larchwood, 51st (Malcolm X Park)	Schuylkill	Streets	In Design	Stormwater Tree Trench	Philadelphia Planning Commission, Philadelphia Department of Parks & Recreation	TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Upland Way	Schuylkill	Streets	In Design	Stormwater Bumpout, Rain Garden, Infiltration Storage Trench, Swale	American Cities Foundation	TBD	2017	TBD
Guerin Recreation Center	Schuylkill	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Pervious Paving	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Harrowgate Park	Delaware	Open Space	In Design	Rain Garden	Southeastern Transportation Authority, Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Ferko Playground	TTF	Open Space	In Design	Stormwater Bumpout, Rain Garden, Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Old York Rd (Skevchenko Park)	TTF	Streets	In Design	Stormwater Bumpout, Infiltration Storage Trench	Department of Public Property	TBD	2017	TBD
Hunting Park	TTF	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench, Swale	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Cloud St from Church St to Waln St	TTF	Streets	In Design	Pervious Paving		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Kinsey from Tackawanna St to Torresdale St	TTF	Streets	In Design	Other		TBD	2017	TBD
Park Ave	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Cobbs Creek Park Reaches 6-8	Cobbs-Darby	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Swale	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Luzerne, Dungan, L, Lycoming (Francis Hopkinson Little School House)	TTF	Streets	In Design	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench		TBD	2017	TBD
Erie Shopping Center	TTF	Streets	In Design	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench		TBD	2017	TBD
Summerdale, Longshore, Tyson (J. Hampton Moore School)	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Galloway, Howard, & Hancock	Delaware	Streets	In Design	Stormwater Tree Trench, Pervious Paving		TBD	2017	TBD
Collazo Park	Delaware	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Pervious Paving	Philadelphia School District, Philadelphia Department of Parks & Recreation, Trust for Public Land	TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Black Coyle and McBride Playground	Delaware	Open Space	In Design	Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Moss Playground	Delaware	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench		TBD	2017	TBD
Smith Playground	Schuylkill	Open Space	In Design	Stormwater Tree Trench, Rain Garden	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Collins, Tulip, and Agate	Delaware	Streets	In Design	Stormwater Tree Trench, Other		TBD	2017	TBD
Warrington - 54th to 55th	Cobbs-Darby	Streets	In Design	Stormwater Bumpout		TBD	2017	TBD
59th, Vodges	Cobbs-Darby, Schuylkill	Streets	In Design	Stormwater Tree Trench, Pervious Paving		TBD	2017	TBD
Camac St, Iseminger St, Juniper St, McClellan St, Pierce St, Watkins St	Delaware	Streets	In Design	Pervious Paving		TBD	2017	TBD
9th St, Hoffman St, Mifflin St, Percy St, Pierce St	Delaware	Streets	In Design	Stormwater Tree Trench, Pervious Paving		TBD	2017	TBD
Hirst, Ludlow, Robinson	Cobbs-Darby	Streets	In Design	Stormwater Tree Trench, Pervious Paving		TBD	2017	TBD
52nd, 53rd, Gainor, and Diamond	Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Baker Playground	Schuylkill	Open Space	In Design	Rain Garden, Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Philadelphia Protestant House	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Har Nebo Cemetery - Algon and Oxford Intersection	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Pennway, Longshore, Algon, Knorr	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Rowland Ave - Ryan to Vista	Delaware	Streets	In Design	Infiltration Storage Trench		TBD	2017	TBD
Glenwood from Pacific to Castor	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Gaul, Weikel, Witte	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Mole, Bancroft	Schuylkill	Streets	In Design	Pervious Paving		TBD	2017	TBD
Cleveland, Gratz, Greene, Roberts	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Heston Lot	Schuylkill	Open Space	In Design	Rain Garden, Infiltration Storage Trench	Department of Public Property	TBD	2017	TBD
Fairmount, Corinthian, 20th, Ridge	Delaware, Schuylkill	Streets	In Design	Stormwater Tree Trench, Infiltration Storage Trench		TBD	2017	TBD
Ralph Brooks Park	Schuylkill	Open Space	In Design	Infiltration Storage Trench	Philadelphia Department of Parks & Recreation, Councilman Johnson, Urban Roots	TBD	2017	TBD
Carmella Playground	Delaware, TTF	Open Space	In Design	Rain Garden, Infiltration Storage Trench	Department of Recreation	TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Mariana Bracetti Academy Charter School	TTF	Streets	In Design	Stormwater Tree Trench, Stormwater Planter, Infiltration Storage Trench		TBD	2017	TBD
Carnell School - Langdon	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Stinger Square	Schuylkill	Open Space	In Design	Rain Garden, Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Crispin St - Ryan to Lansing	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Crispin St - Hartel to Rhawn	Pennypack	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Conestoga Community Playground	Schuylkill	Open Space	In Design	Rain Garden	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Palmer Cemetery	Delaware	Streets	In Design	Stormwater Tree Trench, Stormwater Planter		TBD	2017	TBD
Almond St - York to Boston	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Amber St, Lehigh Ave, Collins St	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Lehigh Ave - Martha to Trenton	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
St. Anne Rectory	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Thompson St and Huntingdon St	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Morris Estates	TTF	Open Space	In Design	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench	Philadelphia Department of Parks & Recreation	TBD	2017	TBD
Hackett School	Delaware	Schools	In Design	Stormwater Tree Trench, Infiltration Storage Trench	Philadelphia School District, Pennsylvania Horticulture Society	TBD	2017	TBD
McKinley School	Delaware	Schools	In Design	Stormwater Tree Trench, Rain Garden, Infiltration Storage Trench	Philadelphia School District	TBD	2017	TBD
Kelley, William D. : 1601-49 N 28TH ST	Schuylkill	Schools	In Design			TBD	2017	TBD
43rd St & 45th St	Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Brandywine St, Melon St, Synedum St	Delaware, Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Master / Wanamaker / Hobart	Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Leithgow / Cambridge	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Penn Treaty School - Moyer St	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Mansfield Ave	TTF	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
50th	Cobbs-Darby, Schuylkill	Streets	In Design			TBD	2017	TBD

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Bridge/Creston/Darrah/Penn	Delaware	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
Wissinoming Park	Delaware	Open Space	In Design	Rain Garden		TBD	2017	TBD
Carlisle / 15th	Delaware, Schuylkill	Streets	In Design	Stormwater Tree Trench		TBD	2017	TBD
JFK, 20th to 23rd Street	Schuylkill	Streets	In Design	Stormwater Tree Trench, Infiltration Storage Trench		TBD	2017	TBD
Grays Ferry Neighborhood Disconnection SMP	Schuylkill	Open Space	In Design	Infiltration Storage Trench		TBD	2017	TBD
Benjamin Franklin Pkwy from 16th St to 19th St	Schuylkill	Streets	Contract Management	Infiltration Storage Trench	Department of Public Property, Philadelphia Department of Parks & Recreation	3.23	2016	Not Yet Bid
Ontario St from A St to 6th St	Delaware	Streets	Contract Management	Stormwater Tree Trench		1.15	2016	Not Yet Bid
Hope St from Master to Jefferson	Delaware	Streets	Contract Management	Pervious Paving		0.21	2016	$1,497,000
Hope St from Berks to Norris	Delaware	Streets	Contract Management	Pervious Paving		0.24	2016	
Germantown Ave SFR - Phase 5	Delaware	Streets	Contract Management	Stormwater Tree Trench, Infiltration Storage Trench		0.45	2016	Not Yet Bid
Callowhill Stormwater Trees	Delaware	Streets	Contract Management	Other	Philadelphia Streets Department	0.09	2016	Not Yet Bid

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
56th from Greenway to Paschall	Schuylkill	Streets	Contract Management	Stormwater Tree Trench, Infiltration Storage Trench		0.54	2016	Not Yet Bid
Benson Park	Delaware	Open Space	Contract Management	Stormwater Planter, Infiltration Storage Trench, Pervious Paving	Department of Public Property	0.38	2016	Not Yet Bid
Ellsworth, 22nd, 20th, 18th	Delaware, Schuylkill	Streets	Contract Management	Stormwater Tree Trench		1.82	2016	Not Yet Bid
Moyamensing Ave and Morris St (Dickinson Square)	Delaware	Streets	In Construction	Stormwater Tree Trench, Stormwater Bumpout, Infiltration Storage Trench	Department of Recreation, Friends of Dickinson Park, Southeastern Transportation Authority	0.89	2015	$963,000
Jackson St, Tree St, 13th St (Epiphany of Our Lord School)	Delaware	Streets	In Construction	Infiltration Storage Trench	Lower Moyamensing Civic Association	0.14	2015	
8th St, Wolf St, and Mildred St (Francis Scott Key School)	Delaware	Streets	In Construction	Stormwater Tree Trench, Infiltration Storage Trench	Lower Moyamensing Civic Association	0.77	2015	
Duval St, Crittenden St, and Johnson St (Anna B. Day School)	TTF	Streets	In Construction	Stormwater Tree Trench	Tookany/Tacony-Frankford Watershed Partnership	2.51	2015	
Germantown Ave SFR - Phase 4 - Laurel to Wildey	Delaware	Streets	In Construction	Stormwater Tree Trench, Infiltration Storage Trench		0.81	2015	$19,371,000**

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Little Sisters of the Poor	Schuylkill	Streets	In Construction	Stormwater Tree Trench	Snyderville Community Development Corporation	2.44	2015	
57th St and Pentridge St (Longstreth School)	Cobbs-Darby	Streets	In Construction	Stormwater Tree Trench, Stormwater Planter	Snyderville Community Development Corporation	0.99	2015	
McCreesh Playground / Catharine Elementary School	Cobbs-Darby	Streets	In Construction	Stormwater Tree Trench	Snyderville Community Development Corporation	2.14	2015	$1,212,000
Springfield Ave and Cobbs Creek Island	Cobbs-Darby	Streets	In Construction	Rain Garden	Snyderville Community Development Corporation	0.94	2015	
William Gray Youth Center	Delaware	Streets	In Construction	Stormwater Tree Trench		0.93	2015	
Parking Lot - 12th St, Marvine St, and Diamond St	Delaware	Streets	In Construction	Stormwater Tree Trench		1.75	2015	
24th St and Diamond St (Dick Elementary School)	Delaware	Streets	In Construction	Stormwater Tree Trench		1.20	2015	$883,000
Alder St from Norris St to Diamond St	Delaware	Streets	In Construction	Stormwater Tree Trench	Philadelphia Housing Authority	0.42	2015	
27th St from Indiana to Toronto	Delaware	Streets	In Construction	Stormwater Tree Trench	Philadelphia Department of Parks & Recreation	0.29	2015	$631,000

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Chalmers (29th and Chalmers Playground)	Delaware	Streets	In Construction	Stormwater Tree Trench, Stormwater Bumpout	Philadelphia Department of Parks & Recreation	0.63	2015	
William Cramp School	Delaware	Streets	In Construction	Stormwater Tree Trench		0.98	2015	
Rosehill St (Barton School)	TTF	Streets	In Construction	Stormwater Tree Trench		1.21	2015	
Kemble Park	TTF	Open Space	In Construction	Stormwater Basin	Philadelphia Department of Parks & Recreation	10.24	2015	$2,248,000
Wister Woods Park	TTF	Open Space	In Construction	Stormwater Basin	Philadelphia Department of Parks & Recreation	9.66	2015	
Dauphin from Frankford to Tulip	Delaware	Streets	In Construction	Stormwater Tree Trench, Infiltration Storage Trench, Pervious Paving		1.25	2015	$1,776,000**
Panati Playground	Delaware	Open Space	In Construction	Rain Garden, Infiltration Storage Trench	Department of Public Property	1.72	2015	$204,000
73rd and Grays	Cobbs-Darby	Streets	In Construction	Stormwater Tree Trench		1.78	2015	$2,570,000
72nd, Buist, 71st, Dicks (Elmwood Park)	Schuylkill	Streets	In Construction	Stormwater Tree Trench, Rain Garden		3.83	2015	
Buist Ave, 70th, Elmwood, Holbrook (Patterson School)	Schuylkill	Streets	In Construction	Stormwater Tree Trench		1.12	2015	

Project Name	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre Estimate (acre-inches)	Completion Date Estimate	Estimated Construction Cost*
Elmwood, 64th, Grays, 65th (Connell Park)	Schuylkill	Streets	In Construction	Stormwater Tree Trench		1.79	2015	
Buist, 63rd, Chelwynde, 64th (Mother Mary of Peace School)	Schuylkill	Streets	In Construction	Stormwater Tree Trench		1.17	2015	
St. James Episcopal Church of Kingesessing	Cobbs-Darby	Streets	In Construction	Stormwater Tree Trench		3.08	2015	
Woodland Ave (Tiger III)	Schuylkill	Streets	In Construction	Stormwater Tree Trench	Philadelphia Streets Department	1.39	2015	$453,000
Bustleton Ave (Tiger III)	Delaware	Streets	In Construction	Stormwater Tree Trench	Philadelphia Streets Department	0.69	2015	$197,000

*Projects are grouped for bidding purposes therefore project construction costs are based on groups of projects.

** GSI projects were added to water/sewer projects and there is no current mechanism to separate the total cost of the GSI component of the project.

Appendix 3

Complete Private Development Green Stormwater Infrastructure Projects

Table 1: Complete Private Development Green Stormwater Infrastructure Projects

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2011-NICE-1729-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface detention, porous pavement	0.51
2011-NICE-1728-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface infiltration, porous pavement	0.31
2008-WOOD-864-01	Combined	Verified	Lower Schuylkill River	19104	Porous pavement	0.51
2011-DREX-1638-01	Combined	Verified	Lower Schuylkill River	19104	Green roof, bioretention, disconnected impervious area	0.74
2010-PHIL-1469-01	Combined	Verified	Delaware Direct	19148	Bioretention, bioinfiltration, subsurface detention pipe	4.63
2012-SPRU-1813-01	Combined	Verified	Delaware Direct	19107	Subsurface detention, green roof	0.10
2011-HAMI-1518-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration, green roof	1.64
2008-DREX-950-01	Combined	Verified	Lower Schuylkill River	19104	Green roof, subsurface detention	0.24
2006-FEDE-409-01	Combined	Verified	Delaware Direct	19106	Subsurface detention, green roof	0.24
2012-SENI-1900-01	Combined	Verified	Lower Schuylkill River	19145	subsurface detention, bioretention	0.42
2010-NORR-1475-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration, porous pavement	2.85
2010-UNIV-1312-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface detention, green roof	0.72
2007-CECI-561-01	Combined	Verified	Delaware Direct	19121	Subsurface detention, subsurface infiltration	0.78
2007-GERM-647-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface detention, bioinfiltration, green roof, bioretention, vegetated swale, cistern	0.82
2007-MCDO-558-01	Combined	Verified	Delaware Direct	19133	Subsurface detention	0.09
2008-FRAN-921-01	Combined	Verified	Lower Schuylkill River	19104	Porous pavement	1.17
2007-THEM-495-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface detention, surface detention	7.68

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2007-4839-625-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface detention	0.45
2008-FRAN-994-01	Combined	Verified	Delaware Direct	19130	Subsurface infiltration	1.11
2008-CAST-875-01	Combined	Verified	Delaware Direct	19149	Subsurface detention	0.27
2006-HUNT-445-01	Combined	Verified	Delaware Direct	19133	Subsurface infiltration, porous pavement	1.36
2006-TEMP-210-01	Combined	Verified	Delaware Direct	19122	Subsurface detention	1.04
2009-PRIN-1147-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface infiltration	0.47
2009-IATS-1023-01	Combined	Verified	Delaware Direct	19148	Subsurface detention, green roof	0.50
2007-WILL-699-01	Combined	Verified	Delaware Direct	19134	Subsurface detention	5.01
2007-SAIN-553-01	Combined	Verified	Lower Schuylkill River	19131	Porous Pavement	3.58
2006-SAFE-234-01	Combined	Verified	Delaware Direct	19134	Subsurface detention	0.61
2006-COMM-328-01	Combined	Verified	Cobbs Creek	19139	Subsurface detention, porous pavement	0.93
2007-HACE-731-01	Combined	Verified	Delaware Direct	19140	Subsurface infiltration	0.55
2006-0017-01	Combined	Verified	Lower Schuylkill River	19142	Subsurface infiltration, porous pavement	1.15
2009-GLOB-1016-01	Combined	Verified	Lower Schuylkill River	19131	Bioretention, subsurface infiltration	1.55
2006-PIZZ-242-01	Combined	Verified	Tacony-Frankford Creek	19138	Subsurface infiltration	0.16
2007-DREX-669-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface detention, porous pavement	0.81
2007-LASA-593-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface infiltration, porous pavement, tree credits	11.38
2008-PROP-824-01	Combined	Verified	Lower Schuylkill River	19139	Subsurface infiltration, porous pavement	3.53
2006-0110-01	Combined	Verified	Delaware Direct	19140	Subsurface infiltration, subsurface detention	0.68
2007-WARN-651-01	Combined	Verified	Delaware Direct	19133	Subsurface infiltration	1.29

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2009-LAWR-1044-01	Combined	Verified	Delaware Direct	19140	Subsurface infiltration, porous pavement	1.67
2006-94-01	Combined	Verified	Delaware Direct	19148	Subsurface detention	2.25
2006-NEWF-343-01	Combined	Verified	Pennypack Creek	19136	Subsurface infiltration	2.63
2007-GUIO-721-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface detention, porous pavement	2.17
2008-NEWK-958-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration, porous pavement, bioinfiltration, green roof, cistern	5.02
2006-PREF-176-01	Combined	Verified	Delaware Direct	19148	Subsurface detention	1.26
2006-UNIO-235-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration, porous pavement	1.24
2012-PROP-1883-01	Combined	Verified	Tacony-Frankford Creek	19138	Subsurface infiltration	1.07
2006-0063-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration	1.76
2012-RIVE-2027-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected impervious area, tree credit	3.66
2007-CECI-556-01	Combined	Verified	Delaware Direct	19121	Subsurface detention	1.08
2007-WARN-646-01	Combined	Verified	Delaware Direct	19133	Subsurface infiltration	2.04
2009-MANT-1033-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration	3.06
2009-PECO-1133-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface infiltration	2.86
2006-777L-326-01	Combined	Verified	Delaware Direct	19147	Subsurface infiltration, porous pavement	2.28
2006-SOLI-300-01	Combined	Verified	Delaware Direct	19149	Subsurface infiltration	1.99
2009-TEMP-1096-01	Combined	Verified	Delaware Direct	19122	Subsurface detention	1.24
2006-LAWT-291-01	Combined	Verified	Delaware Direct	19135	Subsurface detention	0.83
2006-WALN-251-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface detention, green roof, porous pavement	0.68
2006-PASQ-416-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface detention	0.52

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2008-CLAS-765-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration, porous pavement	0.30
2012-LINC-2012-01	Combined	Verified	Delaware Direct	19148	Bioretention, porous pavement	1.80
2009-PENN-1144-01	Combined	Verified	Lower Schuylkill River	19104	Porous pavement, green roof, subsurface detention	0.59
2011-CONV-1491-01	Combined	Verified	Lower Schuylkill River	19107	Subsurface detention, green roof, disconnected impervious area	0.26
2009-TDBA-1072-01	Combined	Verified	Delaware Direct	19149	Subsurface infiltration, bioinfiltration	1.04
2008-2116-992-01	Combined	Verified	Lower Schuylkill River	19103	Subsurface detention, green roof, bioinfiltration	0.45
2011-PENN-1664-01	Combined	Verified	Lower Schuylkill River	19104	Porous pavement	0.19
2007-PRAD-489-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration	1.45
2011-KARA-1505-01	Combined	Verified	Lower Schuylkill River	19139	Subsurface infiltration, porous pavement	3.82
2010-4109-1277-01	Combined	Verified	Lower Schuylkill River	19104	Green roof, porous pavement	0.28
2006-TEMP-197-01	Combined	Verified	Tacony-Frankford Creek	19138	Subsurface detention, porous pavement	0.23
2006-CCPO-276-01	Combined	Verified	Delaware Direct	19122	Surface infiltration/detention	4.58
2010-411W-1300-01	Combined	Verified	Delaware Direct	19122	Subsurface detention	0.15
2010-GEST-1346-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface detention, subsurface infiltration	1.19
2009-WOLC-1169-01	Combined	Verified	Tacony-Frankford Creek	19138	Subsurface detention, bioretention, disconnected impervious area	1.33
2011-NEWN-1620-01	Combined	Verified	Delaware Direct	19123	Subsurface infiltration, green roof, porous pavement	0.88
2009-PARK-1197-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected impervious area	0.23
2005-0099-01	Combined	Verified	Lower Schuylkill River	19131	Hybrid bioinfiltration/bioretention	37.40

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2011-CCTD-1535-01	Combined	Verified	Lower Schuylkill River	19139	Subsurface infiltration	0.93
2011-PROP-1483-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface infiltration, porous pavement	1.55
2010-UNIV-1385-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface detention, bioretention	1.34
2010-STJO-1239-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface infiltration, bioinfiltration, green roof	1.14
2010-AGIL-1461-01	Combined	Verified	Delaware Direct	19121	Subsurface infiltration	1.35
2011-DIAM-1617-01	Combined	Verified	Delaware Direct	19140	Subsurface detention, green roof	0.44
2011-4240-1543-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration	0.74
2011-DOLL-1636-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface infiltration	0.53
2011-PROP-1662-01	Combined	Verified	Lower Schuylkill River	19130	Subsurface infiltration, bioinfiltration	3.68
2011-BOTT-1646-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface detention, bioretention	2.91
2010-PNKW-1360-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface infiltration, porous pavement	2.26
2011-CHRI-1545-01	Combined	Verified	Delaware Direct	19147	Subsurface infiltration, green roof, porous pavement	0.81
2009-PRES-1037-01	Combined	Verified	Tacony-Frankford Creek	19150	Subsurface infiltration, porous pavement	1.80
2009-PENN-1019-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, subsurface detention, tree credits, direct discharge	3.94
2009-TEMP-1077-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration	0.56
2009-CONG-1210-01	Combined	Verified	Delaware Direct	19133	Subsurface infiltration, porous pavement	2.80
2008-SHER-926-01	Combined	Verified	Delaware Direct	19122	Green roof, porous pavement	0.29
2008-NORT-1012-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration, porous pavement	1.43

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2011-3343-1653-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface infiltration, porous pavement	0.70
2007-GAMB-701-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioinfiltration, porous pavement	1.55
2010-EARL-1460-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface infiltration, tree credits	0.40
2007-SIMO-496-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioinfiltration, porous pavement	0.52
2007-HERR-690-01	Combined	Verified	Delaware Direct	19147	Porous pavement	0.34
2010-8828-1321-01	Combined	Verified	Pennypack Creek	19136	Subsurface infiltration	1.06
2006-LE22-460-01	Combined	Verified	Delaware Direct	19123	Subsurface infiltration, porous pavement	0.68
2010-PSDC-1234-01	Combined	Verified	Delaware Direct	19147	Subsurface infiltration	0.79
2009-7149-1186-01	Combined	Verified	Delaware Direct	19135	Subsurface infiltration	0.37
2010-PHIL-1362-01	Combined	Verified	Delaware Direct	19148	Bioretention	2.17
2006-OVER-462-01	Combined	Verified	Lower Schuylkill River	19151	Subsurface infiltration	1.77
2010-PASC-1238-01	Combined	Verified	Cobbs Creek	19142	Subsurface infiltration, porous pavement	2.17
2010-ESPE-1288-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface infiltration, tree credits	0.86
2006-PROG-400-01	Combined	Verified	Delaware Direct	19122	Subsurface infiltration	3.65
2009-PASC-1226-01	Combined	Verified	Cobbs Creek	19142	Subsurface infiltration	2.59
2008-DREX-788-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface infiltration, bioinfiltration, porous pavement	1.83
2009-2007-1090-01	Combined	Verified	Delaware Direct	19148	Subsurface infiltration/detention	17.72
2010-BROA-1347-01	Combined	Verified	Tacony-Frankford Creek	19141	Subsurface infiltration	0.77
2009-NICE-1136-01	Combined	Verified	Tacony-Frankford Creek	19140	Bioretention, subsurface detention	0.41
2009-FRAN-1130-01	Combined	Verified	Delaware Direct	19137	Subsurface infiltration	2.77
2009-THEM-1167-01	Combined	Verified	Delaware Direct	19121	Green roof, porous pavement	0.40

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2010-ARCH-1393-01	Combined	Verified	Delaware Direct	19122	Green roof	0.20
2007-WASH-642-01	Combined	Verified	Delaware Direct	19146	Subsurface infiltration	0.99
2007-1615-544-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface infiltration	0.55
2009-WALM-1045-01	Combined	Verified	Delaware Direct	19148	Direct discharge	7.99
Total Greened Acres:						**237.11**

Table 2: SMIP & Retrofit Complete Green Stormwater Infrastructure Projects

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Type	Greened Acres
2010-COMM-1370-01	Combined	Verified	Delaware Direct	19140	Green roof	0.08
2011-2150-1616-01	Combined	Verified	Delaware Direct	19134	Subsurface infiltration	1.39
2011-RETR-001-01	Combined	Verified	Lower Schuylkill River	19142	Disconnected impervious area	0.51
2012-THEE-1746-01	Combined	Verified	Lower Schuylkill River	19139	Green roof	0.07
2012-NEWM-1776-01	Combined	Verified	Delaware Direct	19135	Cistern	1.01
2012-6225-1857-01	Combined	Verified	Delaware Direct	19135	Bioinfiltration	0.31
2012-ROOF-1869-01	Combined	Verified	Delaware Direct	19125	Disconnected impervious area	0.87
2013-CARD-2076-01	Combined	Verified	Delaware Direct	19124	Subsurface detention, Bioretention	53.66
2012-GSFS-2028-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioretention	0.39
Total Greened Acres:						**58.28**

Appendix 4

Green Stormwater Infrastructure Monitoring Status Report

GSI Monitoring Status Report

1.0 Introduction

During the reporting period of July 1, 2013 to June 30, 2014, the Water Department's *Green City, Clean Waters* program addressed stormwater runoff reductions in urbanized areas using a combination of traditional infrastructure and green stormwater infrastructure (GSI). GSI system vary in size, complexity, and the degree to which the system is connected to the existing drainage system, but in general the objective is to evapotranspire, infiltrate, reuse, or detain stormwater rather than to convey it directly to the sewer system. Monitoring and testing GSI systems is therefore essential to determine the effectiveness of various SMP types in managing stormwater and reducing combined sewer overflows.

The focus of the monitoring program during the proof of concept phase of the *Green City, Clean Waters* program is post-construction performance monitoring and testing using various methods (*e.g.*, continuous water level monitoring, simulated runoff tests, etc.). The primary goal of GSI monitoring and testing is to measure the performance of GSI systems for reducing stormwater runoff volume. Secondary goals include providing information for improvements to GSI design and maintenance and developing appropriate monitoring methods for the variety of GSI projects installed city-wide.

Project characteristics such as contributing drainage area, storage volume, inlet capture efficiency, and (when present) slow release discharge parameters can be observed, allowing for a more complete view of a system's functionality. The comprehensive understanding of GSI through monitoring and testing allows the Water Department to make informed decisions for current and future projects regarding the GSI design standards, type and frequency of maintenance activities, and program optimization.

From November 2012 to June 30, 2014, the Water Department performed monitoring and testing of GSI stormwater management practices (SMPs) using methods described in the Comprehensive Monitoring Plan (CMP) submitted January 10, 2014 and approved by PADEP May 28, 2014. In selecting monitoring locations, The Water Department has made an attempt to allocate monitoring effort roughly according to the types of SMPs that are being constructed for the *Green City Clean Waters* program as a whole (Table 1-1).

Table 1-1: Number of Monitored SMPs and Total Number of SMPs Constructed by SMP Type

SMP Type	Monitored SMPs	Total Constructed SMPs
Stormwater Tree Trench	29	149
Stormwater Planter	7	23
Stormwater Bump-out	2	15
Rain Garden	2	21
Stormwater Basin	0	3
Infiltration/Storage Trench	10	29
Pervious Paving	4	10
Swale	0	3
Stormwater Wetland	0	0
Other	0	19
Total	**53**	**272**

2.0 Data Tracking

During the reporting period, much consideration was given to how best to track the information gathered from GSI monitoring activities. A relational database was created using Microsoft Access to store data collected from the monitoring methods currently being implemented. Data is collected at the task level and can be used in data analysis via queries to determine deployment and site characteristics. This database is also linked to the GreenIT tracking system, and therefore contains the individual SMP information for monitored GSI projects.

3.0 Comprehensive Monitoring Plan Implementation Status

Proposed methods for performance monitoring were outlined in both the draft Comprehensive Monitoring Plan submitted December 1, 2012 and in a comment response sent to PADEP and the EPA on July 31, 2013. A revised CMP was submitted on January 10th, 2014 and approved by PADEP on May 28, 2014. The following sections summarize the status of implementation of monitoring activities described in the CMP through June 30, 2014.

3.1 Green Stormwater Infrastructure Performance Monitoring

Continuous water level and storage volume monitoring of GSI systems is the primary way that the Water Department is evaluating performance of constructed SMPs. To date, 63HOBO U20-001-04water level loggers (Onset Computer Corp, Bourne MA) have been deployed in 47GSI systems (Tables3-1 and 3-2, Figure 3-1). It should be noted that the number of water level sensors is greater than the number of systems because some systems have multiple SMPs and some SMPs have multiple observation wells. Additionally, 13 barometric pressure sensors were also deployed throughout the City to provide compensation for changes in barometric pressure. Each barometric sensor can provide data for multiple water level loggers. A one kilometer radius is the maximum distance used between a barometric sensor and water level loggers deployed in GSI system observation wells.

Table 3-1: Number of sensors and Average Deployment Duration for Continuous Water Level Monitoring Sensors

Sensor Type	Number Currently Deployed	Average Number of Days Deployed
Barometric Pressure Sensor	13	357
Water Level Sensor	63	419

To implement the continuous water level monitoring, several new pieces of equipment were acquired. One hundred and eleven new HOBO U20-001-04, and twenty five new HOBO U20L-04 Water Level Loggers were acquired. Deployment of equipment is in progress. In addition, a ruggedized field computer has been deployed with software and interface devices to perform data collection, preliminary viewing of data, and field analysis of data.

Table 3-2: SMP Attributes for Continuous Water Level Monitoring SMPs

SMP ID	SMP Type	Project Name	System Name
1-1-1	Infiltration/Storage Trench	7th St, 8th St, and Cumberland St (Hartranft School)	SWT-A2
1-2-1	Stormwater Tree Trench	7th St, 8th St, and Cumberland St (Hartranft School)	SWT-B2 & SWT-A3
1-3-1	Stormwater Tree Trench	7th St, 8th St, and Cumberland St (Hartranft School)	SWT-B3
3-1-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 1
3-2-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 2
3-3-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 3
3-4-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 4
3-5-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 5
3-6-1	Stormwater Tree Trench	Belfield Ave from Chew Ave to Walnut Ln	SWT 6
8-1-1	Stormwater Tree Trench	Montgomery Ave, Shissler Playground	SWT-B5
9-1-1	Stormwater Tree Trench	Palmer St from Frankford Ave to Blair St (Shissler Playground)	SWT-A4
9-2-1	Stormwater Tree Trench	Palmer St from Frankford Ave to Blair St (Shissler Playground)	SWT-B4
10-1-1	Stormwater Tree Trench	Thompson St and Columbia Ave	SWT-A3, SWT-A4
12-5-1	Stormwater Tree Trench	4th St and Cambridge St (Bodine High School)	S-5
12-1-3	Infiltration/Storage Trench	4th St and Cambridge St (Bodine High School)	S-1
14-1-1	Rain Garden	12th St and Reed St (Columbus Square)	Columbus Square

170-1-1	Stormwater Tree Trench	Shissler Playground	Blair St.- SWT-A2
170-2-1	Stormwater Tree Trench	Shissler Playground	Hewson St.- SWT-A4
180-1-1	Stormwater Tree Trench	Reese St	Reese St Tree Trench
18-1-1	Stormwater Tree Trench	16th St between Passyunk Ave and Jackson St	SWT-A,B,C,D,E-5
187-3-3	Infiltration/Storage Trench	Columbus Square	Infiltration Planter 3 & 4
20-1-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 1
20-2-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 2
20-3-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 3
20-4-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 4
20-5-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 5
20-6-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 6
20-7-1	Stormwater Planter	Bureau of Laboratory Services	Hunting Park Planter 7
20-8-1	Infiltration/Storage Trench	Bureau of Laboratory Services	Hunting Park Infil. Trench H1
211-1-1	Stormwater Bumpout	Haverford Ave, 57th St and Vine St (Shepard Recreation Center)	SWT2-1
231-2-1	Stormwater Tree Trench	56th St, 57th St, Race St, and Vine St (Daroff School)	SWT1-2
231-3-1	Stormwater Tree Trench	56th St, 57th St, Race St, and Vine St (Daroff School)	SWT1-3
240-1-1	Pervious Paving	Percy St from Catharine St to Christian St	Percy St
264-1-1	Stormwater Tree Trench	57th St and Pentridge St (Longstreth School)	S-2A & B
285-1-1	Stormwater Tree Trench	21st St from Venango to Pacific	Tree Trench
324-1-1	Stormwater Tree Trench	Earl St (Hetzell Playground)	Earl Street Tree Trench
325-1-1	Stormwater Tree Trench	8th St	8th Street
326-1-1	Stormwater Tree Trench	Front St	Front St
327-1-1	Stormwater Tree Trench	9th St	9th Street Tree Trench
366-10-3	Infiltration/Storage Trench	Philadelphia Zoo	P-A8/P-B8/P-C8/SWT-D8/SWT-E8
366-2-2	Infiltration/Storage Trench	Philadelphia Zoo	RG-B2/SWT-A2
366-9-1	Infiltration/Storage Trench	Philadelphia Zoo	SWT-A7
403-1-3	Infiltration/Storage Trench	George W. Nebinger School	Rain Garden
403-1-4	Rain Garden	George W. Nebinger School	Rain Garden
403-2-1	Infiltration/Storage Trench	George W. Nebinger School	Underground Stormwater Basin
88-1-1	Infiltration/Storage Trench	Trenton Ave and Norris St	SWT-A2, SWT-B2, RG-D2
91-1-1	Stormwater Tree Trench	3rd St and Fairmount Ave Intersection	S-7, S-8, S-9

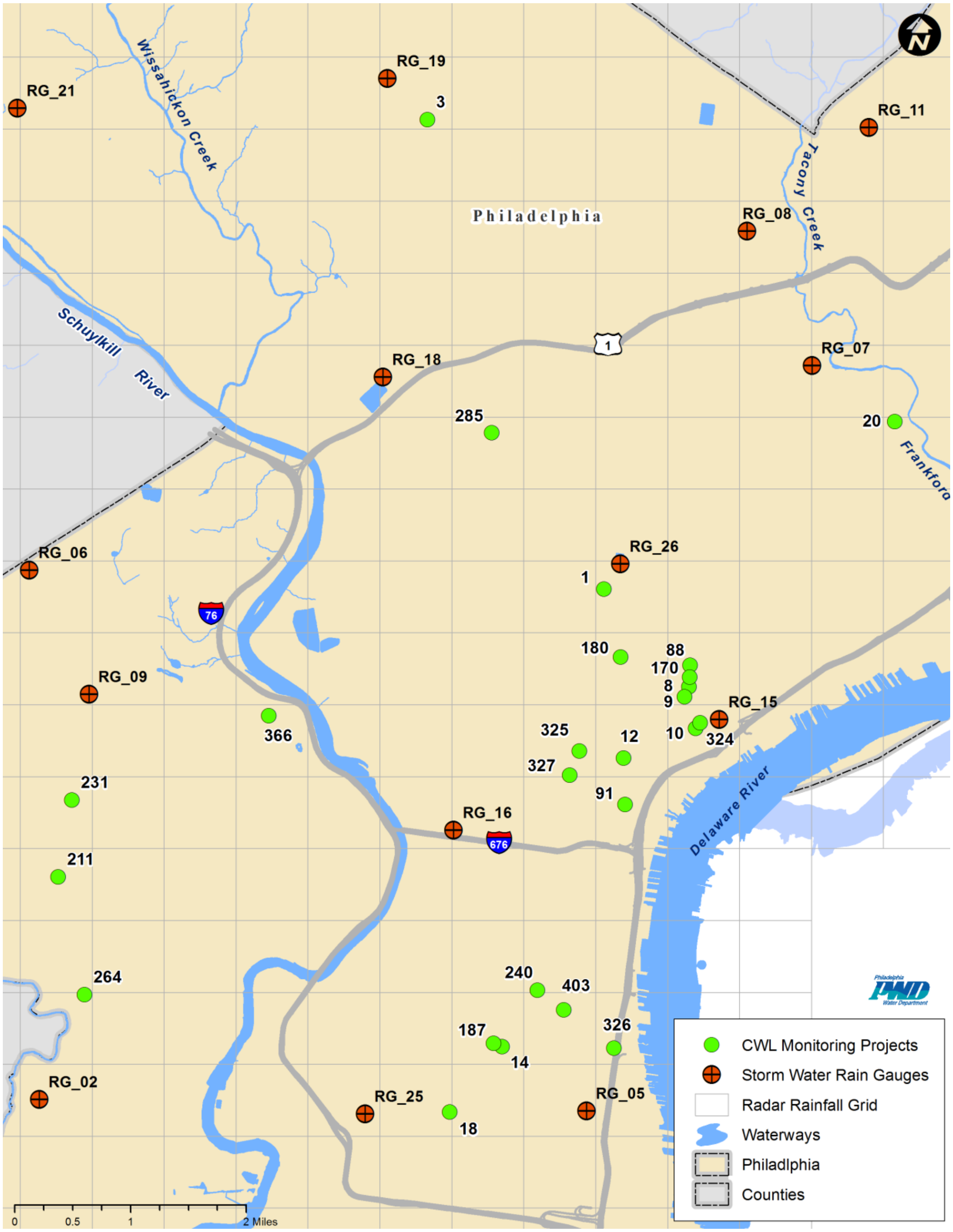


Figure 3-1: Continuous Water Level Monitoring Project Locations, Storm Water Rain Gauges and Radar Rainfall Grid

3.2 Green Stormwater Infrastructure Performance Testing

The Water Department acquired a W-1250 Sensus Water Meter Tester for measuring flow applied to an SMP during Simulated Runoff Tests (SRT). This water meter is capable of estimating flows from 0.04 CFM to 167 CFM. Simulated Runoff Tests have been performed for six GSI systems through June 30, 2014. Monitoring locations are shown in **Table 3-3** and **Figure 3-2**.

Table 3-3: SMP Attributes for SMPs tested with Simulated Runoff Test (SRT)

SMP ID	SMP Type	Project Name	System Name	Test Date
180-1-1	Stormwater Tree Trench	Reese St.	Reese St. Tree Trench	5/30/2013
3-2-1	Stormwater Tree Trench	Belfield Ave. from Chew Ave. to Walnut Ln.	SWT-2	6/21/2013
3-1-1	Stormwater Tree Trench	Belfield Ave. from Chew Ave. to Walnut Ln.	SWT-1	6/24/2013
211-1-1	Stormwater Bumpout	Haverford Ave, 57th. St. and Vine St. (Shepard Recreation Center)	SWT2-1	9/24/2013
170-2-1	Stormwater Tree Trench	Shissler Playground	Hewson St.- SWT-A4	11/21/2013
170-1-1	Stormwater Tree Trench	Shissler Playground	Blair St.- SWT-A2	6/20/2014

3.3 Permeable Pavement Surface Infiltration Rate Testing

The Water Department uses ASTM Standards (ASTM Committee D18, ASTM C1701/C1701M-09 Standard Test method for Infiltration Rate of In Place Pervious Concrete, 2009) (ASTM Committee C15, 2013), with minor modifications for pervious paving infiltration testing. Development of these procedures was completed in FY 2013 and refinement of the methods is ongoing. Two 12" diameter sections of Schedule 60 PVC pipe are used as infiltration rings to allow for performing multiple tests simultaneously. Modifications were made to the test calculations in order to compensate for the different infiltration ring diameter compared to the ring diameter specified in the method. To date, four SMPs have been selected for surface infiltration rate testing. Monitoring locations are shown in **Table 3-4** and **Figure 3-2**.Twenty nine different surface infiltration rate tests of porous surfaces have been performed.

Table 3-4: Permeable Pavement SMPs Selected for Surface Infiltration Rate Testing

SMP ID	Project Name	Surface Type (trade name)	Number of Test Locations	Number of Tests Performed
192-2-1	Herron Playground Basketball Court	Porous Asphalt	6	9
207-1-3	McMahon St (Waterview Recreation Center)	Pervious Concrete	3	6
240-1-1	Percy St from Catharine St to Christian St	Porous Asphalt	1	12
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Porous Asphalt	4	1
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Pervious Concrete	4	1
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Stamped Pervious Concrete	3	1
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Permeable Interlocking Paver (Aqua-Bric)	3	1
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Modular Porous Concrete (Stormcrete)	3	1
445-1-1	Southwest Water Pollution Control Plant Parking Lot	Articulating Concrete Block Mat (Pave Drain)	3	1

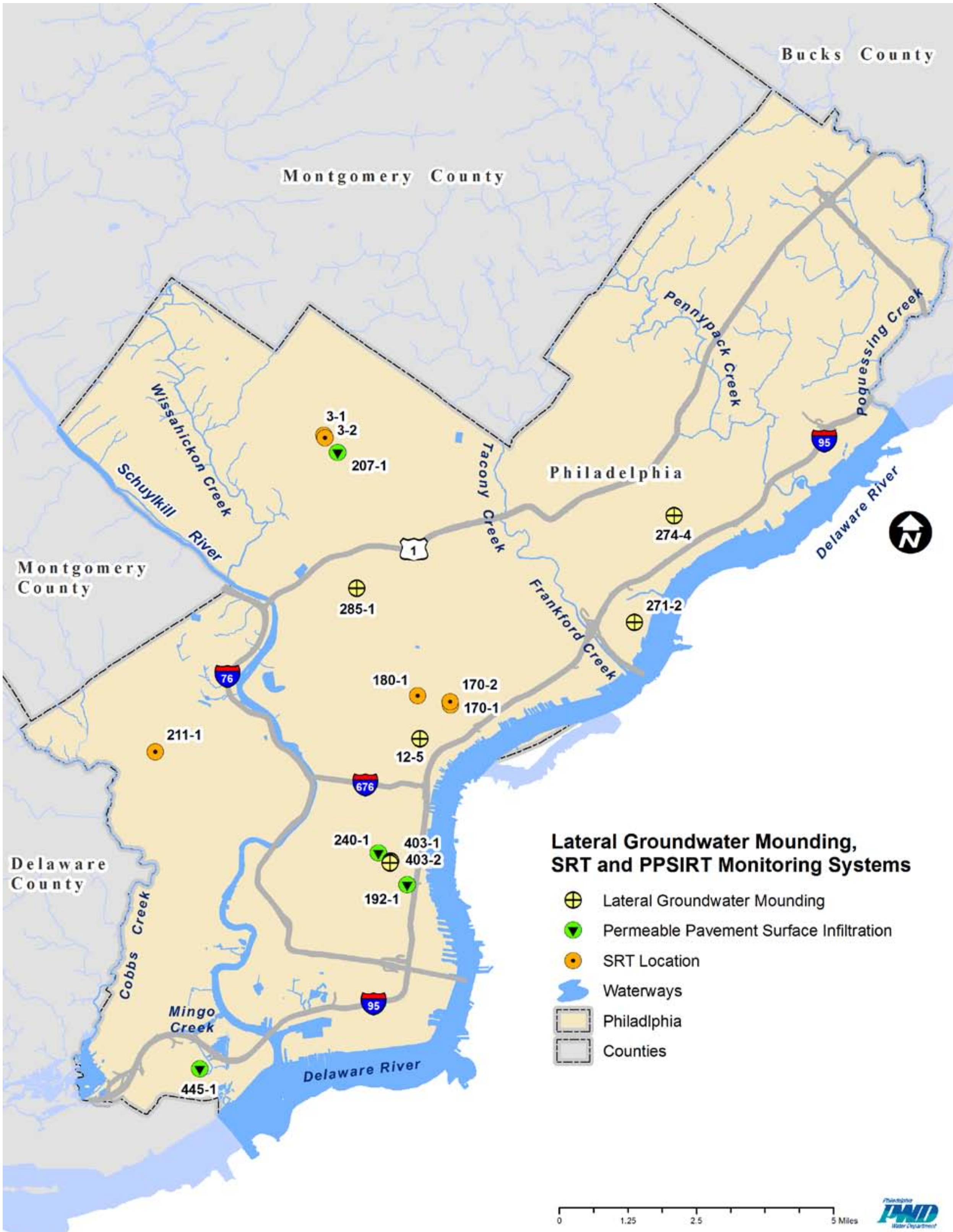


Figure 3-2: Lateral Groundwater Mounding Monitoring, Simulated Runoff Testing and Surface Infiltration Testing Locations

3.4 Soil Surface Infiltration Rate Testing

The Water Department currently has one double ring infiltrometer and five single ring infiltrometers that are used in the implementation of the Soil Surface Infiltration Rate Testing. Refinements to the Soil Surface Infiltration Rate Testing protocol are ongoing. ASTM Standards (ASTM Committee D18, ASTM D3385-09 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer, 2009) and (ASTM Committee D18, ASTM D-5093-02, Standard Test Method for Field Measurement of Infiltration Rate Using Double-Ring Infiltrometer with Sealed-Inner Ring, 2008) are currently under review as elements of Soil Surface Infiltration Rate Testing Standard Operating Procedures. The construction of several Modified Philip-Dunne permeameters is currently underway using methods developed at The University of Minnesota (Gulliver & Anderson, 2007).

3.5 Lateral Groundwater Mounding

In June of 2014, The Water Department installed 16 groundwater monitoring wells in close proximity to six SMPs and four groundwater monitoring wells away from SMPs to act as control wells. Thirty six HOBO U20L-01 Water Level Data Loggers were acquired for deployment to new groundwater lateral mounding study sites. Additional sites have been identified and groundwater well establishment is ongoing for these sites. Monitoring locations are shown in **Table 3-5** and **Figure 3-2**.As the lateral groundwater mounding wells were installed in June 2014, no results are yet available. A more substantive update will be provided in the 2015 Annual Report.

Table 3-5: SMP Attributes for SMPs Selected for Lateral Groundwater Mounding Monitoring

SMP ID	SMP Type	Project Name	System Name	Number of wells
12-5-1	Stormwater Tree Trench	Bodine High School	S-5	3
271-2-1	Rain Garden	Bridesburg Recreation Center	RG-1	3
274-4-2	Stormwater Planter	Roosevelt Playground	SP-13	3
285-1-1	Stormwater Tree Trench	21st and Venango Streets	Tree Trench	1
403-2-1	Infiltration/Storage Trench	George W. Nebinger School	SWT-2	3
403-1-3	Infiltration/Storage Trench	George W. Nebinger School	SWT-1	3

3.6 Sewer System Monitoring

The Water Department continues to perform sewer system monitoring per the methods outlined in the CMP. More information is available in **Appendix A Flow Monitoring**

3.7 Meteorological Monitoring

The Water Department continues to perform meteorological monitoring, including operation and maintenance of a rain gauge network, as described in the CMP. More information is available in **Appendix A Flow Monitoring**

3.8 Groundwater Level Monitoring

The Water Department is monitoring groundwater levels in the Philadelphia region in partnership with the U.S. Geological Survey. As of June 2014, 19 wells have been established from which water level measurements are made on a monthly basis. Results of groundwater monitoring are presented in **Appendix J PWD-USGS Cooperative Groundwater Monitoring Program**. Well PH1043, located in the Germantown section of the City, is equipped with continuous water level recording and telemetry equipment making the data available in near-real time. In addition to the 19 established sites, The Water Department is investigating sources and the means to install more groundwater monitoring wells through internal mechanisms and through external contracts. Nine potential sites have been identified and are being investigated for establishment of new groundwater wells. The three control wells installed as part of the lateral groundwater study (described in section 6.5, above) will also be added to the groundwater monitoring network and will be included in the 2015Annual Report.

4.0 Initial CMP Implementation Successes and Challenges Encountered

The GSI monitoring program has been successful in acquiring the needed equipment, deploying water level sensors to GSI systems, and performing a limited number of simulated runoff and permeable pavement infiltration tests. The GSI Monitoring team has also been successful in providing monitoring assistance to the GSI Implementation and Design groups to collect data from systems where problems have been observed to help interpret cause(s) and verify remediation measures. Some of the problems investigated include perched/ponded water in SMPs (and SMP components) that are designed to drain; rapid recession of stormwater from systems designed for slow release; and localized clogging of porous asphalt. Monitoring staff are beginning to understand the relative merits of continuous water level monitoring and simulated runoff testing for these types of investigations.

One challenge faced during this initial period of establishing the monitoring network is that rainfall is not always uniformly distributed over the contributing drainage area in each storm event. Additionally, green inlets and other stormwater inflow points to SMPs may be temporarily clogged with leaves and trash debris reducing the inlet efficiency. Systems with “highway grate” style inlets appear to be more susceptible to bypass if the grate is offset from the curb and pavement on the curb side is not graded toward the inlet. In many cases, a simulated runoff test can provide valuable information for interpreting continuous water level data. The Water Department has also begun to work with the EPA STAR grant awardees to instrument a number of GSI systems with more sophisticated instruments capable of measuring flows in and out of GSI systems.

In some cases it has been difficult to reconcile elevations of water level observed in observation wells with dimensions from design plans or as-built drawings. Some of the problems encountered are due to the construction of observation wells themselves. Ideally observation wells are sumped below the depth of storage and sealed with a solid cap. Water level data are easier to interpret when there exists a constant baseline water level reading between storm events and a clear transition from the water level in the sumped portion of the well to the base of system storage on the ascending limb of each storm hydrograph. Toward this end, GSI monitoring staff have made comments on individual as-built submittals and worked with GSI implementation and PWD design staff on revising the standard detail for observation wells as well as providing comments on the as-built submission process as a whole.

Another challenge encountered is establishing a network of groundwater wells for monitoring ambient groundwater elevations. Given that a USGS study conducted in the 1980s to revise the groundwater table map of Philadelphia (Paulachok and Wood, 1984) contained several hundred observation points, The Water Department had expected to be able to identify numerous potential existing well locations within the City to investigate for gaining site access and establishing groundwater monitoring wells. Despite an extensive search by USGS and The Water Department and consultation with numerous City agencies and institutions, very few suitable existing wells could be found. The Water Department is still in the process of soliciting qualified bidders to perform the type of narrow-bore drilling and piezometer well installation best suited to ambient groundwater and lateral groundwater mounding monitoring.

5.0 Pilot Projects Selection Criteria

Initial site selection for the GSI pilot program was based largely upon the types of SMPs that were available and the feasibility of site monitoring at a project location given the limited amount of constructed GSI projects at the time. To test the feasibility and measure the effectiveness of GSI under the full range of potential conditions during this early stage of GSI implementation, a pilot program was designed to ensure that a wide range of materials and implementation conditions were represented in sites selected for the monitoring program. Through the creation of the pilot program, additional sites have been selected for either current or future monitoring efforts based upon an extensive list of project characteristics and site variables. Constructed sites currently are undergoing evaluation for monitoring feasibility and are subject to change/be replaced by another site if it is determined that monitoring activities are not practical at the selected site. Pilot Program sites and their variables are documented in the following section.

6.0 Pilot Projects List

This section includes the entire list of selected pilot projects as of August 29, 2014. The information for each project includes the project name, construction status, types of GSI systems, and applied pilot program variables.

Pilot program variables are organized by groups and sub-groups. The structure of the pilot program variables list is as follows:

Green Cell – Bold Letters	Pilot variable primary group
Grey Cell – Bold Letters	Pilot variable sub-group
No shading, indented, standard font letters	Pilot variable within sub-group
No shading, no indent, bold letters	Pilot variable within primary group, but not within any sub-group

The entire list of pilot program variables, with the number of currently identified projects for each variable, is shown in **Table 5-1**. The list of pilot projects and identified pilot variables is not static, and can change over time as new information becomes available.

Table 5-1: List of pilot program variables, with number of identified pilot projects and definitions.

Pilot Locations	
School yards/ schools	GSI is implemented in a school yard or school playground. PWD collaborates with the school for GSI implementation.
Recreation Centers	GSI is implemented on a recreation center site.
"Open Space" park sites	
Mowable	A surface system in an open space park site that is not planted with shrubs and herbaceous species, but rather with mowable grass.
Non-mowable	A surface system in an open space park site that is planted with herbaceous species, shrubs, and occasionally trees.
Surface	A system in an open space park site that manages stormwater on the surface before infiltrating.
Subsurface	A subsurface system within an open space park site. There is no surface storage.
Traffic Triangles	GSI is implemented in the triangular space between the intersection of three streets.
Residential Street	GSI is located on a residential street with stormwater laterals
Gateways	GSI is located in a highly visible area that is a frequently used route into a particular neighborhood.
Alleys	
Public	A narrow residential street, wide enough for one car.
Private	Alleys between homes to access parking behind houses, or alleys between homes with no vehicle access.
With Rooftop Disconnect	GSI is implemented in an alley, and external downspouts are disconnected from the sewer and routed to the GSI system to manage roof runoff.
Without Rooftop Disconnect	GSI is implemented in an alley with no external downspout disconnection.
Centralized Facility	A large GSI system that captures runoff from several streets or properties to manage a large drainage area.
Stormwater + Art Site	Stormwater-relevant art is incorporated with GSI implementation. This can include outreach with local artists or art groups to increase

	aesthetics and awareness of GSI.
Athletic Fields	GSI is installed within an athletic field.
Medians	GSI is implemented in the median of a wide roadway to capture runoff from both sides of the street.
Commercial Corridors	GSI is implemented in the public right of way in an area with high commercial activity, such as shops, restaurants, and other businesses.
Bridge Runoff	Runoff from a bridge is routed to a GSI system.
Streets	
Bumpouts	GSI includes a bumpout system in the public right of way that manages street and sidewalk runoff.
Crosswalks	GSI is located at a crosswalk to managed impervious area from the upstream street.
Tree Trenches	GSI includes a tree trench in the public right of way that manages street and sidewalk runoff.
Planters	GSI includes a stormwater planter in the public right of way that manages street and sidewalk runoff.
Permeable	Permeable pavement is implemented in a street to manage runoff.
Rain Garden	GSI includes a rain garden in the public right of way that manages street and sidewalk runoff.
Infiltration/Storage Trench	GSI includes an infiltration/storage trench without tree pits in the public right of way that manages street and sidewalk runoff.
Sidewalk Swale	GSI includes a swale in the sidewalk that manages street and sidewalk runoff.
Various Ownership Types	
Public Right-of-way	GSI is implemented in the public right of way, managing street and sidewalk runoff.
Public Parcels	GSI is implemented in a public parcel, such as a park, government building, school, etc.
Private	GSI is implemented on private property with assistance from PWD.
Parking Lots	
Surface Systems	A surface system, such as a rain garden, is implemented in a parking lot.
Subsurface Systems	A subsurface system, such as a subsurface infiltration basin, is implemented in a parking lot.
Vacant Lands/ Land Acquisition	Vacant land is acquired by PWD, which is then used for stormwater management with GSI.
Commercial	GSI is implemented on a commercial site, such as a shopping center.
Physical Settings	
Piedmont Province	The site is located in the Piedmont Physiographic Province.
Coastal Plain Province	The site is located in the Coastal Plain Physiographic Province.
Soil Infiltration Capacity	
High tested infiltration rate (>5	The field estimated infiltration rate at the location of the SMP is

in/hr)	greater than 5 in/hr.
Low tested infiltration rate (<0.5 in/hr)	The field estimated infiltration rate at the location of the SMP is less than 0.5 in/hr, but the system is designed for infiltration with no slow-release orifice.
Slope Conditions	
Steep (>3%)	The drainage area to the system is steep, with a slope greater than 3%.
Flat (<1.5%)	The drainage area to the system is relatively flat, with a slope less than 1.5%.
Pilot Systems	
Curbless Street	The system includes a curbless street and runoff is captured by overland surface flow.
Stormwater Tree Pit Designs	Stormwater is managed by single stormwater tree pits.
Rain Gardens	
With Stone	The system is a rain garden with a stone storage layer beneath the bioretention soil media.
Without Stone	The system is a rain garden without a stone storage layer beneath the bioretention soil media. A stone trench can be included adjacent to the rain garden to manage overflow.
With Sumped Inlet Pretreatment	The system includes a rain garden where runoff enters via a sumped inlet.
With Swale Pretreatment	The system includes a rain garden where runoff enters via a vegetated swale.
With Forebay Pretreatment	The system includes a rain garden with a forebay to settle out solids and other debris before runoff enters the basin.
Without Pretreatment	The system includes a rain garden with no pretreatment.
Planters	
With Stone	The system includes a planter or planters with a stone storage layer beneath the bioretention soil media.
Without Stone	The system includes a planter or planters without a stone storage layer beneath the bioretention soil media. A stone trench can be included adjacent to the planter to manage overflow.
With Sumped Inlet Pretreatment	The system includes a planter where runoff enters via a sumped inlet.
Without Pretreatment	The system includes a planter or planters with no pretreatment.
Sidewalk Swales	The system includes a vegetated swale in the sidewalk that manages street and sidewalk runoff.
Pipeless Trenches	The system is a subsurface gravel trench without perforated distribution pipes.
Inlets	
Green Inlets	Green inlets are standard concrete inlets with a sump and trap that include a filter bag to capture large debris, trash and sediment before runoff enters the distribution pipe of an SMP.
Standard Inlets	Standard concrete inlets with a sump and trap that do not include a filter bag. Includes highway grate inlets, city inlets, and open mouth grate inlets.

Bumpout Inlets	Surface curb cut inlet that is part of a curb extension. The inlet is not parallel to the direction of flow along the gutter.
Curb Cut Inlets	Surface inlet consisting of an opening in the curb that allows runoff to flow directly to the SMP from the gutter. The inlet is parallel to the direction of flow along the gutter.
Tree Pit Inlets	Runoff enters the system via below-grade stormwater tree pits, where it will then percolate through the soil of the tree pits into the gravel trench.
Permapave Inlets	Runoff enters the system via an at-grade permeable pavement inlet grate.
Dual Trap Inlets	A single structure that acts as both the inlet and outlet of the system, separated by a weir wall.
Trench Drains	Runoff enters the system via a shallow trench drain, either by curb cuts leading to trench drains or through a surface level grate over the trench drain.
Blue Roof	Detention storage is provided on the roof of a building, but with no vegetation.
Roof Leader Treatments	
Disconnection Options	Roof runoff is managed by disconnecting roof downspouts through a variety of methods, including both external and internal downspouts.
Leader to planter	Roof runoff is managed by disconnecting a roof downspout and leading it to a stormwater planter.
Leader to rain garden	Roof runoff is managed by disconnecting a roof downspout and leading it to a rain garden.
Leader to tree pit	Roof runoff is managed by disconnecting a roof downspout and leading it to a tree pit.
Leader to tree trench	Roof runoff is managed by disconnecting a roof downspout and leading it to a tree trench.
Pumped Systems	The system includes a detention structure where outflow to the combined sewer is controlled by a pump system.
Reuse Systems	Runoff is captured in a detention system to be reused by building or site operations such as providing water for toilets or irrigation.
Stormwater Drainage Wells	The system is a deep vertical injection well, utilizing both vertical and lateral infiltration from the system.
Regrading Street Crown/ Median Treatments	The entire street is re-graded so that all runoff drains to one side of the street or to the median of a multi-lane street, where it is then managed with GSI.
Street Crossing	
Subsurface Street Crossing	Subsurface piping is used to convey stormwater across a street to a GSI practice.
At-grade Street Crossing	Stormwater is conveyed across a street to a GSI practice with shallow or at-grade infrastructure.
Loading Ratio	
High Loading Ratio (>15)	The loading ration of impervious drainage area to system footprint is greater than 15.
Mid-Range Loading Ratio (10-15)	The loading ration of impervious drainage area to system footprint is between 10 and 15.
Low Loading Ratio (<10)	The loading ration of impervious drainage area to system footprint is less than 10.

Bumpouts	A curbed and vegetated system that extends into the street and captures runoff directly from the gutter.
Pilot Materials	
Permeable Materials	
Permeable Pavers	Newly paved area consists of permeable interlocking concrete pavers with a stone storage layer to capture and infiltrate runoff.
Asphalt	Newly paved area consists of permeable asphalt with a stone storage layer to capture and infiltrate runoff.
Concrete	Newly paved area consists of permeable concrete with a stone storage layer to capture and infiltrate runoff.
Play Surface	Newly paved area consists of a permeable rubber play surface with a stone storage layer to capture and infiltrate runoff.
Other	Newly paved area consists of alternative permeable pavement technologies with a stone storage layer to capture and infiltrate runoff.
Storage Types	
Stone	The system includes subsurface storage in gravel.
Arched Systems	The system includes subsurface storage with arched storage systems, such as the StormTech chambers or approved equal.
Structural Vaults	The system includes subsurface storage in a concrete vault.
Crate Systems	The system includes subsurface storage with plastic storage crates such as the Atlantic D-Raintank crates or approved equal.
Silva Cell	The system includes subsurface storage in Silva Cells or approved equal.
Pre-treatment Technologies	
Hydrodynamic Separator	The system includes a hydrodynamic separator for pretreatment with a swirl concentrator and flow controls.
Forebays	The system includes a forebay as pretreatment for solids removal.
Sumped Inlet Systems With Filter	The system includes a green inlet or inlets with a sump, trap, and filter bag.
Sumped Inlet Systems Without Filter	The system includes an inlet or inlets with a sump and trap, but with no filter bag.
Swales	The system includes a vegetated swale as pretreatment for solids and pollutant removal.
Soil Types	
Structural Soils	Tree pits use structural soil, which is planting soil that can be compacted to pavement design and installation requirements while permitting plant growth. Soil is amended with crushed stone to increase structural strength.
Native Soils	The soil media in the vegetated system uses native soils.
Amended Native Soils	The soil media in the vegetated system uses native soils amended with materials to help promote plant health and treatment capacity.
Engineered Imported Soils	The soil media in the vegetated system uses engineered imported bioretention soils.
Modular Planters	Modular precast planter systems designed to have simpler installation and lower cost than cast-in-place planters.

Fencing	The surface portion of the system has fencing around the perimeter of the footprint.
Policy/Partnerships	
LEED/ Sustainable Sites Initiative	GSI is implemented either adjacent to a development seeking LEED certification, or as part of the LEED certification requirements.
Public Agency	GSI is implemented in partnership with at least one other public agency.
Non-Government Organizations	GSI is implemented in partnership with at least one non-government organization.
Civic Groups	GSI is implemented in partnership with at least one civic group.
Center City District, University City District	GSI is implemented within Center City District or University City District.
Public/Private Partnership	GSI is implemented in partnership with a private company or developer.
Other Policy/ Partnership	GSI is implemented in a partnership that does not fit the other policy/partnership variables.
Implementation Strategies	
Complete Street Concepts	GSI is implemented in coordination with other improvement projects to enhance pedestrian friendliness and safety, multi-modal transportation, and overall greening of the street.
Storm Flood Relief	GSI is implemented as part of a storm flood relief project, or as the storm flood relief project.
Standard Detail Roll-Out	GSI is implemented using standard details instead of individual site designs.
Physical networks	GSI includes multiple systems that are hydrologically connected, in that when one overflows, bypass runoff is captured by the next downstream system. The physical network collectively manages at least 1 inch of runoff from the total drainage area.
SMEDs	A Stormwater Implementation Plan (SIP) is developed through an area-wide study that considers existing planning initiatives and outside agencies' goals for the area.
Following Public Works	GSI is implemented in coordination with other public works projects.
Low-Budget Retrofit	Site is retrofitted with simple GSI that does not require fully detailed design or major construction.
Green Campuses	GSI is implemented on a campus, as part of a larger scale plan.
Community Acceptance	
Educational Signage	GSI is implemented with educational signage with information on the purpose and function of the system.
Subsurface Conditions	
Groundwater Mounding	An infiltrating GSI system includes piezometer wells for groundwater level monitoring to determine if any significant groundwater mounding occurs or has an impact on adjacent buildings.
Soil Stability (i.e. subsidence)	Soil stability issues are observed due to the GSI system.
Health and Safety	
Pedestrian Impacts	The GSI system influences pedestrian safety and/or friendliness of a street.

Bicyclist Impacts	The GSI system influences bicycle safety and/or friendliness of a street.
Driver Impacts	The GSI system influences driver safety and/or friendliness of a street, including traffic calming effects.
Vectors	The GSI system leads to problems with animals or insects that could potentially pose a risk to human health.
SMP Performance Monitoring	
SMP Type	
Bioinfiltration	SMP performance monitoring takes place in a bioinfiltration basin.
Bioretention	SMP performance monitoring takes place in a bioretention basin.
Bumpout	SMP performance monitoring takes place in a bumpout.
Bumpout and tree trench/infiltration trench	SMP performance monitoring takes place in a bumpout and tree trench system.
Infiltration/storage trench	SMP performance monitoring takes place in an infiltration/storage trench.
Injection well	SMP performance monitoring takes place in an injection well.
Planter	SMP performance monitoring takes place in a stormwater planter.
Planter trench	SMP performance monitoring takes place in a planter trench.
Porous pavement	SMP performance monitoring takes place in a porous pavement system.
Sidewalk swale	SMP performance monitoring takes place in a sidewalk swale.
Silva Cell	Water level data is monitored in an observation well to assess the performance of a Silva cell system.
Tree trench	SMP performance monitoring takes place in a tree trench.

Greenfield Elementary School

Status: Construction Complete
System Types: Bioinfiltration (1), permeable pavement (2)
Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
School yards/ schools
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Permeable Materials
Permeable Pavers
Playsurface
Storage Types
Stone
Soil Types
Engineered Imported Soils

40224 – Percy St from Catharine St to Christian St

Status: Construction Complete
System Types: Permeable pavement (1)
Number of Applied Pilot Variables: 8

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Permeable Materials
Asphalt
Storage Types
Stone
Implementation Strategies
Following Public-Works
SMP Performance Monitoring
SMP Type
Porous pavement

40330 – Sepviva St from Susquehanna Ave to Dauphin St

Status: Construction Complete
System Types: Infiltration trench (1), stormwater tree pits (17)
Number of Applied Pilot Variables: 8

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Stormwater Tree Pit Designs
New Inlets
Dual Trap Inlets
Loading Ratio
High Loading Ratio (>15)
Pilot Materials
Storage Types
Stone
Implementation Strategies
Following Public-Works

40659 – Waterview Recreation Center – McMahon St from Price St to Haines St

Status: Construction Complete
System Types: Tree trench (2), permeable pavement (1), planter (1)
Number of Applied Pilot Variables: 18

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Planters
With Stone
Without Pretreatment
Inlets
Standard Inlets
Roof Leader Treatments
Disconnection Options
Leader to planter
Loading Ratio
Mid Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Permeable Materials
Concrete
Storage Types
Stone
Soil Types
Native Soils
Policy/Partnerships
Public Agency
Non-Government Organizations
Civic Groups
SMP Performance Monitoring

SMP Type
Permeable pavement

50004 – Belfield Ave from Chew Ave to Walnut Ln

Status: Construction Complete
System Types: Tree trench (6)
Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Crate Systems
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Non-Government Organizations
SMP Performance Monitoring
SMP Type
Tree trench

50006 – Columbus Square Stormwater Planters

Status: Construction Complete
System Types: Planter (2), planter trench (1)
Number of Applied Pilot Variables: 18

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Planters
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Planters
With Stone
With Sumped Inlet Pretreatment
Without Pretreatment
Inlets
Standard Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Civic Groups
Community Acceptance

Educational Signage
SMP Performance Monitoring
SMP Type
Planter trench

50009 - Queen Lane

Status: Construction Complete

System Types: Bumpout (6)

Number of Applied Pilot Variables: 15

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Inlets
Bumpout Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Bumpouts
Pilot Materials
Storage Types
Stone
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Implementation Strategies
Physical networks
Community Acceptance
Health and Safety
Driver Impacts

50009 – Bureau of Laboratory Services

Status: Construction Complete
System Types: Planter (7), infiltration trench (1), tree trench (2)
Number of Applied Pilot Variables: 19

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Planters
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Slope Conditions
Steep (>2%)
Pilot Systems
Planters
With Stone
Without Pretreatment
Inlets
Standard Inlets
Curb Cut Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pretreatment Technologies
Sumped Inlet Systems Without Filter
Soil Types
Engineered Imported Soils
Implementation Strategies
Physical networks

SMP Performance Monitoring
SMP Type
Infiltration/storage trench
Planter

50011 - Liberty Lands

Status: Construction Complete
System Types: Bioretention (1)
Number of Applied Pilot Variables: 16

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
With Stone
With Sumped Inlet Pretreatment
With Swale Pretreatment
Inlets
Standard Inlets
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Swales
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Civic Groups
Other Policy/ Partnership

50014 - 47th & Grays Ferry Rain Garden

Status: Construction Complete
System Types: Bioinfiltration (2)
Number of Applied Pilot Variables: 13

Applied Pilot Variables

Pilot Locations
Traffic Triangles
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
High Loading Ratio (>15)
Pilot Materials
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Other Policy/ Partnership
Community Acceptance
Subsurface Conditions
Soil Stability (i.e. subsidence)

50022 - Madison Memorial Park

Status: Construction Complete
System Types: Subsurface detention basin (1)
Number of Applied Pilot Variables: 8

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
High Loading Ratio (>15)
Pilot Materials
Storage Types
Stone
Policy/Partnerships
Public Agency
Civic Groups

50023 - Herron Playground Porous Basketball Court

Status: Construction Complete

System Types: Infiltration trench (1), porous asphalt (1)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Recreation Centers
"Open Space" park sites
Subsurface
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Permeable Materials
Asphalt
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Policy/Partnerships
Public Agency
SMP Performance Monitoring
SMP Type
Permeable pavement

50024 - Shissler Playground

Status: Construction Complete

System Types: Infiltration trench (1), tree trench (3)

Number of Applied Pilot Variables: 19

Applied Pilot Variables

Pilot Locations
Recreation Centers
"Open Space" park sites
Subsurface
Athletic Fields
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Standard Inlets
Trench Drains
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Policy/Partnerships
Non-Government Organizations
Civic Groups
Community Acceptance
Subsurface Conditions
Groundwater Mounding
SMP Performance Monitoring
SMP Type
Infiltration/storage trench
Tree trench

50026 - Daroff School – 56th St, 57th St, Race St, and Vine St

Status: Construction Complete

System Types: Tree trench (3), Bumpout/tree trench (1)

Number of Applied Pilot Variables: 22

Applied Pilot Variables

Pilot Locations
School yards/ schools
Streets
Bumpouts
Tree Trenches
Planters
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Planters
With Stone
Inlets
Green Inlets
Bumpout Inlets
Trench Drains
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Bumpouts
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Community Acceptance
Health and Safety
Pedestrian Impacts
Bicyclist Impacts
Driver Impacts
SMP Performance Monitoring
SMP Type
Bumpout and tree trench/infiltration trench

50026 - Shepard Recreation Center - 57th St and Vine St

Status: Construction Complete

System Types: Bumpout/tree trench (1), tree trench (2)

Number of Applied Pilot Variables: 18

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Bumpouts
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Bumpout Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Bumpouts
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Community Acceptance
Health and Safety
Pedestrian Impacts
Bicyclist Impacts
Driver Impacts
SMP Performance Monitoring

SMP Type
Bumpout and tree trench/infiltration trench

50027 - Baltimore Ave Island from S 60th St to Wharton St

Status: Construction Complete

System Types: Tree trench (1)

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
Traffic Triangles
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Non-Government Organizations

50027 - Bryant Elementary School - 60th St, 61st St, Cedar Ave, and Hazel Ave

Status: Construction Complete
System Types: Tree trench (2)
Number of Applied Pilot Variables: 12

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Dual Trap Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Sumped Inlet Systems Without Filter
Policy/Partnerships
Non-Government Organizations

50027 - William Harrity School - Webster St and Frazier St

Status: Construction Complete

System Types: Tree trench (5)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
School yards/schools
Recreation Centers
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Non-Government Organizations

50027 - Christy Recreation Center - Christian St, Webster St, and 56th St

Status: Construction Complete

System Types: Tree trench (5)

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Non-Government Organizations

50029 - Morris Leeds Middle School - Mt. Pleasant Ave, Sedgwick St, Gorgas Ln, Rodney St, Lowber Ave, and Woolston Ave

Status: Construction Complete

System Types: Tree trench (14)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Inlets
Green Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Crate Systems
Pre-treatment Technologies
Sumped Inlet Systems With Filter

50029 - Simons Recreation Center - Woolston Ave, Walnut Ln, and Rodney St

Status: Construction Complete

System Types: Tree trench (5)

Number of Applied Pilot Variables: 12

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Slope Conditions
Steep (>2%)
Pilot Systems
Inlets
Green Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Crate Systems
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Public Agency

50032 - PHS PennVest Tree Trenches

Status: Construction Complete
System Types: Tree trench (6)
Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Soil Types
Structural Soils
Policy/Partnerships
Non-Government Organizations
Community Acceptance
Subsurface Conditions
Groundwater Mounding
SMPPerformance Monitoring
SMP Type
Tree trench

50033 - Lancaster Ave from N 58th St to N 63rd St

Status: Construction Complete

System Types: Tree trench (1), bumpout (1), bioinfiltration (1), sidewalk swale (1)

Number of Applied Pilot Variables: 18

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Tree Trenches
Rain Garden
Sidewalk Swale
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Sidewalk Swales
Inlets
Bumpout Inlets
Curb Cut Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Bumpouts
Policy/Partnerships
Public Agency
Non-Government Organizations
Other Policy/ Partnership
Implementation Strategies
Complete Street Concepts

50043 - Harper's Hollow Park

Status: Construction Complete

System Types: Bioinfiltration (1)

Number of Applied Pilot Variables: 13

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Mowable
Surface
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Slope Conditions
Steep (>2%)
Pilot Systems
Rain Gardens
Without Stone
With Sumped Inlet Pretreatment
Inlets
Green Inlets
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils

50043 - Wakefield Park

Status: Construction Complete

System Types: Bioinfiltration (2)

Number of Applied Pilot Variables: 15

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Slope Conditions
Steep (>2%)
Pilot Systems
Rain Gardens
Without Stone
With Sumped Inlet Pretreatment
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50046 - Womrath Park

Status: Construction Complete

System Types: Bioretention (1)

Number of Applied Pilot Variables: 20

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
With Stone
With Sumped Inlet Pretreatment
With Swale Pretreatment
With Forebay Pretreatment
Inlets
Standard Inlet
Loading Ratio
High Loading Ratio (>15)
Pilot Materials
Storage Types
Crate Systems
Pre-treatment Technologies
Forebays
Sumped Inlet Systems Without Filter
Swales
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Civic Groups
Community Acceptance
Educational Signage
SMP Performance Monitoring
SMP Type
Bioretention

50063 - Eadom Parking Lot - 5312-50 Eadom St

Status: Construction Complete
System Types: Bioinfiltration (6)
Number of Applied Pilot Variables: 8

Applied Pilot Variables

Pilot Locations
Parking Lots
Surface Systems
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Policy/Partnerships
Public Agency

50001 - 10th St from Wilder St to Reed St

Status: Construction Complete
System Types: Infiltration trench (2)
Number of Applied Pilot Variables: 12

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Policy/Partnerships
Public Agency
Civic Groups
Other Policy/ Partnership
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50001 - Passyunk Ave from Dickinson St to Reed St

Status: Construction Complete

System Types: Infiltration trench (2)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Policy/Partnerships
Public Agency
Civic Groups
Other Policy/ Partnership
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50001 - Chew Playground - 18th St, 19th St, Ellsworth St, and Washington Ave

Status: Construction Complete

System Types: Bumpout/Tree trench (2), tree trench (2)

Number of Applied Pilot Variables: 18

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Bumpouts
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Garden
Without Stone
Without Pretreatment
Inlets
Standard Inlets
Bumpout Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Bumpouts
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
SMP Performance Monitoring

SMP Type
Bumpout and tree trench/infiltration trench

50001 - 12th St and Reed St (Columbus Square)

Status: Construction Complete

System Types: Bioretention (1)

Number of Applied Pilot Variables: 15

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Rain Garden
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
With Stone
With Sumped Inlet Pretreatment
Inlets
Standard Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Civic Groups
Community Acceptance
Health and Safety
Pedestrian Impacts
SMP Performance Monitoring
SMP Type
Bioretention

50003 - Bodine High School - 4th St and Cambridge St

Status: Construction Complete

System Types: Planter trench (1), planter box (1), tree trench (3)

Number of Applied Pilot Variables: 23

Applied Pilot Variables

Pilot Locations
Stormwater + Art Site
Streets
Tree Trenches
Planters
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Planters
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Dual Trap Inlets
Trench Drains
Loading Ratio
High Loading Ratio (>15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Crate Systems
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Civic Groups
Implementation Strategies
Physical networks
SMP Performance Monitoring
SMP Type
Planter trench
Tree trench

50003 - 3rd St and Fairmount Ave Intersection

Status: Construction Complete
System Types: Bumpout/Tree trench (1)
Number of Applied Pilot Variables: 14

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Bumpout Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Bumpouts
Pilot Materials
Storage Types
Stone
Soil Types
Engineered Imported Soils
Policy/Partnerships
Civic Groups
Community Acceptance
Health and Safety
Pedestrian Impacts
Bicyclist Impacts
Driver Impacts
SMP Performance Monitoring
SMP Type
Bumpout and tree trench/infiltration trench

50007 - Blue Bell Inn Triangle

Status: Construction Complete

System Types: Bioinfiltration (1)

Number of Applied Pilot Variables: 17

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Mowable
Surface
Traffic Triangles
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
Without Stone
With Sumped Inlet Pretreatment
With Swale Pretreatment
Inlets
Standard Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Swales
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Non-Government Organizations

50010 - Barry Playground - 18th St, 19th St, and Bigler St

Status: Construction Complete

System Types: Tree trench (2), infiltration/storage trench (2), infiltration trench (1)

Number of Applied Pilot Variables: 20

Applied Pilot Variables

Pilot Locations
Recreation Centers
"Open Space" park sites
Subsurface
Streets
Tree Trenches
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Green Inlets
Dual Trap Inlets
Roof Leader Treatments
Disconnection Options
Leader to tree trench
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Sumped Inlet Systems Without Filter
Policy/Partnerships
LEED/ Sustainable Sites Initiative
Public Agency
Community Acceptance
Subsurface Conditions

Groundwater Mounding

50019 - Anna B. Day School - Duval St, Crittenden St, and Johnson S

Status: In Construction
System Types: Tree trench (4)
Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Non-Government Organizations
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50019 - Dickinson Square - Moyamensing Ave and Morris St

Status: In Construction

System Types: Bumpout/trench (1), tree trench (1)

Number of Applied Pilot Variables: 21

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Tree Trenches
Planters
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Planters
Without Stone
Without Pretreatment
Inlets
Green Inlets
Bumpout Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Bumpouts
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Fencing
Policy/Partnerships
Public Agency
Civic Groups
Community Acceptance
Health and Safety
Pedestrian Impacts
Bicyclist Impacts
Driver Impacts
SMP Performance Monitoring
SMP Type
Planter trench

50020 - Welsh School - 4th St and Dakota St

Status: Construction Complete
System Types: Bioretention (1), tree trench (1)
Number of Applied Pilot Variables: 13

Applied Pilot Variables

Pilot Locations
School yards/ schools
Streets
Tree Trenches
Rain Garden
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations

50025 - St Thomas Aquinas School - 17th St, 18th St, Morris St, and Fernon St

Status: Construction Complete

System Types: Tree trench (3)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
High Loading Ratio (>15)
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50025 - Smith Elementary School - 19th St, Garnet St, Reed St, and Wharton St

Status: Construction Complete
System Types: Tree trench (1)
Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Standard Inlets
Loading Ratio
High Loading Ratio (>15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems Without Filter
Community Acceptance
Subsurface Conditions
Groundwater Mounding

50034 - Thompson St and Columbia Ave

Status: Construction Complete

System Types: Bumpout /tree trench (1), Bumpout /infiltration trench (1)

Number of Applied Pilot Variables: 16

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Tree Trenches
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Green Inlets
Bumpout Inlets
Loading Ratio
High Loading Ratio (>15)
Bumpouts
Pilot Materials
Storage Types
Stone
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Civic Groups
Community Acceptance
Health and Safety
Pedestrian Impacts
Driver Impacts
SMP Performance Monitoring
SMP Type
Bumpout and tree trench/infiltration trench

50034 - Trenton Ave and Norris St

Status: Construction Complete

System Types: Infiltration trench (2), bioinfiltration (1)

Number of Applied Pilot Variables: 20

Applied Pilot Variables

Pilot Locations
Streets
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drain Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Non-Government Organizations
Civic Groups
Community Acceptance
Health and Safety
Pedestrian Impacts

SMP Performance Monitoring
SMP Type
Bioinfiltration
Infiltration/storage trench

50041 - Springfield Ave and Cobbs Creek Island

Status: In Construction

System Types: Bioinfiltration (1)

Number of Applied Pilot Variables: 16

Applied Pilot Variables

Pilot Locations
Traffic Triangles
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Stone
With Sumped Inlet Pretreatment
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Civic Groups
SMP Performance Monitoring
SMP Type
Bioinfiltration

50041 - Longstreth School - 57th St and Pentridge St

Status: In Construction

System Types: Planter tree trench (1)

Number of Applied Pilot Variables: 16

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Planters
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Systems
Planters
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Fencing
Policy/Partnerships
Civic Groups
SMP Performance Monitoring
SMP Type
Planter trench

50042 - Bridesburg Recreation Center and Bridesburg School - Richmond St, Jenks St, and Buckius St

Status: Construction Complete

System Types: Bioinfiltration (1), infiltration trench (1), tree trench (1)

Number of Applied Pilot Variables: 21

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Civic Groups
Community Acceptance
Subsurface Conditions
Groundwater Mounding
Health and Safety

Pedestrian Impacts
SMP Performance Monitoring
SMP Type
Bioinfiltration

50042 - Roosevelt Playground - Hellerman St, Cottage St, and Levick St

Status: Construction Complete

System Types: Tree trench (3), planter trench (1)

Number of Applied Pilot Variables: 17

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Tree Trenches
Planters
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Planters
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Civic Groups

50044 - Kemble Park

Status: In Construction

System Types: Bioinfiltration (1), infiltration trench (3)

Number of Applied Pilot Variables: 19

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Subsurface
Alleys
Centralized Facility
Streets
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
Without Stone
With Sumped Inlet Pretreatment
With Swale Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Pilot Materials
Storage Types
Crate Systems
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Swales
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency

Community Acceptance
Health and Safety
Vectors

50044 - Wister Woods Park

Status: In Construction

System Types: Bioinfiltration (4)

Number of Applied Pilot Variables: 14

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Streets
Rain Garden
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Slope Conditions
Steep (>2%)
Pilot Systems
Rain Gardens
Without Stone
With Sumped Inlet Pretreatment
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Public Agency

50047 - Philadelphia Zoo - Girard from 39th to 34th

Status: Construction Complete

System Types: Bioinfiltration (5), bioinfiltration /infiltration trench (2), infiltration trench (2), planter trench /infiltration trench (1)

Number of Applied Pilot Variables: 24

Applied Pilot Variables

Pilot Locations
Streets
Planters
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Planters
With Stone
Without Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Soil Types
Engineered Imported Soils
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Public Agency

Public/Private Partnerships
Implementation Strategies
Following Public-Works
SMP Performance Monitoring
SMP Type
Bioinfiltration
Infiltration/storage trench
Planter

50052 - Pleasant Playground - Chew Ave from Pleasant St to Slocum St and Slocum St from Chew Ave to dead end

Status: Design Complete

System Types: Tree trench (2)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Silva Cell
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency

50056 - George W. Nebinger School-Carpenter St between S 6th St and E Passyunk Ave

Status: Construction Complete

System Types: Subsurface detention basin (1), bioinfiltration basin (1)

Number of Applied Pilot Variables: 21

Applied Pilot Variables

Pilot Locations
School yards/ schools
Streets
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Parcels
Parking Lots
Subsurface Systems
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Pilot Systems
Rain Gardens
With Stone
With Swale Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Permeable Materials
Playsurface
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Swales
Soil Types
Engineered Imported Soils

Policy/Partnerships
Other Policy/ Partnership
SMP Performance Monitoring
SMP Type
Bioinfiltration
Infiltration/storage trench

50069 - Callowhill St from 2nd to 7th

Status: Design Complete

System Types: Stormwater tree pit (10)

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs
Policy/Partnerships
Public Agency

73068 - Southwest Treatment Plant Parking Lot

Status: Construction Complete

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations	
Various Ownership Types	
	Public Parcels
Parking Lots	
	Surface Systems
Physical Settings	
Coastal Plain Province	
Soil Infiltration Capacity	
	Low tested infiltration rate (<0.5 in/hr)
Pilot Systems	
Rain Gardens	
	Without Stone
	Without Pretreatment
Pilot Materials	
Permeable Materials	
Permeable Pavers	
	Concrete
SMP Performance Monitoring	
SMP Type	
Permeable pavement	

40794 - Tacony Creek Reaches 4/5

Status: In Design

System Types: Bioretention (8)

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Surface
Centralized Facility
Various Ownership Types
Public Parcels
Pilot Systems
Rain Gardens
Without Stone
With Forebay Pretreatment
Inlets
Green Inlets
Pilot Materials
Pre-treatment Technologies
Forebays
Soil Types
Amended Native Soils
Policy/Partnerships
Public Agency
Non-Government Organizations

50021 - John F Kennedy Blvd from 30th St to 32nd St

Status: In Design

System Types: Tree trench (6)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Center City District, University City District
Other Policy/ Partnership
Implementation Strategies
Complete Street Concepts

50045 - Benjamin Franklin Pkwy from 16th St to 19th St

Status: Design Complete

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Soil Infiltration Capacity
High tested infiltration rate (>5 in/hr)
Low tested infiltration rate (<0.5 in/hr)
Pilot Systems
Inlets
Green Inlets
Pilot Materials
Storage Types
Stone
Pre-treatment Technologies
Sumped Inlet Systems With Filter
Policy/Partnerships
Public Agency
Implementation Strategies
Complete Street Concepts

50048 - Mt. Airy School of God in Christ - 65th, 18th, Chelten, Ogontz

Status: In Design

Number of Applied Pilot Variables: 13

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Inlets
Green Inlets
Bumpout Inlets
Bumpouts
Pilot Materials
Storage Types
Stone
Soil Types
Engineered Imported Soils
Implementation Strategies
Physical networks
Community Acceptance
Health and Safety
Bicyclist Impacts
Driver Impacts

50048 - National Cemetery - Andrews, Rodney, Haines, Limekiln

Status: In Design

System Types: Sidewalk swale (3)

Number of Applied Pilot Variables: 7

Applied Pilot Variables

Pilot Locations	
Streets	
	Sidewalk Swale
Various Ownership Types	
	Public Right-of-way
Physical Settings	
Piedmont Province	
Pilot Systems	
Sidewalk Swales	
Inlets	
Curb Cut Inlets	
Pilot Materials	
Storage Types	
	Stone
Community Acceptance	
Health and Safety	
	Pedestrian Impacts

50052 - Sedgwick Station - Sprague and Durham

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Systems
Pipeless Trenches
Policy/Partnerships
Public Agency

50052 - Chelten Hills Cemetery - Lowber, Upsal, Woolston, Washington

Status: In Design

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Pipeless Trenches

50052 - Finley Playground - E Hortter St, Lowber Ave, E Upsal St, Mansfield Ave

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
Recreation Centers
Pilot Systems
Pipeless Trenches

50052 - Ivy Hills Cemetery - Easton Rd, Thouron Ave, Roumfort Rd, Lynnewood Rd, Mansfield Ave, Ivy Hill Rd

Status: In Design

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Pipeless Trenches

50052 - Pennypacker School -Thouron Ave, Mohican St, Rugby St, W Washington Ln

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
School yards/schools
Physical Settings
Piedmont Province
Pilot Systems
Pipeless Trenches

50053 - Windrim Ave from Wayne Ave to Germantown Ave

Status: In Design

System Types: Bumpout (1)

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations	
Streets	
	Bumpouts
	Infiltration/Storage Trench
Various Ownership Types	
	Public Right-of-way
Physical Settings	
Piedmont Province	
Pilot Systems	
Inlets	
Green Inlets	
Bumpout Inlets	
Bumpouts	
Pilot Materials	
Storage Types	
	Stone
Policy/Partnerships	
Public Agency	
Non-Government Organizations	

50053 - Skevchenko Park - Old York, Somerville, Fisher

Status: In Design

Number of Applied Pilot Variables: 7

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Various Ownership Types
Public Right-of-way
Pilot Systems
Rain Gardens
With Stone
Without Pretreatment
Inlets
Bumpout Inlets
Policy/Partnerships
Public Agency
Implementation Strategies
Physical networks

50055 - Drexel College of Media Arts & Design

Status: In Design

Number of Applied Pilot Variables: 6

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Pipeless Trenches
Inlets
Green Inlets
Policy/Partnerships
Center City District, University City District
Public/Private Partnership

50055 - 40th Street Portal - 40th St and Baltimore Ave

Status: In Design

Number of Applied Pilot Variables: 6

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Pipeless Trenches
Inlets
Green Inlets
Policy/Partnerships
Public Agency
Center City District, University City District

50055 - Beeber Middle School - Woodcrest, Graham, Malvern, 59th

Status: In Design

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
School yards/schools
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Pipeless Trenches
Inlets
Green Inlets

50055 - Malcolm X Park - Pine, Larchwood, 51st

Status: In Design

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Pipeless Trenches
Inlets
Green Inlets
Policy/Partnerships
Public Agency

50055 - Upland Way - Redfield to 59th

Status: In Design

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
Streets
Bumpouts
Infiltration/Storage Trench
Sidewalk Swale
Pilot Systems
Sidewalk Swales
Pipeless Trenches
Inlets
Green Inlets
Bumpout Inlets
Curb Cut Inlets
Bumpouts
Policy/Partnerships
Non-Government Organizations

50059 - Ferko Playground - I St, Cayuga St, L St

Status: In Design

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
Recreation Centers
"Open Space" park sites
Surface
Subsurface
Centralized Facility
Athletic Fields
Streets
Bumpouts
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
Without Stone
Inlets
Green Inlets
Roof Leader Treatments
Disconnection Options
Leader to rain garden
Bumpouts
Pilot Materials
Soil Types
Amended Native Soils
Policy/Partnerships
Public Agency

50059 - Harrowgate Park - Kensington, Tioga, Jasper, Schiller

Status: In Design

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Recreation Centers
"Open Space" park sites
Mowable
Surface
Bridge Runoff
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
Without Stone
With Forebay Pretreatment
Inlets
Green Inlets
Pilot Materials
Pre-treatment Technologies
Forebays
Policy/Partnerships
Public Agency

50060 - Hunting Park - Old York Rd, 9th St, Cayuga St, Hunting Park Ave

Status: In Design

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Mowable
Surface
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Swale Pretreatment
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Pilot Materials
Pre-treatment Technologies
Swales
Policy/Partnerships
Public Agency

50061 - Bustleton Ave from Magee to St Vincent

Status: In Construction

Number of Applied Pilot Variables: 6

Applied Pilot Variables

Pilot Locations
Streets
Infiltration/Storage Trench
Pilot Systems
Inlets
Green Inlets
Loading Ratio
Mid-Range Loading Ratio (10-15)
Pilot Materials
Storage Types
Stone
Policy/Partnerships
Public Agency
Implementation Strategies
Standard Detail Roll-Out

50062 - Woodland Ave from 43rd to 72nd

Status: In Construction

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Pilot Systems
Inlets
Green Inlets
Pilot Materials
Storage Types
Stone
Policy/Partnerships
Public Agency
Implementation Strategies
Standard Detail Roll-Out

50065 - Panati Playground, 2119-29 Clearfield St

Status: In Construction

Number of Applied Pilot Variables: 13

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Infiltration/Storage Trench
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
Without Stone
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Roof Leader Treatments
Disconnection Options
Leader to tree trench
Pilot Materials
Storage Types
Crate Systems
Soil Types
Amended Native Soils
Policy/Partnerships
Public Agency

50068 - Ingersoll Commons - Smedley, Seybert, 16th

Status: In Construction

System Types: Rain garden (1)

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
Centralized Facility
Vacant Lands/ Land Acquisition
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Stone
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Pilot Materials
Permeable Materials
Permeable Pavers
Policy/Partnerships
Public Agency
Non-Government Organizations

50070 - Benson Park- Jefferson, 4th, Harlan, and Lawrence

Status: Design Complete

Number of Applied Pilot Variables: 12

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Subsurface
Various Ownership Types
Public Parcels
Streets
Planters
Physical Settings
Piedmont Province
Pilot Systems
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Loading Ratio
Mid-Range Loading Ratio (10-15)
Low Loading Ratio (<10)
Pilot Materials
Permeable Materials
Permeable Pavers
Storage Types
Stone
Policy/Partnerships
Public Agency

50071 - Collazo Park - Westmoreland and Howard

Status: In Design

Number of Applied Pilot Variables: 12

Applied Pilot Variables

Pilot Locations
Recreation Centers
Various Ownership Types
Public Parcels
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Inlets
Green Inlets
Dual Trap Inlets
Trench Drains
Pilot Materials
Permeable Materials
Asphalt
Soil Types
Engineered Imported Soils
Policy/Partnerships
Public Agency
Non-Government Organizations

50074 - Gathers Recreation Center - Diamond, Glenwood

Status: Design Complete

Number of Applied Pilot Variables: 8

Applied Pilot Variables

Pilot Locations
Recreation Centers
Various Ownership Types
Public Parcels
Pilot Systems
Inlets
Green Inlets
Dual Trap Inlets
Pilot Materials
Storage Types
Stone
Policy/Partnerships
Public Agency
Non-Government Organizations
SMP Performance Monitoring
SMP Type
Tree trench

50075 - William Dick Elementary - 24th, Diamond, 25th St

Status: Construction Complete

Number of Applied Pilot Variables: 14

Applied Pilot Variables

Pilot Locations
School yards/ schools
Athletic Fields
Various Ownership Types
Public Parcels
Physical Settings
Coastal Plain Province
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Inlets
Green Inlets
Dual Trap Inlets
Loading Ratio
Low Loading Ratio (<10)
Pilot Materials
Storage Types
Stone
Soil Types
Engineered Imported Soils
Fencing
Policy/Partnerships
Public Agency
Non-Government Organizations

50077 - 49th St, 50th St, and Haverford St

Status: In Design

System Types: Swale (1), rain garden (1)

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
Traffic Triangles
Streets
Rain Garden
Sidewalk Swale
Vacant Lands/ Land Acquisition
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
Without Stone
Without Pretreatment
Sidewalk Swales
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains

50077 - Heston Lot - Hunter St, 55th St

Status: In Design

Number of Applied Pilot Variables: 9

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Streets
Rain Garden
Vacant Lands/ Land Acquisition
Pilot Systems
Rain Gardens
With Stone
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains
Policy/Partnerships
Public Agency

50078 - Clearview and Washington

Status: In Design

Number of Applied Pilot Variables: 11

Applied Pilot Variables

Pilot Locations
"Open Space" park sites
Non-mowable
Surface
Vacant Lands/ Land Acquisition
Physical Settings
Piedmont Province
Pilot Systems
Rain Gardens
With Stone
With Sumped Inlet Pretreatment
With Forebay Pretreatment
Inlets
Curb Cut Inlets
Trench Drains
Policy/Partnerships
Civic Groups
Implementation Strategies
Following Public-Works

50084 - Carmella Playground

Status: In Design

Number of Applied Pilot Variables: 7

Applied Pilot Variables

Pilot Locations
Recreation Centers
Streets
Sidewalk Swales
Various Ownership Types
Public Parcels
Pilot Systems
Sidewalk Swales
Roof Leader Treatments
Disconnection Options
Leader to planter
Pilot Materials
Storage Types
Arched Systems

50084 - Moss Playground

Status: In Design

Number of Applied Pilot Variables: 10

Applied Pilot Variables

Pilot Locations
Recreation Centers
Centralized Facility
Athletic Fields
Streets
Rain Garden
Infiltration/Storage Trench
Various Ownership Types
Public Parcels
Physical Settings
Slope Conditions
Flat (<0.5%)
Pilot Systems
Inlets
Green Inlets
Curb Cut Inlets
Trench Drains

50086 - East Fairmount Park - Kelly Drive

Status: In Design

Number of Applied Pilot Variables: 3

Applied Pilot Variables

Pilot Locations
Streets
Sidewalk Swale
Pilot Systems
Sidewalk Swales
Policy/Partnerships
Public Agency

50089 - Erie Shopping Center - Castor, Erie, M

Status: In Design

Number of Applied Pilot Variables: 3

Applied Pilot Variables

Pilot Locations
Streets
Planters
Planters
Without Stone
Permapave Inlets

50089 - Francis Hopkinson Little School House - Luzerne, Dungan, L, Lycoming

Status: In Design

Number of Applied Pilot Variables: 3

Applied Pilot Variables

Pilot Locations
Streets
Planters
Infiltration/Storage Trench
Pilot Systems
Planters
With Sumped Inlet Pretreatment

50089 - Glenwood from Pacific to Castor

Status: In Design

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Inlets
Permapave Inlets

50089 - Mariana Bracetti Academy Charter School - Torresdale, Hunting Park, Jasper

Status: In Design

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
Streets
Planters
Infiltration/Storage Trench
Pilot Systems
Planters
Without Stone
With Sumped Inlet Pretreatment

50090 - Philadelphia Protestant House - Levick, Martins Mill, Magee

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Physical Settings	
Slope Conditions	
	Flat (<0.5%)
Pilot Systems	
Inlets	
	Permapave Inlets

40669 - Hope Street from Master to Jefferson

Status: Design Complete

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Materials
Permeable Materials
Asphalt
Implementation Strategies
Following Public-Works

40695 - Hunting Park from Old York Rd to Roosevelt Blvd

Status: In Design

System Types: Vegetated Median (1)

Number of Applied Pilot Variables: 6

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Materials
Permeable Materials
Other
Storage Types
Stone
Implementation Strategies
Following Public-Works

40713 - Mole St from Fitzwater to Catharine and Webster St from 16th to 17th

Status: In Design

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Materials
Permeable Materials
Asphalt
Implementation Strategies
Following Public-Works

40735 - Germantown Ave SFR - Phase 5 - Wildey to Girard

Status: Design Complete

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Implementation Strategies
Storm Flood Relief
Following Public-Works

40736 - Germantown Ave SFR - Phase 6 - 3rd St, Germantown Ave, and Master St

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Implementation Strategies
Storm Flood Relief
Following Public-Works

40747 - Marston, Eyre,Taney

Status: In Design

Number of Applied Pilot Variables: 5

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Materials
Permeable Materials
Asphalt
Implementation Strategies
Following Public-Works

40773 - Galloway, Howard, & Hancock

Status: In Design

System Types: Porous Crosswalk (1)

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
Streets
Crosswalks
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Implementation Strategies
Following Public-Works

40774 - Clifford from 31st to Montgomery

Status: In Design

Number of Applied Pilot Variables: 7

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Permeable
Infiltration/Storage Trench
Various Ownership Types
Public Right-of-way
Physical Settings
Piedmont Province
Pilot Materials
Permeable Materials
Asphalt
Implementation Strategies
Following Public-Works

40775 - Kinsey from Tackawanna St to Torresdale St

Status: In Design

System Types: Injection well (1)

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
Various Ownership Types
Public Right-of-way
Physical Settings
Coastal Plain Province
Pilot Systems
Stormwater Drainage Wells
Implementation Strategies
Following Public-Works

40785 - Collins from Westmoreland to Allegheny, Tulip from Allegheny to Ann, Agate from Clearfield to Allegheny

Status: In Design

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
Streets
Tree Trenches
Various Ownership Types
Public Right-of-way
Pilot Systems
Stormwater Drainage Wells
Implementation Strategies
Following Public-Works

40819 - Camac St, Iseminger St, Juniper St, McClellan St, Pierce St, Watkins St

Status: In Design

Number of Applied Pilot Variables: 3

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Implementation Strategies
Following Public-Works

40827 - Mole, Bancroft

Status: In Design

Number of Applied Pilot Variables: 3

Applied Pilot Variables

Pilot Locations
Streets
Permeable
Various Ownership Types
Public Right-of-way
Implementation Strategies
Following Public-Works

9378 - American Legion Playground

Status: In Planning

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
Centralized Facility
Physical Settings
Slope Conditions
Flat (<0.5%)

Black Coyle & McBride - Huntington, Trenton, Hazzard, Collins

Status: In Design

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Locations
Parking Lots
Subsurface Systems

Burke Playground - Jackson St

Status: In Planning

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

Chelten Ave Vacant Lot between Germantown and Baynton

Status: In Planning

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
Vacant Lands/ Land Acquisition
Policy/Partnerships
Public Agency

Francis Myers Recreation Center

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Systems
Roof Leader Treatments
Disconnection Options
Leader to tree pit

Hackett School

Status: In Planning

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
School yards/Schools
Various Ownership Types
Public Parcels
Parking Lots
Subsurface Systems
Pilot Materials
Storage Types
Structural Vaults

Kingsessing Recreation Center

Status: In Planning

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Systems
Roof Leader Treatments
Disconnection Options
Leader to rain garden

Mastery Charter School - W Berks St

Status: Construction Complete

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

McKinley School

Status: In Design

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
School yards/Schools
Pilot Systems
Roof Leader Treatments
Disconnection Options
Leader to rain garden

Shissler Recreation Center

Status: Construction Complete

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

Thouron & Cliveden Alley

Status: In Planning

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Pilot Locations
Alleys
Public
With Rooftop Disconnect

Christian St from 6th St to E Passyunk Ave

Status: Pending

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

E Passyunk Ave from Federal St to Kimball St

Status: Pending

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

American St. from Thompson St. to Lehigh Ave.

Status: Potential

Number of Applied Pilot Variables: 4

Applied Pilot Variables

Pilot Locations
Medians
Physical Settings
Coastal Plain Province
Implementation Strategies
Complete Street Concepts
SMEDs

Richmond St (I-95)

Status: Potential

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Systems
Stormwater Tree Pit Designs

Temple University SMED

Status: Potential

Number of Applied Pilot Variables: 2

Applied Pilot Variables

Implementation Strategies
SMEDs
Green Campuses

Village of Arts and Humanities SMED

Status: Potential

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Implementation Strategies
SMEDs

Yorktown SMED

Status: Potential

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Implementation Strategies
SMEDs

Methodist Home for Children Resources

Status: Stormwater Management Incentives Program Grant

Number of Applied Pilot Variables: 1

Applied Pilot Variables

Pilot Locations
Commercial

7.0 References

Gulliver, J.S. and J.L. Anderson, ed. 2007. Assessment of Stormwater Best Management Practices. St Paul, MN: University of Minnesota.

Paulachok, Gary N., and Charles R. Wood. Water-table Map of Philadelphia, Pennsylvania, 1976-1980. Interior-Geological Survey, 1984.

APPENDIX C -
2014 CSO PROGRAM MAINTENANCE ANNUAL REPORT

PWD Collector System

Flow Control Unit

2014

CSO Program Maintenance

FLOW CONTROL UNIT

The Collector System Flow Control Unit's primary responsibilities are divided into four groups; Combined Sewer Overflow (CSO) Regulator Maintenance, Pumping Station Operation & Maintenance, Collector System Instrumentation and CCTV Technical Inspections. The Wastewater Pumping Group has a maintenance shop and assemblies at 5202 Pennypack St. in the Torresdale Raw Water Pumping Station. The other three groups have maintenance shops and assemble at the Fox Street Headquarters Facility. A brief description of each of the group's responsibilities and their 2014 fiscal year highlights follows.

CSO REGULATOR MAINTENANCE GROUP

The combined sewer overflow regulating and diversion chambers are serviced and inspected by 19 Interceptor maintenance personnel. This group is responsible for the operations, maintenance, inspections and cleaning of 175 combined sewer-regulating chambers, 89 tide gate chambers, 26 storm relief chambers, 12 sanitary flow diversions, several siphons and other related wastewater control devices throughout the collection system.

Currently PWD maintains ten types of CSO regulators and storage systems:

Brown & Brown (B&B) mechanical	Mechanical Sluice Gates
Computer Controlled Sluice Gates	Side Overflow Weirs
Computer Controlled B&B Shutter Gates	Inflatable Rubber Dams
Static Dams	Water Hydraulic Sluice Gates
Slot type regulators	Computer Controlled Crest Gates

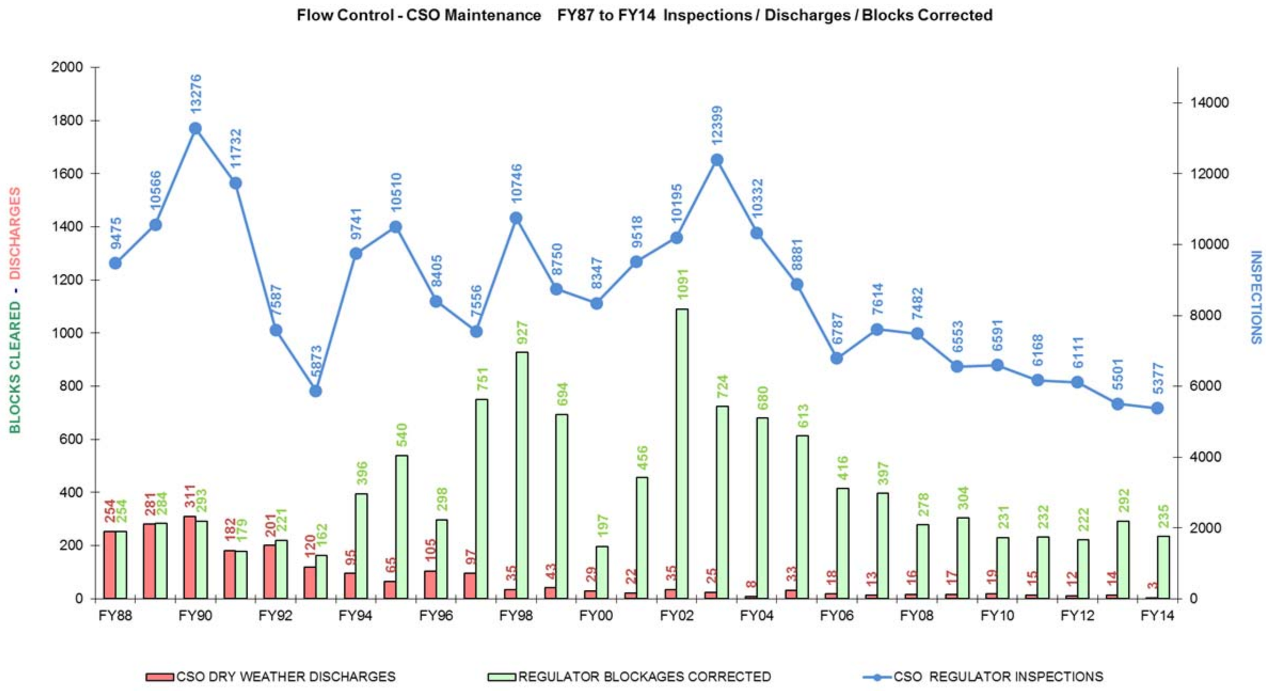
Mechanical or operational malfunctions of the regulators and tide gates can cause dry weather discharges and stream inflow. These types of events can have a major impact on the Wastewater and Fresh Water Treatment Plant's performance, stream water quality and affect the recreational use of our local waterways. Thus, the combined sewer regulator systems are closely monitored for potential blockages and when identified the problems are corrected quickly. CSO chamber Inspections and clearing of any regulator blockages prior to causing a dry weather discharge are the primary responsibilities of this group and are key areas in assessing the group's overall performance.

Dry Weather Discharges are continually tracked and analyzed to determine if new or modified maintenance procedures would help to prevent them from occurring. Although our established procedures have greatly reduced the number and duration of these discharges, the combined system picks up all manner of trash and debris that is unpredictable in its pattern of causing flow disruptions. Despite incorporating best management practices including; having all inlets trapped and cleaned; preventative maintenance schedules for sewer flushing and cleaning or the regulators; CCTV inspection of DWO pipes; etc., it is virtually impossible to eliminate all blockages before they occur.

The City continues to aggressively control and minimize these dry weather overflows by utilizing the latest technology-based controls including our Collector System Remote Monitoring Network that currently includes over 320 sites with over 720 individual level and/or flow measurements. The CSO maintenance personnel are trained in the use of the system's computer programs for analyzing the trend data and have developed a comprehensive understanding of individual CSO sites and their distinctive flow patterns. This familiarity helps them to recognize abnormal conditions quickly at a location so that they can respond before the condition develops into a dry weather CSO blockage or discharge.

The CSO Maintenance Group performed 5,377 inspections of the regulating chambers in FY2014. The work includes frequent visual inspections of the equipment and flow patterns to make sure everything is operating properly. The more comprehensive work such as cleaning and lubricating of the mechanical equipment is scheduled during lower flow periods between rain events.

In FY2014, the crews cleared 235 regulator blockages before they developed into a CSO dry weather discharge. There were only three CSO dry weather discharges for this fiscal year. That is a new record low and continues the trend to reduce these discharges since the peaking in 1990 with 311 discharges for the year.



Many discharges are a result of debris such as rags, sticks, stones and other debris that become lodged in the CSO regulator diversion or the dry weather outlet pipe during dry weather periods. These types of blockages are virtually unpredictable so frequent inspections and closely observing the monitoring trend data is essential to our prevention program. Following moderate to heavy rain events the CSO regulators can have grit, sticks, rags and other debris caught at various places in and around the regulator that could eventually result in a discharge. The CSO maintenance crews perform quick topside inspections of the CSO sites throughout the City for several days following these events to remove or clear away any of this storm debris. The work schedule will then revert to the more comprehensive maintenance such as cleaning, lubricating, adjusting equipment and performing minor repairs to the mechanical regulators.

WASTEWATER PUMPING STATION MAINTENANCE GROUP

The Wastewater Pumping Station Maintenance Group consisting of 24 maintenance personnel are located at the 5202 Pennypack St. Maintenance Shop. They are responsible for the operations and maintenance of 16 wastewater pumping stations, 3 stormwater pumping stations, 2 sodium hypochlorite dosing stations, 11 computer controlled CSO storage regulators and several inline and offline wastewater storage facilities among other duties.

Many of the pumping stations provide for only one running pump and one reserve pump. This arrangement means that pump breakdowns must be responded to immediately and that overhauls need to be completed in a minimum amount of time. The main pump availability statistic compared to prior years is a good indicator of the Maintenance Group's performance in this area. On average, the main pumping units were in service 95.9% of the time in FY2014. The WWP Group completed 5 main wastewater pump overhauls at the stations. These overhauls consist of repair and replacement of the worn pump and motor components to bring the equipment's performance up to new operating condition.

FY 2014 Flow Control Main Pump Unit Out of Service Report

DATE/TIME OUT	DATE/TIME IN	STATION	UNIT	TYPE	REASON	TOTAL DAYS OUT
Thu - 4/24/14 - 10:00 AM	Sat - 4/26/14 - 1:00 PM	BELFRY DRIVE	2	OV	OVERHAUL	2
Wed - 4/9/14 - 9:00 AM	Mon - 4/14/14 - 3:00 PM	CENTRAL SCH	5	BD	JAMMED ROTOVALVE	5
Wed - 3/26/14 - 10:00 AM	Mon - 3/31/14 - 10:00 AM	CENTRAL SCH	3	BD	BREAKDOWN	5
Thu - 3/20/14 - 9:00 AM	Tue - 4/1/14 - 3:00 PM	CENTRAL SCH	6	BD	RUN ONLY N VFD BYPASS (VFD FAN FA LURE)	12
Sat - 2/22/14 - 8:00 AM	Fri - 2/28/14 - 3:00 PM	M LNOR ST	3	OV	OVERHAUL	6
Thu - 12/5/13 - 10:00 AM	Sat - 12/28/13 - 10:00 AM	PNBC-603	3	BD	BAD MPELLOR	23
Sat - 10/19/13 - 7:00 AM	Mon - 11/4/13 - 9:00 AM	BROAD & BLVD	3	BD	WORN MPELLOR	16
Sat - 10/5/13 - 9:00 AM	Sat - 10/5/13 - 2:00 PM	BROAD & BLVD	2	OV	OVERHAUL PUMP	0
Tue - 9/24/13 - 10:00 AM	Tue - 9/24/13 - 2:00 PM	PNBC-603	4	OV	OVERHAUL PUMP	0
Wed - 7/17/13 - 1:00 PM		M NGO CREEK	4	BD	BAD LEAD N MOTOR	420
Tue - 7/16/13 - 9:00 AM	Tue - 7/30/13 - 2:00 PM	CENTRAL SCH	3	OV	OVERHAUL PUMP AND MOTOR	14
Wed - 6/26/13 - 11:00 AM	Mon - 7/8/13 - 2:00 PM	CENTRAL SCH	1	BD	LOCKED ROTOR / BAD BEAR NGS	12
Wed - 4/24/13 - 8:00 AM	Wed - 7/31/13 - 2:00 PM	M NGO CREEK	2	BD	RECT F ER PROBLEM	98

Type Codes: OV - Overhaul BD - Breakdown PM - Preventative Maintenance

In addition to the pumping station maintenance, the group maintains a variety of other equipment throughout the Collector System. They are responsible for the operations and maintenance of the two sodium hypochlorite dosing stations. The stations are located next to the QLRW pump station that injects hypo into the Upper Schuylkill East Interceptor and at the Totem Rd. pump station that injects hypo into the Bucks County force main. The group is responsible for maintaining adequate supply of the chemical, over 1,152,853 gallons in FY2014, for monitoring the downstream hydrogen sulfide levels and adjusting the dosage levels in addition to maintenance and repair of the equipment.

The group also fabricates and repairs bar screens, debris grills and other equipment for the Collector System and performs major maintenance of the CSO mechanical regulators such as installation of tide gates, overflow gates and servicing of the Brown & Brown regulators.

COLLECTOR SYSTEM INSTRUMENTATION MAINTENANCE GROUP

The fourteen Instrument and Electronic Technicians located at the Fox Street facility are primarily responsible for installing, calibrating and maintaining the electronic and instrumentation equipment in the Collector System monitoring and control network. They also repair, calibrate and certify the hazardous gas detection meters for the Department as well as install temporary flow and level monitors for various units in the Water Department.

One of the primary responsibilities of the CS Instrumentation Group is to maintain the network of level, flow meters and rain gauges up and running with a minimum of downtime while maintaining accurate reliable data. The network currently consists of 258 level and flow monitors in the NE SE and SW Drainage Districts, 35 gauges in the citywide rain gauge network, 56 Township flow metering stations and a number of additional monitors at various control sites. It is crucial that the remote site equipment is communicating and downloading data to the server so that the information is available for trend chart viewing and analysis for the users. The CSO maintenance group relies heavily on these charts to monitor the performance of all the CSO regulators while paying special attention to the sites that have had recent or a history of discharges. The monitoring data is used for a wide variety of other purposes such as calibrating the Collector System's hydraulic model, generating township sewage flows for billing and for various Planning and Engineering studies.

CCTV TECHNICAL INSPECTIONS GROUP

The Technical Inspections group consists of two Supervisors and fourteen Technicians who operate and maintain the seven closed circuit TV camera trucks. The seven CCTV trucks logged 38.3 miles of sewer inspections in FY2014.

The group has several primary functions which include inspections of sewers turned in for sewer complaints, special inspection requests from the Water/ Sewer Design group and the post construction inspection program which involves videoing the sewer at the completion of all sewer construction work. Another function of the group is to work with the Defective Connection Program group to identify the defective lateral connections.

FY 2014 Flow Control Service Level Goals					
Month	**CSO Discharges per 100 Inspections**	**% Metering Chambers Operational**	**% CSO Level Meters Operational**	**CCTV Inspections**	**Main Pump Availability**
FY 2014 Monthly Goal -->	**0**	**80% or Higher**	**80% or Higher**	**12.5 Miles**	**95% or Higher**
July - 2013	.0	------	------	3.8	96.9%
August - 2013	.0	------	------	4.5	96.7%
September - 2013	.2	------	------	3.4	98.2%
October - 2013	.0	------	------	3.5	97.5%
November - 2013	.0	------	------	2.9	96.4%
December - 2013	.4	------	------	1.9	94.9%
January - 2014	.0	------	------	2.0	94.7%
February - 2014	.0	------	------	1.9	94.2%
March - 2014	.0	------	------	4.0	97.2%
April - 2014	.0	------	------	3.9	94.2%
May - 2014	.0	87.0%	86.5%	3.1	94.7%
June - 2014	.0	89.8%	90.2%	3.5	94.6%
Year Avg or Total	**.1**	**88.4%**	**88.4%**	**38.3**	**95.9%**

PART 1 | PHILADELPHIA WATER DEPARTMENT | Section 1

DRY WEATHER STATUS | WASTE AND STORM WATER COLLECTION

REPORT | FLOW CONTROL UNIT | FY2014 Annual CSO Report

COLLECTOR	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Totals
UPPER PENNYPACK - 5 UNITS													
INSPECTIONS	18	11	11	14	7	8	13	13	7	5	6	7	120
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	0	1	0	0	0	0	0	1	1	0	3
UPPER DELAWARE LOW LEVEL - 12 UNITS													
INSPECTIONS	34	30	26	36	20	18	47	25	19	18	16	17	306
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	1	0	2	1	1	1	0	1	2	4	3	16
LOWER FRANKFORD CREEK - 6 UNITS													
INSPECTIONS	8	17	14	13	8	13	19	22	10	14	12	8	158
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	2	0	0	0	0	3	3	2	2	0	1	13
LOWER FRANKFORD LOW LEVEL - 10 UNITS													
INSPECTIONS	23	24	22	19	22	41	34	25	24	28	21	20	303
DISCHARGES	0	0	0	0	0	1	0	0	0	0	0	0	1
BLOCKS CLEARED	2	0	1	0	0	5	0	0	1	3	1	0	13
FRANKFORD HIGH LEVEL - 14 UNITS													
INSPECTIONS	41	43	47	46	42	49	33	38	24	31	34	32	460
DISCHARGES	0	0	1	0	0	0	0	0	0	0	0	0	1
BLOCKS CLEARED	1	0	2	1	0	2	0	0	3	0	1	1	11
SOMERSET - 9 UNITS													
INSPECTIONS	29	22	17	35	28	23	29	22	17	14	12	15	263
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	0	0	0	0	0	0	2	1	0	1	5
LOWER DELAWARE LOW LEVEL - 33 UNITS													
INSPECTIONS	58	77	63	86	80	71	58	47	40	39	35	38	692
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	2	1	5	0	0	2	0	0	1	3	1	16
CENTRAL SCHUYLKILL EAST - 18 UNITS													
INSPECTIONS	53	66	55	55	49	32	66	55	53	23	33	45	585
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	5	4	3	5	2	5	7	0	1	6	10	12	60
LOWER SCHUYLKILL EAST - 9 UNITS													
INSPECTIONS	11	16	14	19	11	40	26	12	21	15	14	18	217
DISCHARGES	0	0	0	0	0	1	0	0	0	0	0	0	1
BLOCKS CLEARED	1	3	2	0	0	0	0	0	3	0	0	1	10
CENTRAL SCHUYLKILL WEST - 9 UNITS													
INSPECTIONS	23	25	16	28	27	9	23	34	19	9	17	16	246
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	3	0	3	2	0	4	0	1	0	2	4	22
SOUTHWEST MAIN GRAVITY - 10 UNITS													
INSPECTIONS	31	27	26	43	20	21	29	33	22	20	29	17	318
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	4	2	0	0	0	0	0	0	1	2	1	13
LOWER SCHUYLKILL WEST - 4 UNITS													
INSPECTIONS	8	10	8	18	4	8	5	14	8	4	16	13	116
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	3	0	1	1	0	0	0	0	0	1	3	11
COBBS CREEK HIGH LEVEL - 23 UNITS													
INSPECTIONS	96	77	62	98	84	77	75	84	52	42	32	35	814
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	7	3	7	0	0	1	0	0	6	3	1	1	29
COBBS CREEK LOW LEVEL - 13 UNITS													
INSPECTIONS	36	51	40	56	47	43	39	41	27	16	17	20	433
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	4	0	1	0	0	0	0	3	0	0	2	12
RELIEF SEWERS - 26 UNITS													
INSPECTIONS	37	30	34	26	25	27	39	26	25	27	25	25	346
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTALS / MONTH for 201 REGULATOR UNITS													Totals
TOTAL INSPECTIONS	506	526	455	592	474	480	535	491	368	305	319	326	5377
TOTAL DISCHARGES	0	0	1	0	0	2	0	0	0	0	0	0	3
TOTAL BLOCKS CLEARED	28	29	18	19	7	14	17	3	23	20	26	31	235
AVER. # of INSP. / BC	18	18	25	31	68	34	31	164	16	15	12	11	37
DISC / 100 INSPECTIONS	0.0	0.0	0.2	0 0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0 0	0.1

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
UPPER PENNYPACK 5 NEWPC UNITS															
P01	3	2	2	3	1	2	3	3	1	1	1	2	24	2.0	15.2
P02	3	2	2	3	1	1	3	3	1	1	1	1	22	1.8	16.6
P03	3	2	2	3	2	1	3	3	1	1	1	1	23	1.9	15.9
P04	5	3	3	3	2	3	2	2	2	1	2	2	30	2.5	12.2
P05	4	2	2	2	1	1	2	2	2	1	1	1	21	1.8	17.4
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS															
D02	3	3	3	4	2	2	5	2	3	2	2	1	32	2.7	11.4
D03	3	4	2	3	2	2	4	2	3	2	1	1	29	2.4	12.6
D04	4	4	3	4	3	3	5	3	3	2	2	2	38	3.2	9.6
D05	3	2	2	3	2	1	4	2	2	3	1	2	27	2.3	13.5
D06	3	2	2	3	2	1	4	2	1	1	1	1	23	1.9	15.9
D07	2	2	2	3	2	1	4	2	1	1	1	1	22	1.8	16.6
D08	2	2	2	3	1	2	3	2	1	2	1	2	23	1.9	15.9
D09	2	2	2	3	1	1	3	2	1	1	1	1	20	1.7	18.2
D11	2	2	2	3	1	2	6	3	1	1	1	1	25	2.1	14.6
D12	3	3	2	2	1	1	3	2	1	1	1	3	23	1.9	15.9
D13	4	2	2	2	1	1	3	2	1	1	1	1	21	1.8	17.4
D15	3	2	2	3	2	1	3	1	1	1	3	1	23	1.9	15.9
LOWER FRANKFORD CREEK 6 NEWPC UNITS															
F13	2	4	3	3	1	2	4	3	3	3	3	1	32	2.7	11.4
F14	2	5	3	2	2	3	4	3	3	3	3	2	35	2.9	10.4
F21	1	2	2	2	1	2	2	4	1	2	1	1	21	1.8	17.4
F23	1	2	2	2	2	1	5	4	1	2	2	2	26	2.2	14.0
F24	1	2	2	2	1	3	2	4	1	2	2	1	23	1.9	15.9
F25	1	2	2	2	1	2	2	4	1	2	1	1	21	1.8	17.4
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS															
F03	2	2	2	2	2	3	2	3	1	1	2	1	23	1.9	15.9
F04	2	2	2	2	2	2	2	2	1	1	2	1	21	1.8	17.4
F05	3	2	2	2	2	2	1	2	1	1	1	1	20	1.7	18.2
F06	2	2	2	3	2	8	3	2	3	3	2	3	35	2.9	10.4
F07	2	2	2	1	2	6	1	2	2	3	2	1	26	2.2	14.0
F08	2	2	2	2	2	3	1	2	1	2	3	1	23	1.9	15.9
F09	4	4	5	2	3	11	19	4	4	6	3	3	68	5.7	5.4
F10	1	2	2	1	2	2	1	2	7	5	2	1	28	2.3	13.0
F11	3	2	1	1	2	2	1	2	2	4	3	7	30	2.5	12.2
F12	2	4	2	3	3	2	3	4	2	2	1	1	29	2.4	12.6
FRANKFORD HIGH LEVEL 14 NEWPC UNITS															
T01	2	2	1	1	1	2	2	2	1	2	1	1	18	1.5	20.3
T03	3	3	2	2	1	3	2	3	1	1	3	1	25	2.1	14.6
T04	2	2	16	10	6	8	4	3	1	2	2	1	57	4.8	6.4
T05	1	2	1	2	2	3	2	3	1	1	2	1	21	1.8	17.4
T06	2	3	1	2	2	3	2	3	1	1	1	1	22	1.8	16.6
T07	1	2	1	2	2	2	2	2	1	1	1	1	18	1.5	20.3
T08	2	3	2	2	2	2	2	3	1	2	4	1	26	2.2	14.0
T09	2	2	1	2	3	5	4	4	5	3	4	5	40	3.3	9.1
T10	6	6	8	7	5	4	4	4	5	5	7	7	68	5.7	5.4
T11	6	6	5	6	7	6	2	3	1	4	4	6	56	4.7	6.5
T12	3	3	3	4	3	3	1	2	2	3	1	2	30	2.5	12.2
T13	4	5	4	4	4	4	2	2	1	4	1	3	38	3.2	9.6
T14	3	2	1	1	2	2	2	2	1	1	2	1	20	1.7	18.2
T15	4	2	1	1	2	2	2	2	2	1	1	1	21	1.8	17.4

2 TOTAL DISCHARGES FOR NE & SE DISTRICTS

0.2 AVERAGE DISCHARGES PER MONTH

14.5 AVER. DAYS BEFORE RETURNING TO SITE

3.2 AVER. INSPECTIONS PER DAY PER CREW

DTR = DAYS TO RETURN TO SITE

I/D/C = INSPECTIONS PER DAY PER CREW

I/D = INSPECTIONS PER DISCHARGE

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
SOMERSET LOW LEVEL 9 NEWPC UNITS															
D17	3	2	1	4	3	2	4	2	2	1	1	2	27	2.3	13.5
D18	3	3	1	4	3	3	3	2	2	1	1	1	27	2.3	13.5
D19	3	4	2	4	4	3	3	3	2	2	1	1	32	2.7	11.4
D20	3	3	3	5	3	3	3	3	2	2	3	2	35	2.9	10.4
D21	3	2	2	4	3	3	3	2	2	1	1	1	27	2.3	13.5
D22	3	2	3	4	3	2	3	2	2	1	1	1	27	2.3	13.5
D23	3	2	2	4	4	2	4	6	3	1	1	1	33	2.8	11.1
D24	3	2	2	4	3	2	3	1	1	2	1	2	26	2.2	14.0
D25	5	2	1	2	2	3	3	1	1	3	2	4	29	2.4	12.6
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS															
D37	4	2	2	6	5	2	3	2	3	2	1	1	33	2.8	11.1
D38	1	3	2	3	4	2	3	1	2	1	1	1	24	2.0	15.2
D39	1	2	4	3	4	2	3	1	1	3	1	1	26	2.2	14.0
D40	2	2	2	3	3	2	3	3	1	1	1	2	25	2.1	14.6
D41	2	2	3	3	3	2	3	1	1	1	1	1	23	1.9	15.9
D42	2	2	2	3	2	2	3	1	1	1	1	1	21	1.8	17.4
D43	2	2	2	3	2	2	3	1	1	1	1	1	21	1.8	17.4
D44	1	5	2	3	3	2	3	2	1	1	1	1	25	2.1	14.6
D45	2	2	2	2	3	3	3	2	1	1	1	1	23	1.9	15.9
D46	2	1	2	2	2	2	3	1	2	1	1	1	20	1.7	18.2
D47	2	2	2	2	2	4	3	1	1	1	1	1	22	1.8	16.6
D48	3	6	3	5	4	4	3	2	2	2	2	4	40	3.3	9.1
D49	2	2	2	4	2	3	1	1	1	3	1	1	23	1.9	15.9
D50	2	2	2	2	2	4	1	1	1	1	1	1	20	1.7	18.2
D51	1	2	2	2	2	3	1	2	2	1	1	1	20	1.7	18.2
D52	1	2	2	2	2	2	1	2	1	1	1	1	18	1.5	20.3
D53	2	2	2	2	2	2	1	1	1	1	1	1	18	1.5	20.3
D54	1	2	2	2	2	2	1	1	1	1	1	1	17	1.4	21.5
D58	3	2	3	2	3	3	2	3	3	2	1	1	28	2.3	13.0
D61	1	2	1	2	2	4	1	1	1	1	1	1	18	1.5	20.3
D62	1	2	1	2	2	3	1	2	1	1	1	1	18	1.5	20.3
D63	2	5	4	5	4	2	1	2	1	1	1	1	29	2.4	12.6
D64	1	2	1	2	2	2	1	1	1	1	1	1	16	1.3	22.8
D65	1	2	3	2	2	2	1	1	2	1	1	1	19	1.6	19.2
D66	1	2	1	2	2	1	1	1	1	1	1	1	15	1.3	24.3
D67	1	3	1	2	2	1	1	3	1	1	1	1	18	1.5	20.3
D68	3	4	2	2	3	1	1	1		1	1	1	20	1.8	18.2
D69	2	2	1	3	2	1	1	1	1	1	1	1	17	1.4	21.5
D70	2	4	2	4	2	1	1	1	1	1	2	2	23	1.9	15.9
D71	3	2	1	1	1	1	1	1	1	1	1	1	15	1.3	24.3
D72	3	1	1	2	2	1	1	1	1	1	1	1	16	1.3	22.8
D73	1	1	1	1	1	1	1	1		1	1	1	11	1.0	33.2
				2	1	2	1	1	1		1	1			
TOTAL	211	224	200	249	207	223	233	192	141	149	136	137	2302		
I /D/C	3.5	3.7	3.3	4.1	3.4	3.7	3.8	3.2	2.3	2.4	2.2	2.3			
UP	18	11	11	14	7	8	13	13	7	5	6	7	120	2.0	15.4
UDLL	34	30	26	36	20	18	47	25	19	18	16	17	306	2.1	14.8
LFC	8	17	14	13	8	13	19	22	10	14	12	8	158	2.2	14.4
LFLL	23	24	22	19	22	41	34	25	24	28	21	20	303	2.5	13.5
FHL	41	43	47	46	42	49	33	38	24	31	34	32	460	2.7	13.4
SLL	29	22	17	35	28	23	29	22	17	14	12	15	263	2.4	12.6
LDLL	58	77	63	86	80	71	58	47	40	39	35	38	682	1.8	18.2

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01													0
P02													0
P03													0
P04													0
P05													0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02													0
D03													0
D04													0
D05													0
D06													0
D07													0
D08													0
D09													0
D11													0
D12													0
D13													0
D15													0
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13													0
F14													0
F21													0
F23													0
F24													0
F25													0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03													0
F04													0
F05													0
F06													0
F07													0
F08													0
F09						1							1
F10													0
F11													0
F12													0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01													0
T03													0
T04			1										1
T05													0
T06													0
T07													0
T08													0
T09													0
T10													0
T11													0
T12													0
T13													0
T14													0
T15													0

													TOTAL
UP	0	0	0	0	0	0	0	0	0	0	0	0	0
UDLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LFC	0	0	0	0	0	0	0	0	0	0	0	0	0
LFLL	0	0	0	0	0	1	0	0	0	0	0	0	1
FHL	0	0	1	0	0	0	0	0	0	0	0	0	1
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
SOMERSET LOW LEVEL 9 NEWPC UNITS													
D17													0
D18													0
D19													0
D20													0
D21													0
D22													0
D23													0
D24													0
D25													0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													
D37													0
D38													0
D39													0
D40													0
D41													0
D42													0
D43													0
D44													0
D45													0
D46													0
D47													0
D48													0
D49													0
D50													0
D51													0
D52													0
D53													0
D54													0
D58													0
D61													0
D62													0
D63													0
D64													0
D65													0
D66													0
D67													0
D68													0
D69													0
D70													0
D71													0
D72													0
D73													0
D75													0
													TOTAL DISC
	0	0	1	0	0	1	0	0	0	0	0	0	2

	NO OF UNITS IN DISTRICT BLOCKED												TOTAL
UP	0	0	0	0	0	0	0	0	0	0	0	0	0
UDLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LFC	0	0	0	0	0	0	0	0	0	0	0	0	0
LFLL	0	0	0	0	0	1	0	0	0	0	0	0	1
FHL	0	0	1	0	0	0	0	0	0	0	0	0	1
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01													0
P02													0
P03													0
P04				1						1	1		3
P05													0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02				1									1
D03		1											1
D04									1		2	1	4
D05												1	1
D06				1	1		1					1	4
D07													0
D08						1				2	1		4
D09													0
D11													0
D12													0
D13													0
D15											1		1
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13		1							1				2
F14		1					2	2	1				6
F21													0
F23							1			2		1	4
F24								1					1
F25													0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03													0
F04													0
F05										1			1
F06										1			1
F07									1	1	1		3
F08	1												1
F09	1		1			5							7
F10													0
F11													0
F12													0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01													0
T03													0
T04			2										2
T05													0
T06													0
T07													0
T08													0
T09						2			1				3
T10				1					2				3
T11	1											1	2
T12											1		1
T13													0
T14													0
T15													0

6.417 AVERAGE BLOCKAGES PER MONTH

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
SOMERSET LOW LEVEL 9 NEWPC UNITS													
D17									1				1
D18									1				1
D19	1												1
D20										1		1	2
D21													0
D22													0
D23													0
D24													0
D25													0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													
D37													0
D38													0
D39													0
D40		1											1
D41													0
D42													0
D43													0
D44													0
D45													0
D46													0
D47													0
D48	1	1	1	2			2			1	2	1	11
D49													0
D50													0
D51													0
D52													0
D53													0
D54													0
D58													0
D61													0
D62													0
D63				1									1
D64													0
D65													0
D66													0
D67													0
D68													0
D69													0
D70				1							1		2
D71													0
D72				1									1
D73													0
D75													0
													TOTAL
	5	5	4	9	1	8	6	3	9	10	10	7	77

UP	0	0	0	1	0	0	0	0	0	1	1	0	3
UDLL	0	1	0	2	1	1	1	0	1	2	4	3	16
LFC	0	2	0	0	0	0	3	3	2	2	0	1	13
LFLL	2	0	1	0	0	5	0	0	1	3	1	0	13
FHL	1	0	2	1	0	2	0	0	3	0	1	1	11
SLL	1	0	0	0	0	0	0	0	2	1	0	1	5
LDLL	1	2	1	5	0	0	2	0	0	1	3	1	16

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS															
S05	5	4	4	4	3	3	4	3	4	2	1	2	39	3.3	9.4
S06	3	3	4	5	2	3	4	3	4	2	3	2	38	3.2	9.6
S07	2	3	4	4	2	1	4	3	3	2	2	2	32	2.7	11.4
S08	2	3	4	2	2	1	4	2	3	1	2	4	30	2.5	12.2
S09	7	8	3	4	3	1	6	5	4	2	2	4	49	4.1	7.4
S10	2	3	3	2	2	2	3	2	3	1	1	1	25	2.1	14.6
S12	3	4	4	3	3	3	4	3	4	1	2	4	38	3.2	9.6
S12A	3	4	4	3	3	2	4	3	3	1	4	2	36	3.0	10.1
S13	3	3	4	2	3	2	4	3	3	1	2	2	32	2.7	11.4
S15	3	3	3	3	3	2	4	3	3	1	2	2	32	2.7	11.4
S16	2	3	4	3	3	1	4	2	2	1	1	1	27	2.3	13.5
S17	2	3	2	3	3	1	3	2	2	1	1	1	24	2.0	15.2
S18	3	7	2	6	3	2	3	5	3	1	3	3	41	3.4	8.9
S19	3	3	2	3	4	2	3	3	3	1	2	3	32	2.7	11.4
S21	3	3	2	2	2	2	3	4	3	2	1	2	29	2.4	12.6
S23	3	3	2	2	3	2	3	3	2	1	2	6	32	2.7	11.4
S25	2	3	2	2	3	1	3	4	2	1	1	3	27	2.3	13.5
S26	2	3	2	2	2	1	3	2	2	1	1	1	22	1.8	16.6
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS															
S31	2	2	2	3	1	2	1	1	2	1	1	1	19	1.6	19.2
S35	1	2	1	3	1	2	1	2	2	1	1	1	18	1.5	20.3
S36	2	1	1	1	1	1	1		1	3		1	13	1.3	28.1
S36A	1	2	1	2	1	1	1	1	2	1	1	1	15	1.3	24.3
S37	1	1	1	1	1	1	1		1	1		1	10	1.0	36.5
S42	1	3	6	4	2	17	8	3	5	4	5	8	66	5.5	5.5
S42A	1	2	1	2	1	14	11	4	5	2	6	3	52	4.3	7.0
S44	1	1	1	1	1	1	1		1	1		1	10	1.0	36.5
S46	1	2		2	2	1	1	1	2	1		1	14	1.4	26.1
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS															
S01	2	2	2	2	2	1	2	3	2	1	2	1	22	1.8	16.6
S02	2	2	1	2	3	1	2	3	2	1	2	1	22	1.8	16.6
S03	2	2	1	2	2	1	4	2	2	1	2	1	22	1.8	16.6
S04	3	2	2	2	2	1	2	3	2	1	2	1	23	1.9	15.9
S11	2	2	2	3	2	1	3	3	1	1	1	1	22	1.8	16.6
S14	2	3	2	3	10	1	2	3	2	1	1	1	31	2.6	11.8
S20	2	2	2	3	2	1	3	3	2	1	1	1	23	1.9	15.9
S22	4	6	2	5	2	1	3	7	3	1	4	4	42	3.5	8.7
S24	4	4	2	6	2	1	2	7	3	1	2	5	39	3.3	9.4
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS															
S27	3	2	2	4	2	1	2	4	2	2	1	2	27	2.3	13.5
S28	3	2	2	4	2	1	2	4	2	2	1	2	27	2.3	13.5
S30	3	2	2	4	2	1	2	3	2	2	1	2	26	2.2	14.0
S34	3	2	2	5	2	2	2	4	2	2	2	1	29	2.4	12.6
S39	3	2	2	4	2	1	2	2	1	2	1	1	23	1.9	15.9
S40	2	2	2	4	2	1	1	2	1	2	1	1	21	1.8	17.4
S43	3	2	2	4	2	2	1	2	1	2	1	1	23	1.9	15.9
S47	3	2	2	4	2	2	1	2	1	2	1	1	23	1.9	15.9
S50	4	6	7	7	2	7	12	6	8	2	17	4	82	6.8	4.4
S51	4	5	3	3	2	3	4	4	2	2	3	2	37	3.1	9.9
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS															
S32	1	3	2	5	1	2	2	4	2	1	6	5	34	2.8	10.7
S33	1	3	2	5	1	2	1	4	2	1	7	4	33	2.8	11.1
S38	4	2	2	5	1	3	1	3	2	1	2	3	29	2.4	12.6
S45	2	2	2	3	1	1	1	3	2	1	1	1	20	1.7	18.2

1 TOTAL DISCHARGES IN SW DISTRICT DTR = DAYS TO RETURN TO SITE

0.1 AVERAGE DISCHARGES PER MONTH I/D/C = INSPECTIONS PER DAY PER CREW

13.8 AVER. DAYS BEFORE RETURNING TO SITE I/D = INSPECTIONS PER DISCHARGE

2.5 AVER. INSPECTIONS PER DAY PER CREW

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
COBBS CREEK HIGH LEVEL 23 SWWPC UNITS															
C01	7	5	3	5	4	3	3	4	3	2	1	1	41	3.4	8.9
C02	5	3	3	4	3	3	3	4	3	2	1	3	37	3.1	9.9
C04	4	3	3	4	4	4	4	4	3	2	1	2	38	3.2	9.6
C04A	5	3	3	3	4	4	3	3	3	2	1	2	36	3.0	10.1
C05	6	3	3	4	3	2	3	4	3	4	4	2	41	3.4	8.9
C06	6	3	3	5	4	4	4	5	3	2	2	2	43	3.6	8.5
C07	7	3	3	5	4	4	4	5	3	2	2	2	44	3.7	8.3
C09	5	3	3	5	4	4	5	5	3	2	2	1	42	3.5	8.7
C10	3	3	3	4	4	3	4	4	2	2	1	2	35	2.9	10.4
C11	5	3	3	4	3	4	3	5	2	2	2	1	37	3.1	9.9
C12	3	3	3	4	3	2	3	4	2	2	1	1	31	2.6	11.8
C13	2	3	2	3	3	2	2	2	2	2	1	1	25	2.1	14.6
C14	3	4	3	6	4	5	3	3	2	2	2	1	38	3.2	9.6
C15	2	4	3	4	4	4	2	2	2	2	1	1	31	2.6	11.8
C16	3	5	3	4	5	3	3	3	2	2	1	1	35	2.9	10.4
C17	3	4	3	5	3	3	3	3	2	2	1	1	33	2.8	11.1
C31	3	3	3	6	4	3	5	4	2	1	1	1	36	3.0	10.1
C32	5	3	2	3	4	5	3	3	1	1	1	1	32	2.7	11.4
C33	3	3	2	5	3	3	4	3	2	1	1	3	33	2.8	11.1
C34	3	3	2	5	5	3	4	4	2	1	1	1	34	2.8	10.7
C35	3	3	2	4	3	3	2	4	2	1	1	3	31	2.6	11.8
C36	5	3	2	4	3	3	3	4	2	2	2	1	34	2.8	10.7
C37	5	4	2	2	3	3	2	2	1	1	1	1	27	2.3	13.5
COBBS CREEK LOW LEVEL 13 SWWPC UNITS															
C18	2	5	3	4	3	3	3	3	2	2	2	1	33	2.8	11.1
C19	2	4	3	4	3	3	3	3	2	2	1	1	31	2.6	11.8
C20	3	4	3	4	4	3	3	4	2	1	2	1	34	2.8	10.7
C21	3	4	3	5	4	4	3	3	2	1	1	1	34	2.8	10.7
C22	3	5	3	4	5	4	3	3	2	1	1	1	35	2.9	10.4
C23	4	4	3	4	4	4	3	3	2	1	2	2	36	3.0	10.1
C24	4	4	3	5	3	3	3	3	2	1	1	1	33	2.8	11.1
C25	4	5	4	6	4	4	3	4	3	2	1	2	42	3.5	8.7
C26	2	4	3	4	3	3	3	3	2	1	1	2	31	2.6	11.8
C27	3	4	3	4	3	3	3	3	2	1	1	2	32	2.7	11.4
C28A	2	3	3	4	3	3	3	3	2	1	1	4	32	2.7	11.4
C29	2	2	3	4	4	3	3	3	2	1	2	1	30	2.5	12.2
C30	2	3	3	4	4	3	3	3	2	1	1	1	30	2.5	12.2
TOTAL	258	272	221	317	242	230	263	273	202	129	158	164	2729		
I /D/C	2.8	3.0	2.4	3.5	2.7	2.5	2.9	3.0	2.2	1.4	1.7	1.8			
CSES	53	66	55	55	49	32	66	55	53	23	33	45	585	2.7	11.7
LSES	11	16	14	19	11	40	26	12	21	15	14	18	217	2.1	22.6
CSW	23	25	16	28	27	9	23	34	19	9	17	16	246	2.3	14.2
SWMG	31	27	26	43	20	21	29	33	22	20	29	17	318	2.7	13.3
LSW	8	10	8	18	4	8	5	14	8	4	16	13	116	2.4	13.2
CCHL	96	77	62	98	84	77	75	84	52	42	32	35	814	2.9	10.5
CCLL	36	51	40	56	47	43	39	41	27	16	17	20	433	2.8	11.0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS													
S05													0
S06													0
S07													0
S08													0
S09													0
S10													0
S12													0
S12A													0
S13													0
S15													0
S16													0
S17													0
S18													0
S19													0
S21													0
S23													0
S25													0
S26													0
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31													0
S35													0
S36													0
S36A													0
S37													0
S42						1							1
S42A													0
S44													0
S46													0
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01													0
S02													0
S03													0
S04													0
S11													0
S14													0
S20													0
S22													0
S24													0
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27													0
S28													0
S30													0
S34													0
S39													0
S40													0
S43													0
S47													0
S50													0
S51													0
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS													
S32													0
S33													0
S38													0
S45													0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
COBBS CREEK HIGH LEVEL 23 SWWPC UNITS													
C01													0
C02													0
C04													0
C04A													0
C05													0
C06													0
C07													0
C09													0
C10													0
C11													0
C12													0
C13													0
C14													0
C15													0
C16													0
C17													0
C31													0
C32													0
C33													0
C34													0
C35													0
C36													0
C37													0
COBBS CREEK LOW LEVEL 13 SWWPC UNITS													
C18													0
C19													0
C20													0
C21													0
C22													0
C23													0
C24													0
C25													0
C26													0
C27													0
C28A													0
C29													0
C30													0
													TOTAL DISC
	0	0	0	0	0	1	0	0	0	0	0	0	1

	NO OF UNITS IN DISTRICT BLOCKED												**TOTAL**
CSE	0	0	0	0	0	0	0	0	0	0	0	0	0
LSE	0	0	0	0	0	1	0	0	0	0	0	0	1
CSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SWG	0	0	0	0	0	0	0	0	0	0	0	0	0
LSW	0	0	0	0	0	0	0	0	0	0	0	0	0
CCHL	0	0	0	0	0	0	0	0	0	0	0	0	0
CCLL	0	0	0	0	0	0	0	0	0	0	0	0	0

	NO OF DISCHARGES IN DISTRICT												**TOTAL**
CSE	0	0	0	0	0	0	0	0	0	0	0	0	0
LSE	0	0	0	0	0	1	0	0	0	0	0	0	1
CSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SWG	0	0	0	0	0	0	0	0	0	0	0	0	0
LSW	0	0	0	0	0	0	0	0	0	0	0	0	0
CCHL	0	0	0	0	0	0	0	0	0	0	0	0	0
CCLL	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS													
S05	1					1						1	3
S06		1		1						1			3
S07										1			1
S08			1				1			1	2		5
S09	2		1			1	3		1	1	1	3	13
S10													0
S12						1	1						2
S12A											1		1
S13													0
S15													0
S16											1		1
S17	1												1
S18	1			2		1	1			1	2	2	10
S19												2	2
S21													0
S23		2		2	2						1	3	10
S25		1	1			1	1			1	1	1	7
S26											1		1
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31		1							1				2
S35									1				1
S36													0
S36A													0
S37													0
S42	1		1									1	3
S42A		1	1										2
S44													0
S46		1							1				2
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01													0
S02													0
S03							1						1
S04		1											1
S11							1						1
S14		1		2	2		1		1				7
S20		1											1
S22	1			1							1	3	6
S24	2						1				1	1	5
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27										1			1
S28	1												1
S30	1	1	1										3
S34			1									1	2
S39	1	1											2
S40													0
S43		1											1
S47		1											1
S50											2		2
S51													0
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS													
S32		1										1	2
S33	1	2		1	1						1	1	7
S38	1											1	2
S45													0

14.27 AVERAGE BLOCKAGES PER MONTH

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
COBBS CREEK HIGH LEVEL 23 SWWPC UNITS													
C01													0
C02	1											1	2
C04													0
C04A													0
C05	1	1							1				3
C06													0
C07	1												1
C09													0
C10		1	1										2
C11		1											1
C12			1										1
C13													0
C14													0
C15										1			1
C16			1						1				2
C17									1				1
C31	1									1			2
C32													0
C33	1		1			1			1				4
C34	1		1										2
C35													0
C36			1						1		1		3
C37	1		1						1	1			4
COBBS CREEK LOW LEVEL 13 SWWPC UNITS													
C18													0
C19													0
C20		1											1
C21													0
C22													0
C23	1												1
C24	1	1		1					1			1	5
C25		1											1
C26		1											1
C27									1			1	2
C28A									1				1
C29													0
C30													0
													TOTAL
	23	24	14	10	5	6	11	0	14	10	16	24	157

CSE	5	4	3	5	2	5	7	0	1	6	10	12	60
LSE	1	3	2	0	0	0	0	0	3	0	0	1	10
CSW	3	3	0	3	2	0	4	0	1	0	2	4	22
SWG	3	4	2	0	0	0	0	0	0	1	2	1	13
LSW	2	3	0	1	1	0	0	0	0	0	1	3	11
CCHL	7	3	7	0	0	1	0	0	6	3	1	1	29
CCLL	2	4	0	1	0	0	0	0	3	0	0	2	12

RELIEF SEWER MONTHLY INSPECTION

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	2	1	1	1	1	1	3	1	1	1	1	1	15
R02	2	1	1	1	1	1	3	1	1	1	1	1	15
R03	3	1	1	1	1	1	3	1	1	1	1	1	16
R04	2	1	1	1	1	1	2	1	1	1	1	1	14
R05	3	1	1	1	1	1	2	1	1	1	1	1	15
R06	2	1	1	1	1	1	2	1	1	1	1	1	14
MAIN RELIEF SEWER													
R07	1	1	2	2	1	1	2	1	1	1	1	1	15
R08	1	1	2	1	1	1	2	1	1	1	1	1	14
R09	1	1	3	1	1	1	2	1	1	1	1	1	15
R10	1	1	3	1	1	1	2	1	1	1	1	1	15
R11	1	1	2	1	1	1	1	1	1	2	1	1	14
R11A	1	1	2	1	1	1	1	1	1	1	1	1	13
R12	1	1	2	1	1	1	1	1	1	2	1	1	14
WAKLING RELIEF SEWER													
R13	1	2	1	1	1	1	1	2	1	1	1	1	14
R14	1	2	1	1	1	1	1	2	1	1	1	1	14
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	1	1	1	1	1	1	1	1	1	1	1	1	12
OREGON AVE RELIEF SEWER													
R16	2	2	1	1	1	1	1	1	1	1	1	1	14
R17	2	2	1	1	1	1	1	1	1	1	1	1	14
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	1	1	1	1	1	1	1	1	1	1	1	1	12
32ND ST RELIEF SEWER													
R19	1	1	1	1	1	1	1	1	1	1	1	1	12
MAIN STREET RELIEF SEWER													
R20	1	1	1	1	1	1	1	1	1	1	1	1	12
SOMERSET SYSTEM DIVERSION CHAMBER													
R21													0
TEMPORARY REGULATOR CHAMBER													
R22													
R23	1	1	1	1	1	1	1	1	1	1	1	1	12
ARCH ST RELIEF SEWER													
R24	2	1	1	1	1	1	2		1	1	1	1	13
16TH & SNYDER													
R25	2	1	1	1	1	2	1		1	1	1	1	13
GRANT & STATE RD. RELIEF													
R26	1	2	1	1	1	2	1	2	1	1	1	1	15
TOTAL	37	30	34	26	25	27	39	26	25	27	25	25	346
AVER	1.4	1.1	1.3	1.0	0.9	1.0	1.4	1.0	0.9	1.0	0.9	0.9	1.1

RELIEF SEWER MONTHLY DISCHARGE

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01													0
R02													0
R03													0
R04													0
R05													0
R06													0
MAIN RELIEF SEWER													
R07													0
R08													0
R09													0
R10													0
R11													0
R11A													0
R12													0
WAKLING RELIEF SEWER													
R13													0
R14													0
ROCK RUN STORM FLOOD RELIEF SEWER													
R15													0
OREGON AVE RELIEF SEWER													
R16													0
R17													0
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18													0
32ND ST RELIEF SEWER													
R19													0
MAIN STREET RELIEF SEWER													
R20													0
SOMERSET SYSTEM DIVERSION CHAMBER													
R21													0
TEMPORARY REGULATOR CHAMBER													
R22													0
R23													0
ARCH ST RELIEF SEWER													
R24													0
16TH & SNYDER													
R25													0
GRANT & STATE RD. RELIEF													
R26													0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITS	0	0	0	0	0	0	0	0	0	0	0	0	

RELIEF SEWER MONTHLY BLOCKS CLEARED

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01					1								1
R02													0
R03													0
R04													0
R05													0
R06													0
MAIN RELIEF SEWER													
R07													0
R08													0
R09													0
R10													0
R11													0
R11A													0
R12													0
WAKLING RELIEF SEWER													
R13													0
R14													0
ROCK RUN STORM FLOOD RELIEF SEWER													
R15													0
OREGON AVE RELIEF SEWER													
R16													0
R17													0
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18													0
32ND ST RELIEF SEWER													
R19													0
MAIN STREET RELIEF SEWER													
R20													0
SOMERSET SYSTEM DIVERSION CHAMBER													
R21													0
TEMPORARY REGULATOR CHAMBER													
R22													0
R23													0
ARCH ST RELIEF SEWER													
R24													0
16TH & SNYDER													
R25													0
GRANT & STATE RD. RELIEF													
R26													0
TOTAL	0	0	0	0	1	0	0	0	0	0	0	0	1
AVER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FY 2014 CSO Dry Weather Discharge Listing

Discharge Observed		Discharge Stopped		Last Inspection						
Date	Time	Date	Time	Date	Time	Site ID	Collector	Type Unit	Location	Comment
09/09/13	11:40 AM	09/09/13	12 50 PM	09/07/13	08:50 AM	T-04	FHL	SLOT	Rising Sun Ave. E of Tacony Creek	DEBRIS IN DWO PIPE.
12/13/13	05:10 PM	12/14/13	01 00 PM	12/12/13	09:20 AM	S-42	LSES	B & B	Passyunk Ave. & 29th St.	BLOCKAGE IN THE DWO PIPE.
12/24/13	09:20 AM	12/24/13	11:30 AM	12/23/13	10:00 AM	F-09	LFLL	WH-S	Frankford Ave. N or Frankford Creek	DIRT AND ROCKS FROM WATER MA N BREAK.

Dry Weather Discharges are continually tracked and analyzed to determine if new or modified maintenance procedures would help to prevent them from occurring. Although our established procedures have greatly reduced the number and duration of these discharges, the combined system picks up all manner of trash and debris that is unpredictable in its pattern of causing flow disruptions. Despite incorporating best management practices including; having all inlets trapped and cleaned; preventative maintenance schedules for sewer flushing and cleaning or the regulators; CCTV inspection of DWO pipes; etc., it is virtually impossible to eliminate all blockages before they occur.

The City continues to aggressively control and minimize these dry weather overflows by utilizing the latest technology-based controls including our Collector System Remote Monitoring Network that currently includes over 320 sites with over 720 individual level and/or flow measurements. The CSO maintenance personnel are trained in the use of the system’s computer programs for analyzing the data and have developed a comprehensive understanding of individual CSO site’s distinct flow patterns. This familiarity allows them to quickly recognize abnormal conditions that may indicate accumulating debris so that they can respond before developing into a dry weather CSO blockage.

MISCELLANEOUS SITE INSPECTIONS

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR	5	10	5	7	5	8	6	9	2	6	4	4	71
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE	2	2	4	3	2	3	2	4	1	2	3	1	29
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.	2	3	3	2	2	3	2	3	1	2	3	1	27
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.	2	2	2	2	1	3	2	3	1	2	2	1	23
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.	1	2	2	2	1	2	2	2	1	2	1	1	19
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.	2	2	2	2	1	2	2	2	1	2	2	1	21
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.	1	1	1	2	1	2	2	2	1	1	1	1	16
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.	1	1	1	1	1	1	1	2	1	1	1	1	13
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.	1	1	1	1	1	1	1	2	1	1	1	1	13
T-089-04-CFD-01 FRANKLIN & HASBROOK	9	13	9	7	6	9	8	8	2	8	3	6	88
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.	6	3	3	5	1	2	2	4	1	4	3	4	38
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM	4	3	2	5	1	2	1	2	1	5	3	4	33
Totals	36	43	35	39	23	38	31	43	14	36	27	26	391

MISCELLANEOUS SITE DISCHARGES

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR													0
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE													0
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.													0
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.													0
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.													0
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.													0
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.													0
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.													0
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.													0
T-089-04-CFD-01 FRANKLIN & HASBROOK						1	1			1			3
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.													0
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM													0
Totals	0	0	0	0	0	1	1	0	0	1	0	0	3

MISCELLANEOUS SITE BLOCKAGES CLEARED

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR									1		1		2
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE			1				2	1	1			1	6
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.									1		1		2
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.				1									1
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.													0
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.									1				1
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.							1						1
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.													0
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.													0
T-089-04-CFD-01 FRANKLIN & HASBROOK		3		2	1			1	1			2	10
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.	1	1		2	1		2	1		1	2	1	12
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM				1	1		1		1		1		5
Totals	1	4	1	6	3	0	6	3	6	1	5	4	40

Collector System - Flow Control Unit - FY 2014 CSO Annual Report Miscellaneous Maintenance

SOMERSET GRIT CHAMBER CLEANINGS

DATE	TONS
7/29/2013	72

Out of Service for sewer rehabilitation

T-04 FLOATABLES PILOT PROJECT DEBRIS NET REPLACEMENTS

DATE	TOTAL WEIGHT
Discontinued 12/31/2012	

CSO B&B REGULATOR MAINTENANCE

DATE	SITE
8/6/2013	S-9
8/24/2013	D-18
8/24/2013	D-66
8/31/2013	F-14
9/7/2013	D-19
9/7/2013	D-20
9/9/2013	D-38
9/9/2013	D-44
9/9/2013	S-6
9/9/2013	S-7
9/28/2013	S-5
9/28/2013	S-8
9/28/2013	S-16
9/30/2013	D-39
9/30/2013	D-41
10/19/2013	S-50
11/21/2013	S-1
11/22/2013	S-2
11/30/2013	D-4
11/30/2013	D-45
11/30/2013	D-44
11/30/2013	S-17
11/30/2013	S-23
11/30/2013	S-25
11/30/2013	S-19
12/7/2013	S-18
12/7/2013	D-47
12/28/2013	D-48
12/28/2013	D-49
12/28/2013	D-50
4/5/2014	D-66
4/5/2014	D-68
3/22/2014	S-42
6/27/2014	S-6
6/14/2014	S-50
7/7/2014	S-6

CSO TIDE GATE MAINTENANCE

DATE	SITE
8/24/2013	D-66
9/7/2013	D-19
9/7/2013	D-20
12/7/2013	S-12
12/7/2013	S-18
1/14/2014	D-3
2/25/2014	S-42A
3/22/2014	S-42
1/18/2014	F-9
6/4/2014	S-50

CSO OUTFALL - DEBRIS GRILL MAINTENANCE

DATE	SITE
7/9/2013	T-8
7/12/2013	PFD-01
7/22/2013	PFD-01
7/29/2013	T-15
8/9/2013	T-8
8/12/2013	PFD-01
8/19/2013	PFD-01
8/23/2013	T-8
8/23/2013	PFD-01
8/24/2013	D-58
8/24/2013	D-63
8/24/2013	R-13
8/27/2013	T-8
10/15/2013	PFD-01
10/31/2013	PFD-01
11/20/2013	T-8
2/14/2014	PFD-01
2/18/2014	F-5
3/6/2014	F-5
3/7/2014	PFD-01
3/12/2014	T-8
3/12/2014	T-15
4/14/2014	T-8
5/2/2014	T-8
5/22/2014	PFD-01
5/22/2014	T-8
6/2/2014	PFD-01
6/24/2014	PFD-01
1/14/2014	D-3
7/1/2014	D-2

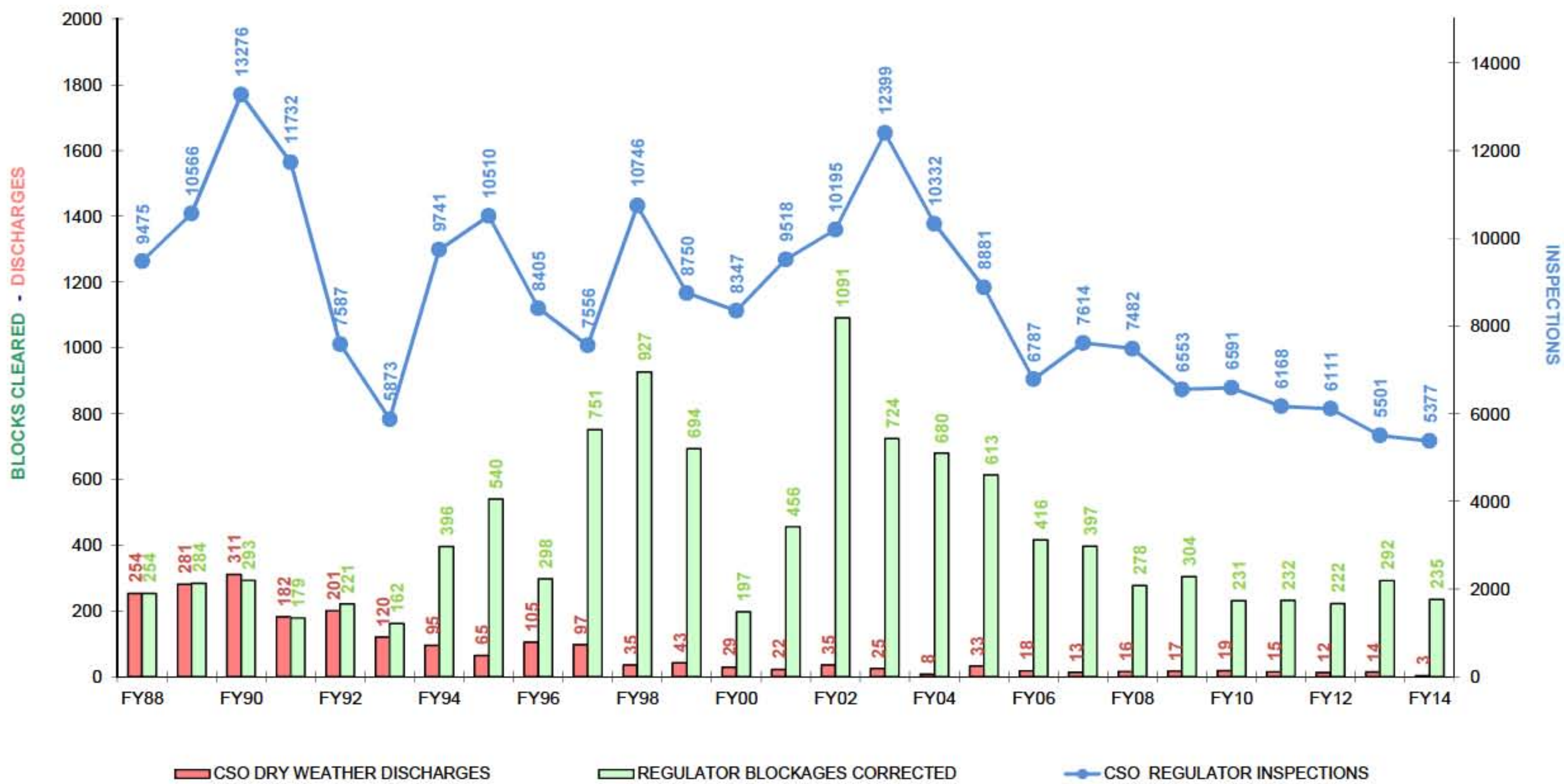
CSPS SIPHON GRIT POCKET CLEANINGS

DATE	CU. YARDS
7/26/2013	26
12/20/2013	20
4/8/2014	30
7/22/2014	30

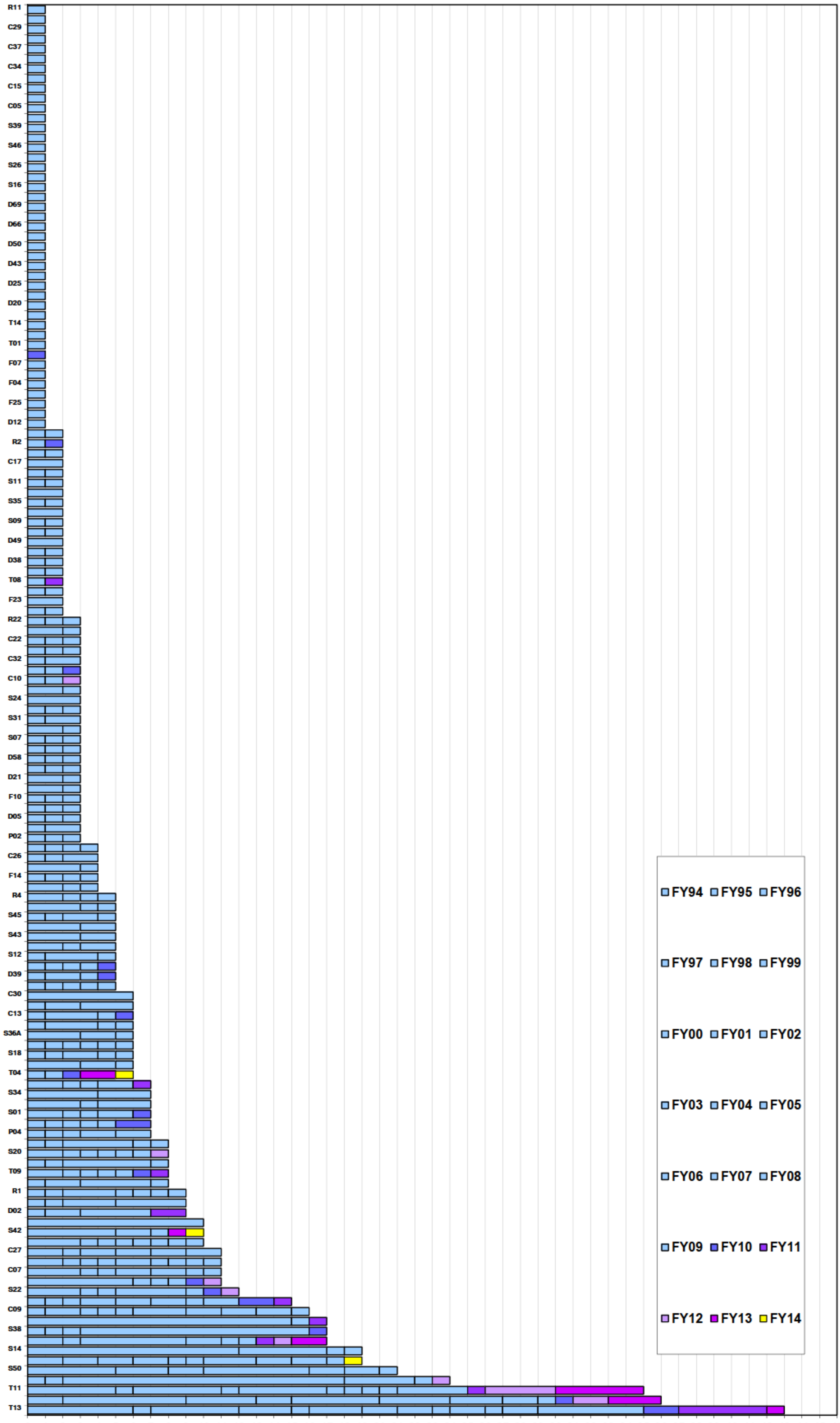
COMPUTER CONTROL CHAMBER PREVENTATIVE MAINTENANCE

DATE	SITE	DATE	SITE
7/9/2013	D-11	1/14/2014	D-7
7/9/2013	F-25	1/14/2014	D-9
7/10/2013	D-15	1/13/2014	D-11
7/10/2013	D-7	1/16/2014	D-15
7/11/2013	D-5	1/13/2014	F-25
7/12/2013	H-29	1/23/2014	H-35
7/24/2013	H-35	1/27/2014	H-29
7/24/2013	T-14	1/2/2014	T-14
7/25/2013	D-9	2/14/2014	D-2
7/31/2013	D-2	2/9/2014	D-3
7/31/2013	D-3	2/20/2014	D-5
8/8/2013	F-25	2/9/2014	D-7
8/12/2013	D-2	2/20/2014	D-9
8/15/2013	D-11	2/24/2014	D-11
8/15/2013	D-5	2/14/2014	D-15
8/16/2013	D-7	2/25/2014	F-25
8/23/2013	D-3	2/25/2014	H-35
8/28/2013	H-35	2/25/2014	H-29
8/29/2013	H-29	2/21/2014	T-14
8/29/2013	D-15	3/10/2014	D-2
8/30/2013	D-9	3/12/2014	D-3
8/30/2013	T-14	3/5/2014	D-5
9/5/2013	D-5	3/5/2014	D-7
9/9/2013	F-25	3/6/2014	D-9
9/12/2013	H-29	3/6/2014	D-11
9/13/2013	T-14	3/15/2014	D-15
9/18/2013	D-15	3/7/2014	F-25
9/18/2013	D-9	3/13/2014	H-35
9/19/2013	D-7	3/10/2014	H-29
9/20/2013	H-35	3/27/2014	T-14
9/23/2013	D-2	4/2/2014	D-2
9/23/2013	D-3	4/2/2014	D-3
9/24/2013	D-11	4/3/2014	D-5
10/2/2013	D-15	4/14/2014	D-7
10/4/2013	H-35	4/4/2014	D-9
10/10/2013	D-5	4/7/2014	D-11
10/10/2013	D-7	4/7/2014	D-15
10/11/2013	D-3	4/4/2014	F-25
10/16/2013	T-14	4/16/2014	H-35
10/21/2013	D-2	4/20/2014	H-29
10/21/2013	D-9	4/30/2014	T-14
10/23/2013	D-11	5/16/2014	D-7
10/23/2013	F-25	5/16/2014	D-9
10/28/2013	H-29	5/5/2014	D-11
11/18/2013	D-2	5/15/2014	D-15
11/18/2013	D-3	5/21/2014	T-14
11/27/2013	D-11	6/12/2014	D-2
11/27/2013	D-15	6/13/2014	D-3
11/27/2013	D-7	6/13/2014	D-5
11/27/2013	F-25	6/5/2014	D-7
11/29/2013	D-5	6/5/2014	D-9
11/29/2013	D-9	6/12/2014	D-11
11/29/2013	H-35	6/19/2014	D-15
12/5/2013	D-9	6/5/2014	F-25
12/6/2013	D-7	6/26/2014	H-35
12/6/2013	F-25	6/9/2014	H-29
12/11/2013	D-3	6/10/2014	T-14
12/11/2013	D-5	7/9/2014	D-2
12/12/2013	D-11	7/9/2014	D-3
12/12/2013	D-15	7/21/2014	D-5
12/16/2013	H-29	7/11/2014	D-7
12/18/2013	H-35	7/11/2014	D-9
12/19/2013	D-2	7/23/2014	D-11
12/19/2013	T-14	7/24/2014	D-15
1/24/2014	D-2	7/30/2014	H-35
1/24/2014	D-3	7/23/2014	H-29
1/16/2014	D-5	7/31/2014	T-14

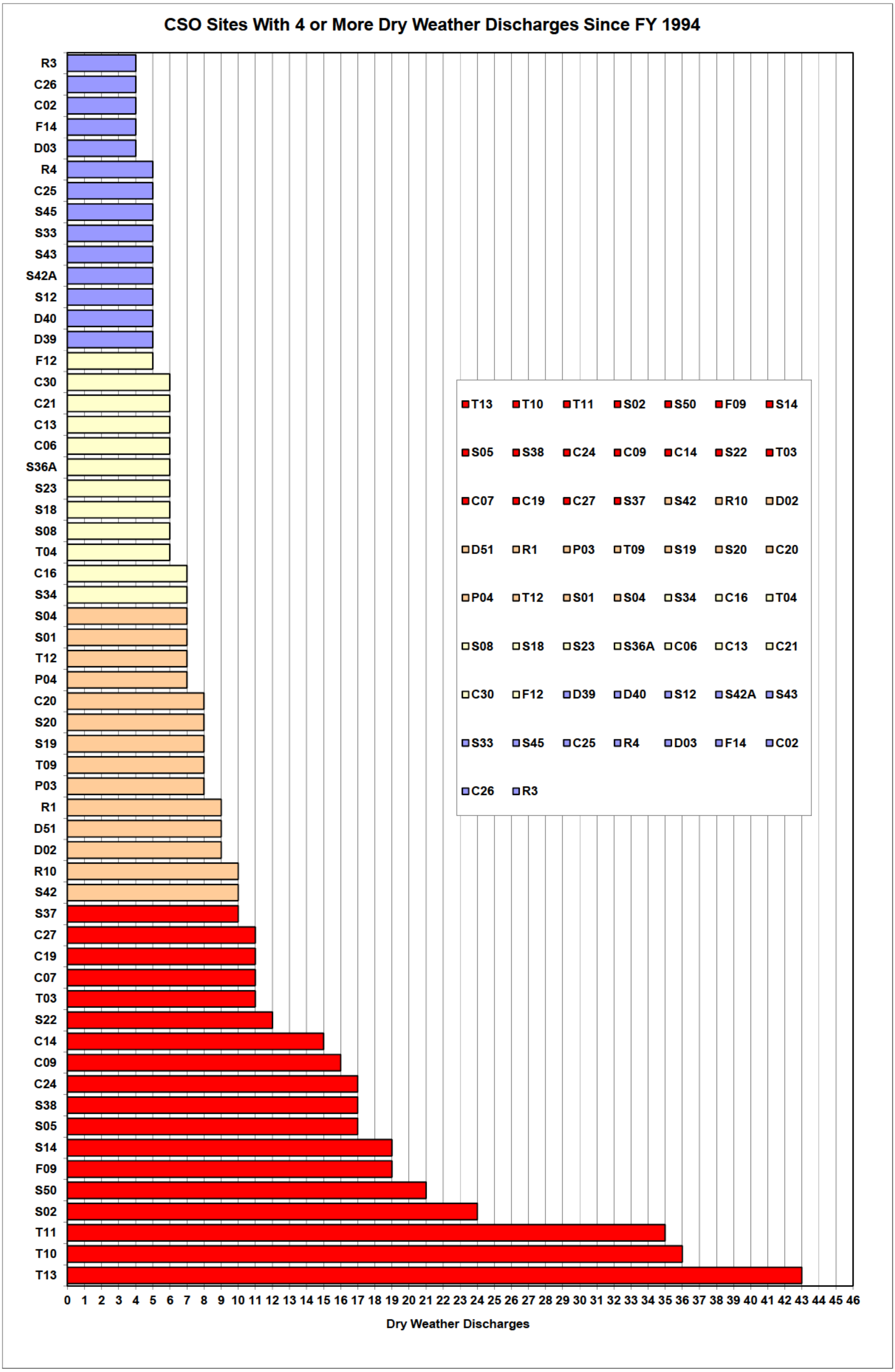
Flow Control - CSO Maintenance FY87 to FY14 Inspections / Discharges / Blocks Corrected



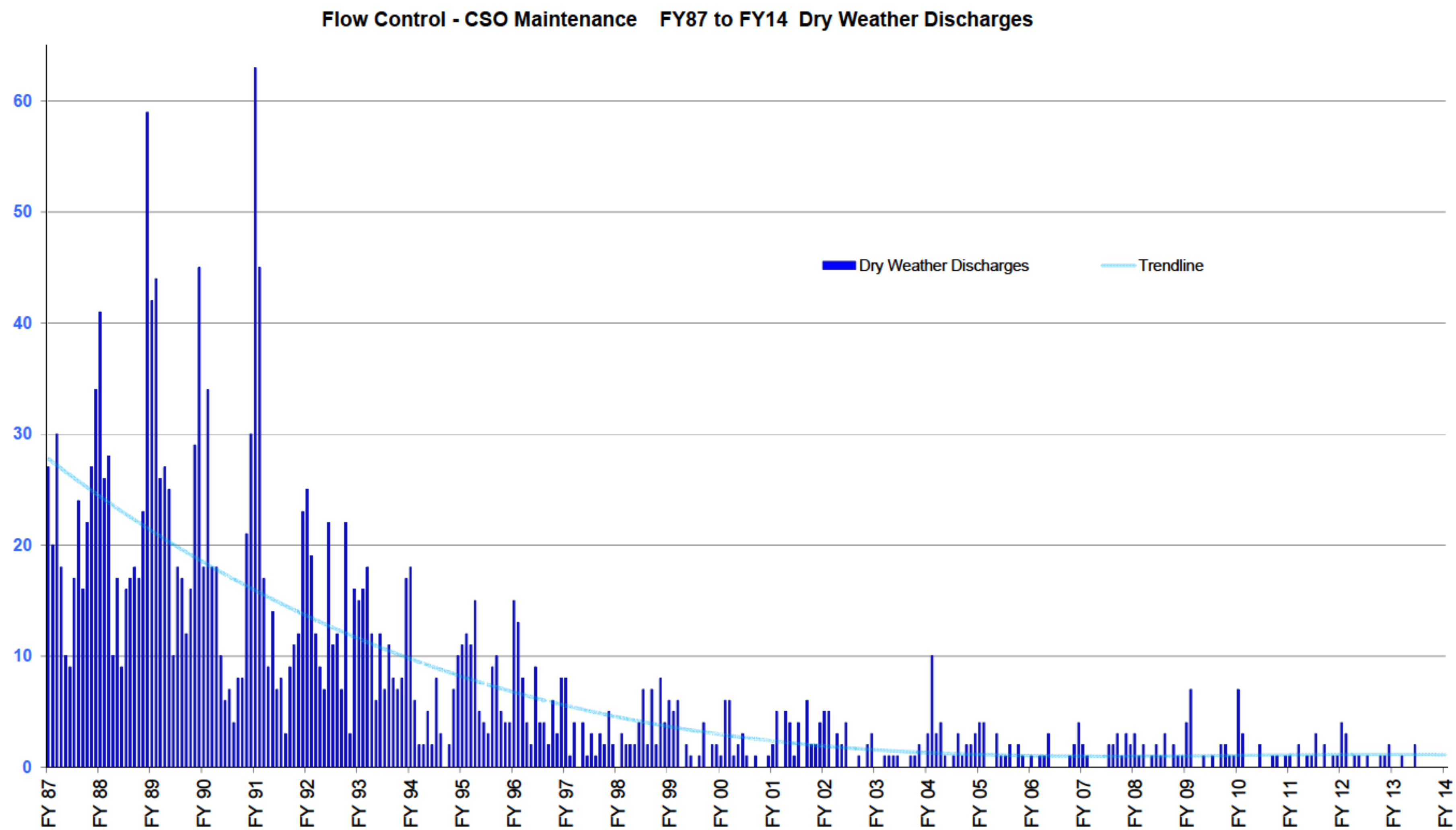
PWD FLOW CONTROL - CSO DISCHARGE HISTORY - FISCAL YEAR 1994 TO 2014



No. of Dry Weather Discharges



CSO Sites With 4 or More Dry Weather Discharges Since FY 1994
R3
C26
C02
F14
D03
R4
C25
S45
S33
S43
S42A
S12
D40
D39
F12
C30
C21
C13
C06
S36A
S23
S18
S08
T04
C16
S34
S04
S01
T12
P04
C20
S20
S19
T09
P03
R1
D51
D02
R10
S42
S37
C27
C19
C07
T03
S22
C14
C09
C24
S38
S05
S14
F09
S50
S02
T11
T10
T13
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46
Dry Weather Discharges



Flow Control - CSO Maintenance FY87 to FY14 Dry Weather Discharges
Dry Weather Discharges
Trendline
0
10
20
30
40
50
60
FY 87
FY 88
FY 89
FY 90
FY 91
FY 92
FY 93
FY 94
FY 95
FY 96
FY 97
FY 98
FY 99
FY 00
FY 01
FY 02
FY 03
FY 04
FY 05
FY 06
FY 07
FY 08
FY 09
FY 10
FY 11
FY 12
FY 13
FY 14

APPENDIX D –
NPDES ANNUAL CSO STATUS REPORT FY 2014

Page

Table 1 - Listing of all CSO permitted outfalls

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
NPDES Permit #0026689 - Northeast						
2	39d 58m 50s	75d 4m 58s	Castor Ave. and Balfour St.	Delaware River	Somerset	D_17
3	39d 58m 45s	75d 5m 6s	Venango St. NW of Casper St.	Delaware River	Somerset	D_18
4	39d 58m 41s	75d 5m 15s	Tioga St. NW of Casper St.	Delaware River	Somerset	D_19
5	39d 58m 43s	75d 5m 28s	Ontario St. NW of Casper St.	Delaware River	Somerset	D_20
6	39d 58m 44s	75d 5m 41s	Westmoreland St. NW of Balfour St.	Delaware River	Somerset	D_21
7	39d 58m 42s	75d 5m 53s	Allegheny Ave. SE of Bath St.	Delaware River	Somerset	D_22
8	39d 58m 38s	75d 6m 12s	Indiana Ave. SE of Allen St.	Delaware River	Somerset	D_23
10	39d 58m 38s	75d 6m 28s	Cambria St. E of Melvale St.	Delaware River	Somerset	D_25
11	40d 1m 18s	75d 1m 44s	Cottman St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_02
12	40d 1m 14s	75d 2m 0s	Princeton Ave SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_03
13	40d 1m 8s	75d 2m 13s	Disston St. SE of Wissinoming St.	Delaware River	Upper Delaware Low Level	D_04
14	40d 0m 58s	75d 2m 34s	Magee St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_05
15	40d 0m 53s	75d 2m 46s	Levick St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_06
16	40d 0m 44s	75d 3m 5s	Lardner St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_07
17	40d 0m 38s	75d 3m 13s	Comly St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_08
18	40d 0m 34s	75d 3m 18s	Dark Run La and Milnor St.	Delaware River	Upper Delaware Low Level	D_09
19	40d 0m 21s	75d 3m 28s	Sanger St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_11
20	40d 0m 2s	75d 3m 43s	Bridge St. Se of Garden St.	Delaware River	Upper Delaware Low Level	D_12

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
21	39d 59m 53s	75d 3m 47s	Kirkbride St. and Delaware Ave.	Delaware River	Upper Delaware Low Level	D_13
22	39d 59m 24s	75d 4m 4s	Orthodox St. and Delaware Ave.	Delaware River	Upper Delaware Low Level	D_15
23	40d 2m 36s	75d 1m 15s	Frankford Avenue & Ashburner Street	Pennypack Creek	Pennypack	P_01
24	40d 2m 36s	75d 1m 16s	Frankford Avenue & Holmesburg St.	Pennypack Creek	Pennypack	P_02
25	40d 2m 13s	75d 1m 19s	Torresdale Ave. NW of Pennypack Ck.	Pennypack Creek	Pennypack	P_03
26	40d 2m 23s	75d 1m 21s	Cottage Avenue & Holmesburg Avenue	Pennypack Creek	Pennypack	P_04
27	40d 2m 2s	75d 1m 21s	Holmesburg Ave SE of Hegerman St	Pennypack Creek	Pennypack	P_05
28	40d 4m 34s	75d 9m 44s	Williams Avenue SE of Sedgewick	Tacony Creek	Frankford High Level	T_01
29	40d 2m 28s	75d 6m 56s	Complost Ave West of Tacony Creek	Tacony Creek	Frankford High Level	T_03
30	40d 2m 11s	75d 6m 48s	Rising Sun Ave East of Tacony Creek	Tacony Creek	Frankford High Level	T_04
31	40d 2m 9s	75d 6m 48s	Rising Sun Ave West of Tacony Creek	Tacony Creek	Frankford High Level	T_05
32	40d 2m 3s	75d 6m 41s	Bingham Street East of Tacony Creek	Tacony Creek	Frankford High Level	T_06
33	40d 1m 51s	75d 6m 43s	Tabor Road West of Tacony Creek	Tacony Creek	Frankford High Level	T_07
34	40d 1m 42s	75d 6m 47s	Ashdale Street West of Tacony Creek	Tacony Creek	Frankford High Level	T_08
35	40d 1m 37s	75d 6m 48s	Roosevelt Blvd. West of Tacony Creek	Tacony Creek	Frankford High Level	T_09
36	40d 1m 37s	75d 6m 47s	Roosevelt Blvd. East of Tacony Creek	Tacony Creek	Frankford High Level	T_10

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
37	40d 1m 29s	75d 6m 43s	Ruscomb Street East of Tacony Creek	Tacony Creek	Frankford High Level	T_11
38	40d 1m 23s	75d 6m 41s	Whitaker Avenue East of Tacony Creek	Tacony Creek	Frankford High Level	T_12
39	40d 1m 22s	75d 6m 42s	Whitaker Avenue West of Tacony Ck	Tacony Creek	Frankford High Level	T_13
40	40d 0m 59s	75d 6m 28s	I Street & Ramona Ave.	Tacony Creek	Frankford High Level	T_14
41	40d 0m 57s	75d 6m 20s	J Street & Juniata Park	Tacony Creek	Frankford High Level	T_15
42	40d 0m 57s	75d 5m 51s	Castor Avenue at Unity Street Circle	Frankford Creek	Upper Frankford Low Level	F_03
43	40d 0m 52s	75d 5m 42s	Wingohocking St East of Adams Ave	Frankford Creek	Upper Frankford Low Level	F_04
44	40d 0m 41s	75d 5m 41s	Bristol Street West of Adams Avenue	Frankford Creek	Upper Frankford Low Level	F_05
45	40d 0m 25s	75d 5m 33s	Worrel Street East of Frankford Creek	Frankford Creek	Upper Frankford Low Level	F_06
46	40d 0m 26s	75d 5m 34s	Worrel Street West of Frankford Creek	Frankford Creek	Upper Frankford Low Level	F_07
47	40d 0m 21s	75d 5m 36s	Torresdale Ave & Hunting Park Ave	Frankford Creek	Upper Frankford Low Level	F_08
48	40d 0m 19s	75d 5m 34s	Frankford Ave North of Frankford Ck	Frankford Creek	Upper Frankford Low Level	F_09
49	40d 0m 19s	75d 5m 35s	Frankford Ave South of Frankford Ck	Frankford Creek	Upper Frankford Low Level	F_10
50	40d 0m 15s	75d 5m 26s	Orchard Street South of Vandyke Creek	Frankford Creek	Upper Frankford Low Level	F_11
51	39d 59m 56s	75d 5m 14s	Sepviva Street North of Butler Street	Frankford Creek	Upper Frankford Low Level	F_12
52	39d 59m 49s	75d 5m 3s	Duncan Street Under Delaware Exp.	Frankford Creek	Lower Frankford Low Level	F_13

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
54	40d 0m 16s	75d 4m 15s	Wakeling Street NW of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_21
55	40d 0m 19s	75d 4m 5s	Bridge Street NW of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_23
56	40d 0m 18s	75d 4m 5s	Bridge Street SE of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_24
57	40d 0m 15s	75d 4m 15s	Ash Street West of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_25
58	40d 0m 30s	75d 3m 20s	Levick St. & Everett Ave.	Delaware River	Wakling Relief Sewer	D_FRW
59	40d 2m 16s	75d 6m 53s	Nedro Ave & 7th St.	Tacony Creek	Rock Run Flood Relief Sewer	T_FRRR
60	40d 0m 36s	75d 5m 44s	Castor Ave. & East Hunting Park Ave.	Frankford Creek	Frankford High Level Relief Sewer	F_FRFG
NPDES Permit # 0026662 – Southeast						
2	39d 58m 9s	75d 7m 19s	Dyott Street & Delaware Ave.	Delaware River	Lower Delaware Low Level	D_38
3	39d 58m 7s	75d 7m 23s	Susquehanna Ave. East of Beach Street	Delaware River	Lower Delaware Low Level	D_39
4	39d 58m 5s	75d 7m 26s	Berks Street East of Beach Street	Delaware River	Lower Delaware Low Level	D_40
5	39d 58m 3s	75d 7m 37s	Palmer Street East of Beach Street	Delaware River	Lower Delaware Low Level	D_41
6	39d 57m 54s	75d 7m 42s	Columbia Avenue East of Beach Street	Delaware River	Lower Delaware Low Level	D_42
7	39d 57m 56s	75d 7m 48s	Marlborough Street & Delaware Ave	Delaware River	Lower Delaware Low Level	D_43
8	39d 57m 53s	75d 7m 54s	Shackamaxon St East of Delaware Ave	Delaware River	Lower Delaware Low Level	D_44
9	39d 57m 48s	75d 8m 0s	Laurel Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_45

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
10	39d 57m 41s	75d 8m 11s	Penn Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_46
11	39d 57m 37s	75d 8m 9s	Fairmont Ave West of Delaware Ave	Delaware River	Lower Delaware Low Level	D_47
12	39d 57m 28s	75d 8m 13s	Willow Street West of Delaware Ave	Delaware River	Lower Delaware Low Level	D_48
13	39d 57m 24s	75d 8m 20s	Callowhill Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_49
14	39d 57m 21s	75d 8m 13s	Delaware Avenue North of Vine Street	Delaware River	Lower Delaware Low Level	D_50
15	39d 57m 11s	75d 8m 17s	Race Street West of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_51
16	39d 57m 7s	75d 8m 25s	Delaware Avenue & Arch Street	Delaware River	Lower Delaware Low Level	D_52
17	39d 56m 57s	75d 8m 23s	Market Street & Front Street	Delaware River	Lower Delaware Low Level	D_53
20	39d 56m 50s	75d 8m 24s	Front Street South of Chestnut Street	Delaware River	Lower Delaware Low Level	D_54
21	39d 56m 26s	75d 8m 32s	South Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_58
22	39d 56m 12s	75d 8m 33s	Catharine Street East of Swanson Street	Delaware River	Lower Delaware Low Level	D_61
23	39d 56m 10s	75d 8m 32s	Queen Street East of Swanson Street	Delaware River	Lower Delaware Low Level	D_62
24	39d 56m 5s	75d 8m 33s	Christian St West of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_63
25	39d 55m 59s	75d 8m 35s	Washington Ave East of Delaware Ave	Delaware River	Lower Delaware Low Level	D_64
26	39d 55m 45s	75d 8m 29s	Reed Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_65

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
27	39d 55m 37s	75d 8m 28s	Tasker Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_66
28	39d 55m 26s	75d 8m 21s	Moore Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_67
33	39d 54m 6s	75d 8m 12s	Pattison Avenue & Swanson Street	Delaware River	Lower Delaware Low Level	D_73
36	39d 58m 21s	75d 6m 58s	Cumberland St East of Richmond St	Delaware River	Lower Delaware Low Level	D_37
37	39d 57m 12s	75d 8m 24s	Race Street West of Delaware Avenue, North of D-51	Delaware River	Lower Delaware Low Level	D_51A
29	39d 55m 13s	75d 8m 20s	Snyder Avenue & Delaware Avenue	Delaware River	Oregon	D_68
30	39d 54m 60s	75d 8m 13s	Delaware Ave North of Porter Street	Delaware River	Oregon	D_69
31	39d 54m 44s	75d 8m 15s	Oregon Avenue & Delaware Avenue	Delaware River	Oregon	D_70
32	39d 54m 33s	75d 7m 59s	Bigler Street & Delaware Avenue	Delaware River	Oregon	D_71
34	39d 54m 24s	75d 8m 8s	Packer Avenue East of Delaware Ave	Delaware River	Oregon	D_72
NPDES Permit # 0026671 - Southwest						
2	39d 56m 17s	75d 12m 17s	Reed Street & Schuylkill Avenue	Schuylkill River	Lower Schuylkill East Side	S_31
3	39d 55m 54s	75d 12m 28s	35th St. and Mifflin St.	Schuylkill River	Lower Schuylkill East Side	S_36A
4	39d 55m 41s	75d 12m 38s	Vare Avenue & 29th Street	Schuylkill River	Lower Schuylkill East Side	S_37
5	39d 55m 12s	75d 12m 5s	Passyunk Avenue & 29th Street	Schuylkill River	Lower Schuylkill East Side	S_42
6	39d 55m 12s	75d 12m 5s	Passyunk Avenue & 28th Street	Schuylkill River	Lower Schuylkill East Side	S_42A

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
7	39d 54m 57s	75d 12m 16s	26th Street 700' North of Hartranft St	Schuylkill River	Lower Schuylkill East Side	S_44
8	39d 53m 53s	75d 12m 39s	Penrose Avenue & 26th Street	Schuylkill River	Lower Schuylkill East Side	S_46
9	39d 57m 38s	75d 10m 50s	24th Street 155' South of Parktown Pl	Schuylkill River	Central Schuylkill East Side	S_05
10	39d 57m 39s	75d 10m 49s	24th Street 350' South of Parktown Pl	Schuylkill River	Central Schuylkill East Side	S_06
11	39d 57m 39s	75d 10m 50s	24th Street East of Schuylkill River	Schuylkill River	Central Schuylkill East Side	S_07
12	39d 57m 29s	75d 10m 43s	Race Street & Bonsall Street	Schuylkill River	Central Schuylkill East Side	S_08
13	39d 57m 30s	75d 10m 45s	Arch Street West of 23rd Street	Schuylkill River	Central Schuylkill East Side	S_09
14	39d 57m 16s	75d 10m 49s	Market Street 25' East of 24th Street	Schuylkill River	Central Schuylkill East Side	S_10
15	39d 57m 11s	75d 10m 51s	24th St. N of Chestnut St. Bridge	Schuylkill River	Central Schuylkill East Side	S_12A
16	39d 57m 7s	75d 10m 52s	Sansom Street West of 24th Street	Schuylkill River	Central Schuylkill East Side	S_13
17	39d 57m 5s	75d 10m 53s	Walnut Street West of 24th Street	Schuylkill River	Central Schuylkill East Side	S_15
18	39d 57m 1s	75d 10m 56s	Locust Street & 25th Street	Schuylkill River	Central Schuylkill East Side	S_16
19	39d 56m 57s	75d 11m 0s	Spruce Street & 25th Street	Schuylkill River	Central Schuylkill East Side	S_17
20	39d 56m 52s	75d 11m 5s	Pine Street West of Taney Street	Schuylkill River	Central Schuylkill East Side	S_18
21	39d 56m 49s	75d 11m 9s	Lombard Street West of 27th Street	Schuylkill River	Central Schuylkill East Side	S_19

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
22	39d 56m 47s	75d 11m 12s	South Street East of 27th Street	Schuylkill River	Central Schuylkill East Side	S_21
23	39d 56m 44s	75d 11m 18s	Schuylkill Avenue & Bainbridge Street	Schuylkill River	Central Schuylkill East Side	S_23
24	39d 56m 34s	75d 11m 28s	Schuylkill Avenue & Christian Street	Schuylkill River	Central Schuylkill East Side	S_25
25	39d 56m 29s	75d 11m 35s	Ellsworth St West of Schuylkill Avenue	Schuylkill River	Central Schuylkill East Side	S_26
26	39d 58m 1s	75d 11m 17s	Mantua Avenue & West River Drive	Schuylkill River	Central Schuylkill West Side	S_01
27	39d 57m 54s	75d 11m 7s	Haverford Avenue & West River Drive	Schuylkill River	Central Schuylkill West Side	S_02
28	39d 57m 51s	75d 11m 4s	Spring Garden St W of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_03
29	39d 57m 53s	75d 11m 4s	Powelton Ave W of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_04
30	39d 57m 16s	75d 10m 53s	Market St West of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_11
31	39d 57m 5s	75d 10m 58s	Schuylkill Expressway & Walnut Street	Schuylkill River	Central Schuylkill West Side	S_14
32	39d 56m 51s	75d 11m 14s	440′ Northwest of South Street	Schuylkill River	Central Schuylkill West Side	S_20
33	39d 56m 46s	75d 11m 22s	660′ South of South St E of Pennfield	Schuylkill River	Central Schuylkill West Side	S_22
34	39d 56m 43s	75d 11m 26s	1060′ South of South St E of Pennfield	Schuylkill River	Central Schuylkill West Side	S_24
35	39d 56m 32s	75d 12m 27s	46th Street & Paschall Avenue	Schuylkill River	Southwest Main Gravity	S_30
36	39d 56m 36s	75d 12m 18s	43rd St. and Locust St.	Schuylkill River	Southwest Main Gravity	S_50
37	39d 56m 13s	75d 12m 23s	49th Street South of Botanic Street	Schuylkill River	Lower Schuylkill West Side	S_32

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
38	39d 56m 8s	75d 12m 24s	51st Street South of Botanic Street	Schuylkill River	Lower Schuylkill West Side	S_33
39	39d 55m 43s	75d 12m 45s	56th Street East of P&R Railroad	Schuylkill River	Lower Schuylkill West Side	S_38
40	39d 54m 39s	75d 12m 55s	64th St. and Buist Ave.	Schuylkill River	Lower Schuylkill West Side	S_45
41	39d 56m 10s	75d 14m 6s	60th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek High Level	C_18
51	39d 58m 51s	75d 16m 4s	City Line Avenue & 73rd Street	Cobbs Creek	Cobbs Creek High Level	C_01
52	39d 58m 51s	75d 16m 1s	City Line Ave 100′ South Side of Creek	Cobbs Creek	Cobbs Creek High Level	C_02
54	39d 58m 30s	75d 15m 26s	Lebanon Ave Southwest of 73rd Street	Cobbs Creek	Cobbs Creek High Level	C_05
55	39d 58m 31s	75d 15m 25s	Lebanon Avenue & 68th Street	Cobbs Creek	Cobbs Creek High Level	C_06
56	39d 58m 26s	75d 15m 26s	Lansdowne Avenue & 69th Street	Cobbs Creek	Cobbs Creek High Level	C_07
57	39d 57m 51s	75d 14m 56s	54th Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_09
58	39d 57m 50s	75d 14m 53s	Gross Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_10
59	39d 57m 43s	75d 14m 53s	Cobbs Creek Pky South of Market St	Cobbs Creek	Cobbs Creek High Level	C_11
60	39d 57m 27s	75d 14m 60s	Spruce Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_12
61	39d 56m 45s	75d 14m 58s	62nd Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_13
62	39d 56m 36s	75d 14m 50s	Baltimore Avenue & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_14
63	39d 56m 31s	75d 14m 26s	59th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek High Level	C_15
64	39d 56m 26s	75d 14m 23s	Thomas Avenue & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_16
65	39d 56m 13s	75d 14m 6s	Beaumont Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_17
66	39d 58m 29s	75d 16m 48s	Cobbs Creek Pky S of City Line Ave	Cobbs Creek	Cobbs Creek High Level	C_31
67	39d 58m 12s	75d 15m 56s	Brockton Road & Farrington Road	Cobbs Creek	Cobbs Creek High Level	C_33
68	39d 58m 40s	75d 15m 44s	Woodcrest Avenue & Morris Park	Cobbs Creek	Cobbs Creek High Level	C_34
69	39d 58m 47s	75d 15m 54s	Morris Park West of 72nd Street & Sherwood Road	Cobbs Creek	Cobbs Creek High Level	C_35
70	39d 58m 49s	75d 15m 35s	Woodbine Ave South of Brentwood Rd	Cobbs Creek	Cobbs Creek High Level	C_36

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
71	39d 57m 55s	75d 15m 15s	Cobbs Creek Parkway South of 67th & Callowhill Streets	Cobbs Creek	Cobbs Creek High Level	C_37
72	39d 58m 22s	75d 16m 11s	Cobbs Creek Parkway & 77th Street	Cobbs Creek	Cobbs Creek High Level	C_32
82	39d 58m 38s	75d 15m 28s	Malvern Ave. and 68th St.	Cobbs Creek	Cobbs Creek High Level	C_04A
42	39d 55m 57s	75d 14m 19s	Mount Moriah Cemetary & 62nd Street	Cobbs Creek	Cobbs Creek Low Level	C_19
43	39d 55m 46s	75d 14m 39s	65th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_20
44	39d 55m 37s	75d 14m 40s	68th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_21
45	39d 55m 27s	75d 14m 46s	70th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_22
46	39d 55m 15s	75d 14m 52s	Upland Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_23
47	39d 55m 1s	75d 14m 49s	Woodland Avenue East of Island Ave.	Cobbs Creek	Cobbs Creek Low Level	C_25
49	39d 54m 44s	75d 14m 56s	Claymont Street & Grays Avenue	Cobbs Creek	Cobbs Creek Low Level	C_29
50	39d 54m 34s	75d 15m 1s	77th Street West of Elmwood Avenue	Cobbs Creek	Cobbs Creek Low Level	C_30
78	39d 54m 49s	75d 14m 50s	Island Ave. Southeast of Glenmore Ave	Cobbs Creek	Cobbs Creek Low Level	C_28A
75	39d 57m 59s	75d 11m 3s	16th St. & Clearfield St.	Schuylkill River	Main Relief Sewer	S_FRM
83	39d 56m 31s	75d 14m 25s	56th St. & Locust	Cobbs Creek	Thomas Run Relief Sewer	C_FRTR
84	39d 57m 49s	75d 14m 53s	Arch Street & Cobbs Creek	Cobbs Creek	Arch Street Relief Sewer	C_FRA

Table 2 - Overflow Summary for 7/1/13 – 6/30/2014

District	Regulator	Frequency	Duration (hours)	Volume (ft^3)
Northeast	D_FRW	45	102	23,164,267
Northeast	D02	46	602.75	61,180,583
Northeast	D03	46	591.75	16,161,840
Northeast	D04	32	405.75	1,086,824
Northeast	D05	53	591.25	114,323,456
Northeast	D06	37	273.5	4,962,679
Northeast	D07	36	190.5	42,148,345
Northeast	D08	46	379.25	3,999,215
Northeast	D09	7	4.5	206,281
Northeast	D11	31	151	10,424,525
Northeast	D12	50	90.5	337,142
Northeast	D13	14	9.25	489,340
Northeast	D15	16	14.25	1,616,979
Northeast	D17	47	139.25	10,096,617
Northeast	D18	47	139.75	7,838,841
Northeast	D19	49	175.25	6,302,442
Northeast	D20	35	72.75	3,831,378
Northeast	D21	40	112.5	7,451,840
Northeast	D22	74	481	34,321,028
Northeast	D23	51	66.25	384,165
Northeast	D25	65	404.75	139,567,643
Northeast	F_FRFG	73	554.5	216,124,767
Northeast	F03	35	62.25	3,726,948
Northeast	F04	60	211	10,824,863
Northeast	F05	62	232.25	1,267,403
Northeast	F06	22	29	936,660
Northeast	F07	42	77.5	3,199,667
Northeast	F08	40	65.75	1,783,548
Northeast	F09	53	185	1,104,836
Northeast	F10	60	273.25	3,707,474
Northeast	F11	67	389.5	19,110,000
Northeast	F12	32	43.25	898,991
Northeast	F13	53	102.75	2,289,600
Northeast	F21	66	357.25	114,249,480
Northeast	F23	44	99.5	2,175,735
Northeast	F24	49	85	1,034,596
Northeast	F25	14	15.25	3,837,189

District	Regulator	Frequency	Duration (hours)	Volume (ft^3)
Northeast	P01	31	17.5	389,578
Northeast	P02	52	138.5	8,309,967
Northeast	P03	43	330.75	5,646,713
Northeast	P04	36	271.75	31,159,674
Northeast	P05	41	434.5	83,069,924
Northeast	T_FRRR	28	49.5	7,709,220
Northeast	T01	64	243.75	8,308,540
Northeast	T03	56	122	4,177,643
Northeast	T04	56	113.25	2,777,252
Northeast	T05	47	56.25	1,544,058
Northeast	T06	44	71.5	10,708,920
Northeast	T07	14	7.5	193,058
Northeast	T08	73	380.5	109,336,514
Northeast	T09	48	66.25	1,161,964
Northeast	T10	63	208	3,433,777
Northeast	T11	53	109.5	1,740,542
Northeast	T12	8	6.75	83,806
Northeast	T13	59	169	6,105,812
Northeast	T14	62	235	201,666,222
Northeast	T15	51	144.25	8,170,612
Southeast	D37	52	263.75	29,849,362
Southeast	D38	44	175	30,058,682
Southeast	D39	51	216.75	37,794,487
Southeast	D40	60	286.5	2,362,258
Southeast	D41	47	129.25	2,767,255
Southeast	D42	24	18.5	297,868
Southeast	D43	18	21	249,311
Southeast	D44	44	130.5	9,449,808
Southeast	D45	38	114.5	54,957,030
Southeast	D46	22	35.75	873,386
Southeast	D47	60	336.75	11,121,762
Southeast	D48	42	114.5	23,777,960
Southeast	D49	3	3.5	93,857
Southeast	D50	16	12.25	318,488
Southeast	D51	64	596.75	3,467,088
Southeast	D51A	51	195.75	2,486,984
Southeast	D52	23	26.75	549,923
Southeast	D53	9	9.5	2,830,545

District	Regulator	Frequency	Duration (hours)	Volume (ft^3)
Southeast	D54	19	39.5	11,178,089
Southeast	D58	30	47.75	1,269,965
Southeast	D61	45	69.25	1,143,778
Southeast	D62	31	36.25	446,207
Southeast	D63	34	67.25	15,008,702
Southeast	D64	32	47.75	276,431
Southeast	D65	34	60	9,862,343
Southeast	D66	42	95.5	10,732,614
Southeast	D67	38	74.5	5,057,097
Southeast	D68	47	211	31,779,875
Southeast	D69	27	66.25	8,392,496
Southeast	D70	19	44.25	9,872,779
Southeast	D71	40	118.5	11,899,534
Southeast	D72	23	92.75	10,726,038
Southeast	D73	39	138.5	23,323,505
Southwest	C_FRA	17	10.25	2,300,759
Southwest	C_FRTR	76	439	28,226,696
Southwest	C01	22	16.25	572,575
Southwest	C02	5	3.75	83,336
Southwest	C04A	26	32.5	3,091,830
Southwest	C05	22	20	784,102
Southwest	C06	55	159	7,489,330
Southwest	C07	30	41.5	2,318,942
Southwest	C09	34	63	2,783,963
Southwest	C10	20	36.75	318,066
Southwest	C11	38	119.5	18,236,247
Southwest	C12	38	102	3,405,404
Southwest	C13	35	77.5	2,294,654
Southwest	C14	36	107	5,252,904
Southwest	C15	26	73.25	725,995
Southwest	C16	7	4.25	74,620
Southwest	C17	55	237	70,348,082
Southwest	C18	38	105.25	6,460,105
Southwest	C19	25	15.5	925,574
Southwest	C20	24	17.25	507,508
Southwest	C21	24	24.75	667,030
Southwest	C22	42	80.5	2,495,722
Southwest	C23	16	24.75	241,329

District	Regulator	Frequency	Duration (hours)	Volume (ft^3)
Southwest	C25	27	69.75	3,417,176
Southwest	C28A	46	49.5	443,763
Southwest	C29	50	184	2,854,513
Southwest	C30	32	136.25	1,505,692
Southwest	C31	39	89	2,206,879
Southwest	C32	34	53.25	2,312,977
Southwest	C33	29	22.25	883,619
Southwest	C34	21	13	625,273
Southwest	C35	14	12	248,923
Southwest	C36	11	9.5	222,651
Southwest	C37	23	15.25	285,097
Southwest	S_FRM	5	4.5	8,149,665
Southwest	S01	44	124.5	15,547,394
Southwest	S01T	44	98	8,636,890
Southwest	S02	45	131.5	1,318,163
Southwest	S03	13	5.5	151,669
Southwest	S04	65	304.75	3,047,870
Southwest	S05	64	293.25	34,010,181
Southwest	S06	63	254.5	16,009,237
Southwest	S07	22	18	1,697,005
Southwest	S08	38	57.75	235,296
Southwest	S09	40	55.75	6,944,268
Southwest	S10	52	160.25	3,055,051
Southwest	S11	51	131.75	900,022
Southwest	S12A	45	59	857,171
Southwest	S13	21	9.75	400,534
Southwest	S14	56	223.75	2,566,178
Southwest	S15	30	23.25	317,914
Southwest	S16	58	185.5	1,333,558
Southwest	S17	29	23.25	657,877
Southwest	S18	51	145.5	6,959,366
Southwest	S19	30	23.75	304,203
Southwest	S20	75	428.75	21,294,011
Southwest	S21	24	15.75	198,284
Southwest	S22	38	68.25	2,671,321
Southwest	S23	53	134	1,514,484
Southwest	S24	38	63	833,841
Southwest	S25	42	87.25	1,896,134

District	Regulator	Frequency	Duration (hours)	Volume (ft^3)
Southwest	S26	61	302.75	17,741,999
Southwest	S30	8	4.75	115,096
Southwest	S31	51	120.25	4,714,845
Southwest	S32	18	11.25	268,984
Southwest	S33	65	286.75	20,118,943
Southwest	S36A	57	244.25	7,862,652
Southwest	S37	53	175.25	3,262,070
Southwest	S38	32	83.75	9,093,902
Southwest	S42	40	91.5	10,965,587
Southwest	S42A	69	401	22,489,978
Southwest	S44	31	42	5,395,298
Southwest	S45	42	115.5	23,807,952
Southwest	S46	25	44.25	3,402,808
Southwest	S50	55	327.25	230,870,015

Table 3 - Overflow Summary for Typical Year Precipitation

Regulator	Frequency	SWO Duration (hrs)	Overflow Volume (MG)	Percent Capture
C01	15	7.25	1.22	93.97%
C02	2	0.5	0.00	99.85%
C04	19	14.5	1.57	90.93%
C04A	11	5.5	1.85	99.14%
C05	14	7.75	1.56	92.39%
C06	59	161.5	34.69	62.48%
C07	20	24	6.29	81.12%
C09	32	48	9.19	83.23%
C10	15	26	0.85	49.28%
C11	41	106.5	83.76	71.60%
C12	40	87.5	13.30	73.72%
C13	30	59.25	7.78	79.38%
C14	32	82.5	23.25	65.30%
C15	19	51	2.65	69.44%
C16	2	0.5	0.00	99.89%
C17	55	254	390.67	54.75%
C18	31	78.25	30.75	63.59%
C19	18	9	2.24	95.83%
C20	13	8.75	1.16	94.92%
C21	16	13.5	1.69	93.89%
C22	37	63	9.82	79.36%
C23	5	11.25	0.62	61.46%
C24	20	51.75	7.22	71.48%
C25	22	29	4.61	89.38%
C26	3	3.75	0.13	97.69%
C27	5	4.25	0.42	97.99%
C28A	39	41.75	1.51	91.42%
C29	48	166.75	14.36	45.88%
C30	30	107.5	6.90	59.16%
C31	40	75	7.92	73.88%
C32	30	40	6.72	84.50%
C33	18	11.5	1.97	92.00%
C34	12	4.25	0.89	96.17%
C35	6	1.75	0.12	97.11%
C36	6	1.75	0.11	97.79%
C37	13	5.75	0.32	95.02%
D02	42	419.75	265.39	7.44%
D03	42	406.75	76.21	4.75%
D04	33	179	5.73	57.86%
D05	57	446.75	601.29	34.70%

Regulator	Frequency	SWO Duration (hrs)	Overflow Volume (MG)	Percent Capture
D06	20	63.5	10.43	55.55%
D07	53	375.5	406.18	30.84%
D08	44	164.5	10.61	41.55%
D09	5	3	0.65	97.18%
D11	18	39.5	33.28	78.30%
D12	48	101.75	1.77	85.96%
D13	10	12.25	1.68	93.31%
D15	14	18.75	7.69	89.05%
D17	49	153.5	64.79	74.30%
D18	50	155.75	53.79	72.07%
D19	52	190	41.44	73.14%
D20	36	74	22.27	75.22%
D21	41	110.5	48.04	68.80%
D22	71	487.75	242.06	46.81%
D23	42	60.5	1.79	89.01%
D24	24	32.25	0.94	82.21%
D25	66	398	952.14	46.80%
D37	56	382.25	360.49	27.44%
D38	50	259.5	364.60	43.52%
D39	55	309	523.51	59.34%
D40	60	371.5	30.49	44.60%
D41	47	191.25	35.53	58.18%
D42	26	46.25	4.48	77.98%
D43	24	41.75	3.17	80.49%
D44	49	213.25	129.42	50.34%
D45	45	208.25	868.41	70.78%
D46	33	87.5	14.12	64.21%
D47	65	488	147.49	42.40%
D48	46	178.75	284.57	55.30%
D49	12	8.5	1.13	89.36%
D50	23	27.25	3.93	78.91%
D51	67	683	36.22	56.99%
D51A	57	260.5	27.56	74.90%
D52	28	53.75	6.43	72.70%
D53	18	25	29.76	86.53%
D54	31	92	162.21	70.47%
D58	32	79.75	14.70	69.96%
D61	48	135.5	14.32	62.51%
D62	34	71.25	5.13	69.02%
D63	39	124	180.89	66.23%
D64	32	64	2.68	79.39%
D65	37	119.75	123.19	63.09%

Regulator	Frequency	SWO Duration (hrs)	Overflow Volume (MG)	Percent Capture
D66	42	160.5	128.38	59.22%
D67	38	123.5	55.48	64.70%
D68	49	254.5	306.81	46.41%
D69	36	130.75	109.01	63.96%
D70	27	86.5	114.40	72.62%
D71	44	215	157.44	49.92%
D72	42	224.25	171.81	54.66%
D73	47	230.25	257.01	51.10%
F03	35	41.75	10.53	84.99%
F04	63	206.75	49.71	69.87%
F05	68	243.75	6.45	71.69%
F06	20	23.75	3.05	67.64%
F07	40	71.75	14.55	80.89%
F08	39	61	7.74	84.25%
F09	61	202.25	7.37	77.60%
F10	66	299.5	22.45	54.41%
F11	71	408.75	110.87	57.52%
F12	31	34	3.27	83.62%
F13	45	100.75	8.66	73.57%
F14	35	38.75	1.01	88.60%
F21	67	360	734.15	53.34%
F23	44	95.75	9.03	68.47%
F24	45	78.25	4.14	75.09%
F25	7	8.75	6.97	96.06%
P01	17	11.25	3.30	93.11%
P02	49	99.25	22.09	71.49%
P03	22	28.25	2.36	88.42%
P04	21	68	55.73	-94.05%
P05	33	171	180.17	-34.74%
R01	66	228.75	9.31	67.96%
R01A	74	439	95.40	53.11%
R02	68	224.75	1.05	71.92%
R03	42	58.75	0.51	87.79%
R04	84	475.5	11.96	58.50%
R05	70	260.25	2.74	74.15%
R06	49	113	27.15	85.81%
R07	14	7.5	3.52	99.16%
R08	39	90.25	198.82	88.04%
R09	19	110	2.98	93.09%
R10	49	219.25	8.06	84.58%
R11	36	41.5	5.71	90.70%
R11A	6	1.5	0.02	99.85%

Regulator	Frequency	SWO Duration (hrs)	Overflow Volume (MG)	Percent Capture
R12	8	6.5	9.60	84.06%
R12R	8	7.75	13.40	96.69%
R13	37	60.75	57.81	93.08%
R13A	10	5	4.22	99.11%
R14	86	199.5	126.27	93.94%
R15	8	6	5.54	99.32%
R18	65	303	85.34	97.24%
R20	5	9.5	0.93	99.67%
R21	3	1	1.94	99.71%
R24	11	3.75	3.99	98.30%
S01	41	108.25	79.05	74.33%
S01T	35	56	16.39	90.49%
S02	49	129	7.21	69.05%
S03	11	4.75	0.46	95.85%
S04	72	329.5	17.85	69.56%
S05	66	284.75	215.05	62.73%
S06	68	269.5	101.39	58.86%
S07	15	18.5	7.38	85.86%
S08	34	51.25	1.06	85.30%
S09	37	55.75	40.06	77.65%
S10	56	166.25	18.33	69.29%
S11	54	134.25	4.95	73.16%
S12	45	63	1.99	35.84%
S12A	43	51	2.96	85.83%
S13	17	7.75	1.67	94.09%
S14	63	232.75	15.64	56.79%
S15	22	19.5	1.55	90.09%
S16	66	193.5	8.41	73.32%
S17	24	24.5	3.31	89.34%
S18	52	161.5	45.05	75.39%
S19	27	22	1.56	86.92%
S20	79	465.25	140.76	39.39%
S21	23	15.75	0.86	91.27%
S22	39	64.75	13.27	86.77%
S23	56	150	9.45	70.36%
S24	39	62.25	3.75	77.39%
S25	45	87.75	10.42	84.59%
S26	66	331.5	123.78	58.25%
S27	67	393.5	1275.04	57.53%
S28	7	2.25	0.33	98.21%
S30	6	2	0.23	97.89%
S31	56	140.25	28.58	75.82%

Regulator	Frequency	SWO Duration (hrs)	Overflow Volume (MG)	Percent Capture
S32	14	7.75	0.72	92.55%
S33	71	318.75	129.62	22.15%
S34	78	424.25	128.25	47.13%
S35	5	1.5	0.12	97.04%
S36	30	30.5	1.34	75.68%
S36A	65	280.5	52.00	59.38%
S37	61	206.75	20.70	64.93%
S38	28	59	45.07	63.26%
S39	21	57.75	24.22	63.84%
S40	20	38	13.88	72.91%
S42	48	152.5	85.38	76.75%
S42A	72	449	167.80	52.49%
S43	61	302.75	84.49	33.50%
S44	41	101.25	51.55	71.15%
S45	41	100	134.08	77.69%
S46	25	37.25	8.19	88.66%
S47	59	440.25	84.52	-10.52%
S50	62	330.75	1329.49	14.49%
S51	3	0.75	0.06	98.43%
T01	66	235.25	35.94	65.53%
T03	61	128.25	19.88	72.93%
T04	60	111.75	13.36	66.93%
T05	43	44.5	5.68	82.33%
T06	37	51.25	42.44	81.52%
T07	9	4.25	0.49	96.40%
T08	71	381.75	629.84	58.65%
T09	44	49.75	4.83	81.72%
T10	64	205.25	18.73	55.98%
T11	55	90.75	7.93	72.54%
T12	7	2.25	0.06	98.69%
T13	62	170	31.53	65.22%
T14	62	233.5	898.07	71.92%

Table 4 - July 2013 PWD Rain Gage Records – Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7/1/2013	0.2	0.3	0.21	NR	0.29	0.21	0.17	0.27	0.25	0.49	0.27	0.47	0.21	0.31	0.24	0.24	0.23	0.25	0.23	0.31	0.4	0.18	0.26	0.68
7/2/2013	0.08	0.11	0.06	NR	0.09	0.04	0.08	0.05	0.03	0.05	0.06	0.19	0.07	0.08	0.09	0.17	0.09	0.03	0.03	0.11	0.02	0.02	0.1	0.02
7/3/2013	0.01	0	0.01	NR	0.01	0.17	0	0.07	0.37	0.29	0.1	0	0.01	0	0	0.01	0	0.53	0.22	0.03	0.09	0.18	0.01	0.08
7/4/2013	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/5/2013	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/6/2013	0	0.18	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/7/2013	0.01	0.01	0.01	NR	0	0.05	0.02	0.02	0.02	0.03	0.03	0	0.02	0.21	0.04	0.03	0.06	0.04	0.16	0.01	0.18	0.02	0	0
7/8/2013	0	0	0	NR	0	0	0	0.03	0	0	0.05	0.01	0.01	0	0	0	0	0.01	0	0	0.04	0	0	0
7/9/2013	0	0	0.1	NR	0	0	0.03	0.21	0	0.2	0.24	0	0.08	0	0	0	0.11	0	0.01	0.18	0.02	0.01	0	0.01
7/10/2013	0	0.03	0.04	NR	0	0.01	0	0	0	0.13	0.01	0.04	0	0	0	0	0	0	0.03	0.25	0.03	0	0.02	0
7/11/2013	0.01	1.17	0	NR	0.03	0.01	0	0	0.01	0.01	0	0.05	0	0.01	0.02	0.03	0.01	0	0.02	0	0.02	0.01	0	0
7/12/2013	1.26	0	0.82	NR	1.22	1.9	1.07	0.82	1.53	0.83	1.17	0.8	0.98	0.76	0.95	1.19	0.89	1.3	0.93	0.99	0.85	1.62	NR	1.04
7/13/2013	0.02	0	0.51	NR	0.71	0.04	0.94	0.27	0.02	0.48	0.72	0.3	0.65	0.96	1	0	0.74	0.05	0.01	0.98	0	0.01	NR	0.47
7/14/2013	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	NR	NR
7/15/2013	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0
7/16/2013	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0
7/17/2013	0	0	0	NR	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0
7/18/2013	0	0	0	NR	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0
7/19/2013	0	0.09	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	NR	0
7/20/2013	0.16	0	0.01	0.05	0.24	0.02	0.15	0.17	0	0.05	0.16	0.32	0.06	0.98	0.81	0.37	0.06	0.15	0.15	0	0.22	0	0.15	0
7/21/2013	0	2.02	0	0.02	0	0.01	0	0.01	0	0.03	0.05	0.01	0.04	0	0.01	0.01	0	0	0	NR	0.01	0	0.01	0
7/22/2013	0	0.33	0.07	0.16	0	NR	0.01	0.06	0	0.25	0.14	0	0.13	0	0	0.02	0	0	0.03	0.04	0.02	0	NR	0.38
7/23/2013	NR	0	1.48	1.77	2.96	NR	2.03	1.47	1.57	0.86	1.35	2.65	1.61	2.85	2.94	3.12	1.9	1.16	0.83	1.6	0.63	1.44	3.07	0.96
7/24/2013	NR	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/25/2013	NR	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26/2013	NR	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/27/2013	NR	1.69	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/28/2013	NR	0	0.44	1.15	3.9	NR	0.54	0.2	0.14	0.24	0.19	4.99	0.41	1.87	1.88	1.71	0.6	0.05	0.32	0.53	0.19	0.15	5.96	0.32
7/29/2013	NR	0	0.16	0.07	0.13	NR	0.12	0.19	0.13	0.05	0.19	0.26	0.16	0.1	0.11	0.15	0.06	0.15	0.03	0.07	0.1	0.13	0.15	0.03
7/30/2013	NR	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/31/2013	NR	1.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5 - July 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
7/1/2013	0.23	0.18	0.27	NR	NR	NR	0.15	0.26	NR	0.18	0.42
7/2/2013	0.09	0.1	0.06	NR	NR	NR	0.05	0.05	NR	0.02	0.03
7/3/2013	0.01	0	0.04	NR	NR	NR	0.16	0.04	NR	0.1	0.09
7/4/2013	0	0	0	NR	NR	NR	0	0	NR	0	NR
7/5/2013	0	0	0	NR	NR	NR	0	0	NR	0	NR
7/6/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/7/2013	0.02	0.01	0.03	NR	NR	NR	0.03	0.09	NR	0.19	0.18
7/8/2013	0	0	0	NR	NR	NR	0.02	0	NR	0.01	0.03
7/9/2013	0	0	0.03	NR	NR	NR	0.04	0	NR	0.06	0.01
7/10/2013	0	0	0.13	NR	NR	NR	0	0	NR	0	0.05
7/11/2013	0.02	0.01	0	NR	NR	NR	0.02	0.01	NR	0.02	0.02
7/12/2013	1.27	0.94	0.9	NR	NR	NR	0.78	0.84	NR	1.45	0.99
7/13/2013	0.06	0.08	0.67	NR	NR	NR	0.25	0.77	NR	0.45	0.01
7/14/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/15/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/16/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/17/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/18/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/19/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
7/20/2013	0.13	NR	0.01	NR	NR	NR	0.01	0	NR	0	0.03
7/21/2013	0	NR	0	NR	NR	NR	0.01	0	NR	0	0
7/22/2013	0.01	NR	0	NR	NR	NR	0.2	1.74	NR	0.1	0.03
7/23/2013	2.94	NR	1.61	NR	NR	NR	0.53	0.65	NR	1.01	0.72
7/24/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
7/25/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
7/26/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
7/27/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
7/28/2013	3.75	NR	0.6	NR	NR	NR	0.5	0.8	NR	0.35	0.25
7/29/2013	0.1	NR	0.05	NR	NR	NR	0.04	0.03	NR	0.07	0.1
7/30/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
7/31/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0

Table 6 – August 2013 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8/1/2013	NR	0	1.06	0.88	1.06	1.14	1.04	0.96	1.12	0.99	1.07	1.3	1.1	0.78	0.89	1.14	1.14	1.07	0.82	NR	0.88	1.14	1.22	1.16
8/2/2013	NR	0.01	0	0	0	NR	0	0	0	0	0	0	NR	0	0	0	0	0	0	NR	NR	0	0	0
8/3/2013	NR	0	0.01	0	0	0.01	0	0.01	0	0.01	0.01	0	0.01	0	0	0	0	0.01	0.01	NR	0.01	0	0	0
8/4/2013	NR	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/5/2013	NR	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/6/2013	NR	0.36	0	0.28	0	0.05	0	0	0.02	0	0	0	0	0	0	0	0	0	0	NR	0.02	0.03	0	0.01
8/7/2013	NR	0	0.03	0.04	0.02	NR	0.02	0.02	0.07	0.01	0.03	0.02	0.05	0.06	0.01	0.01	0.04	0.05	0.01	NR	0	0.14	0.04	0
8/8/2013	NR	0.88	0.75	0.37	0.38	NR	0.19	0.57	0.04	0.67	0.63	0.6	0.6	0.3	0.3	0.2	0.17	0.44	0.25	NR	0.29	0.05	0.27	0.46
8/9/2013	NR	0	0.1	0.16	0.82	NR	0.25	0.08	0.36	0.17	0.14	0.07	0.07	0.46	0.51	0.77	0.13	0.09	0.04	NR	0.02	0.39	0	0.22
8/10/2013	NR	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/11/2013	NR	1.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/12/2013	NR	0	0	0	0	0.08	0.11	0	0	0	0	0	0	0.24	0	0	0.01	0.02	0	0	0	0	0	0
8/13/2013	NR	0	1.79	1.36	1.4	1.88	1.41	1.6	1.8	2.29	1.88	1.71	1.82	1.29	1.69	1.54	1.58	1.77	2.18	2.16	2.53	1.52	1.77	2.63
8/14/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/15/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/16/2013	NR	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/17/2013	NR	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/18/2013	NR	0	0.05	0.03	0.03	0.07	0.05	0.05	0.06	0.06	0.06	0.02	0.05	0.04	0.04	0.04	0.05	0.06	0.06	0.04	0.07	0.05	0.03	0.06
8/19/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/20/2013	NR	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/21/2013	NR	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/22/2013	NR	0	0.56	0.26	0.04	0.01	0.27	0.18	0.03	0.5	0.32	0.18	0.38	0.44	0.4	0.02	0.2	0.45	0.09	0.39	0.02	0.01	0.64	0.54
8/23/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/24/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/25/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/26/2013	NR	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/27/2013	NR	0.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
8/28/2013	NR	0	0.71	0.58	0.81	1.11	0.46	0.69	1.32	0.61	1.06	1.14	0.55	1.53	0.96	0.98	0.74	2.05	2.21	NR	1.6	1.05	0.88	0.55
8/29/2013	NR	0	0	0	0.01	0.01	0	0	0.01	0	0	0	0.01	0	0	0	0	0.02	0	NR	0	0.01	0.01	0
8/30/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/31/2013	NR	1.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7 - August 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
8/1/2013	1.04	NR	1.17	NR	NR	NR	0.77	0.7	NR	0.9	1.01
8/2/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
8/3/2013	0	0	0	NR	NR	NR	0.01	0.02	NR	0.01	0.01
8/4/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/5/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/6/2013	0	0.01	0.04	NR	NR	NR	0	0	NR	0.04	0.01
8/7/2013	0	0.03	0.05	NR	NR	NR	0	0	NR	0.01	0
8/8/2013	0.26	0.24	0.71	NR	NR	NR	0.18	0.15	NR	0.24	0.34
8/9/2013	0.83	0.44	0.04	NR	NR	NR	0.16	0.01	NR	0.13	0
8/10/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/11/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/12/2013	0	0.24	0	NR	NR	NR	0	0	NR	0	0.03
8/13/2013	1.81	1.53	1.81	NR	NR	NR	2.47	2.7	NR	1.66	2.03
8/14/2013	0	0	0	NR	NR	NR	NR	0	NR	0	0
8/15/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/16/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/17/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/18/2013	0.03	0.05	0.05	NR	NR	NR	0.06	0.05	NR	0.08	0.08
8/19/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/20/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/21/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/22/2013	0.04	0.4	0.56	NR	NR	NR	0.69	0.5	NR	0	0
8/23/2013	0	0	0	NR	NR	NR	0	0	NR	0	NR
8/24/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/25/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/26/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/27/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/28/2013	0.86	0.91	0.52	NR	NR	NR	0.67	0.43	NR	1.36	1.96
8/29/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/30/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
8/31/2013	0	0	0	NR	NR	NR	0	0	NR	0	0

Table 8 – September 2013 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
9/1/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/2013	NR	0	1.39	0.21	1.46	1.93	0.68	1.14	2.74	1.16	1.14	1.31	1.16	0.87	0.72	0.54	1.39	0.84	0.91	0.26	1.51	3.38	1.41	0.84
9/3/2013	NR	0	0	0	0	0	0	NR	0	0	0	0	0	NR	NR	NR	0	0	0	NR	0	0	0	0
9/4/2013	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/5/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/6/2013	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/7/2013	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/8/2013	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/9/2013	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/10/2013	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
9/11/2013	0	0.31	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/12/2013	0.1	0	0.15	0.08	0.1	0.13	0.1	0.26	NR	0.23	0.21	0.17	0.17	0.07	0.08	0.11	0.06	0.14	0.22	0.13	0.13	0.01	0.1	0.2
9/13/2013	0.19	0	0.42	0.23	0.27	0.74	0.36	0.41	NR	0.32	0.47	0.13	0.44	0.27	0.29	0.32	0.38	0.58	0.37	0.39	0.4	0.53	0.26	0.22
9/14/2013	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/15/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/16/2013	0.04	0	0.07	0.05	0.04	0.11	0.07	0.07	0.08	0.09	0.07	0.05	0.07	0.04	0.03	0.03	0.06	0.08	0.08	0.08	0.08	0.05	0.05	0.13
9/17/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/18/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/19/2013	0	0.01	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/20/2013	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/21/2013	0.68	0	0.76	0.58	0.59	0.81	0.77	0.9	0.87	0.86	0.88	0.63	0.75	0.64	0.75	0.89	0.72	0.78	0.65	0.57	0.96	0.95	0.72	0.94
9/22/2013	0.38	0	0.51	0.6	0.63	0.38	0.42	0.38	0.39	0.44	0.41	0.61	0.51	0.59	0.54	0.38	0.53	0.44	0.39	0.54	0.5	0.3	0.37	0.24
9/23/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04
9/24/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03
9/25/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01
9/26/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
9/27/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/28/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/29/2013	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/30/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR

Table 9 - September 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
9/1/2013	0	0	0	NR	NR	NR	0	NR	NR	0	0
9/2/2013	1.32	NR	0.79	NR	NR	NR	0.4	0.19	NR	2.29	1.12
9/3/2013	0	NR	NR	NR	NR	NR	0	0	NR	0	0
9/4/2013	0	0	0	NR	NR	NR	0	0	NR	NR	0
9/5/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
9/6/2013	0	0	0	NR	NR	NR	0	0	NR	0	0
9/7/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
9/8/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
9/9/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
9/10/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
9/11/2013	0	NR	0	NR	NR	NR	0	0	NR	0	0
9/12/2013	0.16	NR	0.08	0.17	0.33	NR	0.29	0.39	NR	0.09	0.11
9/13/2013	0.2	NR	0.43	0.28	0.15	NR	0.27	0.15	NR	0.48	0.39
9/14/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/15/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/16/2013	0.04	0.08	0.06	0.12	0.1	NR	0.11	0.12	NR	0.09	0.11
9/17/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/18/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/19/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/20/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/21/2013	0.59	0.78	0.7	0.65	0.78	NR	0.69	0.7	NR	0.87	0.93
9/22/2013	0.39	0.36	0.58	0.51	0.44	NR	0.37	0.41	NR	0.45	0.46
9/23/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/24/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/25/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/26/2013	0	NR	0	0	0	NR	0	0	NR	NR	NR
9/27/2013	0	0	0	0	NR	NR	0	0	NR	0	0
9/28/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/29/2013	0	0	0	0	0	NR	0	0	NR	0	0
9/30/2013	0	0	0	0	0	NR	NR	0	NR	0	0

Table 10 - October 2013 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
10/1/2013	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/2/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/3/2013	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/4/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/5/2013	0.07	0.78	0	0	0.01	0	0	0	0	0	0	0.13	0	0	0	0	0	0	0	0	0	0	0	0
10/6/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.24	0.13	0.1	0	0	0.04
10/7/2013	0.34	0	0.44	0.51	0.38	0.57	0.41	0.48	0.82	0.55	0.54	0.36	0.45	0.39	0.4	0.49	0.4	0.66	0.81	0.54	0.49	0.73	0.38	NR
10/8/2013	0	0.46	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/9/2013	0	1.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/10/2013	0.36	0.01	0.25	0.27	0.34	0.48	0.32	0.3	0.48	0.32	0.29	0.18	0.26	0.28	0.32	0.4	0.24	0.39	0.51	0.2	0.58	0.37	0.3	NR
10/11/2013	1.55	0	1.27	1.73	1.42	1.5	1.32	1.39	1.48	1.33	1.63	0.84	1.72	1.37	1.63	1.48	1.58	1.35	1.47	0.91	1.4	1.45	1.06	NR
10/12/2013	0.01	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	NR
10/13/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	NR
10/14/2013	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/15/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/16/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/17/2013	0	0.06	0.02	0.01	0	0.01	0.02	0.01	0.01	0.04	0.02	0	0.01	0	0	0	0.01	0.01	0.03	0.02	0.04	0.01	0	NR
10/18/2013	0	0	0	0	0.01	0.01	0.01	0	0	0.01	0	0.01	0.01	0	0	0	0.01	0.02	0	0	0	0	0	NR
10/19/2013	0.05	0	0.07	0.07	0.05	0.07	0.06	0.04	0.06	0.07	0.06	0.07	0.05	0.1	0.1	0.07	0.05	0.07	0.07	0.08	0.08	0.06	0.07	NR
10/20/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/21/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/22/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/23/2013	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	NR
10/24/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/25/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/26/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/27/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/28/2013	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/29/2013	0	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
10/30/2013	0.03	0.21	0.01	0.01	0.04	0.03	0.02	0.01	0.05	0.01	0.01	0.03	0.01	0.04	0.05	0.06	0.02	0.02	0.01	0.01	0.01	0.06	0.04	NR
10/31/2013	0.02	0	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.02	0.02	0.02	0.02	0.03	0.03	0.03	NR

Table 11 - October 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
10/1/2013	0	0	0	0	0	NR	0	0	0	0	0
10/2/2013	0	0	0	0	0	NR	0	0	0	0	0
10/3/2013	0	0	0	0	0	NR	0	0	0	0	0
10/4/2013	0	0	0	0	0	NR	0	0	0	0	0
10/5/2013	0.03	0	0	0	0	NR	0	0	0.01	0	0
10/6/2013	0	0	0	0.01	0.24	NR	0.03	0.23	0	0	0.03
10/7/2013	NR	0.42	0.7	0.59	0.56	NR	0.62	0.74	0.48	0.42	0.52
10/8/2013	NR	0	0	0	0	NR	0	0	0	0	0
10/9/2013	NR	0	0	0	0	NR	0	0	0	0	0
10/10/2013	NR	0.35	0.26	0.22	0.45	NR	0.28	0.23	0.6	0.56	0.54
10/11/2013	NR	1.49	1.1	0.9	1.36	NR	1.13	0.92	1.87	1.95	1.45
10/12/2013	NR	0	0	0	0	NR	0	0	0	0	0
10/13/2013	0	0	0	0	0	NR	0	0	0.01	0	0
10/14/2013	0	0	0	0	0	NR	0	0	0	0	0
10/15/2013	0	0	0	0	0	NR	0	0	0	0	0
10/16/2013	0	0	0	0	0	NR	0	0	0	0	0
10/17/2013	0	0	0.02	0.02	0.04	NR	0.02	0.03	0	0.02	0.04
10/18/2013	0.01	0.01	0	0	0	NR	0.01	0	0.01	0	0
10/19/2013	0.04	0.04	0.06	0.04	0.1	NR	0.05	0.07	0.03	0.07	0.07
10/20/2013	0	0	0	0	0	NR	0	0	0	0	0.01
10/21/2013	0	0	0	0	0	NR	0	0	0	0	0
10/22/2013	0	0	0	0	0	NR	0	0	0	0	0
10/23/2013	0	0	0	0	0	NR	0	0	0	0	0
10/24/2013	0	0	0	0	0	NR	0	0	0	0	0
10/25/2013	0	0	0	0	0	NR	0	0	0	0	0
10/26/2013	0	0	0	0	0	NR	0	0	0	0	0
10/27/2013	0	0	0	0	0	NR	0	0	0	0	0
10/28/2013	0	0	0	NR	0	NR	0	0	0	0	0
10/29/2013	0	0	0	0	NR	NR	0	NR	0	0	0
10/30/2013	0.04	0.03	0.01	0	0	NR	0	0	0.07	0.03	0.01
10/31/2013	0.03	0.03	0.02	0.02	NR	NR	0.03	NR	0.03	0.03	NR

Table 12 - November 2013 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11/1/2013	0.12	0	0.19	0.12	0.1	0.17	0.16	0.2	0.15	0.18	0.24	0.12	0.19	0.11	0.13	0.12	0.18	0.13	0.16	0.25	0.22	0.15	0.12	0.24
11/2/2013	0	0	0	0	0.01	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	NR	0	0	0	0
11/3/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/4/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/5/2013	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/6/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/7/2013	0.03	0	0.04	0.04	0.06	0.04	0.05	0.04	0.05	0.04	0.04	0.09	0.04	0.04	0.04	0.05	0.05	0.02	0.03	0.04	0.04	0.03	0.05	0.02
11/8/2013	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
11/9/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/10/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/11/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/12/2013	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0	0	0	0
11/13/2013	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/14/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/15/2013	0	0.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/16/2013	0	0	0.02	0.02	0	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0	0.02
11/17/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/18/2013	0.27	0	0.16	0.15	0.24	0.16	0.16	0.14	0.15	0.21	0.18	0.22	0.16	0.26	0.26	0.26	0.2	0.14	0.15	0.25	0.14	0.16	0.32	0.18
11/19/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/20/2013	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/22/2013	0.03	0	0.02	0.02	0.06	0.02	0.02	0.01	0.03	0.04	0.02	0.05	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02
11/23/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/24/2013	0	2.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/25/2013	0	0.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/2013	0.63	0	0.63	0.65	0.59	0.7	0.61	0.63	0.7	0.66	0.68	0.48	0.67	0.63	0.62	0.67	0.55	0.69	0.75	0.6	0.8	0.69	0.56	0.67
11/27/2013	1.77	0	1.82	1.5	1.58	2.38	1.84	1.81	2.22	2.05	1.99	1.64	1.81	1.57	1.75	2.01	1.82	2.01	2.26	1.79	2.61	2.24	1.71	2.07
11/28/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/30/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 13 - November 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
11/1/2013	NR	0.15	0.24	0.24	0.21	NR	0.27	0.39	0.29	0.17	0.28
11/2/2013	NR	0	0	0	0	NR	0	0	0	0	0
11/3/2013	NR	0	0	0	0	NR	0	0	0	0	0
11/4/2013	NR	0	0	0	0	NR	0	0	0	0	0
11/5/2013	NR	0	0	0	0	NR	0	0	0	0	0
11/6/2013	NR	0	0	0	0	NR	0	0	0	0	0
11/7/2013	0.04	0.05	0.04	0.03	0.03	NR	0.04	0.04	0.05	0.06	0.06
11/8/2013	0	0	0	0	NR	NR	0	0	0	0	0
11/9/2013	0	0	0	0	0	NR	0	0	0	0	0
11/10/2013	0	0	0	0	0	NR	0	0	0	0	0
11/11/2013	0	0	0	0	0	NR	0	0	0	0	0
11/12/2013	0	0	0	0.02	0	NR	0	0.01	0	0	0.01
11/13/2013	0	0	0	0	0	0	0	0	0	0	0
11/14/2013	0	0	NR	0	0	0	0	0	0	0	0
11/15/2013	0	0	0	0	0	0	0	0	0	0	0
11/16/2013	0	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02
11/17/2013	0	0	0	0	0	0	0	0	0	0	0
11/18/2013	0.25	0.19	0.24	0.18	0.14	0.17	0.17	0.12	0.19	0.11	0.11
11/19/2013	0	0	0	0	0	0	0	0	0	0	0
11/20/2013	0	0	0	0	0	0	0	0	0	0	0
11/21/2013	0	0	0	0	0	0	0	0	0	0	0
11/22/2013	0.05	0.01	0.02	0.01	0.04	0.01	0.02	0	0.05	0.02	0.01
11/23/2013	0	0	0	0	0	0	0	0.01	0	0	0.01
11/24/2013	NR	0	0	0	0	0	0	NR	0	0	0
11/25/2013	NR	0	0	0	0	0	0	0	0	0	0
11/26/2013	NR	NR	0.71	0.64	0.67	0.61	0.64	NR	0.73	NR	0.74
11/27/2013	NR	NR	1.83	1.85	2.16	2.23	2.12	NR	2.24	NR	2.6
11/28/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
11/29/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
11/30/2013	NR	NR	0	0	0	0	0	NR	0	NR	0

Table 14 – December 2013 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
12/1/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/2/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/3/2013	0	0.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/4/2013	0	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/5/2013	0	NR	0.01	0.01	0	0	0.01	0	0	0.01	0.01	0	0.01	0.01	0	0	0.01	0.01	0.01	0.01	0	0	0	0.01
12/6/2013	0.63	NR	0.8	0.72	0.61	0.95	0.76	0.74	0.88	0.89	0.79	0.63	0.81	0.7	0.73	0.77	0.75	0.7	0.76	0.79	0.93	0.78	0.69	0.65
12/7/2013	0.12	NR	0.14	0.13	0.1	0.12	0.12	0.13	0.12	0.2	0.15	0.08	0.14	0.12	0.12	0.13	0.15	0.13	0.14	0.16	0.15	0.1	0.1	0.14
12/8/2013	NR	NR	0.28	NR	NR	NR	0.2	NR	NR	NR	0.18	NR	NR	NR	NR	NR	NR	NR	0.26	0.31	NR	NR	NR	0.16
12/9/2013	NR	NR	0.7	NR	NR	NR	0.76	NR	NR	NR	0.9	NR	NR	NR	NR	NR	NR	NR	0.69	0.67	NR	NR	NR	0.61
12/10/2013	NR	NR	0.29	NR	NR	NR	0.29	NR	NR	NR	0.27	NR	NR	NR	NR	NR	NR	NR	0.29	0.35	NR	NR	NR	0.24
12/11/2013	NR	NR	0	NR	NR	NR	0.01	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	0	0	NR	NR	NR	0.01
12/12/2013	NR	NR	0	NR	NR	NR	0	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	0	0	NR	NR	NR	0
12/13/2013	NR	NR	0	NR	NR	NR	0	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	0	0	NR	NR	NR	0
12/14/2013	NR	0.01	0.34	NR	NR	NR	0.41	NR	NR	NR	0.38	NR	NR	NR	NR	NR	NR	NR	0.44	0.38	NR	NR	NR	0.21
12/15/2013	NR	NR	0.4	NR	NR	NR	0.37	NR	NR	NR	0.49	NR	NR	NR	NR	NR	NR	NR	0.34	0.36	NR	NR	NR	0.48
12/16/2013	NR	NR	0	NR	NR	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0
12/17/2013	0	0	0.06	0.03	0.02	0.02	0.05	0.01	0.01	0.01	NR	0.04	0.02	0.02	0.02	0.04	0.02	0.01	0.05	0.06	0	0	0.02	NR
12/18/2013	NR	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/19/2013	0	0.1	0	NR	0	0	0	0	0	NR	0	0	NR	0	0	0	NR	0	0	0	NR	0	NR	0
12/20/2013	0	0.54	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/21/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/22/2013	0.07	0	0.1	0.07	0.08	0.14	0.09	0.08	0.13	0.12	0.1	0.07	0.09	0.08	0.09	0.09	0.09	0.1	0.11	0.11	0.11	0.11	0.06	0.1
12/23/2013	0.51	0	0.57	0.64	0.58	0.73	0.63	0.58	0.62	0.59	0.61	0.61	0.56	0.77	0.64	0.64	0.65	0.57	0.56	0.59	0.55	0.55	0.53	0.52
12/24/2013	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	NR
12/25/2013	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/26/2013	0	1.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/27/2013	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/28/2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/29/2013	1.26	0	1.23	1.29	1.17	1.25	1.23	1.22	1.26	1.27	1.33	1.12	1.29	1.27	1.29	1.39	1.21	1.23	1.21	1.18	1.21	1.23	1.13	1.3
12/30/2013	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/31/2013	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 - December 2013 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
12/1/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
12/2/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
12/3/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
12/4/2013	NR	NR	0	0	0	0	0	NR	0	NR	0
12/5/2013	NR	NR	0.01	0.02	0	0	0	NR	0	NR	0
12/6/2013	NR	0.77	0.82	0.82	0.74	0.78	0.72	NR	0.77	NR	1
12/7/2013	0.14	0.12	0.15	0.18	0.12	0.18	0.14	NR	0.11	0.14	0.17
12/8/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/9/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/10/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/11/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/13/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/14/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/15/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/16/2013	0	0	0	0	0	0	0	0	0	0	0
12/17/2013	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0	NR	0	0
12/18/2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/19/2013	0	0	0	0	NR	0	0	0	0	0	NR
12/20/2013	0	0	0	0	NR	0	0	0	0	0	0
12/21/2013	0	0	0	0	0	0	0	0	0	0	0
12/22/2013	0.08	0.08	0.1	0.13	0.13	0.1	0.12	0.16	0.12	0.12	0.12
12/23/2013	0.56	0.57	0.63	0.54	0.61	0.56	0.44	0.59	0.59	0.66	0.61
12/24/2013	0	0	0	0	0	0	0	0	0	0	0
12/25/2013	0	0	0	0	0	0	0	0	0	0	0
12/26/2013	0	0	0	0	0	0	0	0	0	0	0
12/27/2013	0	0	0	0	0	0	0	0	0	0	0
12/28/2013	0	0	0	0	0	0	0	0	0	0	0
12/29/2013	1.25	1.17	1.3	1.24	1.14	1.18	1.1	1.23	1.2	1.25	1.19
12/30/2013	0	0	0	NR	0	0	0	0	0	0	0
12/31/2013	0	0	0	0	0	0	0	0	0	0	0

Table 16 - January 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1/1/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2/2014	NR	NR	0.22	NR	NR	NR	0.13	NR	NR	NR	0.09	NR	NR	NR	NR	0.07	NR	NR	0.04	NR	NR	NR	NR	0.06
1/3/2014	NR	NR	0.11	NR	NR	NR	0.02	NR	NR	NR	NR	NR	NR	NR	NR	0	NR	NR	0	NR	NR	NR	NR	NR
1/4/2014	NR	0	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/5/2014	NR	0	0.22	NR	NR	NR	0.36	NR	NR	NR	0.44	NR	NR	NR	NR	0.26	NR	NR	0.48	0.31	NR	NR	NR	0.44
1/6/2014	NR	0	0.46	NR	NR	NR	0.39	NR	NR	NR	0.5	NR	NR	NR	NR	0.45	NR	NR	0.37	0.39	NR	NR	NR	0.43
1/7/2014	0	0.39	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/8/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/9/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/10/2014	0.41	0	0.3	0.34	0.4	0.39	0.34	0.34	0.36	0.39	0.35	0.4	0.35	NR	0.41	0.38	0.33	0.36	0.38	0.29	0.45	0.37	0.41	0.37
1/11/2014	NR	NR	NR	NR	NR	NR	0.69	0.63	0.65	NR	0.64	NR	0.72	NR	0.64	NR	NR	NR	0.55	NR	NR	0.68	NR	NR
1/12/2014	0	NR	0	0	0	NR	0	0	NR	NR	NR	NR	NR	NR	0	0	0	0	0	0	0	0	0	0
1/13/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0
1/14/2014	NR	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/15/2014	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0	NR	NR	0	0	NR	NR	NR	NR
1/16/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	NR	0	0	0
1/17/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0
1/18/2014	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0	0	NR	NR
1/19/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/20/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/21/2014	NR	0	0.2	NR	NR	NR	0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.16	NR	NR	NR	NR	0.08
1/22/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
1/23/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
1/24/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/25/2014	0	0	NR	0	0	0	NR	0	0	0	NR	0	0	0	0	NR	0	0	NR	NR	0	0	0	NR
1/26/2014	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	NR	0	0	0	0	0	NR	0	NR
1/27/2014	0	0	0	NR	NR	NR	0	NR	NR	NR	0	NR	NR	NR	0	0	NR	NR	0	0	NR	0	0	NR
1/28/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0
1/29/2014	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	NR
1/30/2014	0	NR	0	0	0	0	0	0	0	NR	0	0	NR	0	0	0	0	0	0	0	0	0	0	0
1/31/2014	0	NR	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	NR	0	0	0	0	0	NR	0

Table 17 - January 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
1/1/2014	0	0	0	0	0	0	0	0	0	0	0
1/2/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/3/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/4/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/5/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/6/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/7/2014	0	0	0	0	0	0	0	0	0	0	0
1/8/2014	0	0	0	0	0	0	0	0	0	0	0
1/9/2014	0	0	0	0	0	0	0	0	0	0	0
1/10/2014	0.4	0.34	NR	0.33	0.41	0.36	0.34	0.41	0.38	0.41	0.41
1/11/2014	NR	NR	NR	0.72	NR	0.64	NR	NR	NR	NR	NR
1/12/2014	0	0	0	0	NR	NR	0	NR	0	0	NR
1/13/2014	0	0	0	0	0	0	0	0	0	0	0
1/14/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/15/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/16/2014	0	0	0	0	0	0	0	0	0	NR	0
1/17/2014	0	0	0	0	0	0	0	0	0	0	0
1/18/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/19/2014	0	0	0	0	0	0	0	0	0	0	0
1/20/2014	0	0	0	0	0	0	0	0	0	0	0
1/21/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1/22/2014	0	0	0	0	0	0	0	0	0	0	0
1/23/2014	0	0	NR	0	0	0	0	0	0	0	0
1/24/2014	0	0	0	0	0	0	0	0	0	0	0
1/25/2014	0	0	0	0	0	0	0	0	0	0	0
1/26/2014	0	0	NR	NR	0	NR	0	NR	NR	0	0
1/27/2014	0	0	NR	0	0	NR	NR	NR	NR	NR	NR
1/28/2014	0	0	0	0	0	0	0	0	0	0	0
1/29/2014	0	0	0	0	0	0	0	0	0	0	0
1/30/2014	0	0	0	0	0	0	0	0	0	0	0
1/31/2014	0	0	0	0	0	0	0	0	0	0	0

Table 18 – February 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2/1/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/2/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/3/2014	NR	0	1.16	NR	NR	NR	1.1	NR	NR	NR	1.01	NR	NR	NR	NR	1.26	NR	NR	0.97	1.25	NR	NR	NR	0.68
2/4/2014	NR	0	0.05	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.01	NR	NR	NR	NR	NR	NR	NR	NR
2/5/2014	NR	0	1.53	NR	NR	NR	1.68	NR	NR	NR	1.78	NR	NR	NR	NR	1.55	NR	NR	NR	1.45	NR	NR	NR	1.44
2/6/2014	0	NR	0	0	0	0	NR	0	0	NR	0	0	NR	0	0	0	0	NR	0	0	NR	NR	0	0
2/7/2014	0	0	0	0	0	0	0	NR	0	NR	0	0	NR	0	0	0	0	NR	0	0	NR	NR	0	0
2/8/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0
2/9/2014	NR	NR	0.09	NR	NR	NR	0.1	NR	NR	NR	0.11	NR	NR	NR	NR	0.13	NR	NR	0.12	0.13	NR	NR	NR	0.13
2/10/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	NR
2/11/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/12/2014	NR	0.1	0.02	NR	NR	NR	0.01	NR	NR	NR	0.01	NR	NR	NR	NR	0	NR	NR	0.01	NR	NR	NR	NR	0.01
2/13/2014	NR	0	1.42	NR	NR	NR	1.42	NR	NR	NR	1.4	NR	NR	NR	NR	1.35	NR	NR	1.21	NR	NR	NR	NR	1.11
2/14/2014	NR	NR	0.15	NR	NR	NR	0.37	NR	NR	NR	0.32	NR	NR	NR	NR	0.11	NR	NR	0.36	NR	NR	NR	NR	NR
2/15/2014	0.09	NR	0.17	0.2	0.09	0.21	0.19	0.06	0.13	0.08	0.18	0.08	0.17	0.12	0.16	0.14	NR	0.09	0.11	0.19	NR	0.09	0.1	NR
2/16/2014	0	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	NR	0	0
2/17/2014	0	0	0	0	0	0	0	NR	0	NR	0	0	0	0	0	0	NR	0	0	0	0	0	0	0
2/18/2014	NR	0.15	0.18	NR	NR	NR	0.19	NR	NR	NR	0.2	NR	NR	NR	NR	0.2	NR	NR	0.19	0.21	NR	NR	NR	NR
2/19/2014	0.36	0	0.41	NR	0.36	0.35	0.44	0.38	0.41	NR	0.38	0.36	NR	0.39	0.41	0.45	NR	NR	0.3	0.36	0.37	NR	0.39	0.35
2/20/2014	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	NR	0	0	0	NR	0	0	0
2/21/2014	0.12	0	0.15	NR	0.12	0.15	0.14	0.14	0.13	NR	NR	0.14	NR	NR	0.15	0.16	NR	NR	0.19	0.18	0.25	NR	0.14	NR
2/22/2014	0	0	0	0	0	0	0	0	0	NR	0	NR	0	NR	0	0	NR	0	0	0	0	0	0	0
2/23/2014	0	NR	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	NR	0	0.01	0	0.03	0	0	0.01
2/24/2014	0	0	0.02	0.01	0	0.01	0.02	0.02	0.01	0.03	0.03	NR	0.02	0	0	0	NR	0.02	0.03	0.02	0.02	0	0	0.02
2/25/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0
2/26/2014	NR	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/27/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0
2/28/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0

Table 19 - February 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
2/1/2014	0	0	0	0	0	0	0	0	0	0	0
2/2/2014	0	0	0	0	0	0	0	0	0	0	0
2/3/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/4/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/5/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/6/2014	0	NR	NR	0	0	NR	NR	0	NR	0	0
2/7/2014	0	0	NR	0	0	NR	NR	0	NR	0	0
2/8/2014	0	0	NR	0	0	0	0	0	0	0	0
2/9/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/10/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/11/2014	0	0	0	0	0	0	0	0	0	0	0
2/12/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/13/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/14/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/15/2014	0.14	0.12	0.1	0.07	NR	0.07	0.06	0.09	0.1	0.08	0.08
2/16/2014	0	NR	NR	0	0	0	0	0	NR	NR	NR
2/17/2014	0	0	0	NR	0	0	NR	0	0	0	0
2/18/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/19/2014	0.37	0.45	0.35	0.39	0.24	0.34	0.31	NR	0.4	NR	0.25
2/20/2014	0	0	0	0	0	0	0	0	0	0	0
2/21/2014	0.12	0.13	NR	NR	NR	NR	NR	NR	0.15	0.23	0.28
2/22/2014	0	0	0	NR	0	NR	0	0	0	NR	NR
2/23/2014	0	0	0.01	0	0.01	0.01	0	0.01	0	0.01	0.01
2/24/2014	0	0.01	0.02	0.03	0.03	0.03	NR	0.02	NR	0.01	0.03
2/25/2014	0	0	0	0	0	0	0	0	0	0	0
2/26/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2/27/2014	0	0	0	0	0	0	0	0	0	0	0
2/28/2014	0	0	0	0	0	0	0	0	0	0	0

Table 20 – March 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3/1/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	NR	0	0	0	0	0	0
3/2/2014	0.04	NR	0.06	NR	0.04	0.07	0.06	NR	NR	0.08	0.07	0.05	0.07	0.06	0.06	NR	NR	0.06	0.06	0.04	0.07	0.05	0.05	0.06
3/3/2014	NR	0	0.06	NR	NR	NR	0.17	NR	NR	NR	0.11	NR	NR	NR	NR	NR	NR	NR	0.03	NR	NR	NR	NR	NR
3/4/2014	NR	0	0	NR	NR	NR	NR	NR	NR	NR	0	NR	NR	NR	NR	NR	NR	NR	0	0	NR	NR	NR	0
3/5/2014	NR	NR	0	NR	NR	NR	0	NR	NR	NR	0	NR	NR	NR	NR	0	NR	NR	0	0	NR	NR	NR	0
3/6/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0
3/7/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/8/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2014	NR	0.27	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/10/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/12/2014	0.26	0	0.32	0.37	0.25	0.34	0.36	0.3	0.28	0.35	0.35	0.33	0.33	0.4	0.38	0.35	0.32	0.25	0.36	0.27	0.4	0.23	NR	0.28
3/13/2014	0	NR	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/14/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/15/2014	0	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/16/2014	0	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/17/2014	NR	0	0.06	NR	NR	NR	0.07	NR	NR	NR	0.06	NR	NR	NR	NR	0.08	NR	NR	0.06	0.04	NR	NR	NR	0.04
3/18/2014	0	0	0	NR	0	0	0	0	NR	NR	0	0	NR	0	0	0	0	NR	0	0	NR	0	NR	0
3/19/2014	0.68	0	0.77	0.76	0.74	0.97	0.69	0.73	0.92	NR	0.81	0.65	0.78	0.7	0.71	0.76	0.66	0.89	0.91	0.61	NR	0.89	0.67	0.94
3/20/2014	NR	0	0	0	0	NR	0	NR	0	NR	0	0	0	0	NR	NR	0	NR	0	0	0	0	0	NR
3/21/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/22/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/23/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/24/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/25/2014	0	0.79	NR	0	0	0	NR	0	0	0	NR	0	0	0	0	NR	0	0	NR	0	0	0	0	NR
3/26/2014	0	1.91	0	0	0	NR	0	0	NR	0	0	0	NR	0	0	0	0	NR	0	0	NR	NR	0	0
3/27/2014	0	0.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/28/2014	0.01	0	0.02	0.02	0	0.03	0.02	0.01	0.03	0.04	0.03	0.01	0.02	0.02	0.03	0.03	0.03	0.02	0.04	0.02	NR	0.02	NR	0.04
3/29/2014	1.71	0.01	1.87	1.73	1.9	1.55	1.77	1.75	1.71	1.85	1.85	1.3	1.99	1.79	1.89	1.86	1.87	1.63	1.68	1.44	1.59	1.56	1.4	1.69
3/30/2014	0.95	0	0.91	1.03	0.87	1.17	1.16	1	1.07	1.19	1.12	0.75	1.2	1.07	1.19	1.23	1.07	0.91	1.18	0.83	1.31	0.79	0.91	0.59
3/31/2014	0.01	0.07	0.05	0.03	0.03	0.05	0.04	0.03	0.05	0.05	0.04	0.01	0.04	0.03	0.03	0.03	NR	0.02	0.04	0.02	0.05	NR	0.03	NR

Table 21 - March 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
3/1/2014	0	0	0	0	0	0	0	0	0	0	0
3/2/2014	NR	0.06	NR	0.06	0.08	NR	0.07	NR	0.06	0.06	0.06
3/3/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/4/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/5/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/6/2014	0	0	0	0	0	0	0	0	0	0	0
3/7/2014	0	0	0	0	0	0	0	0	0	0	0
3/8/2014	0	0	0	0	0	0	0	0	0	0	0
3/9/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/10/2014	0	0	0	0	0	0	0	0	0	0	0
3/11/2014	0	0	0	0	0	0	0	0	0	0	0
3/12/2014	NR	0.3	0.31	0.25	0.39	0.42	0.27	0.24	0.25	0.31	0.47
3/13/2014	NR	0	0	0	0	NR	0	NR	0	0	NR
3/14/2014	NR	0	0	0	0	0	0	0	0	0	0
3/15/2014	NR	0	0	0	0	0	0	0	0	0	0
3/16/2014	NR	0	0	0	0	0	0	0	0	0	0
3/17/2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3/18/2014	NR	0	0	0	0	NR	0	0	NR	0	0
3/19/2014	NR	0.68	0.67	0.79	0.74	0.94	0.8	0.8	0.83	0.8	NR
3/20/2014	NR	NR	NR	0	0	0	NR	NR	NR	0	NR
3/21/2014	NR	0	0	0	0	0	0	0	0	0	0
3/22/2014	NR	0	0	0	0	0	0	0	0	0	0
3/23/2014	NR	0	0	0	0	0	0	0	0	0	0
3/24/2014	NR	0	0	0	0	0	0	0	0	0	0
3/25/2014	NR	0	0	0	0	0	0	0	0	0	0
3/26/2014	NR	0	NR	0	NR	NR	NR	NR	NR	NR	NR
3/27/2014	NR	0	0	0	0	0	0	0	0	0	0
3/28/2014	NR	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.02	0.04	NR
3/29/2014	1.4	1.76	1.71	1.65	1.37	1.71	1.66	1.86	1.69	1.52	NR
3/30/2014	0.94	1.19	0.82	0.78	1.03	1.17	0.99	0.99	0.91	0.88	1.52
3/31/2014	0.03	0.04	0.05	0.04	0.06	0.04	0.04	0.04	0.01	0.04	NR

Table 22 - April 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
4/1/2014	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0
4/2/2014	0	0	0.04	0.03	0.01	0.03	0.03	0.03	0.03	0.04	0.04	0.01	0.04	0.03	0.02	0.02	0.04	0.04	0.04	0.03	0.05	0.02	0.01	0.05
4/3/2014	0.05	0.4	0.15	0.16	0.07	0.1	0.13	0.14	0.08	0.18	0.16	0.06	0.16	0.09	0.08	0.07	0.13	0.13	0.16	0.17	0.17	0.05	0.06	0.19
4/4/2014	0.01	0.2	0.07	0.06	0.02	0.07	0.05	0.06	0.06	0.08	0.08	0.01	0.08	0.06	0.04	0.02	0.06	0.08	0.08	0.07	0.08	0.04	0.01	0.1
4/5/2014	0	0	0	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0	0	0	0.01	0	0	0	0	0	0	0	0
4/6/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/7/2014	0.41	0	0.37	0.44	0.49	0.36	0.4	0.39	0.4	0.39	0.41	0.29	0.45	0.42	0.47	0.47	0.38	0.37	0.38	0.28	0.32	0.37	0.32	0.27
4/8/2014	0.15	0	0.16	0.15	0.19	0.14	0.16	0.18	0.19	0.22	0.18	0.23	0.15	0.15	0.17	0.2	0.16	0.16	0.15	0.16	0.15	0.19	0.18	0.21
4/9/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/10/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2014	0	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2014	0	0.02	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/13/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/14/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2014	0.91	0	0.78	0.61	0.81	1.25	0.93	0.88	1.18	1	0.91	0.58	0.78	0.74	0.96	1.06	0.84	0.77	1.21	0.67	1.31	0.95	0.9	0.88
4/16/2014	0	0	0	0.01	0	0	0	0	0	0.01	0.01	0	0.01	0	0	0	0	0	0	0	0	0	0	0
4/17/2014	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/18/2014	0	0.03	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0
4/19/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2014	0	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/22/2014	0	0	0.18	0.14	0	0.02	0.17	0.16	0.03	0.19	0.1	0.01	NR	0.02	0.01	0.01	0.07	0.03	0.11	0.04	0.08	0.04	0.01	0.01
4/23/2014	NR	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0.01	0	0	0
4/24/2014	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0
4/25/2014	0.28	0.94	0.06	0.03	0.15	0.26	0.09	0.12	0.32	0.07	0.1	0.18	NR	0.08	0.09	0.18	0.07	0.13	0.15	0.04	0.3	0.34	0.32	0.06
4/26/2014	0.25	NR	0.44	0.56	0.45	0.26	0.47	0.36	0.22	0.45	0.39	0.37	NR	0.48	0.48	0.46	0.46	0.36	0.33	0.55	0.21	0.14	0.23	0.35
4/27/2014	0	0.11	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0
4/28/2014	0	0	0	0	0	0	0	0	0	0	0	0.01	NR	0	0	0	0	0	0	0	0	0	0	0
4/29/2014	0.27	0.06	0.25	0.29	0.31	0.32	0.27	0.25	0.33	0.24	0.28	0.22	NR	0.22	0.29	0.31	0.23	0.31	0.32	0.21	0.45	0.36	0.26	NR
4/30/2014	4.83	NR	4.73	4.98	4.59	4.79	4.77	4.86	5.24	5.11	5.05	3.52	NR	3.94	4.74	5.19	4.34	4.9	5.06	4.34	4.83	4.93	3.91	NR

Table 23 – April 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
4/1/2014	0	0	0	0	0	0	0	0	0	0	NR
4/2/2014	NR	0.03	0.03	0.04	0.06	0.04	0.05	0.08	0.02	0.04	0.03
4/3/2014	0.05	0.09	0.18	0.16	0.21	0.17	0.18	0.16	0.07	0.08	0.13
4/4/2014	0.02	0.04	0.08	0.07	0.06	0.07	0.07	0.1	0.02	0.08	0.08
4/5/2014	0.01	0.01	0.01	0	0.01	0.01	0	0	0.01	0	0.01
4/6/2014	0	0	0	0	0	0	0	0	0	0	0
4/7/2014	0.38	0.47	0.42	0.32	0.29	0.37	0.32	0.29	0.4	0.36	0.34
4/8/2014	0.15	0.15	0.15	0.14	0.1	0.18	0.15	0.14	0.18	0.11	0.16
4/9/2014	0	0	0	0	0	0	0	0	0	0	0
4/10/2014	0	0	0	0	0	0	0	0	0	0	0
4/11/2014	0	0	0	0	0	0	0	0	0	0	0
4/12/2014	0	0	0	0	0	0	0	0	0	0	0
4/13/2014	0	0.01	0	0	0	0	0	0	0	0	0
4/14/2014	0	0	0	0	0	0	0	0	0	0	0
4/15/2014	NR	1.09	0.74	0.74	1.3	0.98	1.01	1.11	1.02	1.33	1.46
4/16/2014	NR	0	0	0	0.01	0.01	0	0	0	0	0.01
4/17/2014	NR	0	0	0	0	0	0	0	0	0	0
4/18/2014	0	0	0	0	0	0	0	0	0	0	0
4/19/2014	0	0	0	0	0	0	0	0	0	0	0
4/20/2014	0	0	0	0	0	0	0	0	0	0	0
4/21/2014	0	0	0	0	0	0	0	0	0	0	0
4/22/2014	0.01	0.05	0.07	0.01	0.05	0.17	0.05	0	0.03	0.1	0.19
4/23/2014	0	0	0	0	0	0	0.01	0.01	0	0	0
4/24/2014	0	0	0	0	0	0	0	0	0	0	0
4/25/2014	0.12	0.1	0.05	0.03	0.19	0.12	0.07	0.06	0.37	0.32	0.26
4/26/2014	0.43	0.44	0.49	0.44	0.33	0.37	0.33	0.39	0.16	0.14	0.23
4/27/2014	0	0	0	0	0	0	0	0	0	0	0
4/28/2014	0	0	0	0	0	0	0	0	0	0	0
4/29/2014	0.2	0.23	0.28	0.22	0.34	0.27	0.23	0.25	0.39	NR	0.38
4/30/2014	NR	4.61	5.02	4.77	4.28	4.9	4.53	5.01	5.18	4.73	5.09

Table 24 – May 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
5/1/2014	0.19	0	0.28	0.32	0.21	0.32	0.37	0.41	0.51	0.16	0.37	0.06	NR	0.16	0.18	0.2	0.4	0.22	0.1	0.24	0.16	0.39	0.12	NR
5/2/2014	0	0	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0.03
5/3/2014	0.05	0	0.01	0.01	0.07	0.03	0	0	0.09	0	0	0.09	NR	0.08	0.13	0.05	0.01	0	0.01	0	0	0.13	0.18	0.01
5/4/2014	NR	0.01	0	0	0	0	0	0	0	0.01	0.01	0	NR	0	0.01	0	0	0	0	0	0	0	0	0.01
5/5/2014	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
5/7/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	NR
5/8/2014	0.01	0	0.05	0.07	0.04	0.02	0.02	0.13	0.03	0.04	0.08	0.03	0.09	0.18	0.1	0.03	0.13	0.12	0.11	0.05	0.09	0.01	0.07	0.05
5/9/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/10/2014	0.36	0	0.41	NR	0.21	0.25	0.57	0.5	0.46	1.14	NR	0.14	0.46	0.32	0.63	0.57	0.44	0.29	NR	1	0.11	0.5	0.16	1.34
5/11/2014	0.01	0	0.01	0	0.01	0	0	0.01	0	0.01	NR	0	0	0	0.01	0	0.01	0.01	0	0.01	0	0	0	0.01
5/12/2014	0	1.69	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/13/2014	0	0	0	0	0	0	0.01	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0.01	0
5/14/2014	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/15/2014	0	0	0	0	0	0.01	0	0	0	0.01	NR	0	0	0	0	0	0	0.01	0	0	0	0	0	0.01
5/16/2014	1.56	0.01	1.17	0.27	1.32	2.08	NR	1.15	2.02	1.57	NR	1.34	1.32	1.18	1.27	1.66	1.35	1.58	1.69	0.81	2.53	2.22	1.63	1.33
5/17/2014	0.01	0	0	0	0	0	0	0	0	0.01	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/18/2014	0	0.13	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/19/2014	0	0.08	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/20/2014	0	0	0.01	0	0.01	0.01	0.01	0.01	0.01	0.02	NR	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0	0.01	0.01	0.01	0
5/21/2014	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01	NR	0.01	0	0	0.01	0.01	0.02	0	0.01	0.01	0.01	0	0.03	0
5/22/2014	0.07	0	0.5	0.55	0.04	0.1	0.55	0.83	0.06	0.42	NR	0.05	0.53	0.26	0.08	0.05	0.84	0.2	0.98	0.1	0.33	0.07	0.16	0.21
5/23/2014	0.07	0.26	0.11	0.22	0.05	0.3	0.1	0.1	0.21	0.06	NR	0.08	0.12	0.04	0.07	0.13	0.14	0.07	0.07	0	0.09	0.11	0	0
5/24/2014	0.01	0.84	0	0.02	0	0	0	0.01	0	0	NR	0	0	0.01	0	0	0	0	0	0	0	0	0	0.01
5/25/2014	0	0.01	0	0.01	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0.01	0	0	0	0
5/26/2014	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2014	0.26	0	0.26	0.32	0.4	0.52	0.5	0.47	0.46	0.23	NR	0.25	0.27	0.31	0.44	0.32	0.55	0.34	0.24	0.17	0.35	0.32	0.2	0.29
5/28/2014	1.1	0	0.96	0.71	0.68	0.69	0.96	0.53	0.67	0.93	NR	0.97	0.96	0.79	0.62	0.78	0.91	0.83	0.86	0.29	0.85	0.92	0.85	0.38
5/29/2014	0	0	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0
5/30/2014	0.01	0.01	0	0	0.01	0.01	0.01	0	0.01	0	NR	0.01	0	0	0	0.02	0	0	0	0	0.01	0.01	0	0
5/31/2014	0	0.32	0	0	0	0	0	0	0	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 25 - May 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
5/1/2014	NR	0.39	0.33	0.2	NR	0.11	0.06	0.15	0.26	0.24	0.14
5/2/2014	0	0	0	0	0	0	0	0	0	0	NR
5/3/2014	0.04	0.07	0	0	0	0	0	0.01	0.03	0.03	NR
5/4/2014	0.01	0	0	0	0.01	0.01	0	0.01	0	0	NR
5/5/2014	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0	0	0	0	0	0	0	0	0.01	0.01	0
5/8/2014	0.01	0.13	0.04	0.03	0.02	0.06	0.03	0.04	0.02	0.01	0.05
5/9/2014	0	0	0	0	0	0	0	0	0	0	0
5/10/2014	0.35	0.51	0.51	1.13	0.37	0.3	1.07	0.38	0.72	0.23	0.13
5/11/2014	0.01	0	0.01	0.01	0	0	0.01	0	0	0.01	0.01
5/12/2014	0	0	0	0	0	0	0	0	0	0	0
5/13/2014	NR	0	0	0	0	0	0	0	NR	0.01	0
5/14/2014	0	0	0	0	0	0	0	0	0	0	0
5/15/2014	0	0	0	0	0	0	0.01	0	0	0	0
5/16/2014	NR	1.36	0.64	0.62	NR	1.43	1.52	1.17	2.43	3.08	2.63
5/17/2014	NR	0	0	0	0	0	0	0	0	0	0.01
5/18/2014	NR	0	0	0	0	0	0	0	0	0	0
5/19/2014	NR	0	0	0	0	0	0	0	0	0	0
5/20/2014	NR	0.01	0	0	0.01	0.02	0.02	0	0.01	0	0.01
5/21/2014	NR	0	0.01	0	0.03	0.02	0	0.01	0	0.01	0.01
5/22/2014	NR	0.11	0.22	0.13	NR	0.74	0.2	0.16	0.24	NR	0.16
5/23/2014	NR	0.07	0.07	0.01	NR	0.13	0.01	0.01	NR	0.08	0.22
5/24/2014	NR	0	NR	0.02	NR	0.03	0	NR	0	0	0
5/25/2014	NR	0	0	0	NR	0	0	NR	0	0	0
5/26/2014	NR	0	0	0	NR	0	0	NR	0	0	0
5/27/2014	0.36	0.45	0.18	0.24	NR	0.21	0.52	NR	0.2	0.26	0.37
5/28/2014	1.12	0.77	0.54	0.18	NR	0.97	0.85	NR	0.75	0.93	0.63
5/29/2014	0	0	0	0	NR	0	0	NR	0	0	0
5/30/2014	0.02	0	0	0	NR	0	0	0.01	0	0	0
5/31/2014	0	0	0	0	NR	0	0	0	0	0	0

Table 26 - June 2014 PWD Rain Gage Records - Rain Gages 1 to 24 (NR = Not Reporting)

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
6/1/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/2/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2014	0	0	0.06	0.02	0	0.21	0.08	0.08	0.16	0.14	0.09	0.01	0.08	0.03	0.04	0.05	0.07	0.1	0.06	0.02	0.05	0.15	0.02	0.19
6/4/2014	0	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/5/2014	0.4	0.11	0.12	0.28	0.39	0.11	0.18	0.14	0.13	0.16	0.14	0.37	0.14	0.34	0.33	0.35	0.19	0.11	0.13	0.18	0.14	0.14	0.34	0.1
6/6/2014	0	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/7/2014	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/8/2014	0	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/9/2014	0.53	0.1	1.11	0.66	0.34	0.3	0.43	0.19	0.31	2.43	0.44	0.39	0.74	0.43	0.46	0.47	0.46	0.24	0.71	1.03	0.75	0.31	0.43	1.28
6/10/2014	1.29	0	0.54	0.52	0.57	0.1	0.05	0.03	0.1	0.03	0.05	1.76	0.05	0.37	0.29	0.25	0.02	0.15	0.26	1.6	0.22	0.2	2.47	0.02
6/11/2014	0	0	0.02	0.01	0	0.01	0.01	0	0	0.02	0.01	0	0.01	0.01	0.01	0	0	0.01	0.01	0.02	0.01	0	0	0.01
6/12/2014	0.28	0.02	0.11	0.08	0.21	0.31	0.16	0.1	0.3	0.22	0.18	0.2	0.15	0.2	0.19	0.23	0.16	0.19	0.16	0.06	0.22	0.3	0.3	NR
6/13/2014	0.58	0	0.53	0.72	0.79	0.44	0.37	0.38	0.51	0.8	0.49	0.61	0.65	0.76	0.44	0.61	0.63	0.97	1.06	0.42	0.27	0.57	0.61	NR
6/14/2014	0	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/15/2014	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/16/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/17/2014	0	0	0	0	0.01	0	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0	0	0	0	0	NR
6/18/2014	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/19/2014	0.6	0	0.14	0.16	0.86	0.23	0.17	0.31	0.27	0.14	0.24	0.6	0.17	0.21	0.31	0.52	0.35	0.14	0.26	0.2	0.22	0.24	0.57	NR
6/20/2014	0	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/21/2014	0	1.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/22/2014	0.05	0	0.05	0.03	0.04	0	0	0	0	0	0	0.07	0.01	0	0	0.03	0	0	0	0	0	0.04	0.01	NR
6/23/2014	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/24/2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/25/2014	0.32	0	0	0.1	0	0.28	0.24	0.44	0.53	0.23	0.1	0.02	0.08	0.18	0.02	0.17	0	0.28	0.18	0	0.37	0.58	0.35	NR
6/26/2014	0.4	NR	0.36	0.5	0.76	0.29	0.4	0.28	0.2	0.41	0.46	0.73	0.34	0.43	0.72	0.79	0.43	0.54	0.31	0.5	NR	0.11	0.48	NR
6/27/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/28/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	NR
6/29/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR
6/30/2014	0	NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NR

Table 27 - June 2014 PWD Rain Gage Records - Rain Gages 25 to 35 (NR = Not Reporting)

Date/RG	25	26	27	28	29	30	31	32	33	34	35
6/1/2014	0	0	0	0	NR	0	0	0	0	0	0
6/2/2014	0	0	0	0	NR	0	0	0	0	0	0
6/3/2014	0.01	0.07	0.03	0.08	NR	0.12	0.41	0.22	0.08	0.58	0.17
6/4/2014	0	0	0	0	NR	0	0	0	0.01	0	0
6/5/2014	0.41	0.19	0.12	0.18	NR	0.15	0.13	0.18	0.24	0.06	0.2
6/6/2014	0	0	0	0	NR	0	0	0	0	0	0
6/7/2014	0	0	0	0	NR	0	0	0	0	0	0
6/8/2014	0	0	0	0	NR	0	0	0	0	0	0
6/9/2014	0.54	0.3	1.24	0.99	NR	1.22	1.74	1.14	0.29	0.16	0.16
6/10/2014	0.82	0.05	0.68	1.35	NR	0.05	0.01	0.02	0.62	0.07	0.63
6/11/2014	0	0	0.02	0.01	NR	0.01	0.02	0.02	0.01	0.01	0
6/12/2014	0.28	0.17	0.08	0.05	NR	0.18	0.21	0.17	0.35	0.31	NR
6/13/2014	0.66	0.49	0.71	0.58	NR	0.81	0.75	0.9	0.49	0.12	0.2
6/14/2014	0	0	0	0	NR	0	0	0	0	0	0
6/15/2014	0	0	0	0	NR	0	0	0	0	0	0
6/16/2014	0	0	0	0	NR	0	0	0	0	0	0
6/17/2014	0.01	0	0	0	NR	0	0	0	0	0	0
6/18/2014	0	0	0	0	NR	0	0	0	0	0	0
6/19/2014	NR	0.14	0.18	0.18	NR	0.15	0.15	0.33	0.41	0.24	0.32
6/20/2014	NR	0	0	0	NR	0.01	0	0	0	0	0
6/21/2014	NR	0	0	0	NR	0	0	0	0	0	0
6/22/2014	0.08	0	0	0	NR	0	0	0.01	0	0	0
6/23/2014	0	0	0	0	NR	0	0	0	0	0	0
6/24/2014	0	0	0	0	NR	0	0	0	0	0	0
6/25/2014	0.12	0.12	0.14	0.04	NR	0.5	0.49	0.66	0.61	0.41	0.32
6/26/2014	0.6	NR	0.48	0.46	NR	0.31	0.38	0.38	0.18	0.08	0.17
6/27/2014	0	NR	0	0	NR	0	0	0	0	0	0
6/28/2014	0	NR	0	0	NR	0	0	0	0	0	0
6/29/2014	0	NR	0	0	NR	0	0	0	0	0	0
6/30/2014	0	NR	0	0	NR	0	0	0	0	0	0

Table 28 - Rain Gage records by year and month for FY2014

Date/RG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Jul13	1.75	7.16	3.92	3.22	9.58	2.46	5.16	3.84	4.07	3.99	4.73	10.09	4.44	8.13	8.09	7.05	4.75	3.72
Aug13	0	5.34	5.06	3.96	4.57	4.36	3.8	4.16	4.83	5.32	5.2	5.04	4.64	5.14	4.8	4.7	4.06	6.03
Sep13	1.39	1.57	3.3	1.75	3.09	4.1	2.4	3.16	4.08	3.1	3.18	2.9	3.1	2.48	2.41	2.27	3.14	2.86
Oct13	2.43	3.37	2.08	2.62	2.3	2.7	2.18	2.25	2.93	2.38	2.58	1.65	2.53	2.21	2.54	2.54	2.33	2.54
Nov13	2.85	2.75	2.88	2.51	2.64	3.48	2.85	2.84	3.31	3.21	3.17	2.61	2.91	2.64	2.84	3.15	2.83	3.02
Dec13	2.59	2.78	4.92	2.89	2.56	3.21	4.93	2.76	3.02	3.09	5.21	2.55	2.92	2.97	2.89	3.06	2.88	2.75
Jan14	0.41	0.39	1.51	0.34	0.4	0.39	2.03	0.97	1.01	0.39	2.02	0.4	1.07	0	1.05	1.16	0.33	0.36
Feb14	0.57	0.74	5.35	0.21	0.57	0.73	5.66	0.6	0.68	0.11	5.42	0.58	0.19	0.51	0.72	5.36	0	0.11
Mar14	3.66	3.83	4.12	3.94	3.83	4.18	4.34	3.82	4.06	3.56	4.44	3.1	4.43	4.07	4.29	4.34	3.95	3.78
Apr14	7.16	3.15	7.23	7.47	7.1	7.61	7.49	7.44	8.08	7.98	7.71	5.5	1.68	6.23	7.35	8	6.8	7.28
May14	3.71	3.99	3.77	2.5	3.05	4.35	3.12	4.16	4.54	4.62	0.46	3.04	3.77	3.34	3.56	3.84	4.81	3.68
Jun14	4.46	4.12	3.04	3.08	3.97	2.28	2.09	1.95	2.51	4.58	2.2	4.77	2.42	2.97	2.81	3.47	2.31	2.74
Total	**30.98**	**39.19**	**47.18**	**34.49**	**43.66**	**39.85**	**46.05**	**37.95**	**43.12**	**42.33**	**46.32**	**42.23**	**34.1**	**40.69**	**43.35**	**48.94**	**38.19**	**38.87**
Date/RG	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	
Jul13	3	5.1	2.82	3.77	9.73	3.99	8.63	1.32	4.4	0	0	0	2.79	5.28	0	4.01	2.96	
Aug13	5.67	2.59	5.44	4.39	4.86	5.63	4.87	3.85	4.95	0	0	0	5.01	4.56	0	4.43	5.47	
Sep13	2.62	1.97	3.58	5.22	2.91	2.65	2.7	1.22	2.64	1.73	1.8	0	2.13	1.96	0	4.27	3.12	
Oct13	3.16	1.91	2.73	2.71	1.89	0.04	0.15	2.37	2.17	1.8	2.75	0	2.17	2.22	3.11	3.08	2.67	
Nov13	3.39	3.01	3.85	3.3	2.79	3.22	0.34	0.41	3.1	2.99	3.27	3.04	3.29	0.6	3.57	0.38	3.84	
Dec13	4.86	4.97	2.95	2.77	2.53	4.43	2.04	2.72	3.03	2.95	2.75	2.82	2.54	1.98	2.79	2.17	3.09	
Jan14	1.98	0.99	0.45	1.05	0.41	1.38	0.4	0.34	0	1.05	0.41	1	0.34	0.41	0.38	0.41	0.41	
Feb14	3.5	3.79	0.67	0.09	0.63	3.75	0.63	0.71	0.48	0.49	0.28	0.45	0.37	0.12	0.65	0.33	0.65	
Mar14	4.36	3.27	3.42	3.54	3.06	3.64	2.37	4.05	3.58	3.6	3.71	4.32	3.88	3.98	3.77	3.65	2.05	
Apr14	7.99	6.56	7.96	7.43	6.21	2.12	1.37	7.32	7.52	6.94	7.23	7.66	7	7.6	7.85	7.29	8.37	
May14	4.08	2.69	4.54	4.7	3.42	3.68	1.92	3.87	2.55	2.57	0.44	4.03	4.3	1.95	4.67	4.9	4.37	
Jun14	3.14	4.03	2.25	2.64	5.58	1.6	3.53	1.53	3.68	3.92	0	3.51	4.29	4.03	3.29	2.04	2.17	
Total	**47.75**	**40.88**	**40.66**	**41.61**	**44.02**	**36.13**	**28.95**	**29.71**	**38.1**	**28.04**	**22.64**	**26.83**	**38.11**	**34.69**	**30.08**	**36.96**	**39.17**	

Table 29 - SSO Statistics for Period July 1 2013 – June 30 2014

Main & Shurs

Event No.	Start of Overflow Date Time	End of Overflow Date Time	Event Duration (hours:mins)	Flow Volume (ft^3)	Flow Volume (Millions of gallons)
1	8/13/13 7:47	8/13/13 9:32	1:45	37508	0.281
2	8/28/13 12:05	8/28/13 12:45	0:40	10065	0.075
3	9/2/13 11:57	9/2/13 12:55	0:57	10565	0.079
4	10/11/13 5:30	10/11/13 5:35	0:05	270	0.002
5*	4/30/14 18:12	5/1/14 15:25	21:10	6,195,923	46.346

PC-30

Event No.	Start of Overflow Date	End of Overflow Date	Event Duration (hours:mins)	Flow Volume (ft^3)	Flow Volume (Millions of gallons)
1*	4/30/14 16:37	5/1/14 0:22	7:42	12,034	0.090

*These overflows resulted from significant rain events which caused flooding at local rivers, the PADEP later decided to waive all penalties associated with this event.

APPENDIX E - Wissahickon Sediment TMDL Baseline Monitoring Report - NOVEMBER 2013

WISSAHICKON SEDIMENT TMDL BASELINE MONITORING REPORT

Philadelphia PWD Water Department

NOVEMBER 2013

Contents

Appendices

Appendix A - Site Plans

Appendix B - Wetland Inspection Reports

Appendix C – Stormwater Wetland Photos

Appendix D – Stream Restoration Cross-sections and Photos

Appendix E – Stream Structure Photos and Videomonitoring DVDs

*Note: The Appendices for this report (Wissahickon Sediment TMDL Baseline Monitoring Report) are very large in size (394 MB) and were not included in this document. The Appendices listed above are available upon request.

1 Introduction

As part of its mission to be a steward and protector of Philadelphia's rivers and streams, the Philadelphia Water Department (PWD) has committed to an integrated program for the Wissahickon Creek Watershed comprised of watershed characterization, planning, and management. In 2006, PWD developed a compendium document to represent the analysis of two years' worth of physical, chemical and biological data collected for the Wissahickon Creek Watershed, titled the Wissahickon Creek Comprehensive Characterization Report (WCWCCR). PWD is currently sponsoring the development of an Act 167 Stormwater Management Plan for the Wissahickon Creek Watershed. Upon the completion of this plan, PWD seeks to work with upstream partners to complete an Integrated Watershed Management Plan (IWMP) for the Wissahickon Creek Watershed to manage multiple regulatory programs through a coordinated approach.

The United States Environmental Protection Agency (USEPA) developed a TMDL for the Wissahickon Creek in 2003 to address the stream's listing on Pennsylvania's 1996 and 1998 Clean Water Act Section 303(d) list of impaired waters, and the 2000 305(b) report. The TMDL sets the current sediment load from the Philadelphia portion of the Creek at 1,547,690 lbs/yr. The Waste Load Allocation (WLA) is set at 380,861 lbs/yr, therefore requiring a reduction of approximately 1,166,829 lbs/yr of sediment. Because the Wissahickon Creek Watershed is considered an "urbanized" area subject to coverage by MS4 stormwater permits, all sources of siltation to Wissahickon Creek and tributaries (i.e., overland flow and streambank erosion) are considered by EPA as point sources (2003).

Philadelphia's strategy for TMDL compliance is to focus on meeting the sediment load reduction target of 1,166,829 lbs/year through stream restoration projects, stormwater wetland projects, implementation of the Philadelphia's Stormwater Regulations, and inlet cleaning.

This document provides a description of PWD's 2012 baseline monitoring efforts to measure the effectiveness of the stormwater treatment wetland facilities and stream restoration projects in meeting the targeted sediment reductions required by the EPA's sediment TMDL for Wissahickon Creek. This effort includes hydrologic and hydraulic (H&H) modeling and topographic survey baseline monitoring as a means to confirm sediment reduction estimates presented in PWD's Implementation Plan. These modeling and topographic survey efforts will be accompanied by photo and videomonitoring, as well as formal site inspections of the stormwater treatment wetland facilities.

Stream Restoration and Stormwater Wetland Sites and Locations

Figure 1 provides the name and location of the three stormwater wetland sites, the seven completed stream restoration sites and the planned Gorgas Run project, which is fully designed and awaiting final permitting.

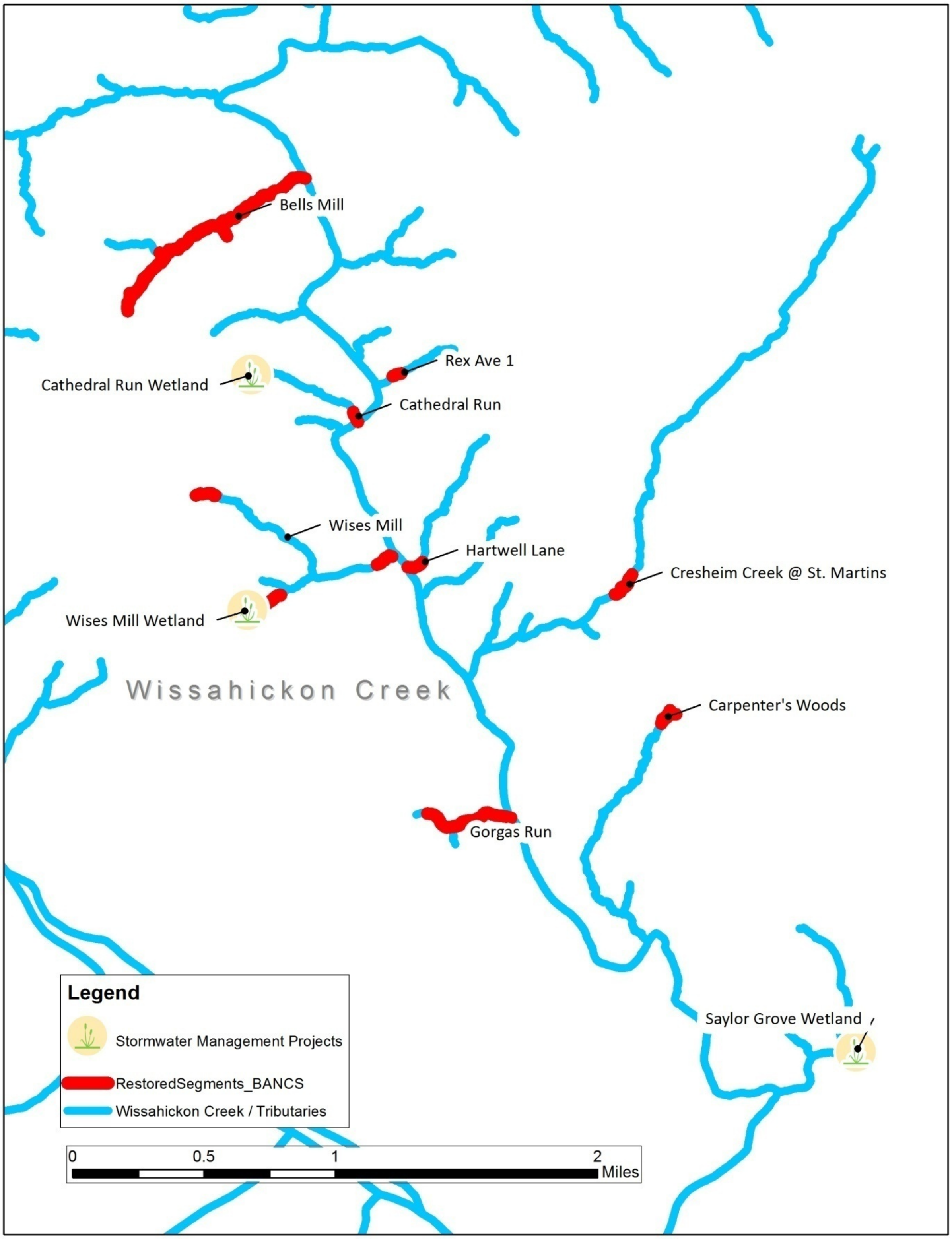


Figure 1 - City of Philadelphia Stormwater Management and Stream Restoration Projects in the Wissahickon Watershed

2 Methods

The sediment reduction determination for stream bank erosion will be achieved through the usage of stream cross-sectional survey and measured change over time. The differential data produced from subsequent surveys will drive the sediment reduction calculations. The performance of the stormwater wetlands was monitored through the use of a calibrated hydrologic and hydraulic model. Additionally, qualitative data was collected in the form of videos, photos and site inspections. The sections below describe these methods in depth and how they will be used to monitor the wetland and stream stabilization projects.

2.1 Sediment Reduction Determination

2.1.1 Stream Restoration - Cross-sectional Survey

The cross-sectional surveys at all stream sites were based off of survey control established by PWD Survey Unit. Easting and Northing observations were collected in state plane feet and elevation was based on City Datum. Observations were made using a Topcon Quick Station and Topcon FC2500 data collector equipped with TopSurv software. The cross-sectional surveys conducted for the TMDL monitoring effort focused on accurately defining the shape of the stream banks and bed so that any change in cross-sectional area could be detected in subsequent surveys. Surveyors recorded points along each cross-section at any change in slope or elevation. Each cross-section was monumented with rebar pins that were driven into the ground on the left and right banks. These points will be used to locate the cross-sections for photomonitoring and the subsequent survey when they will be re-occupied in 2015. Completed stream restoration projects were surveyed during the spring and summer of 2012. The table below lists the dates that each location was surveyed.

Table 1 - Survey Dates at Stream Restoration Sites

Site	Date(s) Surveyed
Bells Mill	5/30/12, 5/31/12, 6/4/12, 6/5/12
Carpenter's Woods	6/6/12
Cathedral Run	6/11/12
Hartwell Run	6/14/12
Rex Ave	6/18/12, 11/9/12
St. Martin's	10/10/12
Wises Mill	5/11/12, 5/16/12, 5/18/12, 5/22/12, 5/23/12, 5/24/12, 5/28/12

2.1.1.1 Cross-section Overlay Methodology

In order to utilize the measured change in cross-sectional area to calculate erosion rates, PWD developed a method to compare cross-sections of the same location to produce erosion rates in feet per year. From this measurement, volume per year can be calculated based on the average weight of sediment for a given length of stream.

To obtain the erosion rates based on the change in cross-sectional area, PWD will utilize Wildland Hydrology's RIVERMorph software. The collected survey data (easting, northing, and elevation) will be used produce the cross-sections. The program relies on a linear regression calculator to draw a line of best fit from the survey data to display the cross-section in a two-dimensional graph.

After the cross-section data is prepared, the boundaries of the left bank, stream bed and right bank are established for each cross-section. The processes of stream bank degradation and stream bed aggradation are both observed in urban streams. Therefore the left bank, right bank and stream bed are separated into 3 separate erosion rate calculation areas (cells) in order to yield more informative data than only comparing the changes in total cross sectional area. The boundaries that serve as the boundaries for each cell (left bank, right bank and stream bed) are based on the baseline year's (2012) rebar and edge of water points. The length from the left bank rebar to the left edge of water (LEW) serves as the boundary for the left bank cell. This is also applied respectively to the right bank cell. The stream bed cell is considered the remaining area between the baseline year edges of water points (EOW). For bank (right/left) cells, the vertical boundary will be established by the elevation of the bar demarcating the outer boundary of the cell. For stream bed cells, the vertical boundary will be established by the EOW elevation identified during the baseline survey of the cross-section (Equation 1-

Equation 3).

Equation 1: Stream Reach Bank Erosion (lb/yr) Calculation

$$E_{REACH} = 96.3 E_i L_{REACH}$$

Where:

E_{REACH} is the erosion rate in lbs/yr

96.3 is sediment density in lbs/ft^3 (Rosgen, 1996)

E_i is the bank or bed erosion rate in ft^2/yr, where ***i*** = bank (right or left) or bed

and L_{REACH} is the length of the reach in ft

Equation 2: Stream bank erosion calculation

$$E_{bank} = (A_Y - A_X) / \Delta T$$

Where:

E_{bank} is the erosion rate in ft^2/yr

A_X is the area of the cell from the baseline (year X) survey

A_Y is the area of the cell from the subsequent (year Y) survey

and ΔT is the time (years) between cross-section measurement

This equation was structured so that a positive quotient indicates that erosion is occurring. The resulting unit is ft^2/yr. The equation for the stream bed (cell 2) is structured similar to the stream bank equation and is as follows:

Equation 3: Stream bed erosion calculation

$$E_{bed} = (A_Y - A_X) / \Delta T$$

Where:

E_{bed} is the erosion rate in ft^2/yr

A_X is the area of the cell from the year X survey

A_Y is the area of the cell from the year Y survey

and ΔT is the time (years) between cross-section measurement

The result of these equations will yield an estimate of sediment loss in lbs/yr for the left bank, right bank and stream bed for a given reach associated with each surveyed cross-section. These quantities can be totaled to determine the amount of sediment lost for each stream restoration site.

2.1.2 Stormwater Wetland - H&H Modeling

To fully understand the effectiveness of each stormwater treatment wetland, PWD developed individual calibrated hydrologic and hydraulic (H&H) models using EPA-Stormwater Management Model (SWMM) modeling software. Stage/Storage/Discharge relationships were established for each wetland based on as-built survey data. HOBO data loggers were deployed at each site to provide water depth data during actual rainfall events. The data loggers were deployed for a long enough period of time to capture data during diverse, variable intensity rainfall events. These events were then used to calibrate the underlying model runoffs parameters based upon the observed water level response within each wetland. The monitoring periods for each wetland were as follows:

Table 2 - Model Calibration Monitoring Periods for Wissahickon Stormwater Wetlands

Site	Monitoring Period
Saylor Grove	May, 2010 - October, 2010
Wises Mill	June, 2012 - January, 2013
Cathedral Run	August, 2012 - November, 2012

Wet weather event boundaries were established using EPA-CDM Sanitary Sewer Overflow Analysis and Planning (SSOAP) toolbox by visualizing each wetland's response to precipitation. Calibration was performed on rain events to determine the difference between the simulated depths and observed depths retrieved from each HOBO data logger. The completion of this calibration routine for each wetland was concluded when agreement between simulated and observed water depths was maximized.

2.2 Qualitative Monitoring Methods

2.2.1 Photomonitoring

Designated photos points were established at each wetland site and are occupied semi-annually. The locations of the cross-sections at the stream restoration sites also serve as the photomonitoring locations. The schedule for photomonitoring efforts, along with the other monitoring techniques, is covered in the following sections.

2.2.1.1 Stormwater Wetlands Photomonitoring

On a semi-annual basis, PWD staff occupies designated photo locations at the stormwater wetland sites. These photos are useful in monitoring seasonal changes in the vegetation and water level. The results of the photomonitoring effort are included in this document as Appendix C. More information on the photomonitoring efforts is included in the site summary section.

2.2.1.2 Cross-section Photomonitoring

Photos at the stream restoration sites are taken at the established cross-section survey locations. Photos are taken from the left bank rebar looking to the right bank, looking upstream and downstream (taken from slightly upstream and downstream from the cross-section so that the actual cross-section is captured in the photograph), and from the right bank rebar looking left. These photos are useful in identifying changes in bed and bank geomorphology over time as well as guiding quality control for the survey data. Cross-section photos are compiled with the graphical representation of each cross-section in Appendix D.

2.2.2 Stream Structure Videomonitoring

The first step in developing the stream structure videomonitoring and evaluation protocol was to conduct a review of all design plan sheets available for the constructed sites. Some sites were constructed as "design-build" due to the need for a rapid response to an emergency erosion issue. Therefore some site plans did not have all structures identified. Additionally, some sites were altered after the initial construction during the adaptive management phase and no longer matched the designed plan. Structure checklists were extracted from the site plans and synonymous structures were renamed to develop a convention. Site plans are included in Appendix A.

PWD staff then developed a scoring matrix for evaluating each structure observed. A grade was assigned to each structure identified in the field. This grade, ranging from A-F, was based on how urgent maintenance was needed to improve the function and the stability of the structure. The table below provides summarizes grades assigned to structures based on site visits during the fall of 2012.

Table 3 - Grading Matrix for Structure Stability

Grade	Description
A	Structure is well-built and functioning as designed. No stability issues.
B	Structure is well-built with only minor deficiencies that present little to no stability issues.
C	Structure is functional, but may not be built properly or could be potentially be in danger of failing in the future. No maintenance action recommended at this time, however, future inspections may necessitate maintenance action.
D	Structure is improperly built and is causing or exacerbating local erosion. Structure is in danger of failing and needs maintenance attention.
F	Structure is improperly built and represents an immediate threat to the stability of the stream. Maintenance action is required to resolve instability.

PWD staff then walked each stream restoration site using the plan set derived checklist as a guide. Each site was walked from upstream to downstream. As staff encountered a new structure, it was videotaped and commentary on the stability and quality of the structure was recorded along with the overall letter grade. In the cases where no plans were available to guide the evaluation, best professional judgment was used to identify structures and assign appropriate names.

2.2.3 Stormwater Wetland Quarterly Inspections

In August 2012, PWD initiated a formal quarterly inspection process to ensure that the stormwater wetlands and the associated infrastructure are functioning as designed. The inspections systematically guide maintenance needs for the wetlands. Each inspection is recorded on forms detailed for each specific facility. The forms and results of the first year's inspections are included as Appendix B.

3 Stormwater Treatment Wetlands

PWD has designed and constructed three stormwater treatment wetlands to manage stormwater in the Wissahickon watershed in response to the sediment TMDL. These facilities reduce sediment loading to the Wissahickon Creek by detaining stormwater run-off from their catchment, thereby allowing entrained sediment to be removed from the water column and be deposited within the facility. This material can then be dredged from the facility periodically when the facility's operational capacity is compromised. Additionally, the flow attenuation by the wetlands may reduce downstream bank erosion, which could decrease sediment supply to the Wissahickon Creek.

PWD's three stormwater treatment facilities are:

1. Saylor Grove Stormwater Treatment Wetland
2. Wises Mill Stormwater Treatment Wetland
3. Cathedral Run Stormwater Treatment Wetland

Overall, each of these wetlands were designed and constructed with a similar concept in mind. Essentially, existing stormwater conveyance infrastructure was modified, through the construction of a diversion chamber to divert a portion of stormwater run-off from the catchment into the wetland.

During larger storm events, the capacity of the treatment wetland becomes maximized. In these situations, the weir in the diversion chamber is overtopped, allowing the excessive volume to bypass the wetland and be conveyed and released from PWD's existing stormwater infrastructure.

PWD's monitoring objective at each stormwater treatment wetland is to define and calculate each facility's capacity to remove sediment from the influent stormwater and sequester it within the facility's treatment area over a five year period.   Initially, PWD developed and calibrated a comprehensive hydrologic and hydraulic (H&H) model that will define the volume of stormwater treated each year at the facility. In combination with an assumed sediment removal efficiency based upon the best available scientific literature, these models will serve as a predictor of each facility's sediment removal ability. Regular topographic survey efforts within each facility's treatment area will provide a differential analysis of the stage/storage/discharge relationship of each facility's treatment. If this analysis reveals significant impact to the function of the facility, as defined by the H&H model, maintenance action would be taken, as needed.

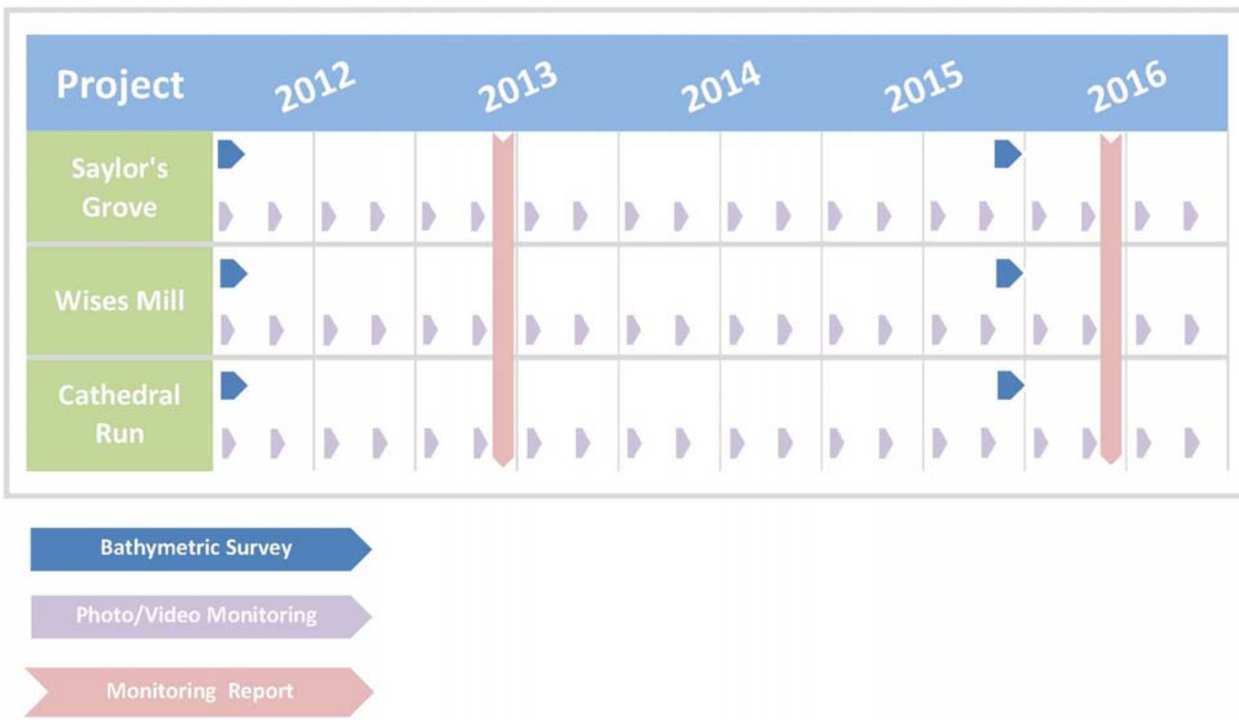


Figure 2 - Stormwater Wetland Monitoring Schedule

3.1 Saylor Grove Stormwater Treatment Wetland

Saylor Grove is a one-acre stormwater wetland that was constructed in the fall of 2005 on a parcel of Fairmount Park known as Saylor Grove. The wetland is designed to treat a portion of the 70 million gallons of stormwater generated in the 150-acre catchment per year before it reaches the Monoshone Creek, a tributary of the Wissahickon Creek. The function of the wetland is to treat stormwater runoff in an effort to improve source water quality and to minimize the impacts of storm-related flows on the aquatic and structural integrity of the riparian ecosystem. This project is a highly visible urban stormwater best management practice in the Wissahickon Watershed.

Since the completion of construction in 2005, Saylor Grove has been extensively monitored. Presently, a calibrated H&H model has been developed that permits the understanding of the performance of the facility during each year's actual rainfall events. PWD has also conducted regular photo-monitoring from 12 consistent locations around Saylor Grove since 2007 to document visual changes to the site that could impact its overall performance. Issues like plant growth, trash accumulation, and damaged infrastructure are identified and recorded using this monitoring technique. Based on this monitoring effort, PWD dredged portions of Saylor Grove in 2010 to increase the facility's capacity and improve overall performance.

2012 Photomonitoring

Established photomonitoring has been recorded at this site since 2007, though photos are not available for all locations. Regularly scheduled photomonitoring events began in 2012. PWD staff conducted photomonitoring at the 12 established photomonitoring points in 2012 on January 3, March 22, and July 13th as well as on March 19, 2013 and June 20, 2013. These photos have been compiled with previous years' photos from the same established points and are located in Appendix C.

3.2 Wises Mill Stormwater Treatment Wetland

Wises Mill Run is a steep first-order tributary to the mainstem of the Wissahickon Creek. The Wises Mill Run watershed consists of a 92-acre southern portion and a 169-acre northern portion that merge just

north of Wises Mill Road before meeting the Wissahickon Creek. Both branches are negatively affected by urbanization and large storm events. Severe entrenchment has occurred in both branches and excessive amounts of sediment have been transported to the Wissahickon Creek.

Expanding upon the restoration work on the 250 foot reach constructed by PWD's Waterways Restoration Team, during FY 2008, PWD commenced the design of a stormwater treatment wetland on a 2-acre area of Fairmount Park. The wetland infiltrates, detains, and treats a portion of stormwater from the 92-acre southern portion of the watershed prior to discharging to the headwaters of Wises Mill's lower branch. Overall, the goals of this project are to reduce bank erosion and sediment from nonpoint source pollution and enhance downstream aquatic and macroinvertebrate biodiversity.

The construction of this wetland was completed in 2012 and PWD initiated monitoring. In 2013, PWD completed a calibrated H&H model for the catchment that provides a detailed understanding of the performance of this stormwater management facility. PWD plans to conduct the next topographic survey in 2015, as well as extensive photo and video monitoring over the next 5 years.

2012 Photomonitoring

There are 25 established photo locations at this site. Photos were collected on March 21, 2012, July 13, 2012, November 6, 2012, March 19, 2013 and June 20, 2013. These photos have been organized by photo location and date and compiled into slides. The slides are available in Appendix C.

3.3 Cathedral Run Stormwater Treatment Wetland

Cathedral Run is a first order tributary to the Wissahickon Creek. The stream originates from springs downstream of Courtesy Stables near the intersection of Cathedral and Glen Campbell Roads. PWD installed a stormwater treatment wetland just west of the current location of outfall W-076-01. The wetland is located in a natural depression area, and is approximately one acre in size. The project provides more than 94,000 ft^3 of storage and substantially reduces flows to an impaired reach of Cathedral Run. During dry weather, the facility will provide one acre of valuable wet meadow habitat. During FY 2010, PWD received final necessary permits, and bid and awarded this project.

PWD completed construction of this wetland in 2012 and has initiated monitoring. PWD plans to conduct the next topographic survey in 2015, as well as continuing photo monitoring over the next 5 years. In 2013, PWD completed a calibrated H&H model for the catchment that provides a detailed understanding of the performance of this stormwater management facility.

2012 Photomonitoring

There are 15 established photo points at Cathedral Run wetland. Photos were collected on March 21, 2012, July 12, 2012, March 19, 2013 and June 20, 2013. Photos have been organized and compiled into slideshows and available in Appendix C.

3.4 H&H Model Results

Calibrated SWMM models were completed for each stormwater wetland in 2013. The models were runs with both design storms (24-Hour, Type II Distribution - NOAA Atlas 14) and the typical rainfall year data, which is based upon data from the PWD Rain-gage Network measured during the 2005 calendar year. The results of this analysis presented in Figures Figure 3 and Figure 4.

During the monitoring period, PWD expects to use these models further to estimate the expected annual sediment removal for typical and actual rainfall years. Published literature will be referenced to defined average sediment load concentrations and removal efficiency. The combination of the calibrated SWMM models and sediment load assumptions will permit the estimated of annual sediment load reductions produced by each stormwater treatment wetland. This analysis will be presented in the 2016 monitoring report.

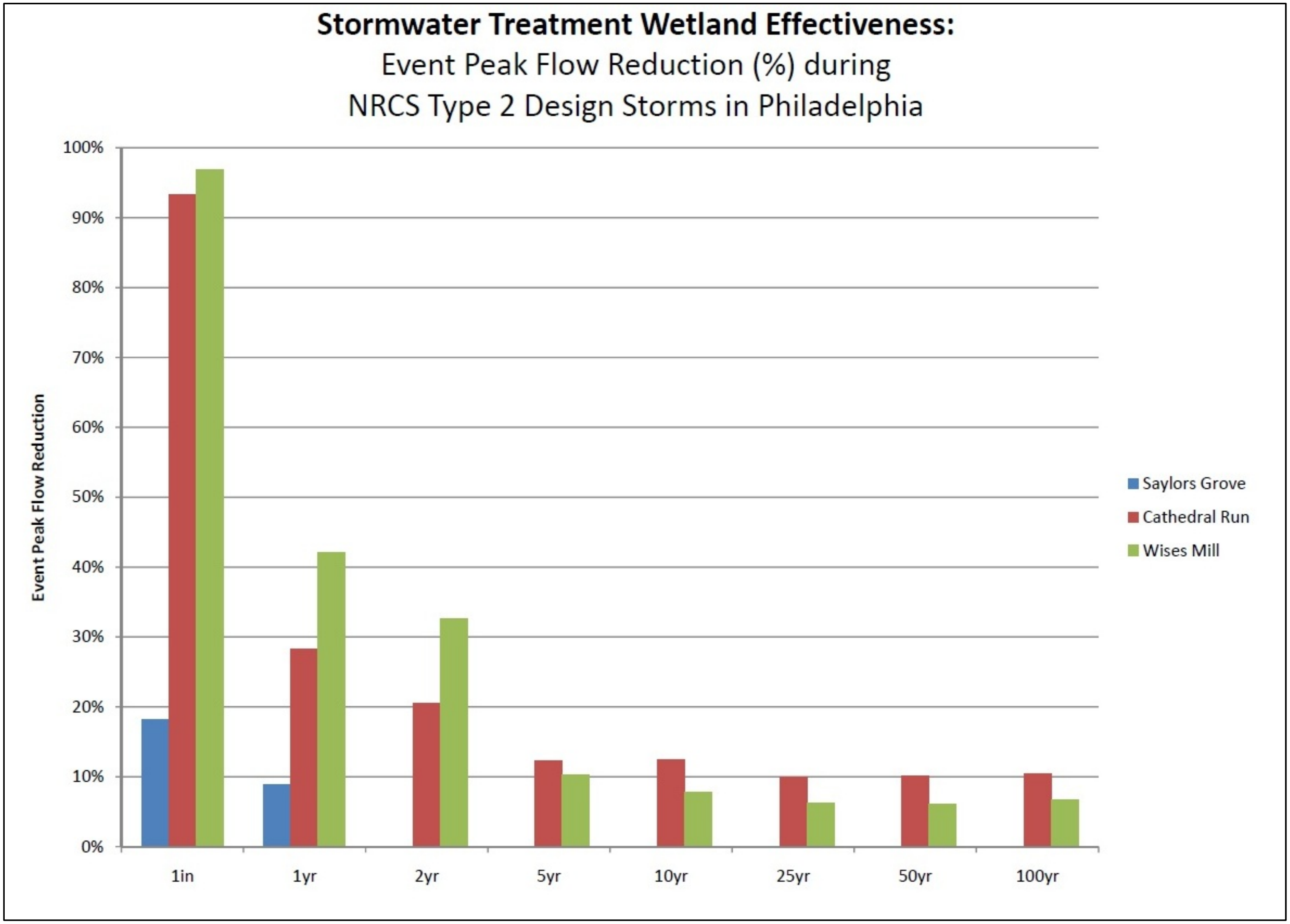


Figure 3: Stormwater Treatment Wetland Effectiveness during NRCS Type 2 Design Storms in Philadelphia

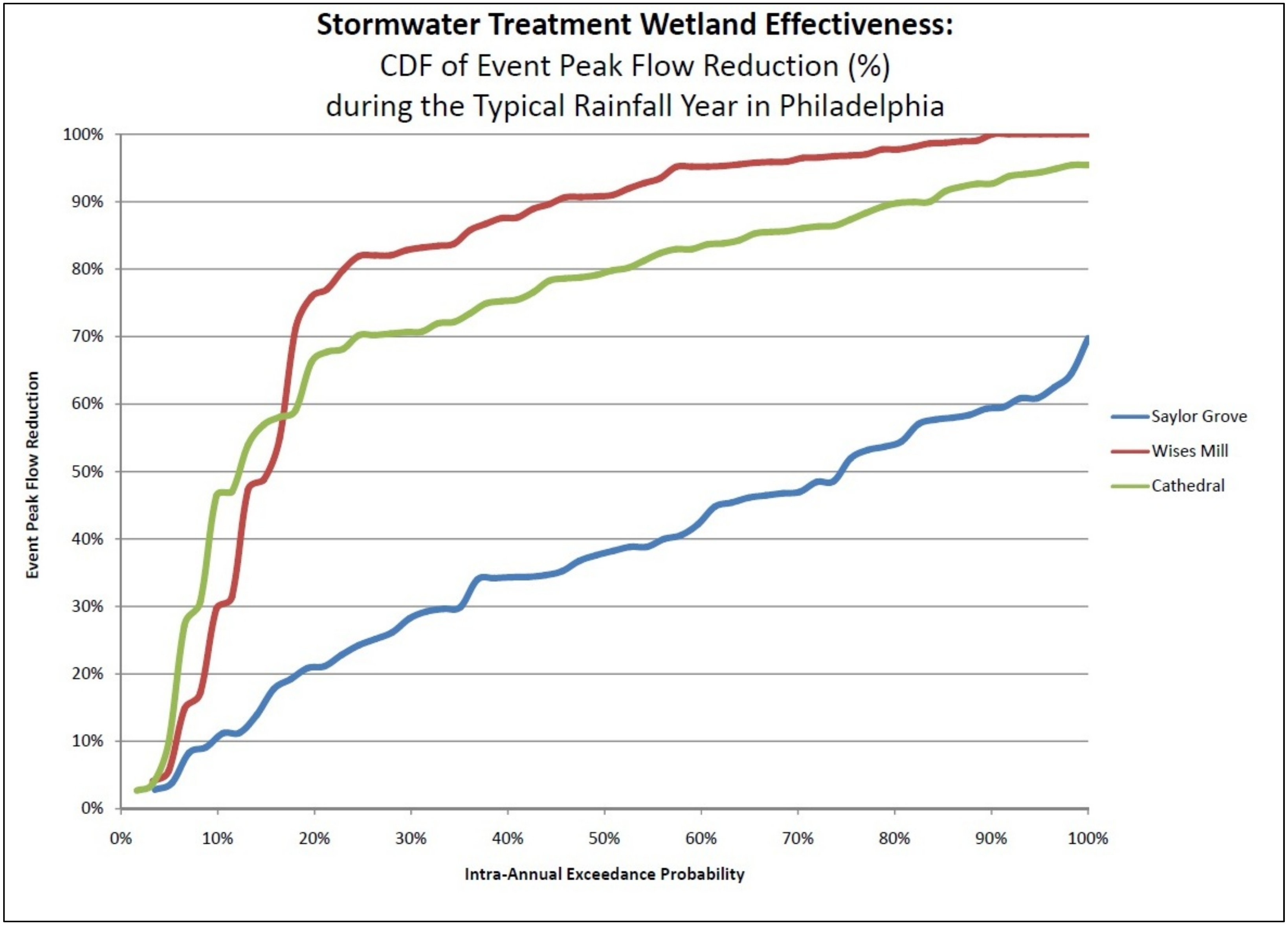


Figure 4: CDF of Stormwater Treatment Wetland Effectiveness during the Average Rainfall Year in Philadelphia

4 Stream Restoration Projects

As a drinking water, waste water, and stormwater utility with a substantial amount of infrastructure located within stream corridors throughout the City, PWD has a great appreciation for the ability of stream migration and bank erosion to significantly influence the overall sediment load to higher order streams, such as the Wissahickon Creek. This appreciation was even further reinforced over the last decade, as PWD invested in the practice of stream assessment and restoration as a core mission, culminating in multiple stream restoration projects and the formation of a full-fledged Ecological Restoration Program.

This combination of past experience and present understanding guides the implementation of stream restoration projects as a means of reducing the amount of sediment supplied to Wissahickon Creek due to stream bank erosion and sediment transport processes. Since 2006, PWD has implemented seven stream restoration projects on first and second-order streams in the Wissahickon watershed. An eighth project, Gorgas Run, has been designed. These projects were conducted in response to highly erosive conditions that were producing systematic instability in these stream corridors:

1. Carpenter's Woods
2. Cathedral Run
3. Cresheim Creek at St. Martins
4. Hartwell Lane
5. Rex Avenue 1
6. Bells Mill Run
7. Wises Mill Run
8. Gorgas Run (designed)

PWD estimates that these projects could produce a sediment load reduction to the Wissahickon Creek of more than 1.1 million pounds per year. To monitor and assure stability in each of these stream corridor projects, PWD has initiated regular monitoring at each of these project sites for a five year period beginning in 2012 and concluding in 2016. The 2012 efforts involved the installation of baseline cross-sections at regular intervals within the project areas. Photo and video documentation was initiated and will also be collected semi-annually to supplement quantitative methods. In 2016, these cross-sections will be re-occupied to estimate the lateral erosion rate and sediment load (see methods section on cross-section overlays for more information). This data will be used to assure that these projects have met the anticipated sediment load reductions goals and define any maintenance requirements should any significant instability be observed. The figure below outlines the monitoring schedule for the stream restoration sites.

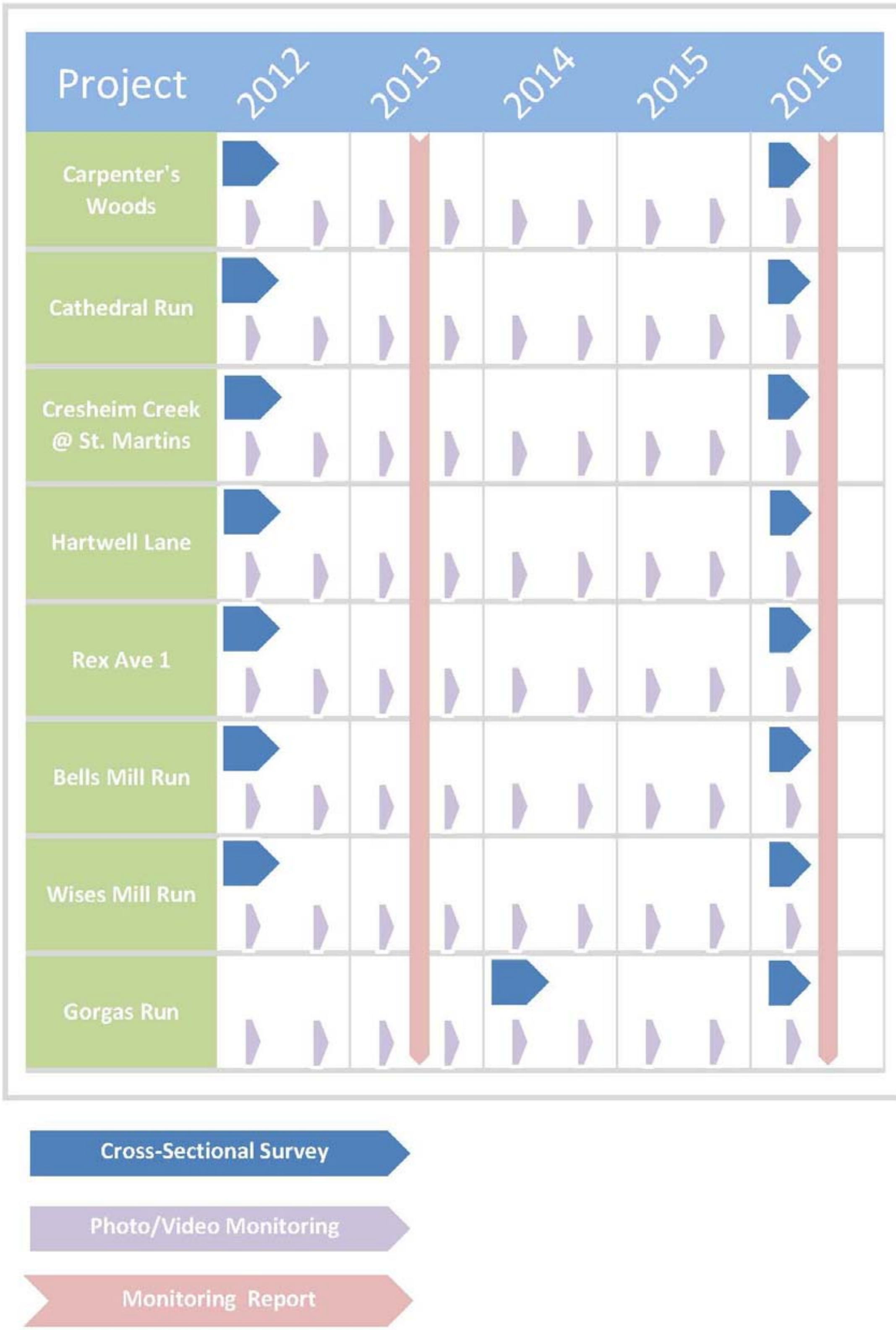


Figure 5 Monitoring Schedule for Stream Restoration Sites

4.1 Carpenter's Woods

Construction Complete: 2009

Stream: Kitchen's Lane

Stream Length: 600 feet

Anticipated Sediment Reduction: 15,000 lb/yr

# of XS Monitoring Locations: 6

Monitoring Start Date: 2012

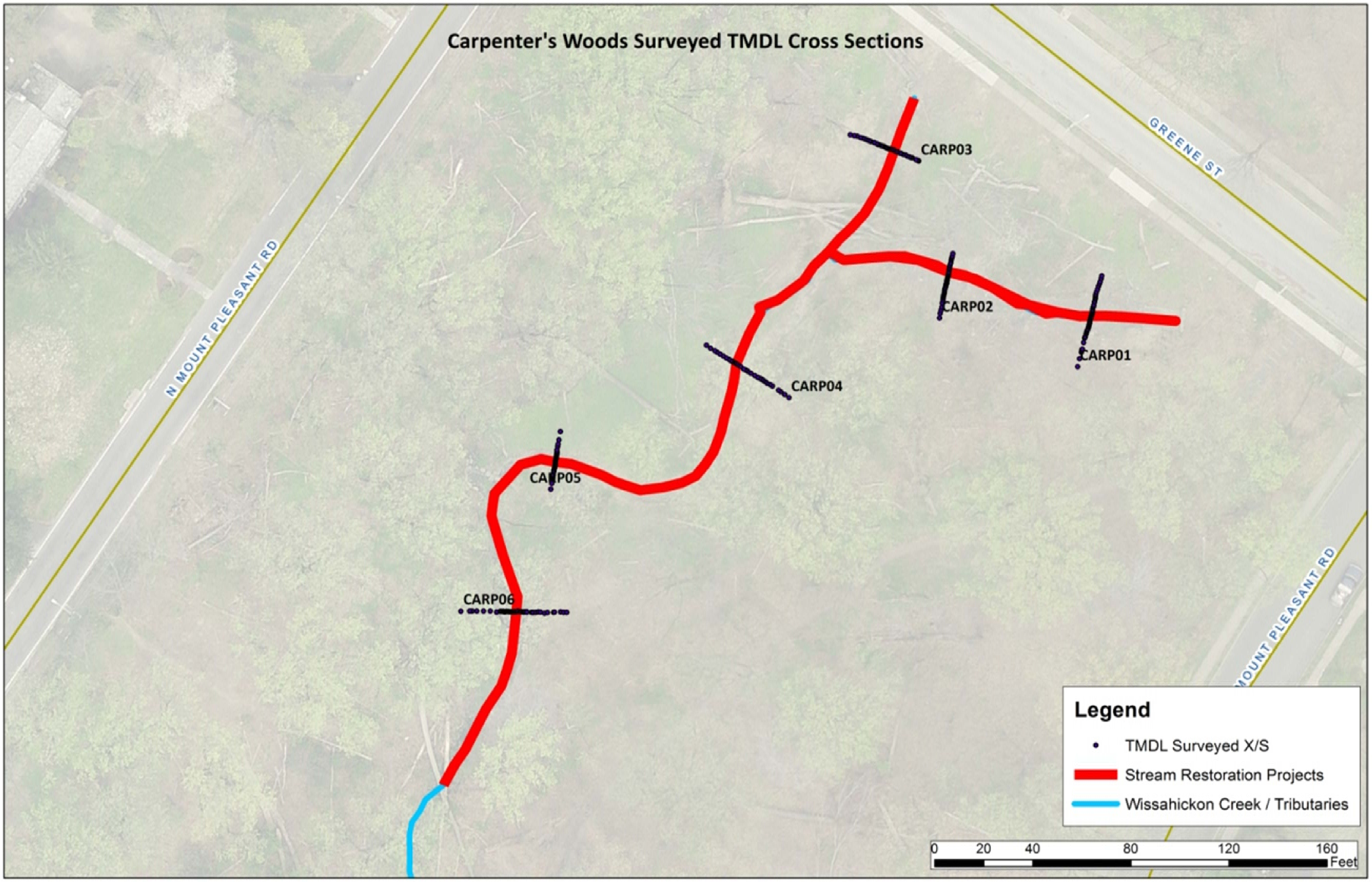
Project Description

In the upstream-most reach of Kitchen’s Lane, repair work was completed in 2009 in a section of Fairmount Park known as Carpenter’s Woods. Two stormwater outfalls were severely undermined due to high velocity stormwater flows from Greene Street. The erosion was so severe that the aprons for these outfalls were suspended up to five feet from their respective conveyance channels. Terraced boulder infiltration swales were installed to compensate for the vertical drop as well as reduce the energy of future storm flows. Cobble and boulder armoring was installed within the conveyance channels to reduce erosion and stabilize the banks. The repair work was supplemented with shrub and tree plantings to further stabilize the site.

2012 Cross-Sectional Survey

On June 8, 2012, PWD staff conducted a cross sectional topographic survey at six monumented sites in Carpenter’s Woods. The six cross-sections will serve as the baseline for the next survey to be conducted in 2016. Photos were collected at each cross-section on the day of the survey, June 8 and again on December 21, 2012.

Photographs and graphical representations of the cross-sections for the location can be found in Appendix D.


Carpenter's Woods Surveyed TMDL Cross Sections
CARP03
CARP02
CARP01
CARP04
CARP05
CARP06
GREENE ST
N MOUNT PLEASANT RD
MOUNT PLEASANT RD
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 20 40 80 120 160
Feet

4.2 Cathedral Run

Construction Complete: 2006

Stream: Cathedral Run

Stream Length: 300 feet

Anticipated Sediment Reduction: 14,000 lb/yr

# of XS Monitoring Locations: 5

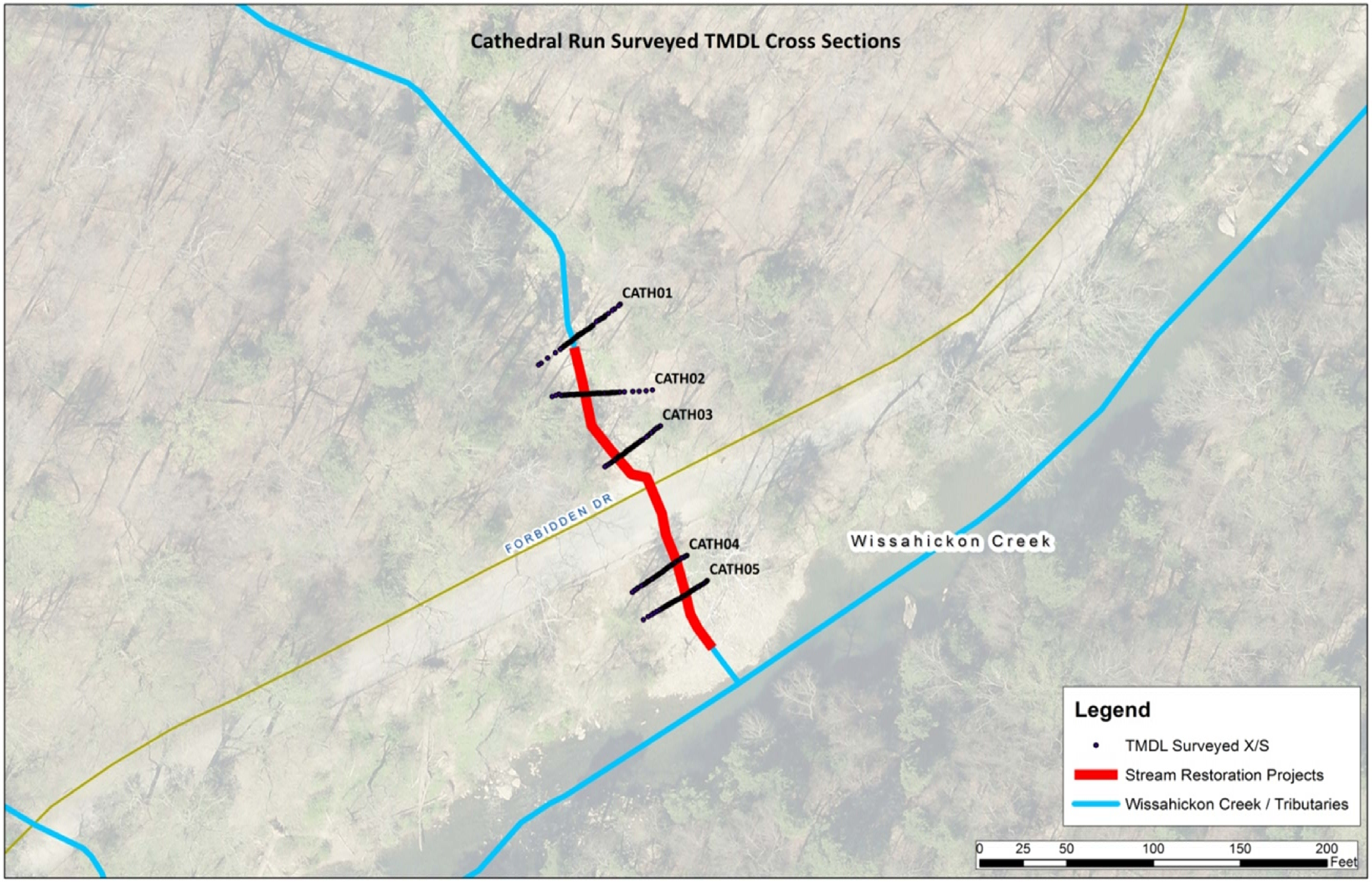
Monitoring Start Date: 2012

Project Description

In April of 2006, emergency repair work was completed 60 feet upstream of Forbidden Drive to protect a gas line crossing that was in danger of being exposed. Repairs consisted of the installation of a grouted native stone protection upstream and downstream of the pipe crossing as well as a grouted native stone weir downstream of the pipe crossing.

2012 Cross-Sectional Survey

Five cross-sections at this site were established and observed on June 8, 2012. The map below indicates the actual locations of these cross-sections. Photos were collected on June 8 and December 21, 2012. Photos and graphical representations of the data collected can be located in Appendix D.



Cathedral Run Surveyed TMDL Cross Sections
CATH01
CATH02
CATH03
CATH04
CATH05
FORBIDDEN DR
Wissahickon Creek
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0
25
50
100
150
200
Feet

4.3 Cresheim Creek at St. Martins

Construction Complete: 2011 (repair work completed 8/2012)

Stream: Cresheim Creek

Stream Length: 450 feet

Anticipated Sediment Reduction: 27,000 lb/yr

# of XS Monitoring Locations: 5

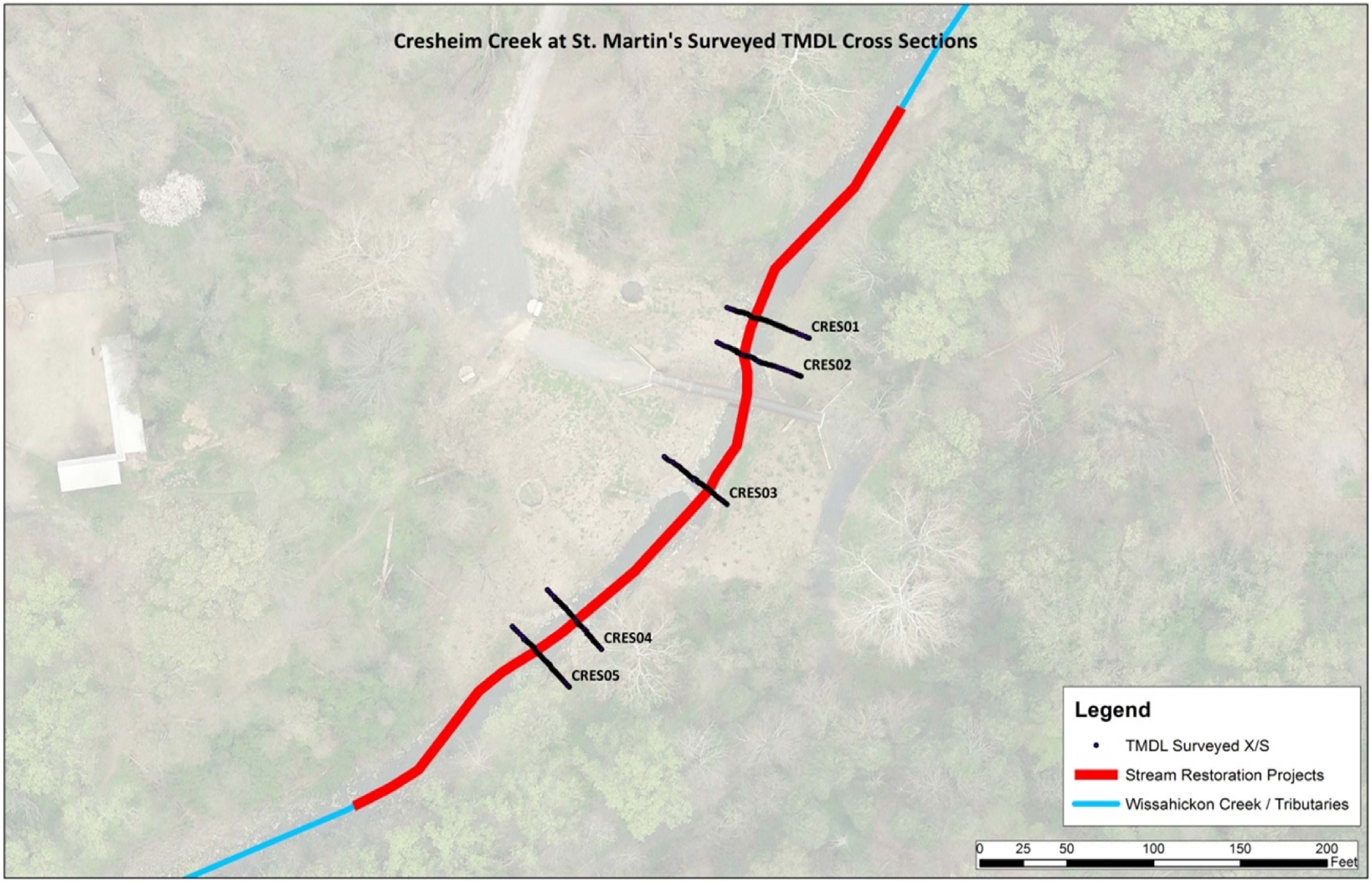
Monitoring Start Date: 2012

Project Description

The St. Martin's project on Cresheim Creek in Fairmount Park relocated the flow path and protected eroding stream bank. Existing water and sewer infrastructure threatened by high storm flows was protected while restoring this reach of the Cresheim Creek stream channel, and restoring access to the stream valley with reconstruction of a pedestrian bridge. The project utilized stone toe protection, rock vane structures, and riparian plantings to preserve the long-term stability of this reach. Structure repair work at this site during August 2012 reinforced and extended some of the structures. This accounts for the current condition differing from the site plans included in Appendix A.

2012 Cross-sectional Survey and Photomonitoring

The survey at this site was delayed due to repair work that took place at the site from June 2012 until August 2012. Survey work was conducted on October 10, 2012. Five cross-sections were established and observations were collected. The map below shows the actual location of the observed cross-sections. Photos were collected on December 20, 2012. Photos of the cross-sections and graphical representations of the data are located in Appendix D.



Cresheim Creek at St. Martin's Surveyed TMDL Cross Sections
CRES01
CRES02
CRES03
CRES04
CRES05
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 25 50 100 150 200
Feet

4.4 Hartwell Lane

Construction Complete: 2009

Stream: Hartwell Run

Stream Length: 300 feet

Anticipated Sediment Reduction: 15,000 lb/yr

# of XS Monitoring Locations: 5

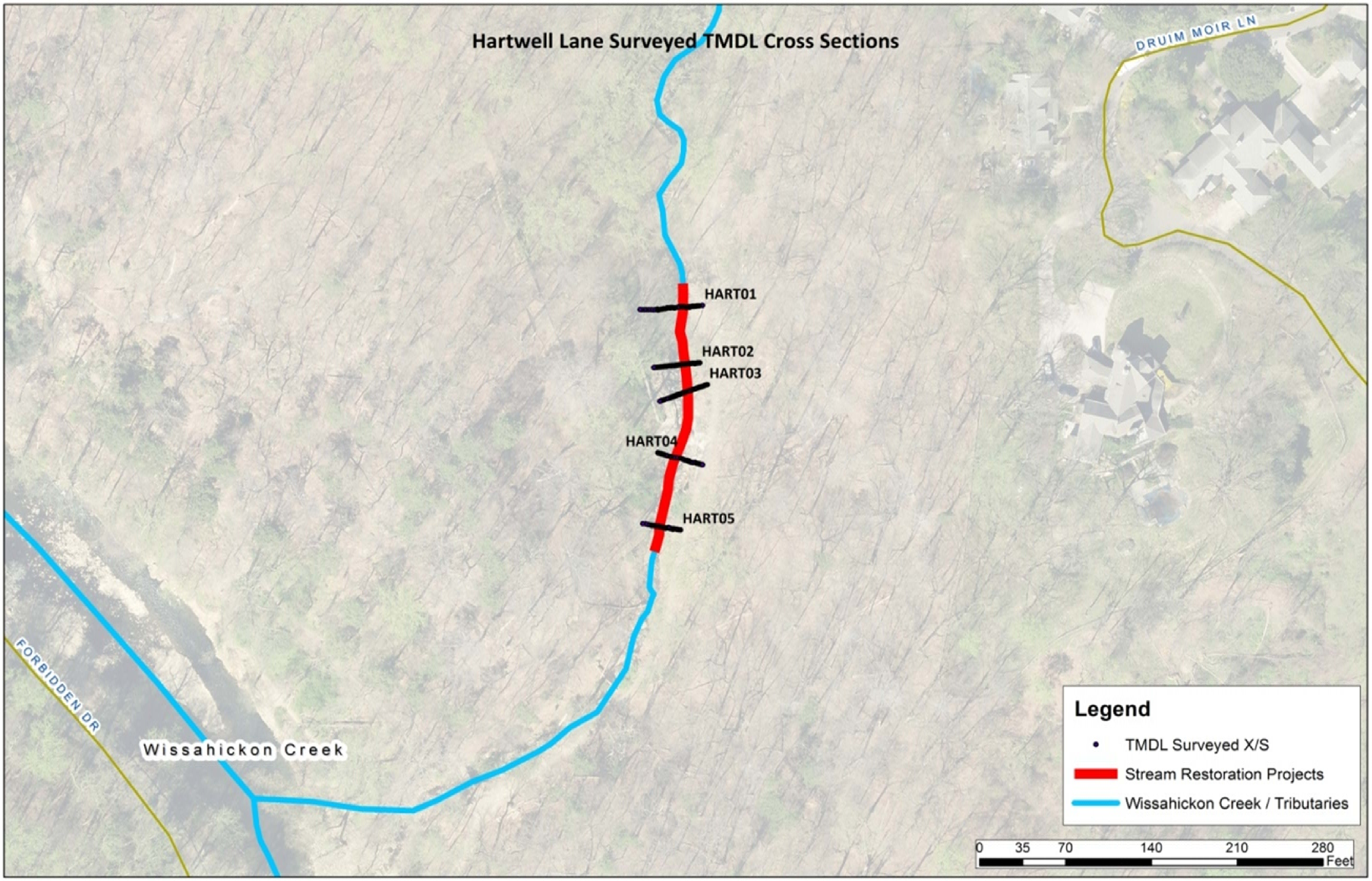
Monitoring Start Date: 2012

Project Description

In October, 2009 emergency repairs were completed on Hartwell Run at the stream crossing of the Wissahickon High-Level Interceptor. The concrete masonry encased pipe had succumbed to severe erosion which had exposed the interceptor. Frequent blockage of the three foot conveyance orifice by boulders, woody debris and fine sediment would cause stream flow to overtop the culvert. The combination of reduced flood flow conveyance, the steep slope of Hartwell Run cause severe bank erosion and plunge pool formation downstream of a culvert, as well as undermined a portion of the concrete-encased sanitary crossing. PWD completed repairs to the concrete encasement and stabilized the banks upstream and downstream of the culvert. Upstream of the structure, a step-terrace system was installed to reduce the energy of flood flows, which will alleviate the high shear stress in and around the conveyance orifice.

2012 Cross-sectional Survey and Photomonitoring

Cross-sections at the Hartwell Lane stream restoration site were surveyed on June 13, 2012. Five cross-sections were established and observed. The graphical exports of the topographic data are located in Appendix D. Photomonitoring was also initiated at these cross-sections and photos were collected on June 13, 2013 and December 20th, 2012. Photomonitoring will continue semi-annually. These photos are also included in Appendix D. The map below indicates actual cross-section locations.


Hartwell Lane Surveyed TMDL Cross Sections
DRUIM MOIR LN
HART01
HART02
HART03
HART04
HART05
FORBIDDEN DR
Wissahickon Creek
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 35 70 140 210 280
Feet

4.5 Rex Ave 1

Construction Complete: 2010

Stream: Rex Ave Run

Stream Length: 300 feet

Anticipated Sediment Reduction: 9,100 lb/yr

# of Monitoring Locations: 3

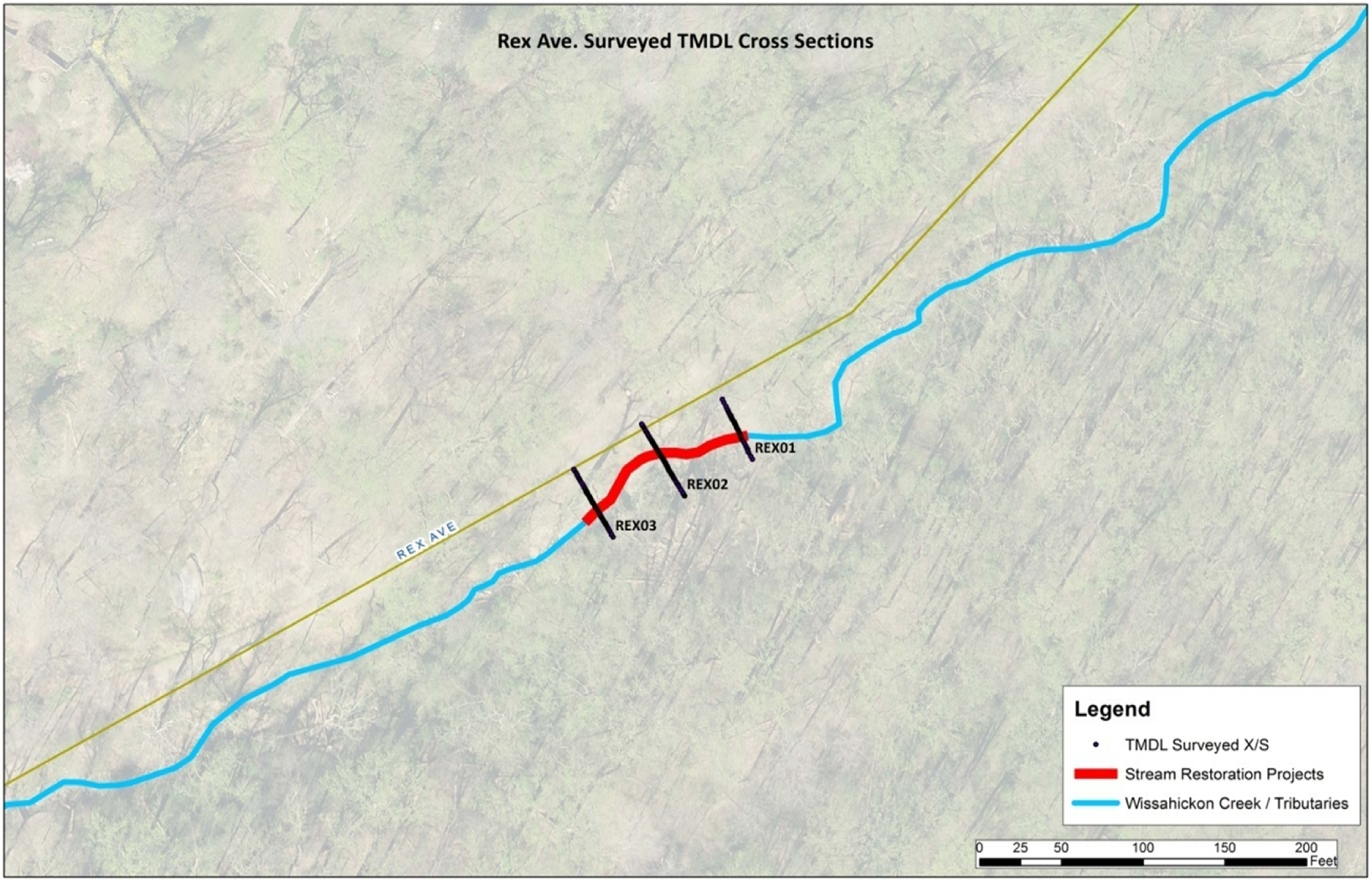
Monitoring Start Date: 2012

Project Description

This main purpose of this emergency project was to repair a section of stream bank that had been damaged by a break in the nearby 30 inch transmission water main. The project utilized structural elements such imbricated rock walls and boulder steps to provide protection against bank erosion and stream bed incision. These elements were supplemented with native riparian plantings.

2012 Cross-sectional Survey and Photomonitoring

The initial survey at this site was on June 18, 2012. PWD's Waterways Restoration Team conducted repair work on the upstream-most boulder step (BS1). This impacted the cross-section REX01 (see map below) which had to be resurveyed on November 11, 2012. The efforts of these two combined dates will serve as the baseline condition for comparison of erosion rates. Actual cross-section locations are shown in the map below. Photos were collected during the original survey on June 18, 2012 and again on December 21, 2012. Photos and graphical exports of the cross-section data are available in Appendix D.


Rex Ave. Surveyed TMDL Cross Sections
REX AVE
REX01
REX02
REX03
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 25 50 100 150 200
Feet

4.6 Bells Mill Run

Construction Complete: 2012

Stream: Bells Mill Run

Stream Length: 6,722 feet

Anticipated Sediment Reduction: 420,000 lb/yr

# of XS Monitoring Locations: 24

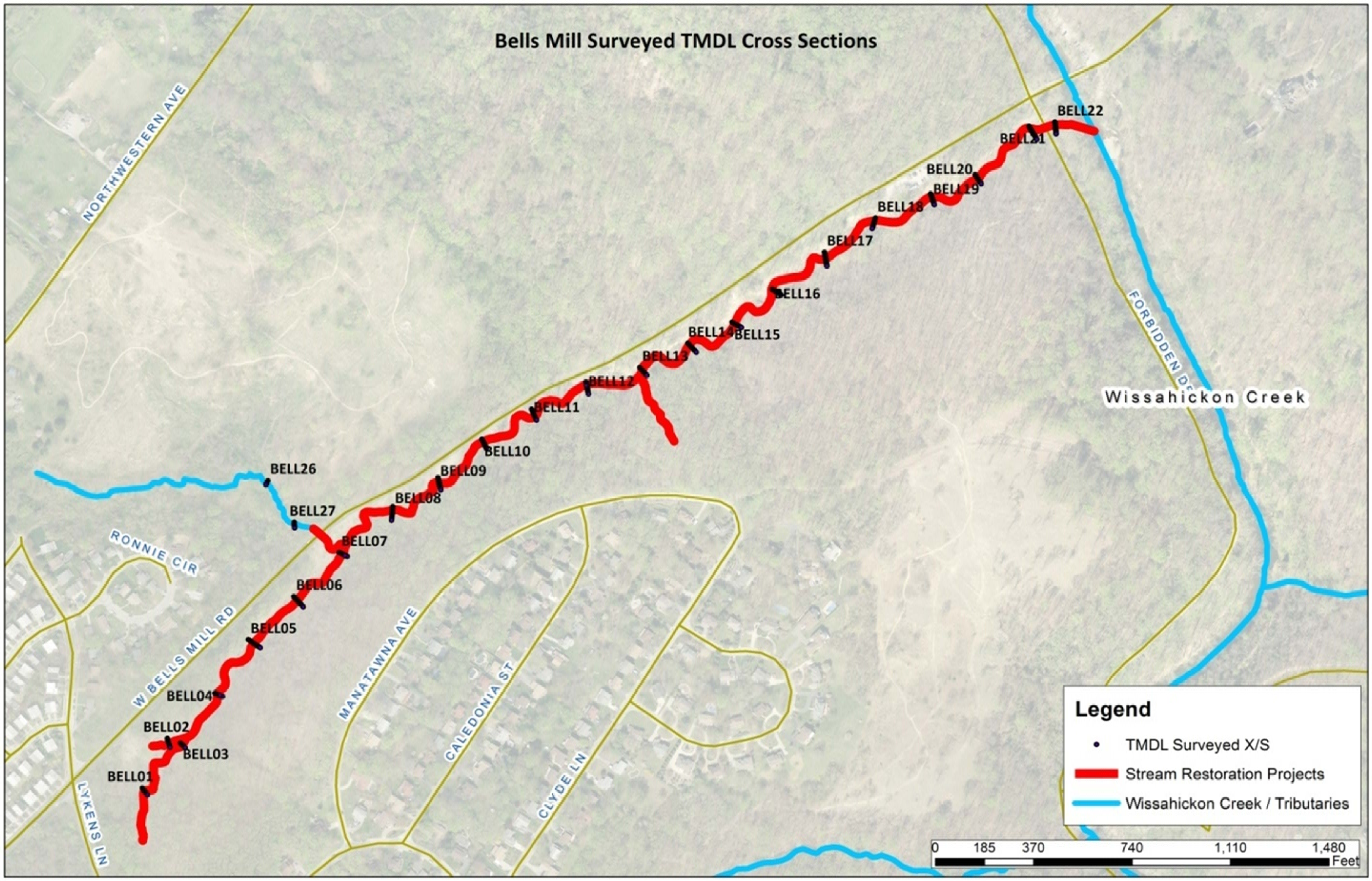
Monitoring Start Date: 2012

Project Description

Bells Mill is a 2nd order tributary to Wissahickon Creek. The tributary arises from an outfall near the intersection of Lykens Lane and Bells Mill Road. The streambank stabilization techniques at this site include standard rock vanes, "J" hook vanes, rock step riffles, wing deflectors, root wads, grade control measures and live branch layers. These structures will allow for improved habitat and sediment transport dynamics while reducing overall bank erosion and protecting critical sewer infrastructure.

2012 Cross-sectional Survey and Photomonitoring

A total of 24 cross-sections were established and surveyed on May 30-31 and June 5-6, 2012. Photos were collected during the survey and again on December 20, 2012. Slides of photos and graphical exports of the cross-sectional survey data are included in Appendix D.


Bells Mill Surveyed TMDL Cross Sections
NORTHWESTERN AVE
RONNIE CIR
W BELLS MILL RD
LYKENS LN
MANATAWNA AVE
CALEDONIA ST
CLYDE LN
FORBIDDEN DR
Wissahickon Creek
BELL01
BELL02
BELL03
BELL04
BELL05
BELL06
BELL07
BELL08
BELL09
BELL10
BELL11
BELL12
BELL13
BELL14
BELL15
BELL16
BELL17
BELL18
BELL19
BELL20
BELL21
BELL22
BELL26
BELL27
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 185 370 740 1,110 1,480
Feet

4.7 Wises Mill Run

Construction Date: 2012

Stream: Wises Mill Run

Stream Length: 7,056 feet

Anticipated Sediment Reduction: 490,000 lb/yr

# of XS Monitoring Locations: 38

Monitoring Start Date: 2012

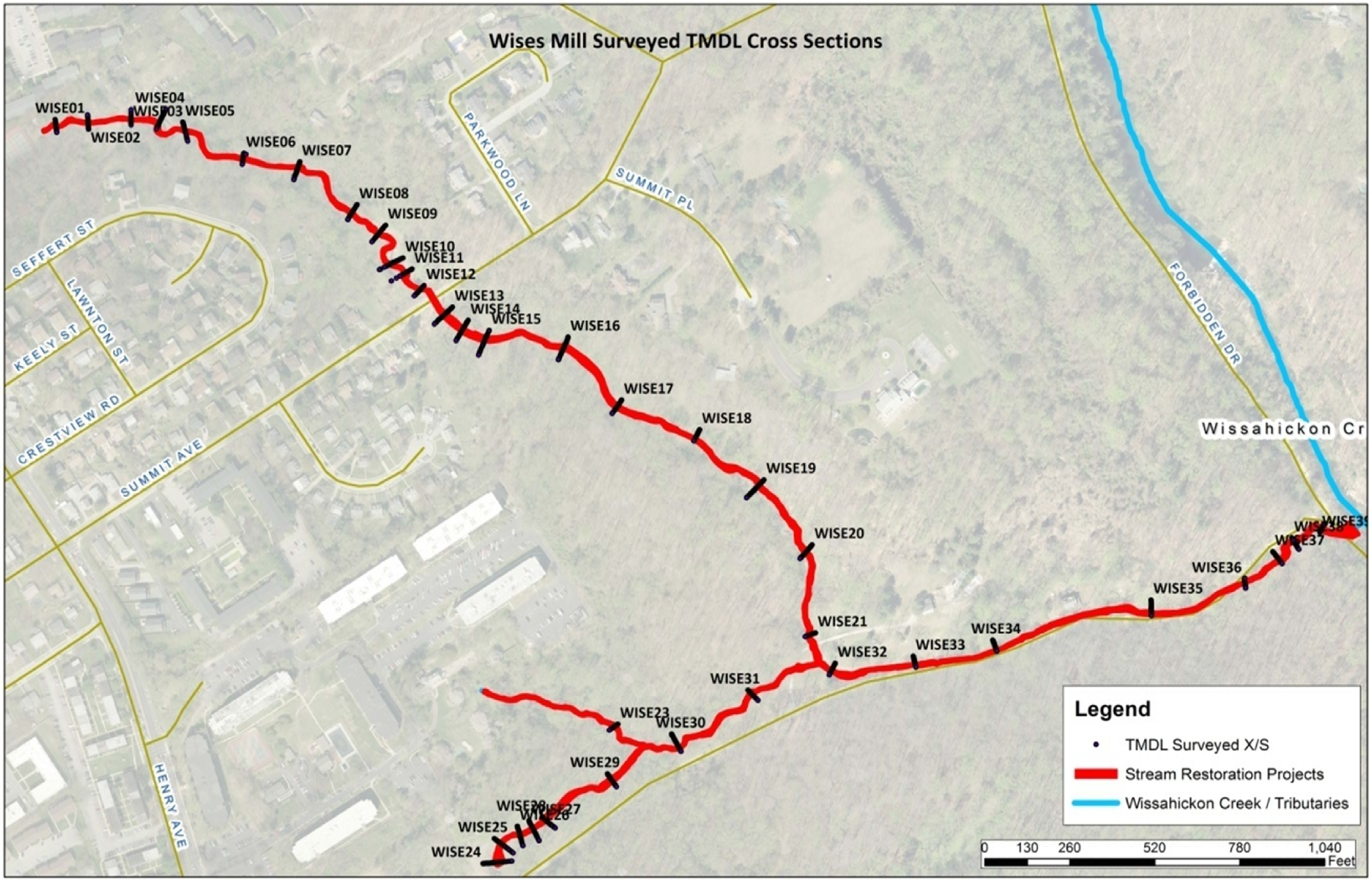
Project Description

The Wises Mill Stream Restoration focused on stabilizing and restoring multiple reaches of the Wises Mill Run. This project utilized multiple restorative design elements such as stone toe bank protection, bank re-grading and stabilization, riparian corridor planting, and modifying planform to actively reduce bank erosion. Adaptive management took place at this site after some of the installed stream and bank structures were observed to not function well in an urban stream system. This has resulted in the plan sets differing from the site's actual structure inventory.

2012 Cross-sectional Survey and Photomonitoring

Cross-sections were established and baseline survey data was collected from May 21st, 2012 to May 29th, 2012 along the Wise's Mill Run. Photos were collected at each cross-section during the survey and again on December 20, 2012. Cross-sections will be reoccupied in 2015 and photomonitoring will take place on a semi-annual basis.

The map below shows the actual locations of the observed cross-sections. Cross-sections are distributed throughout the stream corridor; though restoration work was focused in four areas (see site plans in Appendix A). Slide shows comprised of the graphic exports of the cross-section data and photos collected can be found in Appendix D.



Wises Mill Surveyed TMDL Cross Sections
WISE01
WISE02
WISE04
WISE03
WISE05
WISE06
WISE07
WISE08
WISE09
WISE10
WISE11
WISE12
WISE13
WISE14
WISE15
WISE16
WISE17
WISE18
WISE19
WISE20
WISE21
WISE23
WISE24
WISE25
WISE27
WISE29
WISE30
WISE31
WISE32
WISE33
WISE34
WISE35
WISE36
WISE37
SEFFERT ST
LAWNTON ST
KEELY ST
CRESTVIEW RD
SUMMIT AVE
PARKWOOD LN
SUMMIT PL
HENRY AVE
FORBIDDEN DR
Wissahickon Cr
Legend
TMDL Surveyed X/S
Stream Restoration Projects
Wissahickon Creek / Tributaries
0 130 260 520 780 1,040
Feet

4.8 Gorgas Run

Construction Date: 2014 (anticipated)

Stream: Gorgas Run

Stream Length: 2,170 feet

Anticipated Sediment Reduction: 170,000 lb/yr

# of Monitoring Locations: 10

Monitoring Start Date: 2014

Project Description

Gorgas Run is a steep headwater tributary to the Wissahickon Creek with a drainage area of 499 acres. Due to high peak stormwater flows, Gorgas Run has been severely degraded and is categorized as an 'F' type stream channel, as defined by the Rosgen stream classification method. To mitigate the impacts of development in the Gorgas Run watershed, PWD to apply Natural Stream Channel Design principles to restore the 1,800 feet of stream channel that encompasses Gorgas Run. With this effort, the quality of both Gorgas Run and Wissahickon Creek will be improved. During FY 2010, PWD began conceptual design of this project, which included topographic survey, soil borings, and groundwater monitoring wells. Design plans for this project were finalized in FY 2013. PWD expects the project to bid and construction to begin during FY 2014.

The map below indicates the location of the proposed cross-section monitoring sites.

Wissahickon Creek
GORG09
GORG08
FORBIDDEN DR
GORG07
GORG06
GORG05
GORG04
GORG11
GORG10
Gorgas Run
GORG03
GORG02
GORG01
HENRY AVE
HERMITAGE ST
FOUNTAIN ST
LAWNTON ST
PEDLEY RD
GATES
Legend
X/S Monitoring Locations
Stream Restoration Projects
Wissahickon Creek / Tributaries
0
250
500
1,000
Feet

4.9 Structure Evaluation and Videomonitoring

During the autumn of 2012, all stream restoration and bank stabilization structures were evaluated in regard to their stability and effectiveness at reducing erosion. The following table details the evaluation. Photos and videos with commentary of each structure are included in Appendix E. Please refer to the Methods section for information on the grading matrix.

Site	Structure Name	Structure ID	Structure Type	Inspection Date	Inspection Grade	Description
Carpenter's Woods	Boulder Outfall Protection	BOP1	In-stream	11/2/12	A	Located on the Northeast corner of Carpenter's Woods, this structure is stable and preventing the scour that was occurring at the end of the outfall apron.
Carpenter's Woods	Imbricated Rock Wall	IRW1	Bank Stabilization	11/2/12	A	On the downstream right of BOP#1, this structure is intact and in concert with the boulder outfall protection, is preventing scour from occurring at the end of the outfall apron.
Carpenter's Woods	Imbricated Rock Wall	IRW2	Bank Stabilization	11/2/12	A	On the downstream left of BOP#1, this structure is intact and in concert with the outfall protection, is preventing scour from occurring at the end of the outfall apron.
Carpenter's Woods	Boulder Step	BS1	In-stream	11/2/12	A	Downstream from BOP#1, this step is stable and provides grade control and reduces erosion.
Carpenter's Woods	Rock Lined Channel	RLC1	In-stream	11/2/12	A	Upstream of BS#1, coarse material was placed to reduce erosion during storm events. This material is stable.
Carpenter's Woods	Boulder Step	BS2	In-stream	11/2/12	A	Downstream from BS#1 and BOP#1, this structure is well built and properly keyed into the bank.
Carpenter's Woods	Rock Lined Channel	RLC2	In-stream	11/2/12	A	Coarse material has remained in place and is preventing the degradation of the stream bed during storm events.
Carpenter's Woods	Boulder Step	BS3	In-stream	11/2/12	A	Continuing downstream from BS#2, this structure is intact and providing grade control.
Carpenter's Woods	Rock Lined Channel	RLC3	In-stream	11/2/12	A	Coarse material has remained in place and is preventing the degradation of the stream bed during storm events.
Carpenter's Woods	Boulder Outfall Protection	BOP2	In-stream	11/2/12	B	The protection for the center outfall under Greene Street is in good condition and is preventing scour.
Carpenter's Woods	Boulder Step	BS4	In-stream	11/2/12	B	This step is the first structure downstream of the center outfall and BOP#2. A scour pool has developed directly downstream of this structure. The pool appears to be stable but should be continued to be monitored to ensure that the structure is not undermined.
Carpenter's Woods	Boulder Step	BS5	In-stream	11/2/12	B	Continuing downstream of the center outfall and BS#4, this structure is stable and functioning as installed. A large tree has fallen in this area and is suspended over the stream channel.
Carpenter's Woods	Rock Lined Channel	RLC4	In-stream	11/2/12	A	The confluence of the two channels coming down from BOP#1 and BOP#2 is stabilized with large cobble material. No issues identified in this area during the field visit.
Carpenter's Woods	Boulder Outfall Protection	BOP3	In-stream	11/2/12	B	This outfall is located by the intersection of Greene St. and North Mt. Pleasant Road. Though the use of smaller material for this structure is less desirable, the structure is intact and stabilizing the outfall.
Carpenter's Woods	Boulder Step	BS6	In-stream	11/2/12	B	Downstream of BOP#3, this boulder step is in good condition functioning properly without signs of erosion or deterioration.
Carpenter's Woods	Rock Lined Channel	RLC5	In-stream	11/2/12	A	This channel stabilization feature extends from BOP#3, through BS#6 and downstream until it meets the channel formed by the other two outfalls.
Carpenter's Woods	Boulder Step	BS7	In-stream	11/2/12	B	This structure is stable; however, downstream of this structure there is some erosion being exhibited on the downstream right

						bank.
Carpenter's Woods	Imbricated Rock Wall	IRW3	Bank Stabilization	11/2/12	B	This wall is stable and functioning normally. It stabilizes the bank and protects tree roots that were in danger of being undermined.
Carpenter's Woods	Rock Lined Channel	RLC6	In-stream	11/2/12	A	Though some of the material has been transported downstream, the coarse material placed in the channel is stabilizing the bed.
Carpenter's Woods	Imbricated Rock Wall	IRW4	Bank Stabilization	11/2/12	A	This structure is located on the downstream right bank. It is stable, providing bank protection from erosion and is in no danger of failing.
Carpenter's Woods	Imbricated Rock Wall	IRW5	Bank Stabilization	11/2/12	A	On the downstream left entering the bend, this structure is resting properly on its footers and is backangled into the bank.
Carpenter's Woods	Boulder Step	BS8	In-stream	11/2/12	A	Located at the conclusion of IRW#5, this structure is stable, and well situated into the bed of stream channel. Properly angled sides help to redirect flow through the center of the structure.
Carpenter's Woods	Boulder Step	BS9	In-stream	11/2/12	B	This structure serves to stabilize the confluence of the flow from BOP#1 and BOP#2 (northeast corner) and BOP#3 (northwest corner). There is no erosion occurring at this site.
Carpenter's Woods	Imbricated Rock Wall	IRW6	Bank Stabilization	11/2/12	B	This structure is downstream of the confluence and BS#9 and is in overall good shape. There is some slight unraveling of the wall at the downstream end where some of the material has fallen into the channel.
Carpenter's Woods	Log Revetment	LR6	Bank Stabilization	11/2/12	B	Approximately 150 feet downstream from the end of IRW#6, this structure is protecting a tree from being undermined.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Cathedral Run	Cross Vane	CV1	In-stream	10/26/12	A	Structure is arched upstream and keyed into banks. Wings are angled properly in cross-sectional view. Structure was recently cleaned of sediment by PWD – WRT staff prior to video collection. Area has a lot of sediment drop out when high flows from Cathedral Run meet high flows of the Wissahickon Creek. Concrete apron upstream of cross vane prevents scour at culvert.
Cathedral Run	Headwall Repair	HR1	Bank Stabilization\ Infrastructure	10/26/12	A	Headwall was damaged during high flows that deteriorated the historic stonework. Repair work showing no signs of damage.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Cresheim Creek	Rock Formed Stilling Well	RFSW1	Off-Channel	10/26/12	A	DSR upstream of bridge. No obvious signs of failure. Slight erosion due to overland flow upslope of structure.
Cresheim Creek	Cross Vane	CV1	In-stream	10/26/12	A	Properly angled wings and depression in center of structure. Protruding out of stream bed slightly, causing flow to go between boulders.
Cresheim Creek	Rock Lined Bank	RLB1	Bank Stabilization	10/26/12	A	On DSL bank, upstream of Rock Cross Vane #1. No signs of failure and functioning as designed.
Cresheim Creek	Rock Lined Bank	RLB2	Bank Stabilization	10/26/12	A	On DSR bank, upstream of Rock Cross Vane #1. No signs of failure and functioning as designed.
Cresheim Creek	Imbricated Rock Wall	IRW1	Bank Stabilization	10/26/12	A	On DSL bank and in good condition. Properly bank-angled into bank.
Cresheim Creek	Rock Lined Bank	RLB3	Bank Stabilization	10/26/12	A	Located on DSR bank. There are no signs of deterioration and structure is functioning as designed.

Cresheim Creek	Cross Vane	CV2	In-stream	10/26/12	B	In good condition. Only issue is there is a dramatic change in water surface elevation at this structure and water courses through the boulders rather than cascading over. Structurally sound at time of inspection. Tied in to IRW #1.
Cresheim Creek	Rock Lined Bank	RLB4	Bank Stabilization	10/26/12	A	Good condition with no signs of being flanked. Tied into Rock Lined Channel #1.
Cresheim Creek	Rock Lined Channel	RLC1	Off-Channel	10/26/12	A	On DSL. Receives flow from path at top of terrace. No signs of failure. Tied into IRW #1. No signs of erosion or disturbance.
Cresheim Creek	Rock Lined Bank	RLB5	Bank Stabilization	10/26/12	A	Providing toe bank protection. US of CV#3 on DSL.
Cresheim Creek	Cross Vane	CV3	In-stream	10/26/12	A	Keyed into bank. Properly sloped wings of vane, dipping toward center of structure. Angled upstream to direct thalweg through center of structure.
Cresheim Creek	Rock Formed Stilling Well	RFSW2	Off-Channel	10/26/12	A	On DS side of the bridge up on right bank. Overflows into Rock Lined Channel #2.
Cresheim Creek	Rock Lined Channel	RLC2	Off-Channel	10/26/12	A	No structural issues. Rip-rap is all still in place. No erosion where channel meets creek.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Hartwell Lane	Imbricated Rock Wall	IRW1	Bank Stabilization	11/9/12	B	This wall at the upstream end of the project area has the least number of rock courses of the IRWs at the site. While some settling has occurred, this structure is stable and protects the bank and sewer line from eroding.
Hartwell Lane	Imbricated Rock Wall	IRW2	Bank Stabilization	11/9/12	A	This structure is located on the DSL bank, is well built and provides extensive bank protection.
Hartwell Lane	Rock Pile	N/A	N/A	11/9/12	N/A	Not a structure but material is similar to what was used to build walls and steps.
Hartwell Lane	Boulder Step	BS1	In-stream	11/9/12	A	This structure is well built and functioning well. There are no signs of deterioration or erosion.
Hartwell Lane	Imbricated Rock Wall	IRW3	Bank Stabilization	11/9/12	A	This wall is stable and is functioning to prevent erosion of the DSL bank.
Hartwell Lane	Boulder Step	BS2	In-stream	11/9/12	A	This structure is in good condition and providing stability to the channel. The offset of the rock course to its footer prevents undermining of the structure.
Hartwell Lane	Imbricated Rock Wall	IRW4	Bank Stabilization	11/9/12	A	On the DSR bank, this structure continues from BS#2 to the interceptor crossing. This structure is stable and in concert with the associated boulder steps, is preventing any erosion from occurring on the banks and in the area of the interceptor.
Hartwell Lane	Boulder Step	BS3	In-stream	11/9/12	C	This structure is stable and properly tied in to IRW#3 and IRW#4. The thalweg at this structure is skewed toward the DSR. This is due to structure being lower on this side rather than the thalweg being directed toward the center of structure. This could be a result of settling of the rock over time.
Hartwell Lane	Boulder Step	BS4	In-stream	11/9/12	A	Proper backangling and elevations along the cross section of this structure add to its stability and proper functionality.
Hartwell Lane	Gunited Bank	GB1	Bank	11/9/12	A	The area directly upstream of the interceptor and culvert is very

			Stabilization			stable due to application of gunite to this once heavily eroding area near vulnerable infrastructure.
Hartwell Lane	Imbricated Rock Wall	IRW5	Bank Stabilization	11/9/12	A	Downstream of the culvert, on the DSL bank is IRW#5. It is in good condition and provides stability to the steep bank.
Hartwell Lane	Imbricated Rock Wall	IRW6	Bank Stabilization	11/9/12	A	On the downstream right side of the culvert is IRW#6. This structure is stable and protects the bank directly downstream of the culvert.
Hartwell Lane	Boulder Step	BS5	In-stream	11/9/12	B	This structure is stable and lowers the water surface elevation so that bed erosion is reduced despite the steep slope. There is some bank erosion occurring on the DSR bank directly downstream of this structure.
Hartwell Lane	Boulder Step	BS6	In-stream	11/9/12	C	There is extensive erosion on the DSR bank at this structure. During significant flow events, the stream flanks this boulder step and erodes the bank. This structure could be improved if it were extended along the cross and keyed into the bank.
Hartwell Lane	Boulder Step	BS7	In-stream	11/9/12	N/A	Due to the unavailability of a plan set for this site, it is unclear if this was a designed structure or a result of upstream boulders being dislodged and moved downstream.
Hartwell Lane	Imbricated Rock Wall	IRW7	Bank Stabilization	11/9/12	B	With the exception of one dislodged boulder, this structure is stable and provides protection for the steep bank in this area.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Rex Ave.	Boulder Step	BS1	In-stream	10/26/12	A	This structure was recently repaired. The stream began to outflank this boulder step on the downstream left bank. The structure was readjusted so that flow was directed through the center of the boulder step, as originally designed.
Rex Ave.	Imbricated Rock Wall	IRW1	Bank Stabilization	10/26/12	A	This structure extends throughout the length of the project. The rock wall is stable and providing much needed protection to the bank, access road and underlying sewer pipe. Some erosion exhibited at the downstream conclusion of the structure, likely from flow coming from Rex Ave.
Rex Ave.	Boulder Step	BS2	In-stream	10/26/12	A	Overall, this structure is in good shape. Step is angled upstream and on the wings to direct the thalweg to the center of the structure.
Rex Ave.	Boulder Step	BS3	In-stream	10/26/12	A	Structure is functioning properly, although there does appear to be some erosion occurring just downstream of the structure on the left bank.
Rex Ave.	Boulder Step	BS4	In-stream	10/26/12	A	Boulder step is functioning as designed. Structure is properly placed on visible footer rock to reduce undermining from scour.
Rex Ave.	Boulder Step	BS5	In-stream	10/26/12	C	Structure is stable, however, there is considerable erosion occurring directly downstream of the structure on the downstream left bank. Future larger storms could eventually cause this structure to be outflanked and render the structure dysfunctional.
Rex Ave.	Boulder Step	BS6	In-stream	10/26/12	A	The downstream-most structure is in good overall condition and is functioning as designed.
Rex Ave.	Rock Lined Channel	RLC1	Off-Channel	10/26/12	A	Located between Boulder Steps 2 and 3, on top of the bank from the IRW, this structure is a stabilized gully that receives flow from

						Rex Ave during heavy rain events.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR1	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion
Bells Mill Run	Rock Backfill Bank	RBB1	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR2	Bank Stabilization	9/14/12	B	The bank is mostly stable with several minor areas of erosion observed that do not compromise the overall integrity of the structure.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR3	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion.
Bells Mill Run	Rock Backfill Bank 2	RBB2	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle 1	RSR1	In-stream	9/14/12	B	The structure is stable, but slightly disconnected from one bank and may be elevated higher than specified in the contract drawings
Bells Mill Run	Channel Substrate Backfill	CSB1	In-stream	9/14/12	B	The channel substrate material appears to be stable and mixing well with the natural channel substrate material; Only minor signs of migration of this material downstream were observed.
Bells Mill Run	Rock Lined Bank	RLB1	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR4	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion
Bells Mill Run	Rock Bank Revetment	RBR1	Bank Stabilization	9/14/12	A	The bank and adjacent scour pool are very stable; No signs of erosion or displaced bounders
Bells Mill Run	Rock Bank Revetment	RBR2	Bank Stabilization	9/14/12	A	The bank and adjacent scour pool are very stable; No signs of erosion or displaced bounders
Bells Mill Run	"A" Vane	AV1	In-stream	9/14/12	C	Structurally, the vane is in fair shape, however the entire structure appears to be constructed higher than specified
Bells Mill Run	Rock Toe Bank	RTB1	Bank Stabilization	9/14/12	B	The bank is mostly stable with several minor areas of erosion and displaced bounders observed that do not compromise the overall integrity of the structure.
Bells Mill Run	Rock Toe Bank	RTB2	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Toe Bank	RTB3	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, with minor undercutting along some portions of the bank noted.
Bells Mill Run	Rock Step Riffle	RSR2	In-stream	9/14/12	C	The structure is stable, but is not fully tied into the DSL bank and was not constructed with the slight upstream arch recommended in the detail to promote the maintenance of the thalweg in the center of channel.
Bells Mill Run	Rock Toe Bank	RTB4	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion; However, it was noted that the stream channel did migrate toward the right bank thereby placing this structure at a reduced risk for further insult.
Bells Mill Run	Rock Step Riffle	RSR3	In-stream	9/14/12	B	While the structure is stable and keyed into both banks, it was noted that it was seemingly installed overtop bedrock forcing its

						elevated position; this would suggest the question of the designer's intent given that the bedrock out-crop would provide long-term stability and prevent future incision in its own right.
Bells Mill Run	Channel Substrate Backfill	CSB2	In-stream	9/14/12	N/A	Present
Bells Mill Run	Rock Toe Bank	RTB5	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR4	In-stream	9/14/12	B	Similar to RSR5, the presence of bedrock in the area appears to have affected the contractor's ability to install per the detail; Overall the structure is stable
Bells Mill Run	Rock Backfill Bank	RBB3	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV1	In-stream	9/14/12	N/A	Could not locate
Bells Mill Run	"J" Hook Vane	JHV2	In-stream	9/14/12	D	The super-elevated installation of this structure has caused the stream to excessively erode the DSL bank; A recommendation was noted to consider extending RBB3 past JHV2 in the process of re-constructing this structure. The constructability of "J" Hook structures was also questioned given the size of the recommended materials and the channel dimension.
Bells Mill Run	Rock Toe Bank	RTB6	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion. The presence of bedrock was also observed along the entire length of the structure.
Bells Mill Run	Rock Step Riffle	RSR5	In-stream	9/14/12	C	The structure is stable, but not completely to the design; The structure is built completely perpendicular to the adjacent stream bank with no upstream arch. The presence of visible bedrock may have prevented the structure from being built to the specified elevation in the construction schedule.
Bells Mill Run	Rock Toe Bank	RTB7	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion. The development of a low bankfull bench also supports the high rating of this structure.
Bells Mill Run	Rock Step Riffle	RSR6	In-stream	9/14/12	B	The structure is stable and constructed very close to the detail with signs of minor erosion evident on the DSR bank.
Bells Mill Run	Rock Step Riffle	RSR7	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks; A well-defined and maintained pools is also present on the downstream side of the structure.
Bells Mill Run	Rock Backfill Bank	RBB4	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV3	In-stream	9/14/12	A	The structure is very stable and perfectly represents the design intent as presented in the detail and specification. The structure effectively directs the thalweg away from the DSL bank and the in-stream rocks on the 'Hook' are well embedded into the streambed.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR5	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion; Slight undercutting was noted on the downstream portion of the structure.
Bells Mill Run	Rock Step Riffle	RSR8	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks; A well-defined and maintained pool is also present on the downstream side of the structure.

Bells Mill Run	Channel Substrate Backfill	CSB4	In-stream	9/14/12	N/A	Present
Bells Mill Run	Rock Backfill Bank	RBB5	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Toe Bank	RTB8	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Backfill Bank	RBB6	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion. It was noted that the culvert that discharges from the DSL bank did show some evidence of instability and slight incision. The recommendation is to construct a scour pool with R6/7 rock to stabilize the area and dissipate energy.
Bells Mill Run	"A" Vane	AV2	In-stream	9/14/12	A	The structure is in excellent condition with all rocks present, stable, and at a suitable elevation within the channel.
Bells Mill Run	"A" Vane	AV5	In-stream	9/14/12	N/A	This structure was not located during the assessment. It is assumed that the structure may have been buried by Channel Substrate Backfill material that seemed to have migrated from upstream and is distributed in the proposed location of this structure. No action recommended.
Bells Mill Run	Rock Step Riffle	RSR9	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks; A well-defined and maintained pool is also present on the downstream side of the structure.
Bells Mill Run	Rock Toe Bank	RTB9	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	"A" Vane	AV3	In-stream	9/14/12	A	The structure is in excellent condition with all rocks present, stable, and at a suitable elevation within the channel.
Bells Mill Run	Rock Step Riffle	RSR10	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is mostly tied into both banks;
Bells Mill Run	Rock Toe Bank	RTB10	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank. Some minor sedimentation concerns are visible on the downstream side.
Bells Mill Run	Rock Step Riffle	RSR11	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is mostly tied into both banks;
Bells Mill Run	Rock Step Riffle	RSR12	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks; A well-defined and maintained pool is also present on the downstream side of the structure.
Bells Mill Run	Channel Substrate Backfill	CSB5	In-stream	9/14/12	N/A	Present
Bells Mill Run	Rock Backfill Bank 7	RBB7	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR6	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion
Bells Mill Run	Rock Step Riffle	RSR13	In-stream	9/14/12	B	The structure is stable and is a good representation of the intended design. Its presence in the bankfull gully has allowed much of the Channel Substrate material to partially bury the structure.
Bells Mill Run	Rock Step Riffle	RSR14	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks
Bells Mill Run	"A" Vane	AV4	In-stream	9/14/12	A	The structure is in excellent condition with all rocks present,

						stable, and at a suitable elevation within the channel and fully tied into both banks.
Bells Mill Run	Rock Toe Bank	RTB11	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	"J" Hook Vane	JHV4	In-stream	9/14/12	C	The structure is stable, but does not fully meet its intent. Significant gaps in the rocks are present along the vane arm and most of the rock along the vane and hook appear to be elevated slightly higher than proposed.
Bells Mill Run	Rock Lined Bank	RLB2	Bank Stabilization	9/14/12	A	The bank is stable with some very minor signs of displaced rock or erosion, and most rocks keyed into the bank.
Bells Mill Run	Rock Toe Bank	RTB12	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Toe Bank	RTB13	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Toe Bank	RTB14	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Backfill Bank	RBB8	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Channel Substrate Backfill	CSB6	In-stream	9/14/12	N/A	Present
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR7	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR8	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion or degradation.
Bells Mill Run	Rock Toe Bank	RTB15	Bank Stabilization	9/14/12	A	The bank is stable with no signs of displaced rock or erosion, and all rocks well keyed into the bank.
Bells Mill Run	Rock Step Riffle	RSR15	In-stream	9/14/12	A	The structure is stable and constructed very close to the detail and is fully tied into both banks
Bells Mill Run	Rock Toe Bank	RTB16	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Toe Bank	RTB17	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR16	In-stream	9/14/12	D	The structure does not meet the standard presented in the detail and specification. It is comprised of 3 rocks that are loosely arranged and are tied into either bank. The rocks area also super elevated in the stream channel.
Bells Mill Run	Rock Backfill Bank	RBB9	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion. It is noted that NMRBR9 was not present in this area. This is likely due to issues with acquiring woody materials during construction.
Bells Mill Run	Channel Substrate Backfill	CSB7	In-stream	9/14/12	N/A	Present
Bells Mill Run	Rock Toe Bank	RTB18	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion, and is well protected at the bank toe
Bells Mill Run	"J" Hook Vane	JHV5	In-stream	9/14/12	D	The structure is stable, but does not fully meet its intent. The major issue is the super elevation of the hook portion of the structure. Because the arm and hook portions of the structure have commons elevations, the structure could potentially force

						erosive flows into the opposite bank, rather than through the center of the channel.
Bells Mill Run	Rock Toe Bank	RTB19	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV6	In-stream	9/14/12	D	The structure is stable, but does not fully meet its intent. The major issue is the super elevation of the hook portion of the structure. Because the arm and hook portions of the structure have common elevations, the structure could potentially force erosive flows into the opposite bank, rather than through the center of the channel.
Bells Mill Run	Rock Backfill Bank	RBB10	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR10	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion or degradation
Bells Mill Run	Rock Backfill Bank	RBB11	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion. An abundance of R8 was used in this location. It was also observed that NMRBR11 was not present probably due to the issues with acquiring woody materials during construction.
Bells Mill Run	Rock Toe Bank	RTB20	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR12	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion or degradation.
Bells Mill Run	Rock Toe Bank	RTB21	Bank Stabilization	9/14/12	D	The center portion (~30') of the structure was not completed. The plan called for a section of gabion baskets to be removed and replaced with RTB. This work was overlooked.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR13	Bank Stabilization	9/14/12	B	The structure is mostly stable with natural material present and tightly locked into the bank and no signs of erosion or degradation. Some credit was taken because the structure was not constructed to the recommended design length.
Bells Mill Run	Rock Step Riffle	RSR17	In-stream	9/14/12	C	The structure is stable with rocks located at a suitable elevation, but significant gaps between rocks are present
Bells Mill Run	Rock Toe Bank	RTB22	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Channel Substrate Backfill	CSB8	In-stream	9/14/12	N/A	Present
Bells Mill Run	"J" Hook Vane	JHV8	In-stream	9/14/12	B	The structure is stable, but not fully tied into the bank. Overall, the structure was constructed well with the arm and hook installed at suitable elevations and the thalweg flowing through the center of the hook.
Bells Mill Run	Natural Material Rock Bank Revetment	NMRBR14	Bank Stabilization	9/14/12	A	The bank is stable with all natural material present and tightly locked into the bank and no signs of erosion or degradation.
Bells Mill Run	Rock Step Riffle	RSR18	In-stream	9/14/12	F	The structure was extremely super elevated with the large boulders projecting well out of the streambed (24-30"). The observed condition presents an immediate risk to the reach. If left in place as built, a strong likelihood exists that the upstream reach will become impounded with sediment causing downstream bank erosion and channel migration.
Bells Mill Run	Natural Material Rock Bank	NMRBR15	Bank	9/14/12	A	The structure was replaced with the RTB details due to the lack of

	Revetment		Stabilization			an adequate quantity of woody material required for the NMRBR. The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR19	In-stream	9/14/12	C	While not constructed entirely per the detail, the structure is installed at suitable elevations and is stable. Base flow is located in the center of channel and a nice pool depth is maintained on the downstream side.
Bells Mill Run	Rock Toe Bank	RTB23	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV9	In-stream	9/14/12	D	The vane is entirely outside the active channel and provide no really service to the stream.
Bells Mill Run	Rock Toe Bank	RTB24	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV10	In-stream	9/14/12	D	The vane holds little resemblance to the construction detail and is entirely lacking the 'Hook' portion of the structure. The vane arm is also installed at an improper angle and projects too far away from the bank.
Bells Mill Run	Rock Step Riffle	RSR20	Bank Stabilization	9/14/12	D	The structure was super elevated with the large boulders projecting well out of the streambed (18-24"). The observed condition presents some risk to the reach leading to potential channel migration and bank erosion.
Bells Mill Run	Rock Toe Bank	RTB25	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	"J" Hook Vane	JHV11	In-stream	9/14/12	D	The structure is not functionally per the design. The vane arm and hook rocks are super elevated and disconnected.
Bells Mill Run	Rock Step Riffle	RSR21	In-stream	9/14/12	F	The structure was extremely super elevated with the large boulders projecting well out of the streambed (24-30"). The observed condition presents an immediate risk to the reach. The structure has already caused erosion to the DSL bank and will continue to force storm flows into this bank, and will most likely cause future erosion.
Bells Mill Run	"J" Hook Vane	JHV12	In-stream	9/14/12	C	The structure is not constructed ideally. Its arm length is shorter than recommended; however the elevations of the rocks seem commensurate with the channel dimension and not causing ill effects.
Bells Mill Run	Rock Toe Bank	RTB26	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR22	In-stream	9/14/12	C	The structure is super elevated, but remains tied into both stream banks and is not significantly impeding flow. Some erosion was noted on the DSR side of the structure that should be monitored
Bells Mill Run	"J" Hook Vane	JHV13	In-stream	9/14/12	D	The structure does not represent a "J" Hook, but rather a cross-vane. In combination with super elevated condition, the structure is acting to impede flow and cause channel migration and bank erosion on the DSL and sedimentation upstream.
Bells Mill Run	Rock Toe Bank	RTB27	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.

Bells Mill Run	Rock Step Riffle	RSR23	In-stream	9/14/12	D	The structure was super elevated with the large boulders projecting well out of the streambed (24-30"). The observed condition presents some risk to the reach leading to potential channel migration and bank erosion.
Bells Mill Run	Undercut Bank Rock Packing	UBRP1	Bank Stabilization	9/14/12	A	The structure is protecting the undercut bank well with no signs if erosion observed
Bells Mill Run	Rock Toe Bank	RTB28	Bank Stabilization	9/14/12	A	The structure is protecting this steep bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR24	In-stream	9/14/12	C	The structure is super elevated, but remains tied into both stream banks and is not significantly impeding flow.
Bells Mill Run	Rock Step Riffle	RSR25	In-stream	9/14/12	D	The placement of this structure seems inappropriate given the proximity of RSR24, just upstream and RSR26, just downstream. A recommendation is made for its removal.
Bells Mill Run	Rock Step Riffle	RSR26	In-stream	9/14/12	B	Overall, structure is functioning well and not negatively impacting the stream. Its lower profile permits decent connected from upstream to downstream. The slight gap in the middle of RSR26 provided cause for a slightly reducing score.
Bells Mill Run	Rock Toe Bank	RTB29	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	"J" Hook Vane	JHV14	In-stream	9/14/12	A	The structure provides a good example of the proper installation of the arm and hook portions of this type of structure. The slight reduction in elevation moving from the bank toward the stream provides for the hook to be almost fully immersed in the streambed, as presented in the construction detail.
Bells Mill Run	"J" Hook Vane	JHV15	In-stream	9/14/12	D	The structure is not representative at all of the construction detail with little attention rock placement. The placement of the arm is actually opposite the recommended direction (downstream, rather than upstream) Due to the lower profile of the in-stream rock, the need for action may be avoided depending on the amount of other repair work taking place in the area.
Bells Mill Run	Rock Toe Bank	RTB30	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Toe Bank	RTB31	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR27	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel dimension.
Bells Mill Run	"J" Hook Vane	JHV16	In-stream	9/14/12	C	Although the structure is not failing, it does appear that one too many rocks were used, causing it to project too far into the stream channel. In combination, with the slight super-elevated condition, the structure is not performing in an ideal manner, causing the thalweg to move around, rather through the hook of the structure.
Bells Mill Run	Rock Step Riffle	RSR28	In-stream	9/14/12	F	The structure is failing entirely, with severe bank erosion observed on the downstream side of both banks. The primary cause was likely the super elevated condition of the structure which causes impoundment of larger discharges that mostly

						likely cut around it on both sides. Additionally, the majority of rocks within the structure itself have been displaced. Immediate repair is highly recommended.
Bells Mill Run	Rock Toe Bank	RTB32	Bank Stabilization	9/14/12	B	The structure is protecting this bank face well with few signs of erosion observed.
Bells Mill Run	Rock Step Riffle	RSR29	In-stream	9/14/12	F	The structure is failing entirely, with severe bank erosion observed primarily on the DSR bank for 20-25 ft downstream. The primary cause was likely the super elevated condition the structure which causes impoundment of larger discharges which likely cut around it on both sides. Immediate repair is highly recommended.
Bells Mill Run	Rock Backfill Bank	RBB12	Bank Stabilization	9/14/12	A	The structure is protecting this steep bank face well with no signs of erosion observed. The excellent integrity of the structure is bolstered by the migration of the channel thalweg into the DSR bank as noted in the assessment of RSR29.
Bells Mill Run	"J" Hook Vane	JHV17	In-stream	9/14/12	N/A	Structure not found; Assumed to be buried other large quantity of bed material observed in the area of the proposed structure.
Bells Mill Run	Rock Toe Bank	RTB33	Bank Stabilization	9/14/12	D	While the installed portion of the structure is in decent condition, the structure needs to be extended upstream 40-50 ft to bolster the fully exposed and eroding steep bank face.
Bells Mill Run	Rock Step Riffle	RSR30	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure. Some credit was taken for rock displacement and minor erosion observed on the DSL side of the structure.
Bells Mill Run	Rock Toe Bank	RTB34	Bank Stabilization	9/14/12	A	The structure is protecting this steep bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR31	In-stream	9/14/12	D	The structure was super elevated with the large boulders projecting well out of the streambed (24-30"). Channel migration and bank erosion is present on the DSL side of the structure and some evidence of rock displacement.
Bells Mill Run	Rock Toe Bank	RTB35	Bank Stabilization	9/14/12	C	The structure is in fair condition; however some undercutting and bank erosion is present throughout the length of the structure. This structure should be watched closely for signs of continuing degradation.
Bells Mill Run	"J" Hook Vane	JHV18	In-stream	9/14/12	B	The structure is in good condition, but has been partially buried and disconnected from the channel thalweg by much of the channel substrate material.
Bells Mill Run	Channel Substrate Backfill	CSB10	In-stream	9/14/12	N/A	Present
Bells Mill Run	Rock Step Riffle	RSR32	In-stream	9/14/12	F	The structure is failing entirely, with severe bank erosion observed on the downstream side of both banks. The primary cause was likely the super elevated condition of the structure which causes impoundment of larger discharges which likely cut around it on both sides. Additionally, the majority of rocks within the structure itself have been displaced. Immediate repair is highly recommended.
Bells Mill Run	Rock Toe Bank	RTB36	Bank	9/14/12	A	The structure is protecting this bank face well with no signs of

			Stabilization			erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR33	In-stream	9/14/12	A	The structure is well constructed with excellent placement of the rocks in proportion to the surrounding channel dimension.
Bells Mill Run	Rock Step Riffle	RSR34	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel.
Bells Mill Run	Rock Toe Bank	RTB37	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Toe Bank	RTB38	Bank Stabilization	9/14/12	A	The structure is protecting this steep bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR35	In-stream	9/14/12	C	The structure is stable and in fair condition. Inappropriate rock size was noted which causes significant difficulty in properly embedding the structure into the streambed at the prescribed elevation.
Bells Mill Run	Rock Step Riffle	RSR36	In-stream	9/14/12	C	The structure is stable, but presents a large (30-36") step due to poor attention to the rock placement prescribed in the construction schedule. No signs of active erosion or rock displacement observed.
Bells Mill Run	Rock Backfill Bank	RBB13	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR37	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR38	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Backfill Bank	RBB14	Bank Stabilization	9/14/12	A	The structure is protecting this bank face well with no signs of erosion observed; All rocks in place.
Bells Mill Run	Rock Step Riffle	RSR39	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR40	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportions to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR41	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportions to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Toe Bank	RTB39	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Toe Bank	RTB40	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Backfill Bank	RBB15	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.

Bells Mill Run	Rock Backfill Bank	RBB16	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR42	In-stream	9/14/12	A	The structure is well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR43	In-stream	9/14/12	C	The structure is stable and in fair condition. Inappropriate rock size was noted which causes significant difficulty in properly embedding the structure into the streambed at the prescribed elevation.
Bells Mill Run	Rock Toe Bank	RTB41	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Toe Bank	RTB42	Bank Stabilization	9/14/12	B	The bank is stable with minor signs of displaced rock or erosion just behind the bank face.
Bells Mill Run	Rock Lined Bank	RLB3	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR44	In-stream	9/14/12	C	The structure is stable and in fair condition. Inappropriate rock size was noted which causes significant difficulty in properly embedding the structure into the streambed at the prescribed elevation.
Bells Mill Run	Rock Step Riffle	RSR45	In-stream	9/14/12	B	The structure is fairly well constructed with decent placement of the rocks in proportions to the surrounding channel dimension. The water surface connects from upstream across the structure.
Bells Mill Run	Rock Lined Bank	RLB4	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Toe Bank	RTB43	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Backfill Bank	RBB17	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Bells Mill Run	Rock Step Riffle	RSR46	In-stream	9/14/12	A	The structure is well constructed with decent placement of the rocks in proportion to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR47	In-stream	9/14/12	A	The structure is well constructed with decent placement of the rocks in proportions to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Step Riffle	RSR48	In-stream	9/14/12	A	The structure is well constructed with decent placement of the rocks in proportions to the surrounding channel dimension. The water surface connects well from upstream across the structure.
Bells Mill Run	Rock Backfill Bank	RBB18	Bank Stabilization	9/14/12	A	The bank is very stable with no signs of displaced rock or erosion.
Site	**Structure Name**	**Structure ID**	**Structure Type**	**Inspection Date**	**Inspection Grade**	**Description**
Wises Mill Run (6)	Rip-rap	RR1	Bank Stabilization	10/26/12	B	This rock was placed in a gully that had formed along the apron of the outfall to prevent further soil loss. It is stabilizing the gully and the concrete apron, though some evidence of erosion is still present.
Wises Mill Run (6)	Rock Backfill Bank	RBB1	Bank Stabilization	10/26/12	B	Located on the downstream left at the end of the outfall, this structure is stable and preventing erosion from occurring in this

						area.
Wises Mill Run (6)	Rock Backfill Bank	RBB2	Bank Stabilization	10/26/12	B	This structure is located on the downstream right bank. Material used to build structure appears to be mostly in place and is protecting the bank downstream of the outfall apron. A large transverse bar has developed near the downstream end of the structure as has an area of bank erosion.
Wises Mill Run (6)	Imbricated Rock Wall	IRW1	Bank Stabilization	10/26/12	A	This structure on the downstream left bank is stable and well installed. The offset courses of rock help to ensure the stability of the structure.
Wises Mill Run (6)	Rock Backfill Bank	RBB3	Bank Stabilization	10/26/12	A	On DSR bank, this structure is intact with no displaced boulders or active visible erosion.
Wises Mill Run (6)	Rock Lined Bank	RLB1	Bank Stabilization	10/26/12	A	RLB#1 is on the downstream left bank and continues until it meets with the culvert at the driveway. This structure is covered with herbaceous and shrub vegetation which is also assisting in preventing soil loss to erosion.
Wises Mill Run (6)	Rock Backfill Bank	RBB4	Bank Stabilization	10/26/12	A	This structure is on the DSR bank and is preventing further damage to the roadway passing over the culverted stream. It is in good condition and shows no signs of deteriroration.
Wises Mill Run (5)	Cross Vane #1	CV1	In-stream	10/26/12	B	Due to the lack of as-built plans for this project, it is unclear whether this cross vane was a planned structure or if it has formed due to settling of the boulders from RBB#5 and RBB#6. This rock formation is providing grade control to the stream directly downstream of the undersized culvert.
Wises Mill Run (5)	Rock Backfill Bank #5	RBB5	Bank Stabilization	10/26/12	A	Heavy boulder protection downstream of the undersized culvert on the left bank is preventing erosion during heavy storm events when flow may overtop the culvert.
Wises Mill Run (5)	Rock Backfill Bank #6	RBB6	Bank Stabilization	10/26/12	A	Heavy boulder protection downstream of the undersized culvert on the right bank is preventing erosion during heavy storm events when flow may overtop the culvert.
Wises Mill Run (5)	Rootwad	RW1	Bank Stabilization\ Habitat	10/26/12	B	Downstream of the headwall on the downstream right bank, this structure is keyed into the bank and is also paired with some boulder protection. There is evidence of some erosion downstream of this structure on the right bank.
Wises Mill Run (5)	Rootwad	RW2	Bank Stabilization\ Habitat	10/26/12	B	This rootwad is in good structural condition, although it does not appear to be providing much in the way of bank stability. In concert with the associated boulders, this structure may provide more protection during significant flow events.
Wises Mill Run (5)	Imbricated Rock Wall	IRW2	Bank Stabilization	10/26/12	B	This structure is located on the downstream left bank and is providing bank protection for this bend. This structure also has some rootwads incorporated into its design.
Wises Mill Run (5)	Engineered Debris Jam	EDJ1	In-stream	10/26/12	C	Remnants of this structure essentially consist of a log and boulder on the stream bed. This could actually impede flow and cause bank and bed erosion by forcing the stream flank the structure.
Wises Mill Run (5)	Rootwad	RW3	Bank Stabilization\ Habitat	10/26/12	C	This structure is providing no stability to stream bed or bank. It is no longer keyed into the bank and is now situated on a point bar. Boulders which were once likely part of this rootwad have now

						become dislodged and are embedded in sediment. Directly downstream from this structure is an actively and severely eroding vertical bank face.
Wises Mill Run (5)	Rootwad	RW4	Bank Stabilization\ Habitat	10/26/12	D	This structure is providing no stability to stream bed or bank. It is no longer keyed into the bank and is now situated on a point bar. Boulders which were once likely part of this rootwad have now become dislodged and are embedded in sediment.
Wises Mill Run (5)	Engineered Debris Jam	EDJ2	In-stream	10/26/12	D	Erosion extends along the DSR bank from the area near RW#3 and RW#4 to the EDJ#2. Additional bank erosion is observed downstream behind the structure on the right bank as well as on the left bank directly across the stream from this structure. It is on a near perpendicular angle to the bank, which may make the structure susceptible during significant flow event and cause additional erosion on the DSL bank.
Wises Mill Run (5)	Rock Lined Bank	RLB2	Bank Stabilization	10/26/12	B	Boulders placed along the toe of the bank on the DSL are protecting the bank from further erosion. There is erosion occurring downstream of this structure.
Wises Mill Run (4A)	Rootwad	RW5	Bank Stabilization\ Habitat	10/26/12	B	This structure is on the DSL bank and is providing adequate bank protection by moving the thalweg off of the bank. Visible in the video is past erosion downstream of the structure.
Wises Mill Run (4A)	Rootwad	RW6	Bank Stabilization\ Habitat	10/26/12	C	While the structure itself is good condition, it does not appear to be providing significant bank protection due to its location at a riffle/ grade drop section of the stream.
Wises Mill Run (4A)	Rootwad	RW7	Bank Stabilization\ Habitat	10/26/12	C	This structure is located on the DSR bank near an outfall. As designed, the rootwad and associated boulders have accumulated woody debris, however, the buildup of material is blocking flow from the outfall. Extensive erosion observed downstream of this structure on the DSR bank should continue to be monitored for any expansion.
Wises Mill Run (4A)	Rootwad	RW8	Bank Stabilization\ Habitat	10/26/12	B	This structure protects the bank during higher flows and is nicely keyed into the bank. It is also shored up by a large boulder.
Wises Mill Run (4B)	Imbricated Rock Wall	IRW3	Bank Stabilization	10/26/12	B	Extending along the DSR bank from the culvert passing under Summit Ave. and continuing to JHV#1. Overall the structure is in good condition and in no danger of failing, though there is some erosion occurring behind the structure.
Wises Mill Run (4B)	J-Hook Vane	JHV1	In-stream	10/26/12	D	This structure is located at the end of IRW#3 and has experienced some deterioration in the form of dislodging of the upper course of boulders. At higher flows, the stream will flow through the gap in the middle of the structure rather than over top of the structure and into the designed scour pool directly downstream. The drop into the pool is necessary to reduce the erosive force of the flow and that would not be achieved with this structure in its current condition.
Wises Mill Run (4B)	J-Hook Vane	JHV2	In-stream	10/26/12	D	The in-stream portion of this structure has become buried by the streambed substrate, negating its function to reduce the stream's energy during significant storm events. There is also

						erosion occurring behind the structure which is due to the longitudinal portion of the structure directing flow into the bank behind the structure. This may be a result of the structure being too close to JHV#1.
Wises Mill Run (4B)	Manhole Protection	MHP1	Bank Stabilization\ Infrastructure	10/26/12	B	The heavy boulder protection at this exposed manhole is effectively preventing further erosion from occurring.
Wises Mill Run	Boulder Outfall Protection	BOP1		10/26/12	A	Boulders placed to at this outfall are serving to stabilize the area and reduce erosion. It is tied into two additional structures, IRW#4 and IRW#5, on the right and left banks.
Wises Mill Run	Imbricated Rock Wall	IRW4		10/26/12	B	On DSR bank, this structure extends throughout the project reach and is in good condition. All structures tied into this IRW are stable.
Wises Mill Run	Imbricated Rock Wall	IRW5		10/26/12	B	This structure is stable and is providing much of the bank protection on the DSL bank. Like IRW#4, this structure extends for nearly the entire project area.
Wises Mill Run	Cross Vane	CV2		10/26/12	C	The material for this structure is oversized and has resulted in a cross vane that is excessively protruding from the stream, allowing the flow to go between the boulders rather than over the top of the structure. This could lead to the eventual unraveling of the structure and lead to future erosion as the stream flanks the structure. Additionally, this structure is angled downstream as opposed to the ideal backangling that increases the stability of the structure.
Wises Mill Run	Cross Vane	CV3		10/26/12	C	As with CV#2, this structure was built with extremely large material, and is resulting in the stream flowing under the structure as opposed to over the top. The structure is stable and there is no visible erosion.
Wises Mill Run	Rootwad	RW9		10/26/12	B	This structure is keyed into the bank and there is no erosion evident. The rootwad is perched well above the stream bed and much of the bank protection is coming from the IRW#4.
Wises Mill Run	Rootwad	RW10		10/26/12	B	This structure is keyed into the bank and there is no erosion evident. The rootwad is perched well above the stream bed and much of the bank protection is coming from the IRW#4. Additionally, the rootwad is facing downstream contrary to an ideal orientation.
Wises Mill Run	Rootwad	RW11		10/26/12	B	This structure is keyed into the bank and there is no erosion evident. The rootwad is perched well above the stream bed.
Wises Mill Run	Rootwad	RW12		10/26/12	B	Tied into IRW#4, this structure is stable and closer to the stream bed so that it provides bank protection during moderate flow.
Wises Mill Run	Cross Vane	CV4		10/26/12	-	This structure was unable to be identified out in the field.
Wises Mill Run	Rootwad #	RW13		10/26/12	B	This structure is stable, but similar to the upstream rootwads, it is perched above the stream.
Wises Mill Run	Boulder Outfall Protection	BOP2		10/26/12	B	The use of large boulder material has stable the gully originating from the outfall by Wises Mill Road. There is a small amount of erosion evident on the DSL of this structure.
Wises Mill Run	Rootwad	RW14		10/26/12	B	This structure is stable, but similar to the upstream rootwads, it is

						perched above the stream.
Wises Mill Run	Rootwad	RW15		10/26/12	B	This structure is stable and provides bank protection during high flows.
Wises Mill Run	Rootwad	RW16		10/26/12	B	This structure is stable and provides bank protection during high flows.

5 Discussion

The Philadelphia Water Department, through its Office of Watersheds, is committed to monitoring stream restoration and stormwater wetland sites to ensure that they are functioning properly and reduce sediment loads to the Wissahickon Creek. In addition, an eighth stream restoration project, Gorgas Run, will be completed during the next monitoring period. This project is anticipated to keep another 170,000 pounds of sediment per year out of the Wissahickon Creek.

This baseline report will serve as the basis for comparison for the various methods of evaluating the success of stream restoration and stormwater wetland sites in the Wissahickon watershed. Through this detailed effort, PWD staff will be able to calculate bank erosion, sediment accretion and quickly be able to identify any issue with the installed structures. Regularly scheduled photomonitoring, videomonitoring, H&H modeling, topographic and cross-sectional surveys, and formalized stormwater wetland inspections will all help to ensure each site is functioning at an optimal level.

The monitoring efforts detailed in this report will also be used to identify areas that need improvement or are not functioning as designed. The initial baseline monitoring has identified the need for adaptive management and repair work at the Bells Mill Stream Restoration. The structure videomonitoring that evaluated the stability and functionality of each in-stream and bank stabilization structure throughout the Wissahickon watershed identified a total of 16 structures that were failing and in need of immediate adjustment in order to improve bank stability. Beginning in December 2013, these structures will be adjusted and repaired to specification. All structures will continue to be monitored; in particular those rated ‘C’ and ‘D’ during the initial evaluation, and corrective action will be taken if structure degrades into a more unstable condition.

This report will be updated in 2016 and will include all monitoring efforts from the end of FY 2013 as well the appropriate comparative analysis for each site. PWD is confident these projects, as evidenced through extensive monitoring, will meet the estimated sediment load reduction.

APPENDIX F - PCB Pollutant Minimization Plan – Seventh Annual Report

Philadelphia Water Department

PCB

Pollutant Minimization Plan

Seventh Annual Report

Table of Contents

1 PMP Achievement Executive Summary

The Philadelphia Water Department (PWP) submitted its PCB Pollutant Minimization Plan (PCB PMP) on September 30, 2005 and was issued a Completeness Determination letter on January 12, 2006. PWD initiated the actions called for in its PCB PMP on March 4, 2006.

PWD's PCB PMP set out the following approaches to achieving PCB minimization:

- Sample three Water Pollution Control Plants' effluent every two years and analyze using Method 1668A.

- Visit and inspect three hundred ninety-nine (399) sites listed by either EPA or other agencies as housing PCB-containing devices and report the number of devices that have been removed from each site, both prior to our inspection and subsequent to it.

- Visit and inspect thirty-one (31) sites listed by the Philadelphia Department of Public Health as having previously undergone some type of PCB remediation activity, and report the number of sites removed from the list as posing no threat of PCB discharge to PWD's sewer system.

- Report any reductions in PCB concentrations in the wastestreams from our three Water Treatment Plants by measuring PCBs in the ferric chloride used in the treatment process as well as reductions of PCBs in the source water (Delaware River or Schuylkill River).

- Continue the sewershed PCB trackdown sampling program for each of our three Water Pollution Control Plants.

Refer to the First, Second, Third, Fourth, Fifth, and Sixth Annual Reports for information on PMP efforts during Years 1, 2, 3, 4, 5, and 6.

During the seventh year of our five-year PCB PMP, the following tasks were performed:

- Forty-nine (49) of the three hundred ninety-nine (399) sites listed by EPA or other agencies as housing PCB-containing devices were inspected. Other sites in the original listing were found to be duplicate listings or were found not to exist.

- Wet-weather PCB sampling and analysis of the three Water Pollution Control Plants' (WPCPs') effluent was performed as required by PWD's NPDES permits. See Section 7, "Tabular Summary", for data.

- PWD wet weather and dry weather WPCP effluent data have been entered into the DRBC PCB database.

- Significant reductions in WPCP effluent PCB loadings were seen over the course of the PMP (see "Tabular Summary").

2 Facility and Contact Information

Facility Name and Address:	Philadelphia Water Department 1101 Market Street Philadelphia, PA 19107
Water Pollution Control Plants:	Northeast WPCP 3899 Richmond St. Philadelphia, PA 19137
	Southeast WPCP 25 Pattison Ave. Philadelphia, PA 19148
	Southwest WPCP 8200 Enterprise Ave. Philadelphia, PA 19153
Contact Person:	Peter Pineda Assistant Manager, Industrial Waste 1101 Market St., 3rd Floor Philadelphia, PA 19107
	Phone: 215-685-6370 Fax: 215-685-6232 Email: peter.pineda@phila.gov
Date of Submittal of PMP:	September 30, 2005
Date of Completeness Determination:	January 12, 2006
Date of Initiation of PMP:	March 4, 2006
Reporting Period:	Year 7

3 Revisions to PMP

During Year 7, no revisions were made to the PMP.

4 Material and Process Modifications

During Year 7 of the PMP, there were no material or process modifications made relevant to PCB minimization.

5 Measures to Address Known, Probable and Potential Sources

5.1 Known and Probable Sources

Two known sources of PCBs were identified in PWD's PCB PMP. These were the source water for PWD's Water Treatment Plants (Delaware and Schuylkill Rivers) and the ferric chloride supplied to PWD by DuPont and used in the water treatment process. No direct measurement of the PCB concentration in the source water was made during Year 3. With respect to the ferric chloride, during Year 3 of the PMP, PWD switched ferric chloride suppliers and began receiving ferric chloride from Kemira (Chicago) rather than DuPont. During Year 5, PWD obtained a copy of a letter from Vista Analytical Laboratory to Kemira. Lab analysis of Kemira's ferric chloride for coplanar PCBs (which is the same analysis on which the DuPont ferric chloride content was based) gave a result of 28.3 pg/g. Compared to the DuPont concentration of 0.00055 mg/L, this is a ninety-five percent (95%) reduction in PCB content in ferric chloride used by PWD in its water treatment process.

One probable source of PCBs was identified in PWD's PCB PMP. This source is sludge stored in lagoons at both NEWPCP and SWWPCP. Trackdown efforts conducted in the sewersheds of both NEWPCP and SWWPCP included sampling of the lagoons. The data are available in Attachment B of the Year 5 report.

5.2 Potential Sources

Numerous potential sources of PCBs were identified in PWD's PCB PMP. These were identified from databases supplied by EPA, the Philadelphia Fire Department, the Philadelphia Department of Public Health and others. The thirty-one (31) potential sources supplied by the Philadelphia Department of Public Health were identified as sites at which some form of prior PCB remediation had taken place. All thirty-one (31) of these sites were inspected during Year 1 of the PMP.

The remaining potential sources of PCBs, taken from information supplied by EPA and others, were identified as sites on which PCB devices were believed to be present. These sites were separated into three groups by sewershed (NEWPCP, SEWPCP or SWWPCP). Approximately one hundred sixty-seven (167), seventy-three (73) and one hundred fifty-seven (157) sites were listed for NEWPCP, SEWPCP and SWWPCP, respectively. During Year 7 of the PMP, PWD's Industrial Waste Unit inspected twenty-eight (28) of the NEWPCP-related sites, ten (10) of the SEWPCP-related sites and eleven (11) of the SWWPCP-related sites. Several listings were found to be either duplicate listings or non-existent. The exact number of devices removed is uncertain due to the original listing containing no specific information on the number of devices believed to exist at some sites. The results of these inspections are summarized in the Tables, "Inspections of Potential Source Sites" (see Attachment A). The disposal records for some of the sites are not included with this report, but are available.

Table 1 - Known, Probable and Potential Sources and Measures to Address Sources

Source	Source Type: *Known*	Source Type: *Probable*	Source Type: *Potential*	Measure to Address Source
Water Supply (Delaware and Schuylkill Rivers)	X			PCB PMP and action by others
Ferric Chloride used in Water Treatment	X			Switched ferric chloride suppliers
Sludge Lagoons (NEWPCP and SWWPCP)		X		Trackdown for each WPCP calls for sampling and analysis
PCB Device sites in sewershed of each WPCP (see Attachment A, "Inspections of Potential Source Sites")			X	Site inspections, evaluation and followup
Significant Industrial Users			X	Modify permits as warranted
Electric Company (PECO) customers			X	Undetermined. PECO will not share customer information.

6 Incremental and Cumulative Changes from the Baseline Loading

6.1 Loading Baseline

PWD's PCB PMP provides the following baseline loadings (see Section 7, "Tabular Summary):

WPCP	Baseline Loading (mg/day)
NEWPCP	11,510
SEWPCP	7,559
SWWPCP	10,970

These loadings differ from those found in the TMDL. This is because the data are from different sampling events, the PMP baseline loadings are weighted by wet versus dry weather results, the analyses are for different numbers of congeners and there is a difference in analytical methods.

6.2 Baseline Loading Reduction – Direct Measurement

During Year 7, wet-weather effluent sampling for PCBs was performed at each of PWD's three Water Pollution Control Plants (WPCPs), as required by PWD's NPDES permits. See Section 7 ("Tabular Summary") for data.

6.3 Baseline Loading Reduction – Other Measures of Progress

See Attachment A ("Potential Sources and Inspection Findings").

7 Tabular Summary

Facility: Philadelphia Water Department
Contact Information
Name: Peter Pineda
Phone: 215-685-6370
Email: peter.pineda@phila.gov

Date of Completeness Determination: January 12, 2006
Date of Initiation of PMP: March 4, 2006

NPDES No(s).: PA0026689 (Northeast Water Pollution Control Plant, NEWPCP)
PA0026662 (Southeast Water Pollution Control Plant, SEWPCP)
PA0026671 (Southwest Water Pollution Control Plant, SWWPCP)

Cumulative Percent Reductions

Baseline Loading Calculations Date: 2005
Revisions Date: N/A

Year	Loading (milligrams per day)		Estimated Reductions (from baseline) (milligrams per day)		Cumulative Reductions (% from baseline)	
TMDL Estimated Loading (to be added by DRBC)						
Discharger Computed Baseline						
NEWPCP	11,510					
SEWPCP	7,559					
SWWPCP	10,970					
			N/A		N/A	
2007	December 3, 2007		December 3, 2007		December 3, 2007	
NEWPCP	8,594		2,916		25.3	
SEWPCP	4,595		2,964		39.2	
SWWPCP	6,369		4,601		41.9	
2009	March 27, 2009	October 16, 2009	March 27, 2009	October 16, 2009	March 27, 2009	October 16, 2009
NEWPCP	5,846	6,571	5,664	4,939	49.2	42.9
SEWPCP	3,435	4,287	4,124	3,272	54.6	43.3
SWWPCP	7,334	5,690	3,636	5,280	33.1	48.1
2010	April 21, 2010	December 2, 2010 (Dec. 13 for NEWPCP)	April 21, 2010	December 2, 2010 (Dec. 13 for NEWPCP)	April 21, 2010	December 2, 2010 (Dec. 13 for NEWPCP)
NEWPCP	5,490	4,615	6,020	6,895	52.3	59.9
SEWPCP	2,155	2,736	5,404	4,823	71.5	63.8
SWWPCP	2,948	5,027	8,022	5,943	73.1	54.2
2011	September 6, 2011	November 17, 2011	September 6, 2011	November 17, 2011	September 6, 2011	Novermber 17, 2011
NEWPCP	6,224	3,745	5,286	7,765	45.9	67.5
SEWPCP	4,135	1,368	3,424	6,191	45.3	81.9
SWWPCP	10,270	4,280	700	6,690	6.4	61.0
2012	June 13, 2012	October 16, 2012	June 13, 2012	October 16, 2012	June 13, 2012	October 16, 2012
NEWPCP	11,189	2,542	321	8,968	2.8	77.9
SEWPCP	5,659	1,296	1,900	6,263	25.1	82.9
SWWPCP	5,766	2,663	5,204	8,307	47.4	75.7
2013	April 20, 2013	October 8, 2013	April 20, 2013	October 8, 2013	April 20, 2013	October 8, 2013
NEWPCP	2,849	2,349	8,661	9,161	75.2	79.6
SEWPCP	2,803	2,599	4,756	4,960	62.9	65.6
SWWPCP	3,673	3,040	7,297	7,930	66.5	72.3

Measures

Description	Date Initiated	Date Completed	Comments/Status:
SEWPCP Phase 2 Trackdown Sampling	October 17, 2006	October 20, 2006	Complete
NEWPCP Phase 1 Trackdown Sampling	November 3, 2010	November 4, 2010	
NEWPCP Phase 2 Trackdown Sampling	January 26, 2012	January 27, 2012	
SWWPCP Phase 1 Trackdown Sampling	October 12, 2011	October 13, 2011	
SWWPCP Phase 2 Trackdown Sampling	February 23, 2012	February 24, 2012	
Inspections of "Potential Source" sites	March 4, 2006	April 2011	363 Completed
Inspections of "Potential Source" sites (Phila. Health Dept. list)	October 30, 2006	March 21, 2007	31 of 31 Completed

Monitoring

Sample Location	Date of Sample Collection	Date Results Received	Total PCBs (pg/l)	Penta-PCBs (pg/l)
SEWPCP Phase 2 Trackdown Sampling	October 17-20, 2006	May 1, 2007		
NEWPCP, SEWPCP & SWWPCP effluent	December 2-3, 2007	March 28, 2008		
NEWPCP			13,709	2340
SEWPCP			13,580	2233
SWWPCP			7,362	1,314
NEWPCP, SEWPCP & SWWPCP effluent	March 27, 2009	May 29, 2009		
NEWPCP			4,047	850
SEWPCP			1,593	373
SWWPCP			8,866	1,474
NEWPCP, SEWPCP & SWWPCP effluent	October 16, 2009	December 23, 2009		
NEWPCP			5,924	1,238
SEWPCP			3,797	711
SWWPCP			4,612	886
NEWPCP, SEWPCP & SWWPCP effluent	April 21, 2010	June 18, 2010		
NEWPCP			6,746	1,629
SEWPCP			5,322	1,114
SWWPCP			3,623	729
NEWPCP, SEWPCP & SWWPCP effluent	December 2, 2010	January 31, 2011		
NEWPCP	(December 13, 2010)		5,671	1,379
SEWPCP			6,755	1,348
SWWPCP			6,177	1,110
NEWPCP, SEWPCP & SWWPCP effluent	September 6, 2011	October 25, 2011		
NEWPCP			7,646	1,624
SEWPCP			10,206	1,723
SWWPCP			12,385	1,911
NEWPCP, SEWPCP & SWWPCP effluent	November 17, 2011	January 13, 2012		
NEWPCP			4,600	1,159
SEWPCP			3,376	635
SWWPCP			5,162	997
NEWPCP, SEWPCP & SWWPCP effluent	June 13, 2012	Juyl 24, 2012		
NEWPCP			13,745	2,057
SEWPCP			13,968	2,954
SWWPCP			6,954	1,331
NEWPCP, SEWPCP & SWWPCP effluent	October 16, 2012	November 30, 2012		
NEWPCP			3,123	791
SEWPCP			3,198	595
SWWPCP			3,211	558
NEWPCP, SEWPCP & SWWPCP effluent	April 20, 2013	May 29, 2013		
NEWPCP			3,500	806
SEWPCP			6,918	1,566
SWWPCP			4,429	932
NEWPCP, SEWPCP & SWWPCP effluent	October 8, 2013	January 20, 2014		
NEWPCP			2,886	669
SEWPCP	(November 27, 2013)		6,414	1,204
SWWPCP			3,666	757

Attachment A

Potential Sources and Inspection Findings

Loc ID	Name	Address	Location	Contact	Equipment	Number	Aroclor	Conc	Gallons		Insp Date
NE-36	PWD	9001 STATE RD	BAXTER WTP	Jim Cantz	transformers	1			155	Located outside Post Bld. In fenced area. Secure. Labeled <50ppm.	7/8/2013
NE-11	Posel Corporation	9381 Krewstown Road	By Fitness Center	Rosa Corrado	Transformer	1		<50 ppm		Located on side of fitness center. In good condition. No leaks.	4/10/2013
NE-12	Posel Corporation	9381 Krewstown Road	Behind Shopping Ctr. By door 23	Rosa Corrado	Transformer	1		<50 ppm		Retrofilled to <50 ppm (Sign fading). Faceplate is not viewable. Good condition. No leaks.	4/10/2013
NE-46	NE SHOPPING CTR	9173 ROOSEVELT BLVD		J.HOLSOPPLE	TRANSFORMER	1		<50	415	In fenced area outside. No leaks. Good Condition. No nearby drains. No Secondary containment. Certified non-PCB	4/1/2013
NE-47	NE SHOPPING CTR	9173 ROOSEVELT BLVD	OFFICE EXTERIOR	J.HOLSOPPLE	TRANSFORMER	1		<50	200	Outside fenced area by Hooters. No leaks in good condition. No nearby drains. No secondary containment.	4/1/2013
NE-84	Wolf Investments	1771 TOMLINSON	WALL EXTERIOR	John Wolf	TRANSFORMER	2				Located outside by auto shop. Fenced area and secure.	4/1/2013
NE-216	Thermacore	2000 Cabot Blvd. suite 150	bld. Rear	David O'Connor	Transformer	1				Transformer looks good, no leaks.	11/7/2013
NE-204	SPD	13500 Roosevelt Blve	transformer room	Dave Urda	Transformer	4	1260/1254	5 to 25 ppm	318x3/345	Secondary Containment, no drains	4/22/2013
NE-206	Perfecseal	9800 Busleton Ave	outside bld rear	Pauline Smith	Transformer	4			3x100/1x720	Drains greater than 100 ft from transformer. No secondary Containment. In fenced area outside.	6/27/2013
NE-217	Phila. Rust Proof	3220 Amber St	Outside	Richard Vezzosi	transformers	2	1260	6/10ppm	40		9/6/2013
NE-218	Phila. Rust Proof	3221 Frankford Ave	Outside	Richard Vezzosi	Transformers	2	1260	12/22ppm	50		9/6/2013
NE-219	Henshell Corp.	2229 N. 19th street	Trans. Rm near Boiler	Kevin Maloney	Transformer	1	1260	407	175	No drains near transformers. No visible leaks.	10/18/2013
NE-220	Henshell Corp.	2229 N. 19th street	Trans. Rm near office	Kevin Maloney	Transformer	2			41	No drains near transformers. No visible leaks.	10/18/2013
NE-221	Abbey Color Inc	400 E. Tioga St	inside trans. Vault	Roger Nielson	Transformer	2			102	Good condition, no leaks.	12/12/2013
NE-211	DELAVAU LLC	10101 roosevelt blvd	East side of Bld	James Hansen	TRANSFORMER	1		<50	258	IN a fenced area, secondary containment	9/3/2013
NE-203	Henshell Corp.	2229 N. 19th street	Outside by Indiana Ave	Kevin Maloney	Transformer	1			240	No drain w/I 10 ft. of transformers. Fenced in area.	10/18/2013
NE-222	Allied Tube and Conduit	11350 Norcom Rd	In Electrical Rm	Donn Carroll	Transformer	4	Interteen			Over a pit that has a sump pump.	5/2/2013
NE-226	Newman Paper	6101 Tacony St	outdoor	Michael Freeman	transformer	4			2x100/90/465	Outside in fenced area. Drains >50 ft away. Good condition, no leaks.	10/1/2013
NE-227	Kinder-Morgan	3300 N. Delaware Ave	outdoors	Don Krain	transformer	1	silicone		162	Transformer is in a secure location. Facility has restricted access. Good condition, no leaks.	9/6/2013
NE-228	Kinder-Morgan	3300 N. Delaware Ave	in boiler rm	Don Krain	Capacitor	1					9/6/2013
NE-229	SPS Technologies	301 Highland Ave	elevated throughout plant	Steve Pierce	Transformer	multiple				In good condition. No Leaks.	11/25/2013
NE-230	Hillock	7363A Tulip St	electrical room	John Hillock	Transformer	3	hi flash pt			New transformers installed about 2012. Good Condition. Drains in room.	3/20/2013
NE-223	Dickler	4201 Torresdale Ave		Ken Hamel	Capacitors	6		<2		No drains near capacitors.	5/16/2013
NE-231	Philadelphia Rust Proof	3225 Frankford Ave	outside Bank#3	Richard Vezzosi	transformers	2	mineral	0	50	Secondary Containment. Not retrofilled. No PCB content detectable	9/30/2013
NE-232	Cardone	5660 Rising Sun Ave	electrical rm	Glen Dipalentino	transformer	1	mineral		283	n vault, no drain. Good condition. No leaks	9/17/2013
NE-10	HONEYWELL	Margeret & Bermuda Sts	Cooling Tower 4	Paul Persing	205-807-8442	2	mineral oil		305	Located outside. Good condition. No Leaks	10/21/2013
NE-20	HONEYWELL	Margeret & Bermuda Sts	Cooling Tower 3	Paul Persing	205-807-8442	1	mineral oil		215	Located outside. Good condition. No Leaks	10/21/2013
NE-27	HONEYWELL	Margeret & Bermuda Sts	Cooling Tower 5	Paul Persing	205-807-8442	1	RLS Oil		248	Located outside. Good condition. No Leaks	10/21/2013
SW-205	Biosolids	7800 Penrose Ferry		Amy Szor	Transformer	1			325	Located next to admin bld. Retrofilled. In locked cabinet outside	9/16/2013
SW-208	McNeill	7050 Camp Hill Rd	WWTP	Kristen Egan	Transformer	1		Non Detect	135	On concrete pad by wwplant. No Secondary Containment	11/5/2013
SW-200	Grovers Market	70th and Grovers	Shop. Ctr. Rear		Transformer	3		<50ppm		Located outside in fenced area. Labeled as <50ppm. Transformers corroded at bottom. Staining on concrete, but no leaks visible.	4/5/2013
SW-212	G.J Littlewood	4045 Main Street	Vault	Dave Littlewood	transformer	5			3x50/2x75	In a vault with blocked drains	5/14/2013

Loc ID	Name	Address	Location	Contact	Equipment	Number	Aroclor	Conc	Gallons		Insp Date
SW-204	STARLITE	1111 LANCASTER AVE	1st Floor Trans rm	Jay Rosenbluth	Transformer			>50		No leaking. In Trans Vault. Drains plugged	10/16/2013
SW-214	Sun Chemical	3301 Hunting Park Ave	Boiler Room	LEE OCHAL	Capacitor	4	interteen		1.2	Good condition, no leaks. Owner performs quarterly inspections.	6/19/2013
SW-215	SUN CHEMICAL	3301 Hunting Park Ave	outdoor	LEE OCHAL	Transformer	1			160	Located outside in locked cabinet. No visible leaks.	6/19/2013
SW-216	Plains Products	3400 S. 67th Street	outdoor	Steven Sontag	Transformer	1	10C		187	Located in secure area, restricted access facility. Good condition, no leaks.	10/30/2013
SW-217	Phila. Energy Solutions-Schuykill Tank Farm	70th & Essington Ave	Plant Wide	Jim Disario	Transformers	Several				PES has own PMP for PCBs. Transformers regularly inspected.	10/4/2013
SW-213	Astra Foods	6430 Market St	outside centrifuge bld.	Demitri Poulmento	transformer	2				Near drain. Good condition. No leaks.	10/30/2013
SE-201	Columbia Silk and Dye	1726 N. Howard Street	In vault	Craig Garton	Transformer	2		35		Secondary Containment. Nearby drains.	11/6/2013
SE-212	Nat'l Chemical Laboratories, Inc	401 N. 10th St	transformer vault	Henry Pollack	transformer	4	10C		2x69/2x136	Good condition, no leaks.	10/16/2013
SE-213	JAWS	2148 E. Tucker St		Howard Serrota	capacitor	1				Capacitor is old, dirty, not leaking.	10/17/2013
SE-208	Inolex	2101 Swanson St	Reactor Dock	Dave Olson	Transformer	3		>50		Transformer drain goes to pretreatment system. Inspec	6/6/2013
SE-209	Inolex	2101 Swanson St	Waccocoe St	Dave Olson	Transformer	1		>50		Transformer drain goes to pretreatment system. Inspec	6/6/2013
SE-210	Inolex	2101 Swanson St.	Railroad/Swanson St	Dave Olson	Transformer	1				Transformer drain goes to pretreatment system. Inspec	6/6/2013
SE-211	Inolex	2101 Swanson St	A warehouse	Dave Olson	Transformer	3				Transformer drain goes to pretreatment system. Inspec	6/6/2013
SE-205	ASHLAND	2801 COLUMBUS BLVD	Main outsideprocess bld	Eric Weisbrod	TRANSFORMER	1		<50	370	Outside. On concrete pad.	5/7/2013
SE-206	Ashland	2801 COLUMBUS BLVD	Front Gate	Eric Weisbrod	Transformer	1		<50	300	Has drains nearby. Retrofilled	5/7/2013
SE-207	Ashland	2801 COLUMBUS BLVD	Roof of Bld. 10	Eric Weisbrod	Transformer	1		<50	238	Roof drain is of concern. Labeled non pcb	5/7/2013
SE-204	INOLEX	2101 SWANSON ST	Jackson St	Dave Olson	TRANSFORMER	1				Drain goes to pretreatment system. Inspected monthly	6/6/2013

	Inspections	Reinspections	New Inspections
Northeast	28	9	19
Southwest	10	0	10
Southeast	11	0	11
total	49	9	40

APPENDIX G –
MONITORING LOCATIONS

Page

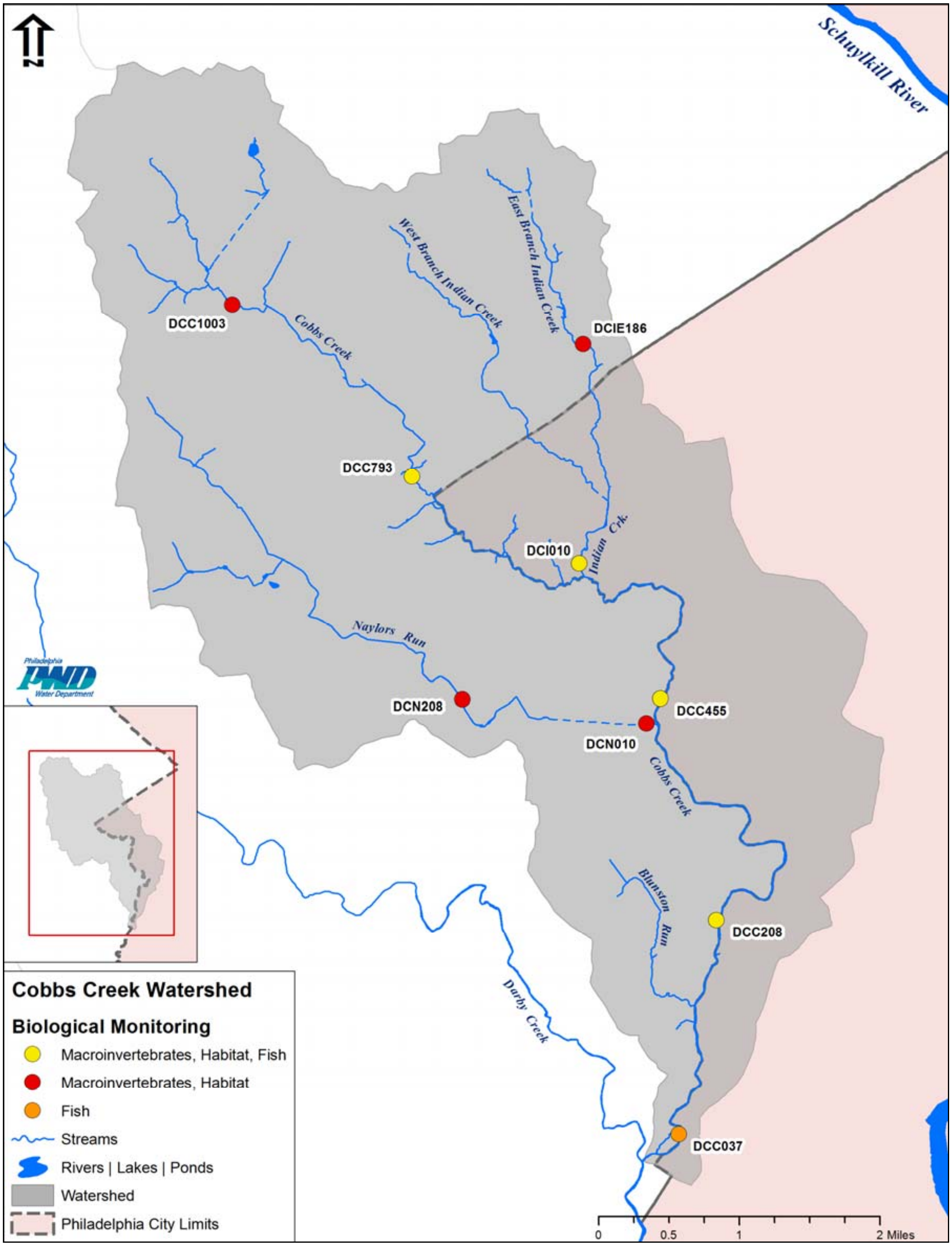


Figure 1 - Biological and Physical assessment locations in Cobbs Creek Watershed

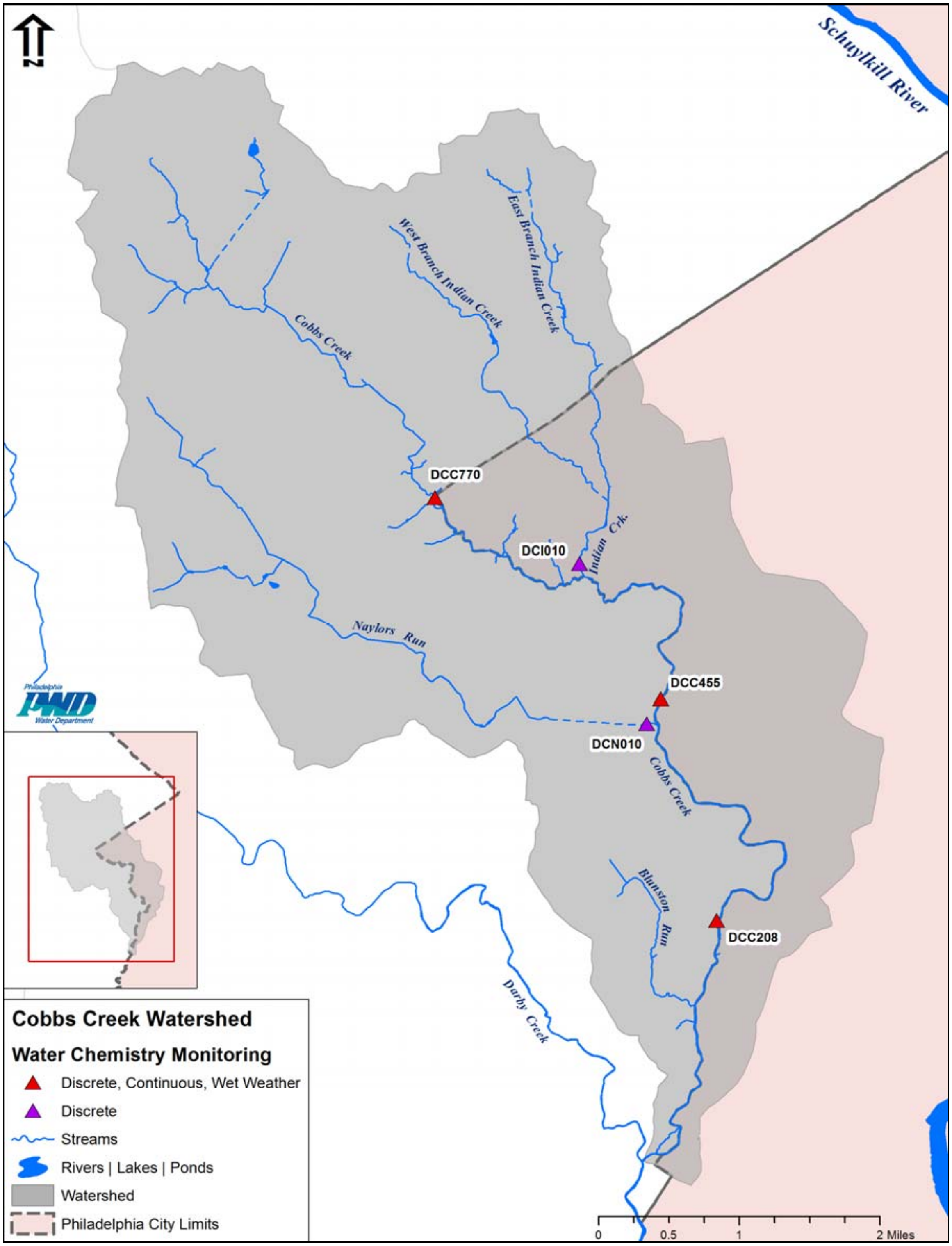


Figure 2 - Chemical monitoring locations in Cobbs Creek Watershed

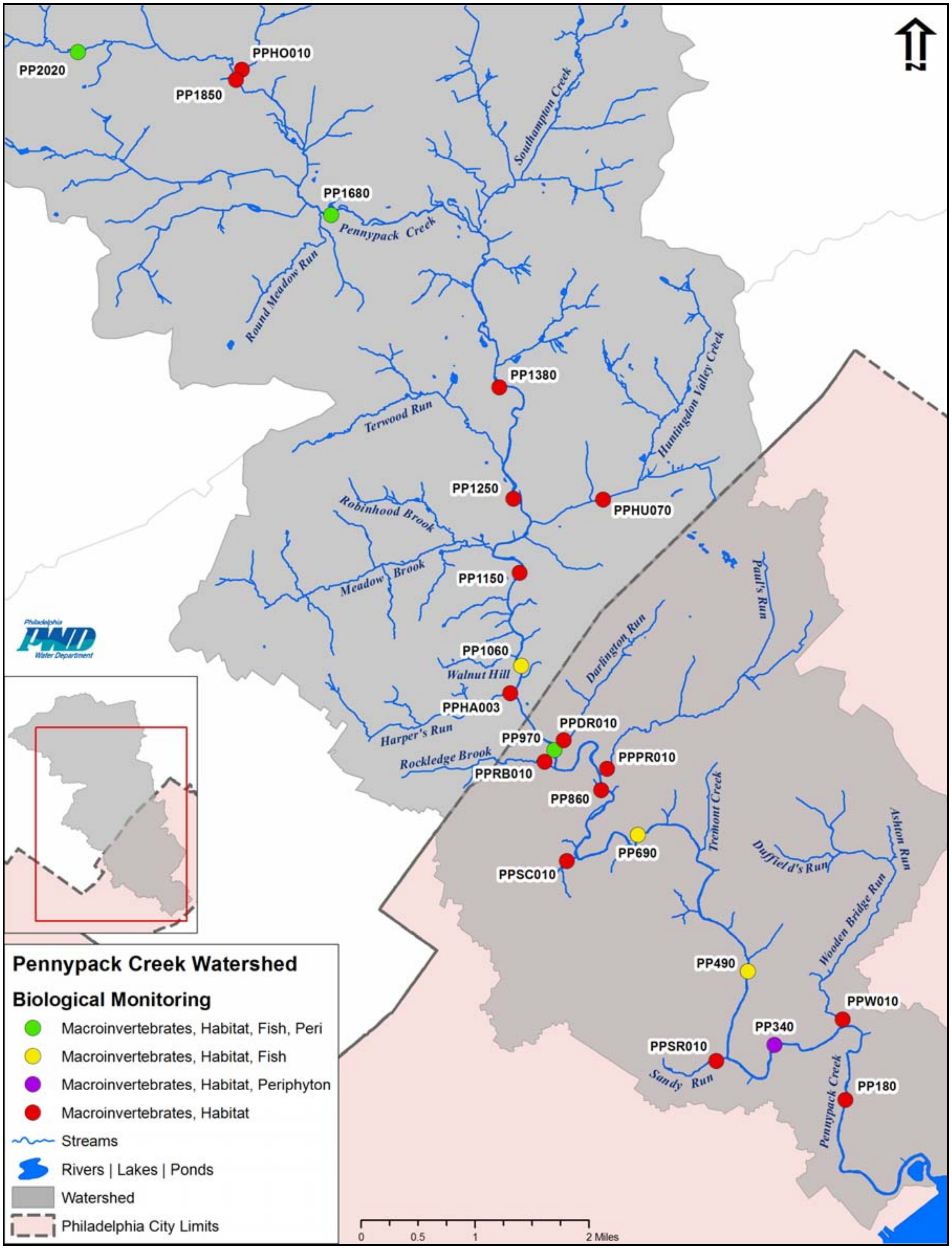


Figure 3 - Biological and Physical assessment locations in Pennypack Watershed

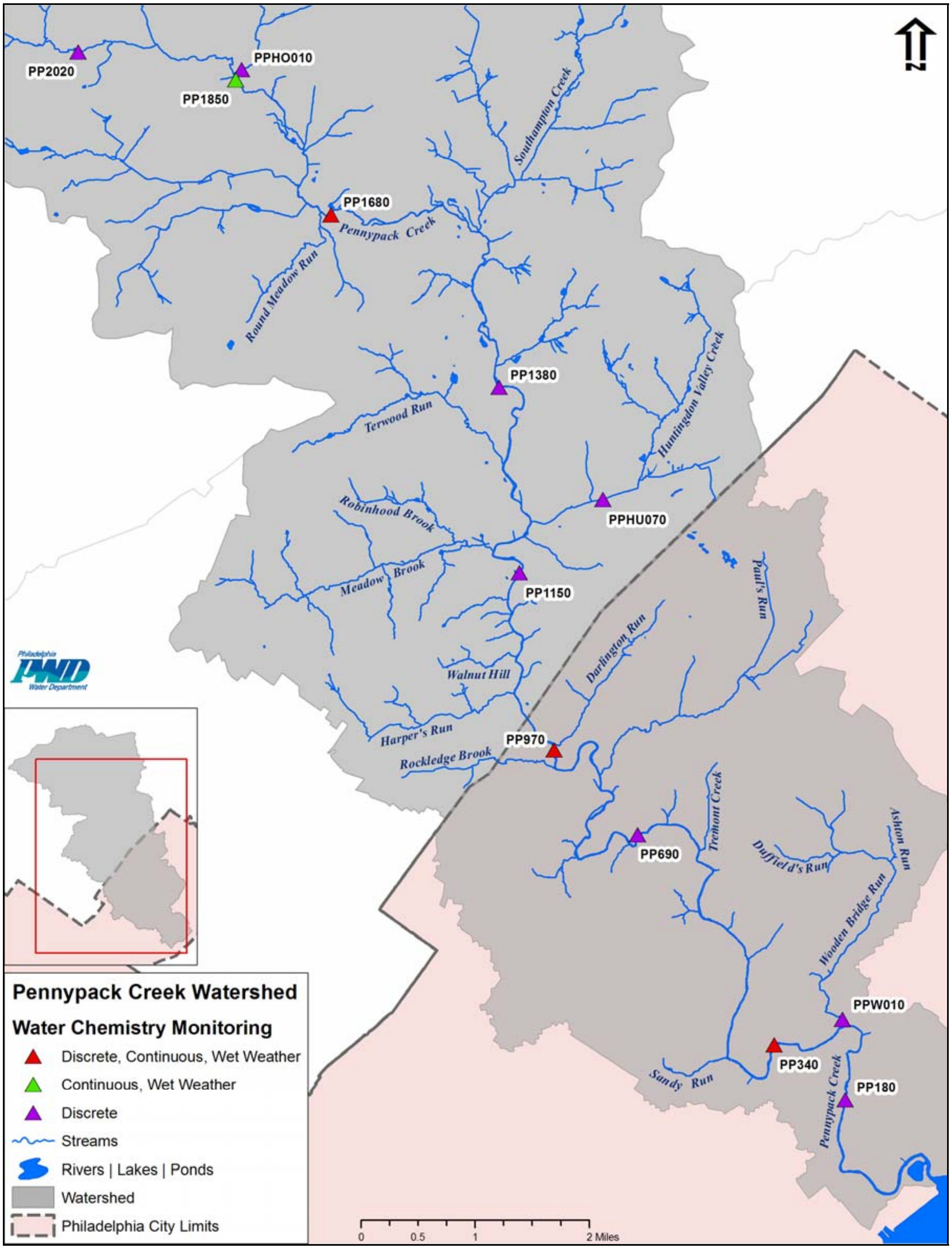


Figure 4 - Chemical monitoring locations in Pennypack Watershed

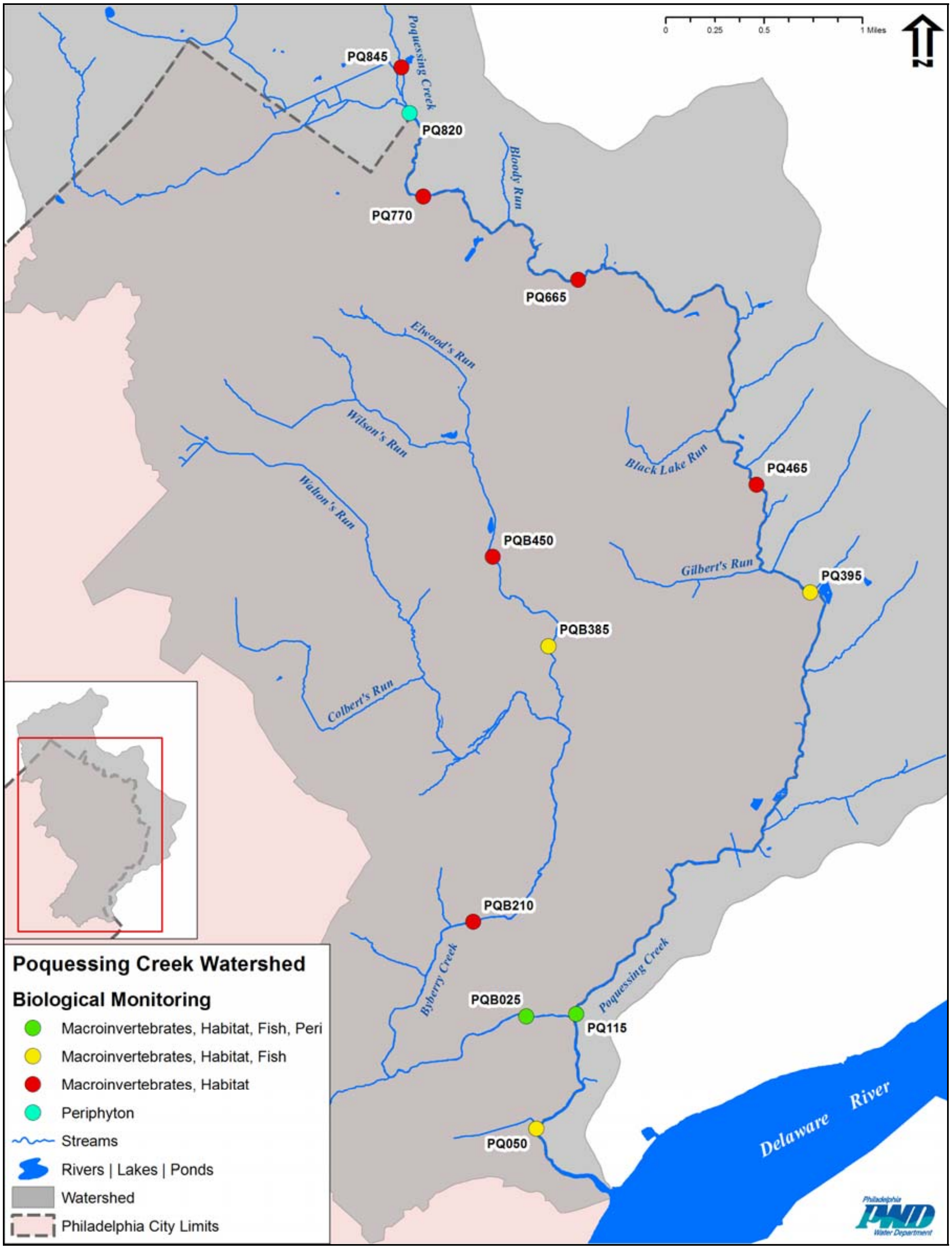


Figure 5 - Biological and Physical assessment locations in Poquessing-Byberry Watershed

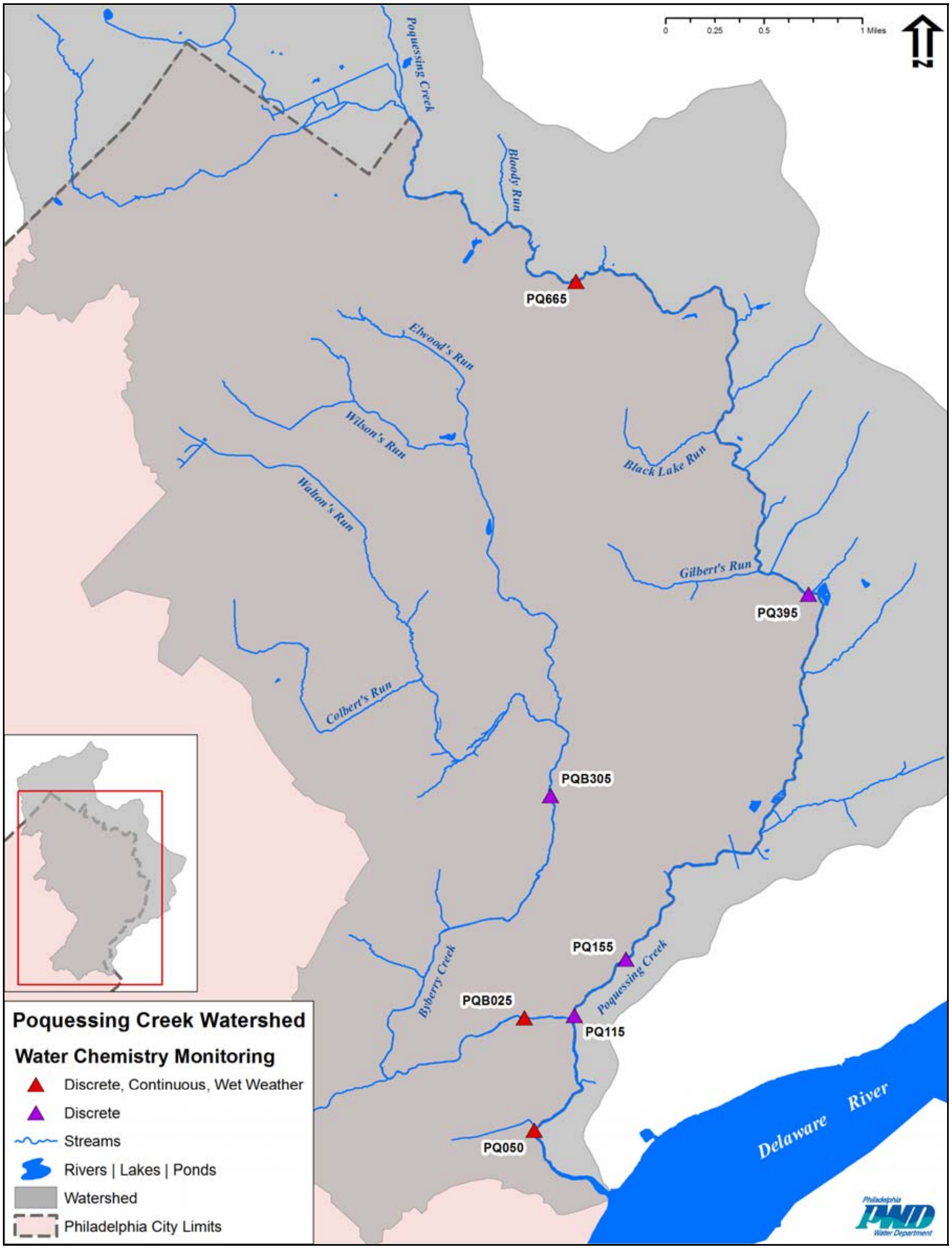


Figure 6 - Chemical monitoring locations in Poquessing-Byberry Watershed

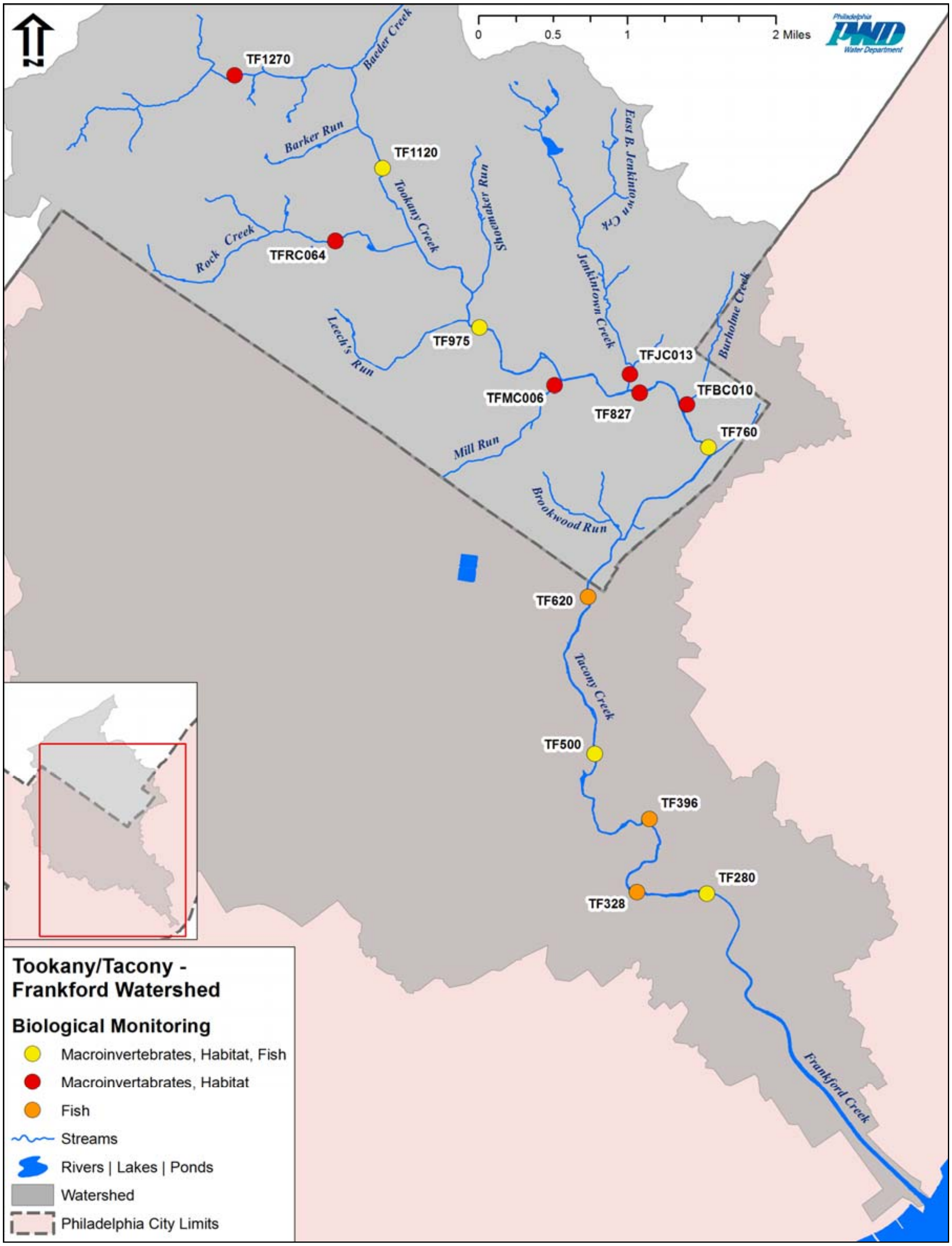


Figure 7 - Biological and Physical assessment locations in Tacony-Frankford Watershed

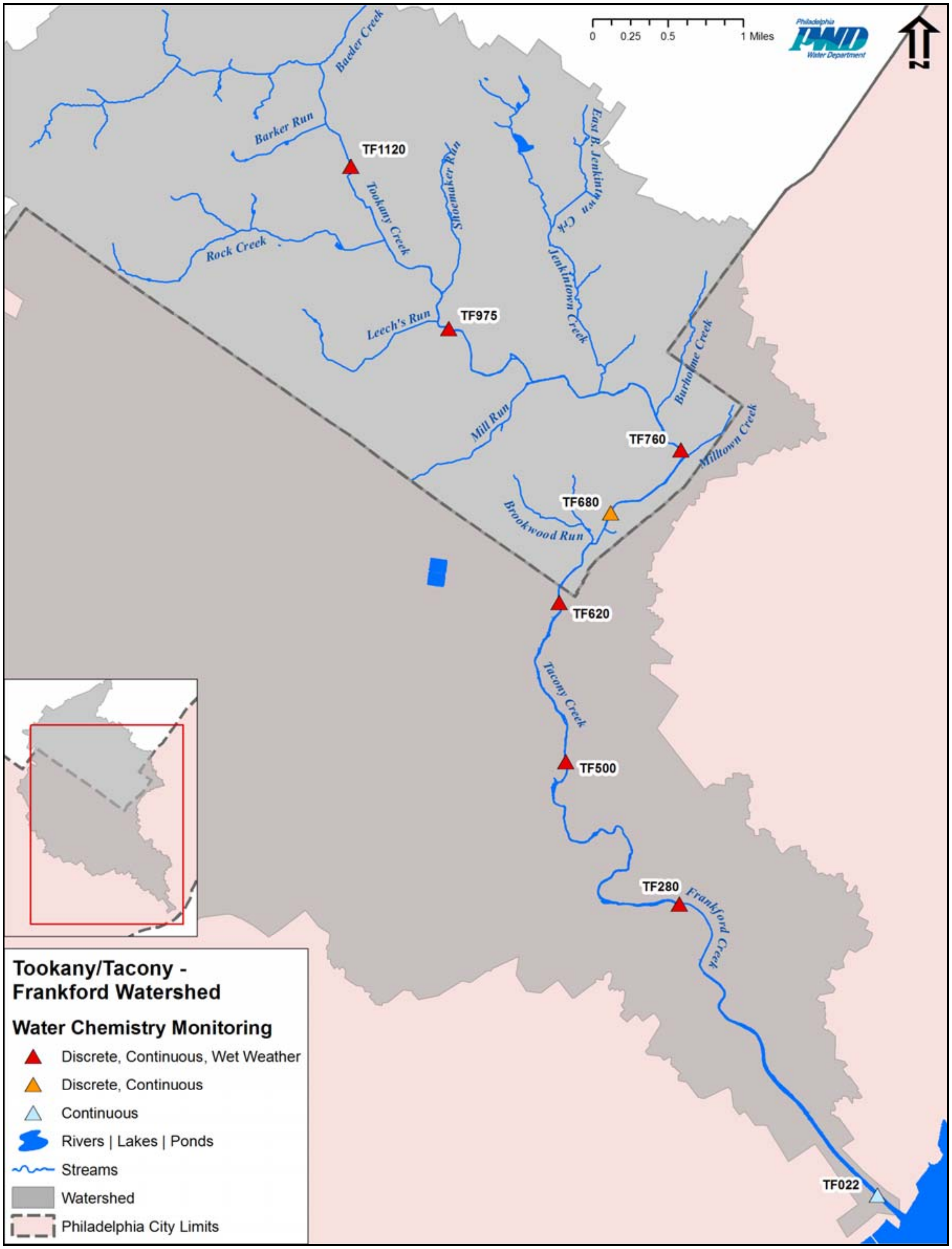


Figure 8 - Chemical monitoring locations in Tacony-Frankford Watershed

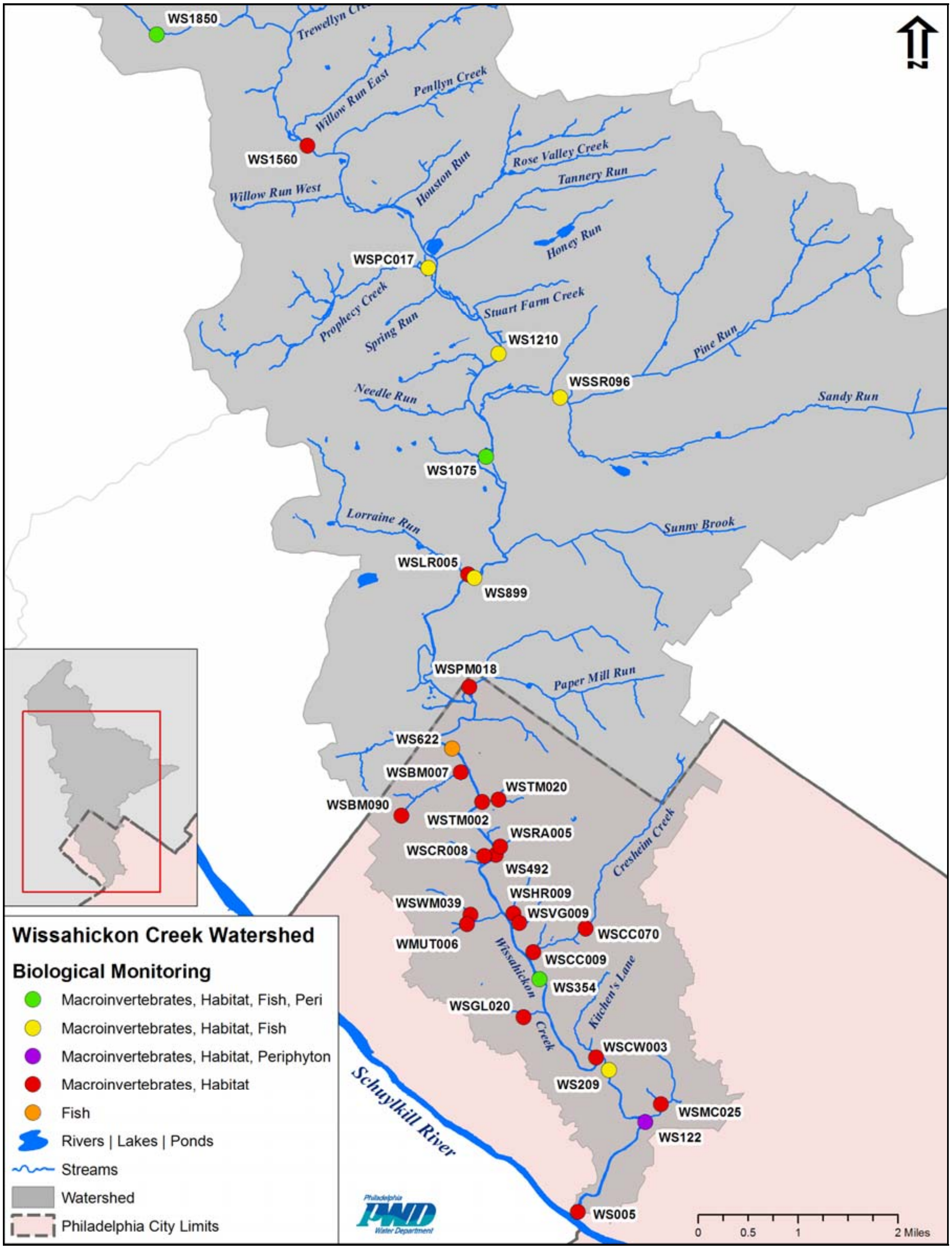


Figure 9 - Biological and Physical assessment locations in Wissahickon Watershed

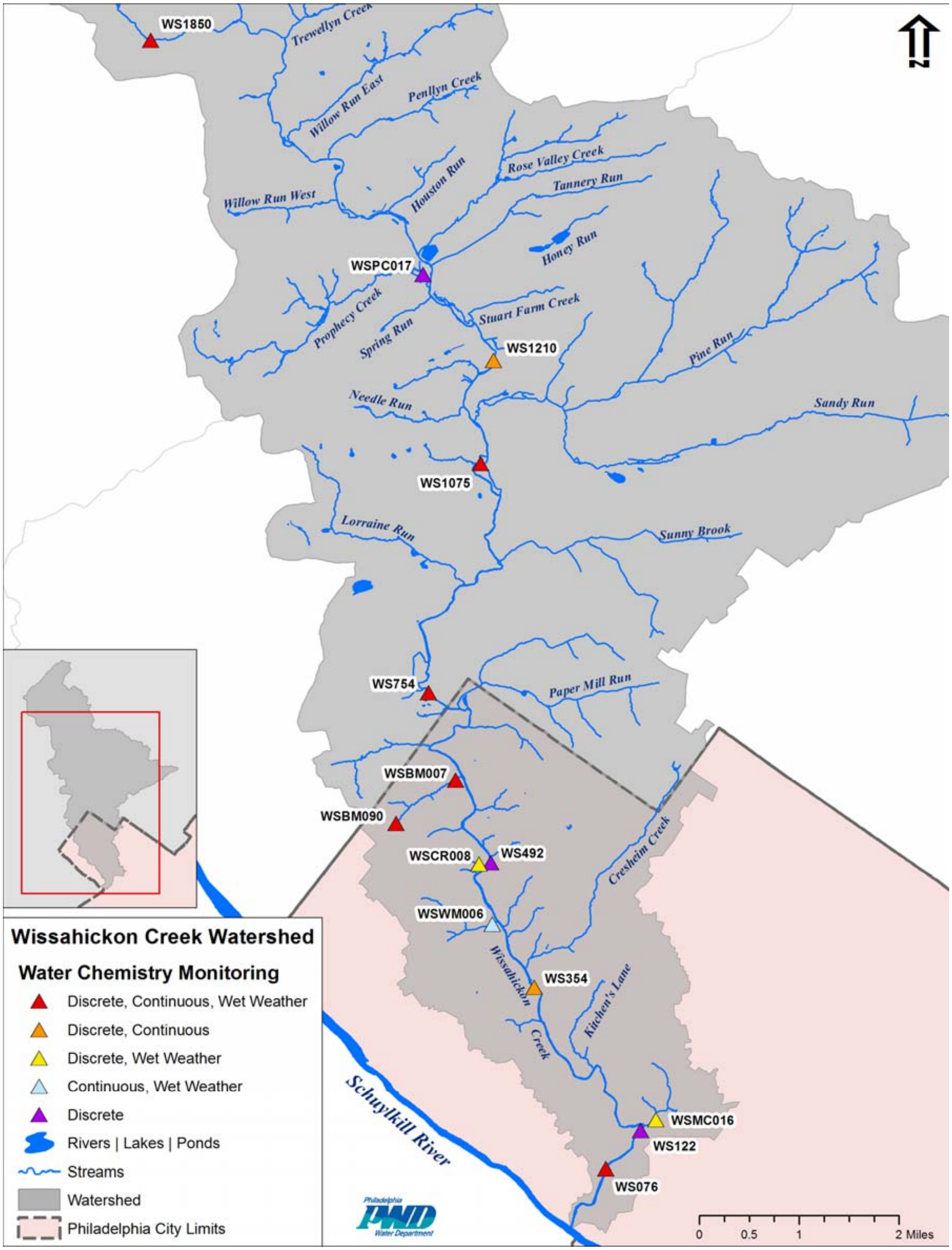


Figure 10 - Chemical monitoring locations in Wissahickon Watershed

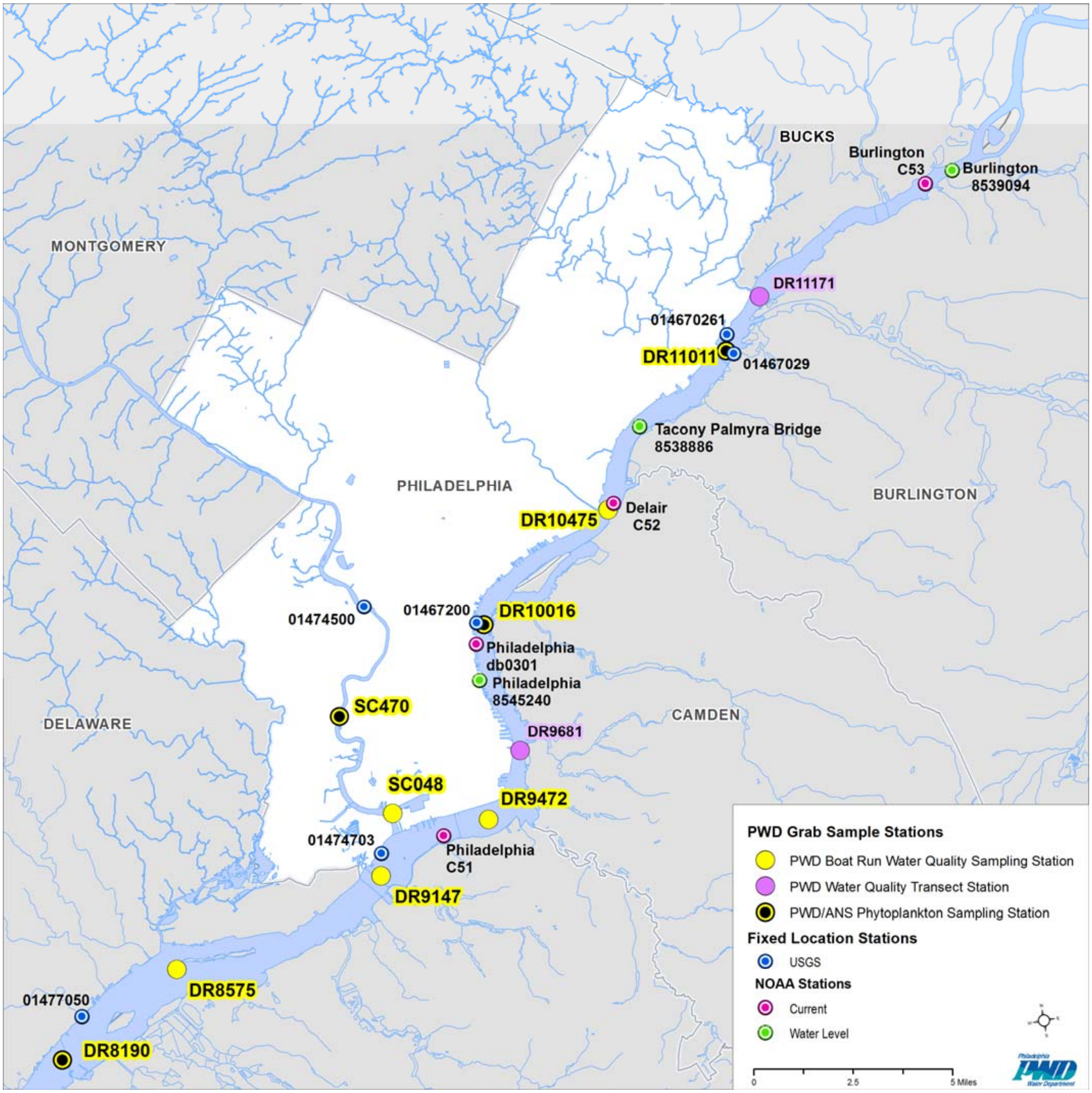


Figure 11 - Chemical monitoring locations in Delaware Estuary and Lower Schuylkill River Watershed

Table - 1 Water Quality Standards and Reference Values

Parameter	**Criterion**	**Water Quality Criterion or Reference Value**	**Source**
Alkalinity	Minimum	20 mg/L	PA DEP
Aluminum	Aquatic Life Acute Exposure Standard	750 ug/L	PA DEP
Aluminum	Aquatic Life Chronic Exposure Standard	87 ug/L (pH 6.5-9.0)	53FR33178
Chlorophyll a	Reference reach frequency distribution approach for Ecoregion IX, subregion 64, 75th percentile	3 ug/L, (Spectrophotometric) ***	EPA 822-B-00-019
Dissolved Cadmium	Aquatic Life Acute Exposure Standard	0.0043 mg/L*	PA DEP
	Aquatic Life Chronic Exposure Standard	0.0022 mg/L*	PA DEP
	Human Health Standard	0.010 mg/L*	PA DEP
Dissolved Chromium	Aquatic Life Acute Exposure Standard	0.015 mg/L*	PA DEP
	Aquatic Life Chronic Exposure Standard	0.010 mg/L*	PA DEP
Dissolved Copper	Aquatic Life Acute Exposure Standard	0.013 mg/L *	PA DEP
	Aquatic Life Chronic Exposure Standard	0.0090 mg/L *	PA DEP
	Human Health Standard	1000 mg/L	PA DEP
Dissolved Iron	Maximum	0.3 mg/L	PA DEP
Dissolved Lead	Aquatic Life Acute Exposure Standard	0.065 mg/L *	PA DEP
	Aquatic Life Chronic Exposure Standard	0.025 mg/L *	PA DEP
	Human Health Standard	50 mg/L	PA DEP
Dissolved Zinc	Aquatic Life Acute Exposure Standard	0.120 mg/L *	PA DEP
	Aquatic Life Chronic Exposure Standard	0.120 mg/L *	PA DEP
	Human Health Standard	5000 mg/L	PA DEP
Dissolved Oxygen	Average Min (August 1 to February 14)	5 mg/L	PA DEP
	Instantaneous Min (August 1 to February 14)	4 mg/L	PA DEP
	Average Min (February 15 to July 31)	6 mg/L	PA DEP
	Instantaneous Min (February 15 to July 31)	5 mg/L	PA DEP

Parameter	**Criterion**	**Water Quality Criterion or Reference Value**	**Source**
Fecal Coliform	Maximum	200/100mL (Swimming season) or 2000/100mL (Non-swimming season)	PA DEP
Fluoride	Maximum	2.0 mg/L	PA DEP
Iron	Maximum	1.5 mg/L	PA DEP
Manganese	Maximum	1.0 mg/L	PA DEP
NH3-N	Maximum	pH and temperature dependent	PA DEP
NO2-3-N	Nitrates – Human Health Consumption for water + organisms	2.9 mg/L ***	EPA 822-B-00-019
NO2 + NO3	Maximum (Public Water Supply Intake)	10 mg/L	PA DEP
Periphyton Chl-a		Ecoregion IX – 20.35 mg/m2	EPA 822-B-00-019
pH	Acceptable Range	6.0 - 9.0	PA DEP
TDS	Maximum	750 mg/L	PA DEP
Temperature		Varies w/ season. **	PA DEP
TKN	Maximum	0.675 mg/L ***	EPA 822-B-00-019
TN	Maximum	4.91 mg/L ***	EPA 822-B-00-019
TP	Maximum	140 ug/L ***	EPA 822-B-00-019
TSS	Maximum	25 mg/L	Other US states
Turbidity	Maximum	8.05 NTU ***	EPA 822-B-00-019
* - Water quality standard requires hardness correction; value listed is water quality standard calculated at 100 mg/L CaCO3 hardness			
** - Additionally, discharge of heated wastes may not result in a change of more than 2°F during a 1-hour period.			
*** - Ecoregion IX, subregion 64 seasonal median			

Appendix H –

PWD Quarterly Dry Weather Water Quality Monitoring Program

Background

In 2009, the Philadelphia Water Department (PWD) initiated a dry weather water quality sampling program designed to work in tandem with the continuous data collection efforts of the PWD/USGS Cooperative Continuous Water Quality Monitoring Program. Grab samples are collected from 10 sites covering all six of Philadelphia County's watersheds on a quarterly basis by the staff of PWD's Bureau of Laboratory Services (BLS). Data collected through this program are most pertinent to Target A (Dry Weather Water Quality & Aesthetics) of PWD's Integrated Watershed Management Plan (IWMP) Strategy, as outlined in the following section.

The IWMP Target Strategy

IWMPs are designed to meet the goals and objectives of numerous water resources-related regulations and programs. Each IWMP results in a series of implementation recommendations that utilize adaptive management approaches to achieve measurable, watershed-wide benefits. By working with stakeholder groups to prioritize goals and evaluate options, PWD has learned that stakeholder priorities can at times differ from those identified by the data-driven problem identification process. This can present challenges in development and approval of a management alternative for watershed implementation. PWD has developed an approach that addresses what often emerges as a set of high-priority stakeholder concerns while simultaneously addressing the scientifically defined priorities.

By defining three distinct targets to meet the overall plan objectives, priorities identified by stakeholders can be addressed simultaneously with those identified through scientific data. Two of the targets were defined so they could be fully met through implementation of a limited set of options, while the third target would be best addressed through an adaptive management approach. In addition to the three targets, a fourth category has been developed to capture the more programmatic implementation options related to planning, outreach, reporting and continuation of the Watershed Partnership.

Targets are defined here as groups of objectives that each focus on a different problem related to the urban stream system. They can be thought of as different parts of the ultimate goal of fishable and swimmable waters through improved water quality, more natural flow patterns and restored aquatic and riparian habitat. Targets are specifically designed to help focus plan implementation. By defining these targets, and designing alternatives and an implementation plan to address the targets simultaneously, the plan will have a greater likelihood of success. It also achieves some of the objectives within a relatively short time frame, providing incentives to the communities and agencies involved in the restoration, as well as immediate benefits to the people living in the watershed. PWD's IWMP planning targets are defined below:

3 Targets of the IWMP

- Aesthetically appealing, accessible streams during dry weather
- Improved stream habitat for fish and macroinvertebrates
- Wet weather water quality that meets fishable and swimmable criteria

Program Support

A number of implementation options deemed appropriate for a given watershed are “programmatic” in nature. While these options may support achievement of Targets A, B, and/or C, implementation of these options alone would not result in achievement of a particular target. These “Program Support” associated options include items such as monitoring, reporting, feasibility studies, outreach/education, and continuation of the Watershed Partnership.

Target A: Dry Weather Water Quality and Aesthetics

Streams should be aesthetically appealing (look and smell good), accessible to the public, and an amenity to the community. Target A was defined with a focus on eliminating sources of sewage discharge and other pollution during dry weather, along with trash removal and litter prevention. Access and interaction with the stream during dry weather has the highest priority, because dry weather flows occur about 60-65% of the time during the course of a year. These are also the times when the public is most likely to be near or in contact with the stream. In dry weather, stream water quality should be similar to background concentrations in groundwater, particularly with respect to bacteria.

Figure 1. Eroded stream bank at Poquessing Creek

Target B: Healthy Living Resources

Improvements to the number, health, and diversity of benthic macroinvertebrate and fish species need to focus on habitat improvement and the creation of refuges for organisms to avoid high velocities during storms. Fluvial geomorphological studies, wetland and streambank restoration/creation projects, and stream modeling should be combined with continued biological monitoring to ensure that correct procedures are implemented to increase habitat heterogeneity within the aquatic ecosystem.

Improving the ability of an urban stream to support viable habitat and fish populations focuses primarily on the elimination or remediation of the more obvious impacts of urbanization on the stream. These include loss of riparian habitat, eroding and undercut banks, scoured streambed or excessive sediment deposits, channelized and armored stream sections, trash buildup, and invasive species. Thus, the primary tool to accomplish Target B is stream restoration.

Target C: Wet Weather Water Quality and Quantity

The third target is to restore water quality to meet fishable and swimmable criteria during wet weather. Improving water quality and flow conditions during and after storms is the most difficult target to meet in the urban environment. During wet weather, extreme increases in streamflow are common, accompanied by short-term changes in water quality. Where water quality and quantity problems exist, options may be identified that address both. Any stormwater management practice that increases infiltration or detains flow will help decrease the frequency of damaging floods; however, the size of such structures may need to be increased in areas where flooding is a major concern. (Reductions in the frequency of erosive flows and velocities will also help protect the investment in stream restoration made as part of Target B.)

Target C must be approached somewhat differently from Targets A and B. Full achievement of this target means meeting all water quality standards during wet weather, as well as elimination of flood-related issues.

Meeting these goals will be difficult. It will be expensive and requires a long-term effort. A rational approach to achieve this target includes stepped implementation with interim goals for reducing wet weather pollutant loads and stormwater flows, along with monitoring for the efficacy of control measures.

Monitoring Locations

Water quality samples are taken at 10 USGS gage sites in the USGS/PWD Cooperative Monitoring Program (Figure 2). Site identification codes used by PWD's Bureau of Laboratory Services (BLS)

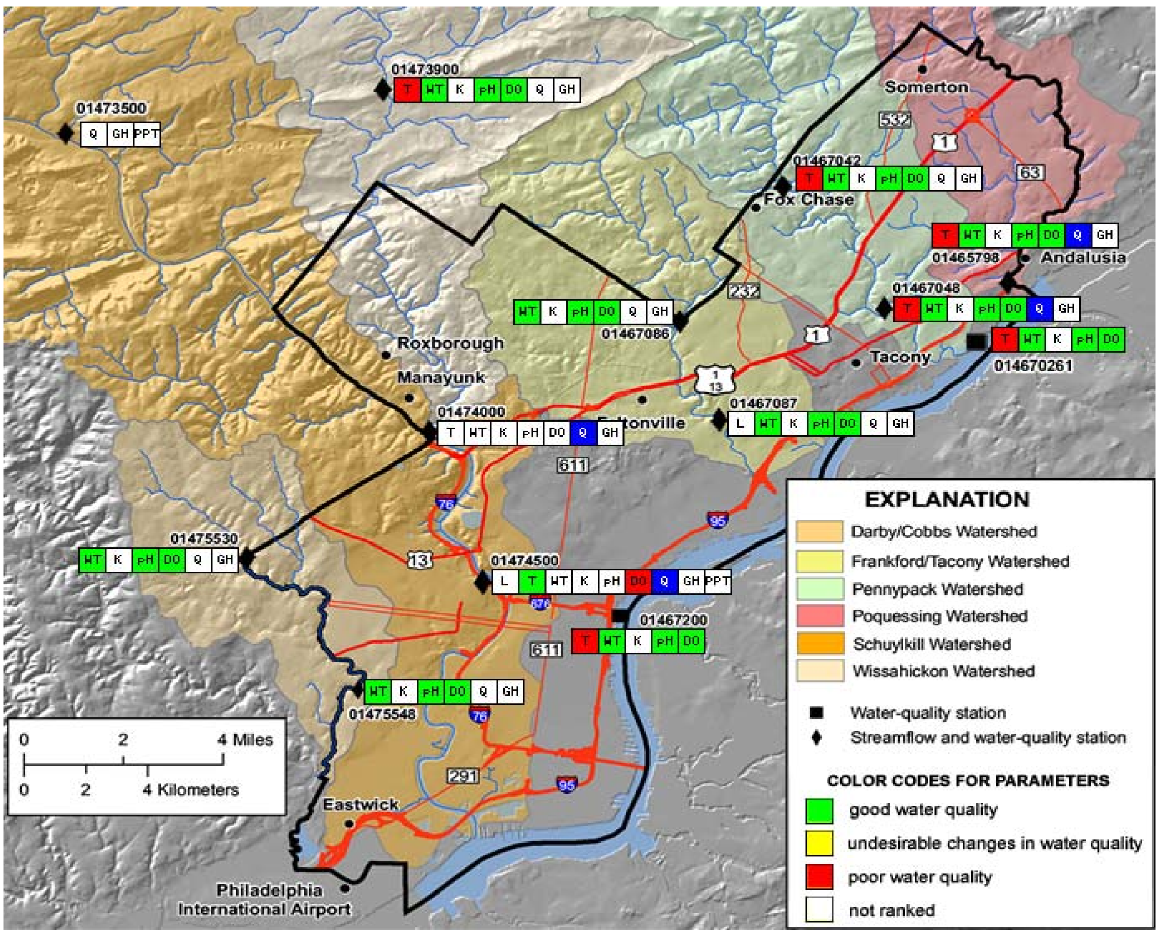


Figure 2. Philadelphia Water Quality Gage Stations as Viewed on Cooperative USGS-PWD Website (http://pa.water.usgs.gov/pwd/).

and rivermile-based site ID codes are presented alongside USGS gage station numbers in Table 1. USGS stream gaging stations are ideal monitoring points as they allow discrete sample data to be coupled with continuous discharge data being collected year-round at these sites for loading estimate purposes. Furthermore, grab sample results and field meter readings taken at the time of grab sampling may be invaluable when evaluating continuous water quality data from these USGS gages.

PWD is implementing a City-wide approach to dry weather water quality monitoring, rather than focusing on an individual watershed. Because a number of Green Stormwater Infrastructure (GSI) and other stormwater management projects are in the early stages of implementation, water quality benefits will only be observable over a period of several years.

Gauging the success of such projects on a more immediate scale is best accomplished solely by hydrological analysis. Therefore, the strategic value of the widespread sampling approach is that as more GSI projects are completed over the coming years, the water quality data should gradually begin to reflect their positive environmental impacts.

Table 1. Monitoring Locations in the PWD/USGS Cooperative Program with Location IDs used by PWD Bureau of Laboratory Services and River Mile-Based Site IDs.

Description	USGS Gage #	BLS Location ID	Site ID
Cobbs Creek at US Rte. 1 (City Line Ave.)	01475530	COBB700	DCC770
Cobbs Creek at Mt. Moriah Cemetery	01475548	COBB355	DCC251
Schuylkill River at Fairmount Dam	01474500	SCHU154	SC825
Wissahickon Creek at Ft Washington (Rte. 73)	01473900	WISS500	WS1075
Wissahickon Creek at Ridge Ave.	01474000	WISS130	WS076
Tacony Creek at Castor Ave.	01467087	TACO250	TF280
Tacony Creek at Adams Ave.	01467086	TACO435	TF597
Pennypack Creek at Pine Rd.	01467042	PENN407	PP993
Pennypack Creek at Rhawn St.	01467048	PENN175	PP340
Poquessing Creek at Grant Ave.	01465798	POQU150	PQ050

Quarterly Dry Weather Monitoring July 2009 – June 2014

Sample Collection Dates

This report summarizes cumulative results from 21 sets of quarterly grab samples that were collected from June 2009 through June 2014. Samples were categorized by season (winter, spring, summer, fall) as well as according to PA DEP seasonal recreational use water quality criteria for interpretation of microbial sample results (Non-Swimming season or Swimming season) (Table 2). PWD is not aware of any spills, discharges or unusual conditions that would cause misleading results in the water quality data from any of these grab samples.

Table 2. PWD/USGS Quarterly Dry Weather Grab Sample Dates

Sample date	Season	Recreational Use Season
30-Jun-09	summer	Swimming
02-Oct-09	fall	Non-Swimming
17-Dec-09	winter	Non-Swimming
11-Mar-10	spring	Non-Swimming
22-Jun-10	summer	Swimming
15-Sep-10	fall	Swimming
20-Dec-10	winter	Non-Swimming
29-Mar-11	spring	Non-Swimming
27-Jun-11	summer	Swimming
15-Sep-11	fall	Swimming
13-Dec-11	winter	Non-Swimming
20-Mar-12	spring	Non-Swimming
18-Jun-12	summer	Swimming
26-Sep-12	fall	Swimming
02-Jan-13	winter	Non-Swimming
04-Apr-13	spring	Non-Swimming
17-Jul-13	summer	Swimming
26-Sep-13	fall	Swimming
17-Jan-14	winter	Non-Swimming
26-Mar-14	spring	Non-Swimming
17-Jun-14	summer	Swimming

Nutrient Analysis

The macronutrients phosphorus and nitrogen are essential to the growth and overall survival of all plants. However, when occurring in surplus they can be extremely detrimental to aquatic ecosystems, and in turn to the human population that utilizes these water bodies for drinking water and recreational activities such as fishing, boating, and swimming. Elevated nutrient concentrations in rivers and streams can most often be attributed to anthropogenic pollution sources. In these situations, the most common sources of both nutrients are runoff from fertilized lawns/farmland and wastewater discharge.

The most immediate result of excessive nutrient concentrations in any natural water body is excessive plant growth, seen in a variety of growth forms from suspended algae to aquatic macrophytes. As the first step in the process of eutrophication, this unnatural acceleration of aquatic plant growth can start a chain reaction leading to highly adverse effects to that ecosystem. For example, in small shallow streams, unnaturally high densities of algal periphyton can cause pronounced fluctuations in dissolved oxygen and pH and also adversely affect aquatic habitat by forming thick mats of filamentous algae or algal scums on stream substrates. Moreover, alteration of the algal community structure can lead to the proliferation of nuisance taxa, taste and odor problems in the drinking water supply, increased water treatment costs and, in rare cases, production of toxins (*e.g.*, from cyanobacteria blooms). As a result of these direct and indirect responses, streams and rivers can suffer severe impacts to both aquatic biodiversity and human recreational use.

It should be noted that several phosphorus-containing compounds, known as polyphosphates, can be found in the region's waterways, but they are naturally occurring and are present due to the geologic composition of the area. Furthermore, these polyphosphates pose little ecological threat as they are not present in a biologically available form. Only over long periods of time can these compounds be broken down into orthophosphates, which plants and algae can absorb and utilize for growth. Therefore, aside from the relatively minor contributions of the region's geology, the most significant source of orthophosphates in rivers and streams is human-generated pollution. It is for this reason that orthophosphates, along with nitrates, are included as components of this water quality monitoring program. These forms of N and P are readily available to stream producers.

Ammonia, present in surface waters as un-ionized ammonia gas (NH_3) or as ammonium ion (NH_4^+), is produced by deamination of organic nitrogen-containing compounds such as proteins, and also by hydrolysis of urea. In the presence of oxygen, ammonia is converted to nitrate (NO_3^-) by a pair of bacteria-mediated reactions, together known as the process of nitrification. Nitrification occurs quickly in oxygenated waters with sufficient densities of nitrifying bacteria, effectively reducing ammonia concentration, although at the expense of increased NO_3^- concentration. Ammonia is a primary form of nitrogen produced from excretory waste products and other organic material in sewage. Thus, presence of ammonia can be an indicator of sewage pollution. As ammonia is converted to nitrate in oxygenated streams, ammonia is a non-conservative pollution indicator that tends to decrease in concentration with increasing distance from the source of pollution. PA DEP water quality criteria for NH_3 reflect the relationship between stream pH, temperature, and ammonia dissociation. Ammonia toxicity is inversely related to hydrogen ion [H^+] concentration (*e.g.*, an increase in pH from 7 to 8 increases NH_3 toxicity by approximately an order of magnitude). At pH 9.5 and above, even background concentrations of NH_3 may be considered potentially toxic.

Ammonia may be introduced to streams through fertilizers, breakdown of natural organic material, stables and livestock operations, stormwater runoff, and in some cases from more serious anthropogenic sources of untreated sewage such as defective laterals, crossed/illicit connections, and sanitary sewer overflows (SSOs). PWD has established intensive field infrastructure trackdown, infrared photography, sewer camera monitoring, and dye testing programs to identify and correct these problems where and when they occur.

Nutrient Results

Nutrient data collected thus far at each of the sites are generally consistent with the data collected for Comprehensive Characterization Reports (CCRs) prepared for each of the respective watersheds. Five of 10 sites are not affected by treated wastewater discharges and had orthophosphate concentration less than the reporting limit, which was 0.1 mg/L for samples collected in June 2009, 0.09 mg/L for samples collected in March and June 2014, and 0.05 mg/L for the remaining 18 quarterly samples collected to date (Table 3). Conversely, Pennypack and Wissahickon creeks had multiple instances of elevated orthophosphate concentration, which is likely attributable to point source discharge of treated wastewater. Dilution effects were seen between upstream and downstream gages, particularly in the cases of Pennypack and Wissahickon creeks.

Though the Schuylkill River sampling station is downstream from several discharges of treated wastewater, nutrient concentrations are generally smaller than those observed from the Pennypack and Wissahickon creeks, perhaps reflecting the Schuylkill station’s much larger overall watershed size and dilution capacity.

Summary statistics for the orthophosphate samples, including results from the application of the PA DEP Chemistry Statistical Assessments protocol (PA DEP, 2007), are shown in Table 3. Exceedances were evaluated relative to the US EPA (2000) Subecoregion 64 guideline for orthophosphate of 0.02625 mg/L, *i.e.*, the median of the 25th percentile seasonal concentrations. Since the detection limit is greater than the guideline, all non-detected samples were considered "possible exceedances." The nonparametric statistical assessment results show that the locations at Pennypack and Wissahickon creeks, and the Schuylkill River, failed to attain water quality consistent with this guideline. The other locations are classified as needing further evaluation due to the predominance of samples below the detection limit that are all possible exceedances.

Similar examples of wastewater discharge impacts and upstream/downstream dilution have also begun to emerge with regard to the nitrate data that has been collected. The data seem to indicate a trend toward decreased nitrate

Table 3. Orthophosphate Summary Statistics and Assessments. (Concentrations in mg/L)

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances	Possible Exceedances	Assessment
01465798	0.061	0.050	0.020	0.050	0.100	21	21	0	21	Needs more evaluation
01467042	0.435	0.365	0.269	0.140	0.953	20	0	20	0	Non-attaining
01467048	0.309	0.215	0.207	0.096	0.852	21	0	21	0	Non-attaining
01467086	0.061	0.050	0.020	0.050	0.058	21	20	1	20	Needs more evaluation
01467087	0.062	0.050	0.022	0.050	0.117	21	19	2	19	Needs more evaluation
01473900	0.311	0.266	0.134	0.112	0.723	21	0	21	0	Non-attaining
01474000	0.177	0.163	0.073	0.050	0.414	20	2	18	2	Non-attaining
01474500	0.128	0.103	0.076	0.050	0.367	21	4	17	4	Non-attaining
01475530	0.061	0.050	0.020	0.050	0.100	21	21	0	21	Needs more evaluation
01475548	0.061	0.050	0.020	0.050	0.100	21	21	0	21	Needs more evaluation

concentrations during warmer months, which would correspond to the increased uptake of nutrients by plant life during those growing seasons (Figure 4). The only exceptions are the Pennypack and Wissahickon Creek gage sites, which as previously stated are directly impacted by treated wastewater discharge. It should be noted, however, that these statements and observations are in no way conclusive given that the dataset is still relatively limited in size. As this dataset grows in subsequent years, further statistical analysis can be carried out and any apparent patterns or phenomena can be explored.

Summary statistics for the nitrate samples, including results from application of the PA DEP Chemistry Statistical Assessment protocol (PA DEP, 2007), are shown in Table 4. Exceedances were evaluated relative to a) the PA DEP water quality standard for nitrite and nitrate of 10 mg/L, and b) the US EPA (2000) subecoregion 64 guideline for nitrite and nitrate of 0.995 mg/L, *i.e.*, the median of the 25th percentile seasonal concentrations. The nonparametric statistical assessment results show that with respect to the PA DEP standard, all locations were in attainment except the upstream Wissahickon gage. One exceedance at 12 mg/L was observed at that site, and more data is needed to make an evaluation. All sites failed to attain water quality consistent with the US EPA subecoregion-based guideline.

Quarterly dry-weather analysis of ammonia began in the fall of 2011, limiting the size of the current dataset to 13 results per location. PWD laboratory reporting limits for ammonia fluctuated based on the performance of lab analytical equipment with spiked and blank samples. Ammonia concentration detection limits were 0.5 mg/L for the fall 2011 sample set, and the subsequent sample set results had detection limits of 0.1 mg/L. Ammonia concentration exceeded the detection limit in only 19 of the 128 samples: The downstream Tacony site (01467087) most often exceeded the detection limit, and a maximum concentration of 0.317mg/L was observed at the downstream Pennypack site (01467048) in winter 2014. Results are shown in Table 5 and Figure 5.

There were no observed violations of ammonia water quality criteria at any site during this period of dry-weather monitoring. With 109 of the 128 sample results characterized as non-detects due to laboratory reporting limits, ammonia criteria was calculated with corresponding temperature and pH values to determine if possible exceedances existed (i.e., the criteria fell below the detection limit). None of the non-detect samples had the potential to violate water quality criteria.

Table 4. Nitrate Summary Statistics and Assessments. Concentrations are in mg/L.

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances, PADEP	Exceedances, Subecoregion	PADEP Assessment	EPA Subecoregion Assessment
01465798	1.784	1.803	0.420	1.027	2.491	20	0	0	20	Attaining	Non-attaining
01467042	4.501	4.067	0.952	3.200	6.104	18	0	0	18	Attaining	Non-attaining
01467048	3.682	3.370	0.835	2.840	5.346	20	0	0	20	Attaining	Non-attaining
01467086	2.347	2.382	0.411	1.517	2.974	20	0	0	20	Attaining	Non-attaining
01467087	1.959	2.149	0.755	0.609	3.373	20	0	0	20	Attaining	Non-attaining
01473900	5.722	5.008	2.048	3.786	12.039	19	0	1	18	Needs more evaluation	Non-attaining
01474000	3.789	3.700	0.950	1.288	5.770	19	0	0	19	Attaining	Non-attaining
01474500	2.891	2.755	0.452	2.141	3.817	20	0	0	20	Attaining	Non-attaining
01475530	3.093	3.100	0.279	2.489	3.521	20	0	0	20	Attaining	Non-attaining
01475548	2.604	2.677	0.469	1.626	3.280	20	0	0	20	Attaining	Non-attaining

Table 5. Ammonia Summary Statistics and Assessments. Concentrations are in mg/L.

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances
01465798	0.132	0.100	0.111	0.100	0.500	13	10	0
01467042	0.142	0.100	0.115	0.100	0.500	13	12	0
01467048	0.148	0.100	0.121	0.100	0.500	13	10	0
01467086	0.131	0.100	0.111	0.100	0.500	13	13	0
01467087	0.194	0.170	0.118	0.100	0.500	13	4	0
01473900	0.131	0.100	0.111	0.100	0.500	13	13	0
01474000	0.136	0.100	0.121	0.100	0.500	11	11	0
01474500	0.143	0.100	0.112	0.100	0.500	13	10	0
01475530	0.131	0.100	0.111	0.100	0.500	13	13	0
01475548	0.132	0.100	0.111	0.100	0.500	13	12	0

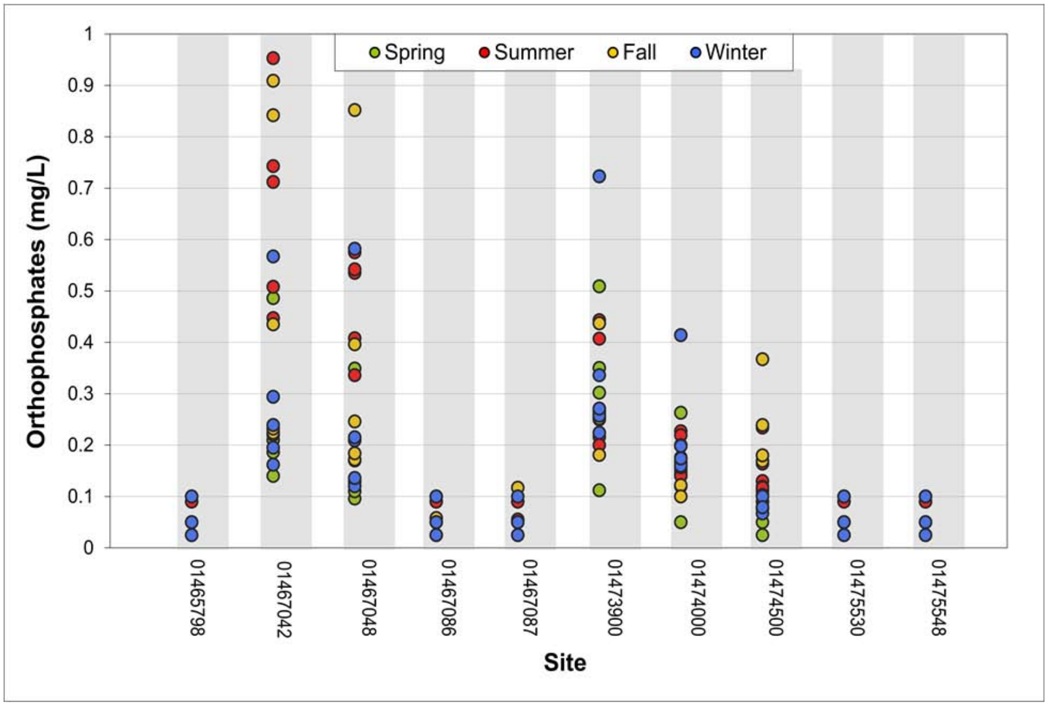


Figure 3. Orthophosphate concentration at 10 USGS gage stations, July 2009-June 2014

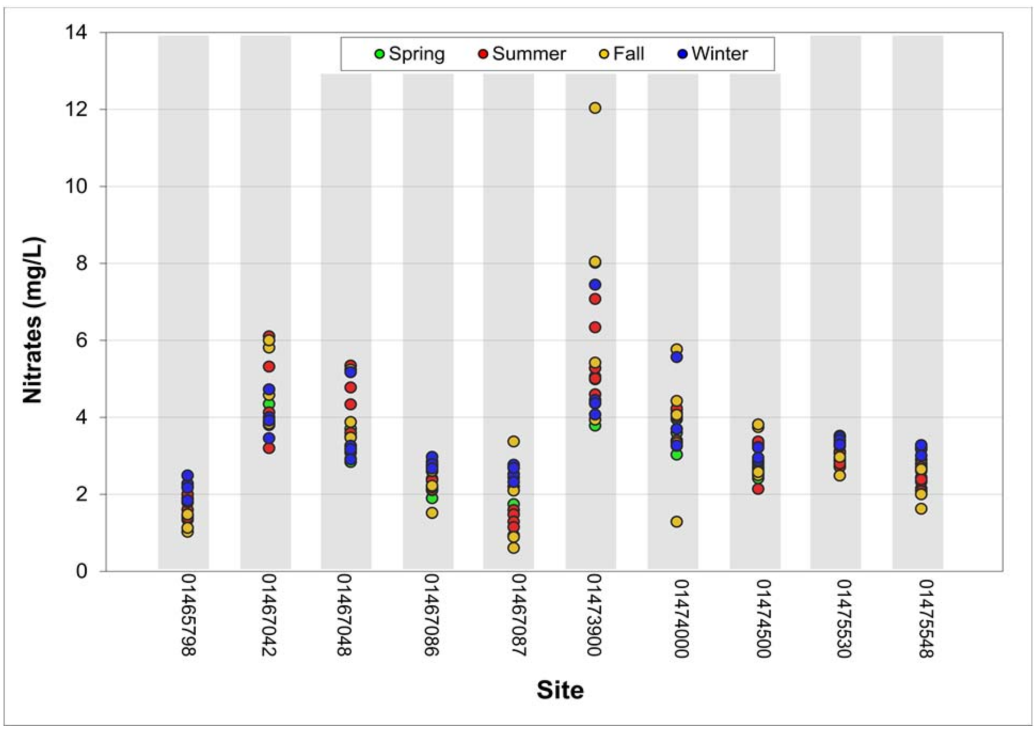


Figure 4. Nitrate concentration at 10 USGS gage stations, July 2009- June 2014

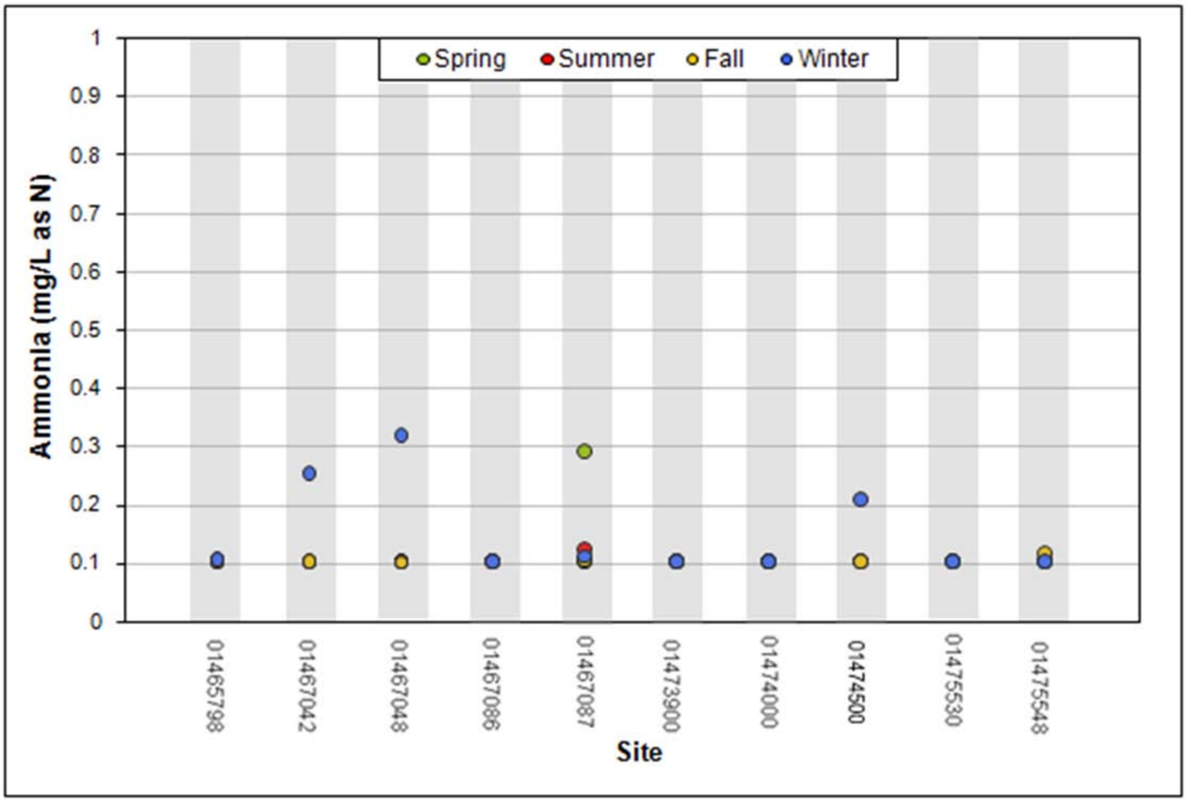


Figure 5. Ammonia concentration at 10 USGS gage stations, September 2011- June 2014

Microbial Analysis

Fecal indicator bacteria, found naturally in the gut of warm-blooded animals, can be used in the detection of human or animal waste contamination in a body of water. While these bacteria themselves are generally harmless to humans, they are considered to be very reliable indicators of the presence of other, more serious fecal-borne pathogens such as viruses, protozoa and other bacteria. The extent to which a water body is contaminated with fecal indicator bacteria can indicate the likelihood that the water has been contaminated by human or animal wastes. In urban environments, the most likely dry weather pollution sources are domestic animals, wildlife and untreated sewage from improperly connected or leaking sanitary sewers.

PWD performs three fecal indicator bacteria tests, including fecal coliform, *Escherichia coli (E. coli.)*, and enterococci. The fecal coliform test covers a relatively wide subgroup of fecal-specific bacteria; however, it does include some species that are not necessarily fecal in origin. *E. coli*, on the other hand, is a single coliform species that is noteworthy due to the fact that it occurs only in the fecal matter of humans and other warm-blooded animals. This qualifies *E. coli* as an excellent indicator of human waste. The final coliform group tested, the enterococci, are significant in that they tend to mimic many enteric pathogens with their ability to thrive in saline conditions over a wide range of temperatures. This makes the enterococci test very useful in waterways that may have a marine influence, or in any river or stream that may have above normal salinity due to geology.

Microbial Analysis Results

PA DEP has established seasonal bacteria water quality criteria that are more stringent in warmer months, or the “swimming season.” For the period May 1 through September 30, water quality standards require that the geometric mean of a group of at least five samples collected on non-consecutive days over a 30-day period not exceed 200 fecal coliform CFU (colony forming unit) per 100mL. During the non-swimming season, this value increases to 2000 CFU/100mL.

While samples were collected on a quarterly basis and not within a 30-day period as required by PA DEP water quality criteria, results of microbial analyses from the seven swimming season samples generally indicate fecal coliform geometric means greater than 200CFU/100mL (Table 6). The only exceptions were the downstream Wissahickon Creek and Schuylkill River gage sites, which each had fecal coliform geometric means less than 200 CFU/100mL, based on 10 samples each. The 2000 CFU/100mL geometric mean standard for non-swimming season samples was not exceeded at any of the 10 sites, based on 11 samples at each site.

US EPA recommended water quality criteria (1986) were used as guidelines for evaluation of sample results for other microbial parameters, as PA DEP does not have recreational use water quality criteria for *E. coli* or enterococci. Guidelines used for *E. coli* and enterococci were geometric means of 126 and 33 CFU/100mL, respectively. The *E. coli* geometric mean guideline was exceeded at six of the 10 sites. The enterococci geometric mean guideline was exceeded at eight of the 10 sites (Table 7).

Table 6. Fecal Coliform Geometric Mean Results and PA DEP Water Quality Recreational Use Criteria Achievement Status by Season

Gage	n	n, non-detects	Geometric mean (CFU/100 mL)	Season	Attaining Standard
1465798	11	1	42	non-swimming	Yes
1465798	10	0	601	swimming	No
1467042	11	1	27	non-swimming	Yes
1467042	10	0	293	swimming	No
1467048	11	0	414	non-swimming	Yes
1467048	10	1	2113	swimming	No
1467086	11	0	274	non-swimming	Yes
1467086	10	0	1180	swimming	No
1467087	11	0	212	non-swimming	Yes
1467087	10	0	588	swimming	No
1473900	11	0	44	non-swimming	Yes
1473900	10	0	299	swimming	No
1474000	11	1	19	non-swimming	Yes
1474000	10	0	146	swimming	Yes
1474500	11	1	27	non-swimming	Yes
1474500	10	2	66	swimming	Yes
1475530	11	1	64	non-swimming	Yes
1475530	10	0	354	swimming	No
1475548	11	0	104	non-swimming	Yes
1475548	10	0	1064	swimming	No

Table 7. *E. Coli* and Enterococci Geometric Mean Results and US EPA Recreational Use Water Quality Guideline Achievement

	n, non-detects		Geometric mean (CFU/100 mL)		Attaining Guideline	
Gage	**E. coli**	**Enterococci**	**E. coli**	**Enterococci**	**E. coli**	**Enterococci**
01465798	1	0	150	66	No	No
01467042	1	0	86	45	Yes	No
01467048	0	0	876	128	No	No
01467086	1	0	428	109	No	No
01467087	1	1	320	65	No	No
01473900	0	0	114	70	Yes	No
01474000	1	1	45	23	Yes	Yes
01474500	4	2	38	9	Yes	Yes
01475530	1	0	141	122	No	No
01475548	1	0	258	99	No	No

Results for all three microbial parameters were similar seasonally, with samples collected during spring and winter generally having smaller concentrations than fall and summer samples (Figures 6 through 8). Bacteria samples collected from 2009-2014 indicate a fair correlation between fecal coliform and *E. coli* ($r = 0.81$), and weaker correlations between fecal coliform and enterococci ($r = 0.25$), and *E. coli* and enterococci ($r = 0.31$) (Figures 9-11).

While the number of microbial samples limits trend analysis, PWD acknowledges the unusually high fecal coliform concentration at the downstream Pennypack site (01467048, Pennypack at Lower Rhawn St. Bridge). At the time of this writing, PWD is conducting additional dry weather grab sampling at strategic locations upstream of 01467048 in order to determine possible sources of the high fecal coliform concentrations (e.g., a leaking sewer pipe).

Other than the observations at 01467048, the number of samples limits further conclusive statements for microbial parameters at this time, particularly in the case of fecal coliform where the number of results is further reduced by categorization according to swimming vs. non-swimming season. Furthermore, US EPA is currently revising recommended recreational use water quality criteria for microbial parameters. As the quarterly dry weather monitoring program continues, more samples will be obtained allowing for more rigorous statistical analyses in the future..

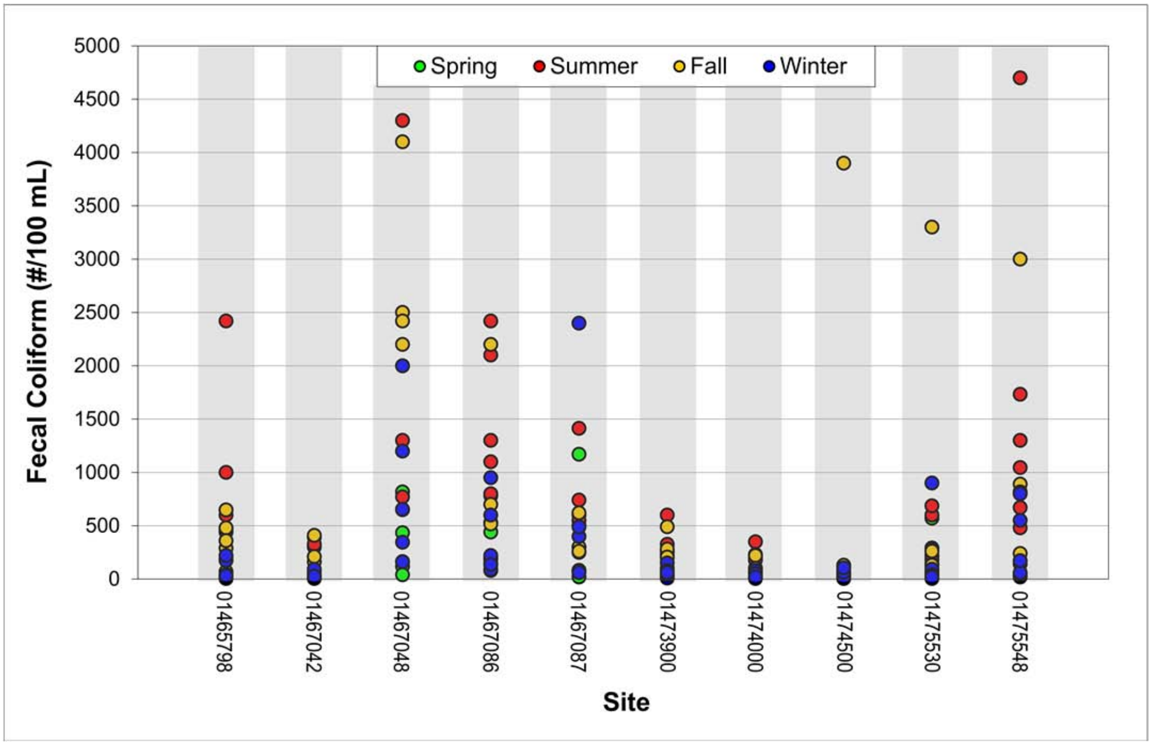


Figure 6. Fecal Coliform results at 10 USGS gage stations, July 2009- June 2014

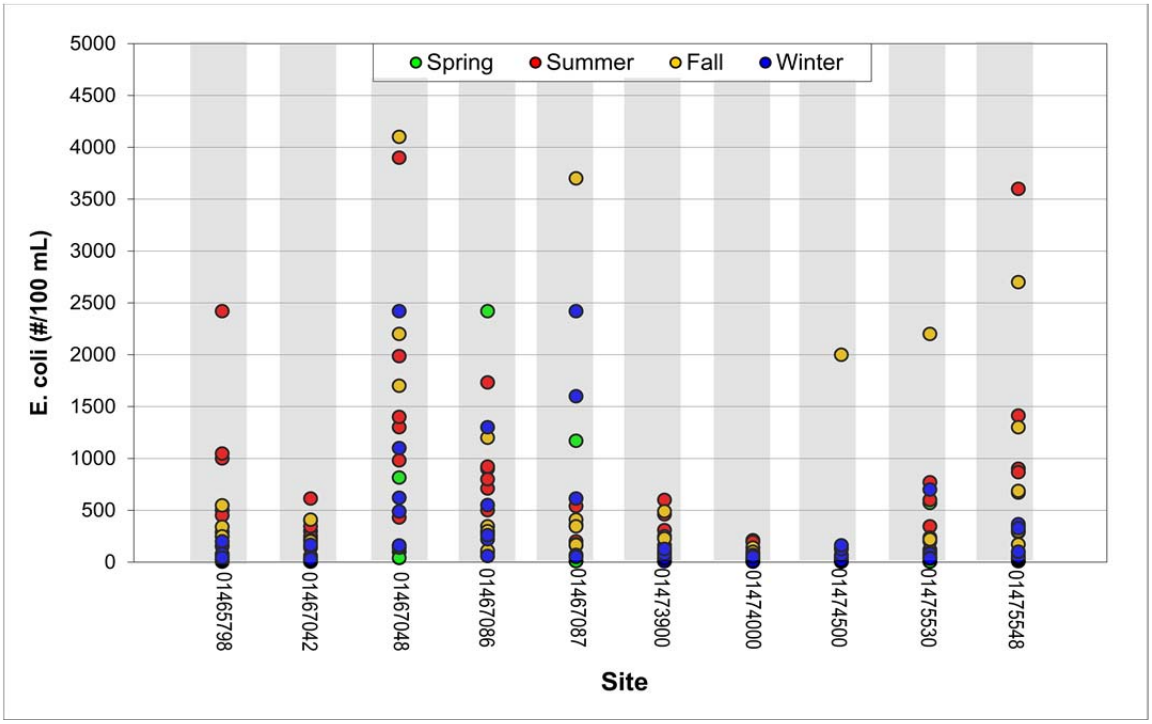


Figure 7. E. coli results at 10 USGS gage stations, July 2009-June 2014

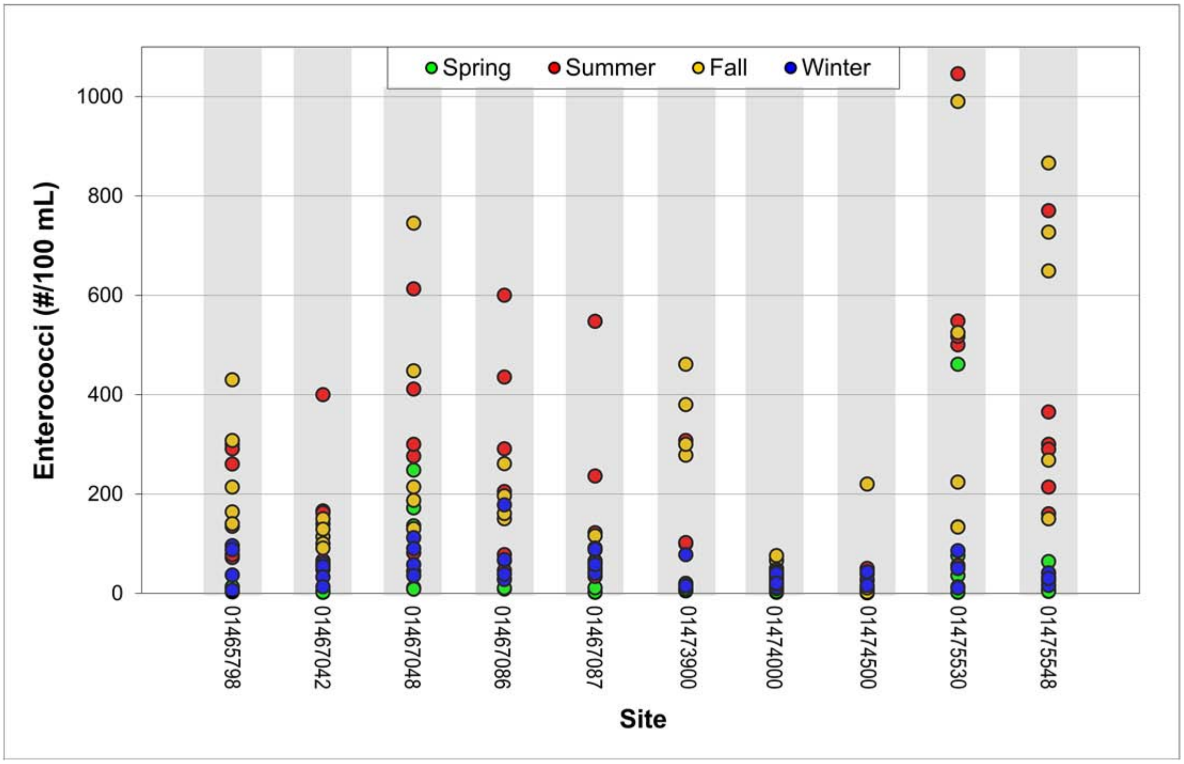


Figure 8. Enterococci results at 10 USGS gage stations, July 2009- June 2014

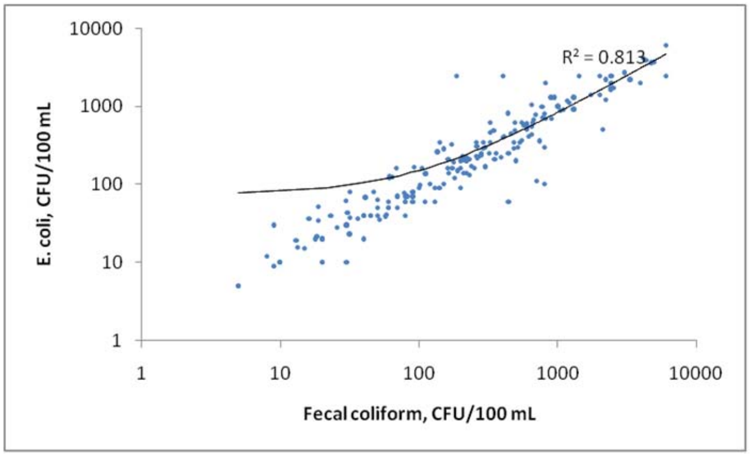


Figure 9. Scatterplot of 2009-2014 Correlating E. coli and Fecal coliform (x-y axes plotted in log10 scale)

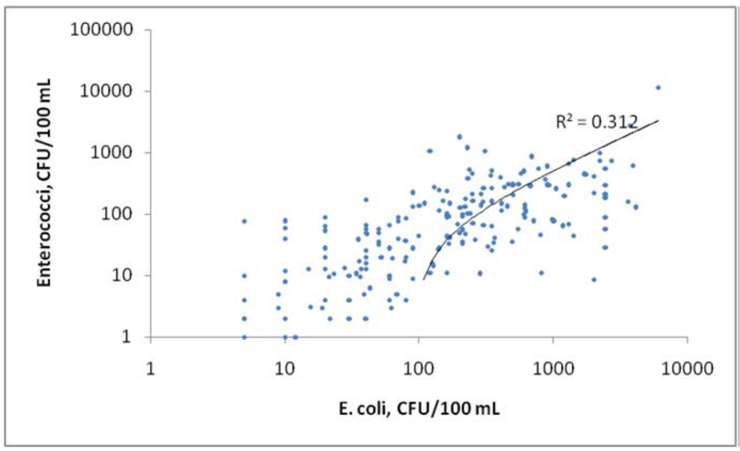


Figure 10. Scatterplot of 2009-2014 Correlating Enterococci and E. coli (x-y axes plotted in log10 scale)

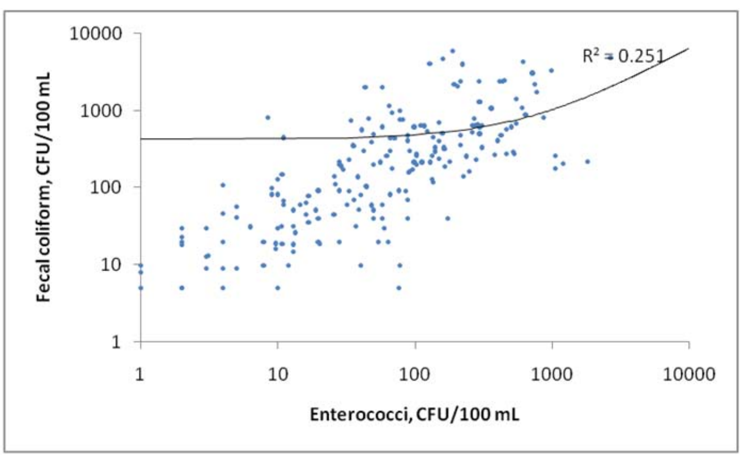


Figure 11. Scatterplot of 2009-2014 Correlating Fecal coliform and Entercocci (x-y axes plotted in log10 scale)

Physicochemical Analysis

In addition to nutrient and microbial analyses, a basic set of physicochemical parameters were also monitored as part of the discrete quarterly sampling program. These parameters (dissolved oxygen, pH, temperature, and specific conductance) were specifically chosen to coincide with those being measured by the USGS continuous water quality monitoring gages. These data can then be utilized as valuable field checks when analyzing continuous water quality data from USGS gages. The physicochemical data are summarized by parameter in Figures 12-15.

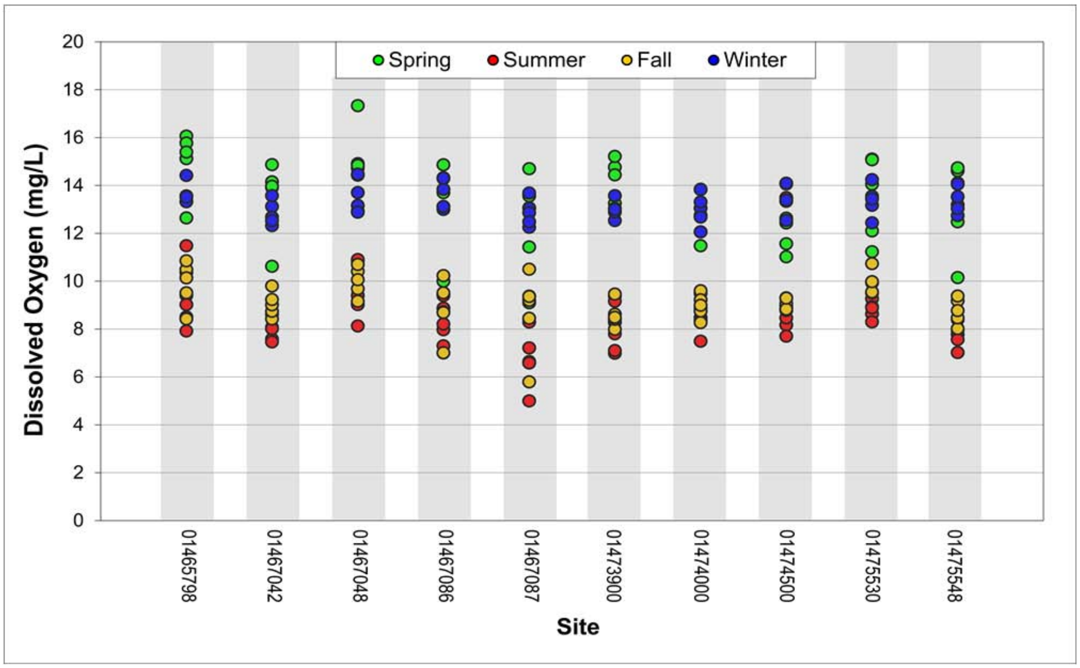


Figure 12. Dissolved oxygen results at 10 USGS gage stations, July 2009- June 2014

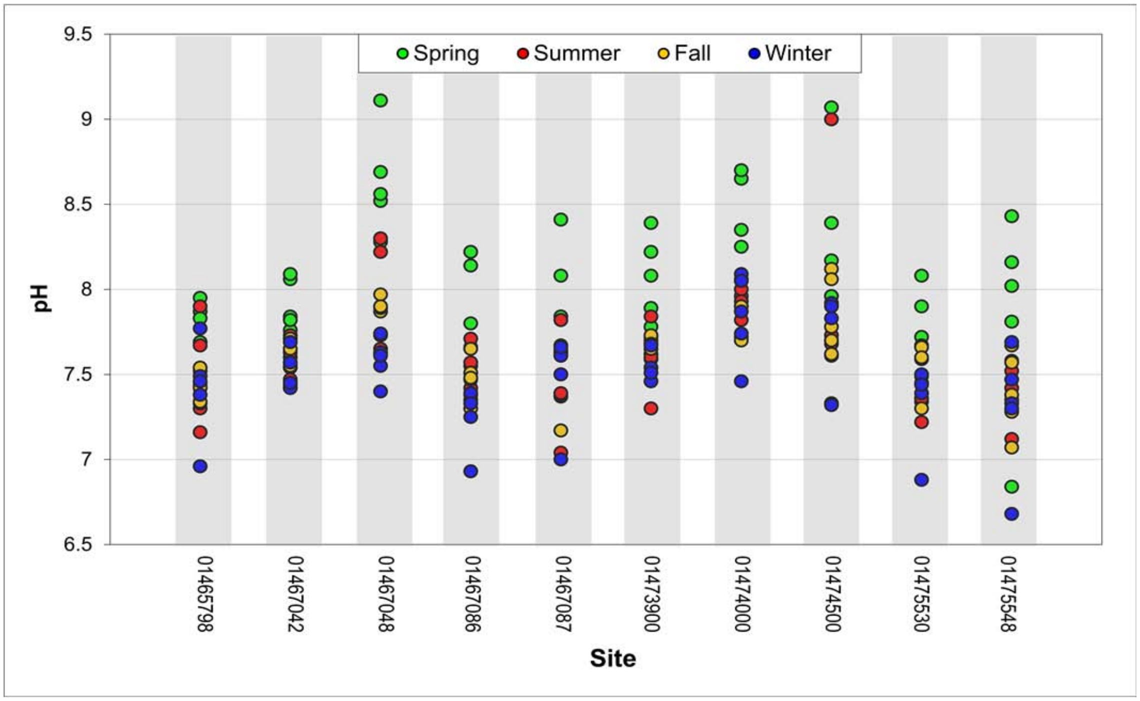


Figure 13. pH results at 10 USGS gage stations, July 2009- June 2014

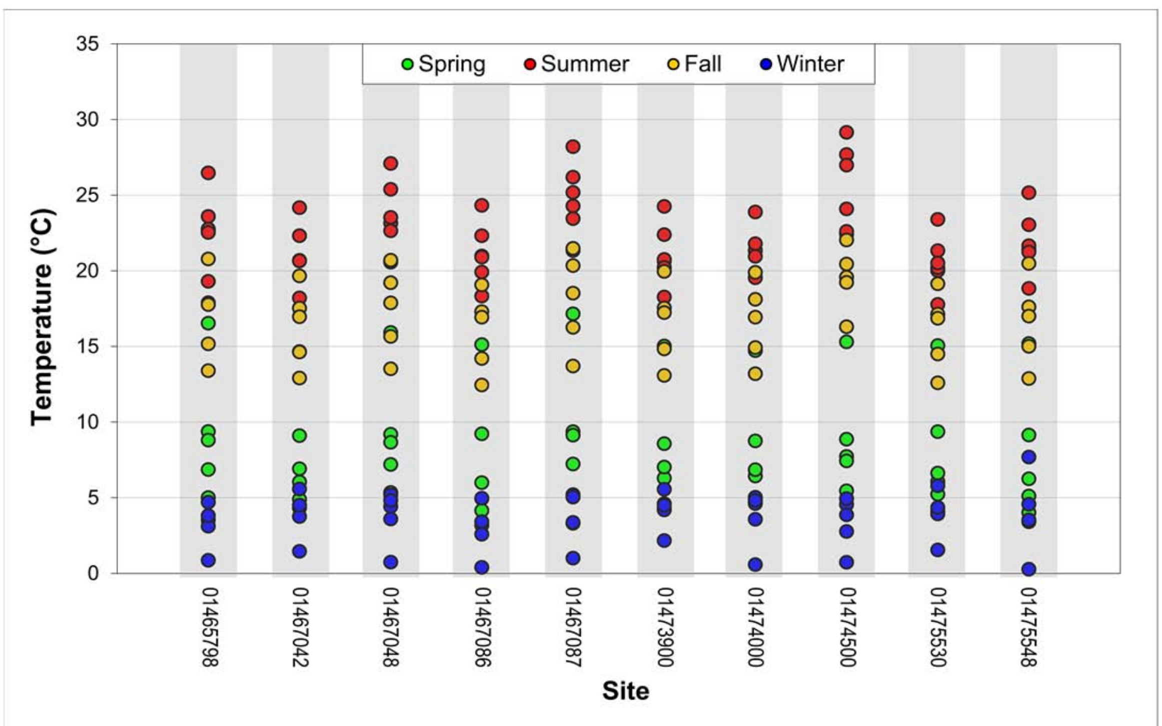


Figure 14. Temperature results at 10 USGS gage stations, July 2009- June 2014

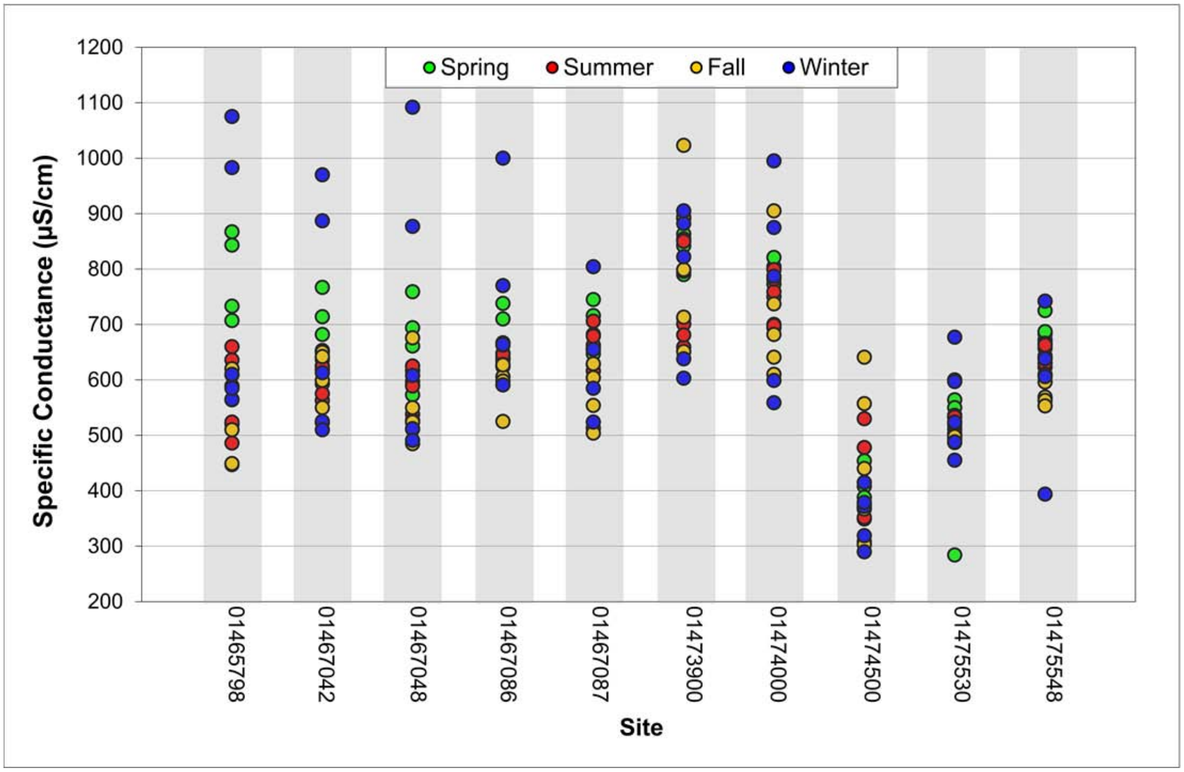


Figure 15. Specific conductance results at 10 USGS gage stations July 2009- June 2014

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United States Environmental Protection Agency (US EPA). (1986). Quality Criteria for Water. EPA 440/5/86/001. Washington, D.C. 447 p.

United States Environmental Protection Agency (US EPA). (2000). Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion IX. EPA 822/B/00/019. Office of Water, U.S. Environmental Protection Agency, Washington D.C.

Appendix I–

PWD-USGS Cooperative Water Quality Monitoring Program Annual Summary

Background

PWD and the United States Geologic Survey (USGS) have constructed and/or refurbished gaging stations in 10 locations throughout Philadelphia's watersheds. USGS staff is responsible for construction and maintenance of the gage structure, stream stage monitoring instruments, data communications, maintaining and verifying stage-discharge rating curves and pumping apparatus. PWD staff is responsible for installation and maintenance of continuous water quality instrumentation. Data collected through the PWD/USGS cooperative water quality monitoring program are disseminated through the USGS National Water Information System (NWIS) Web Interface (http://waterdata.usgs.gov/pa/nwis/nwis), as well as a website specifically dedicated to Philadelphia's watersheds (Figure 1).

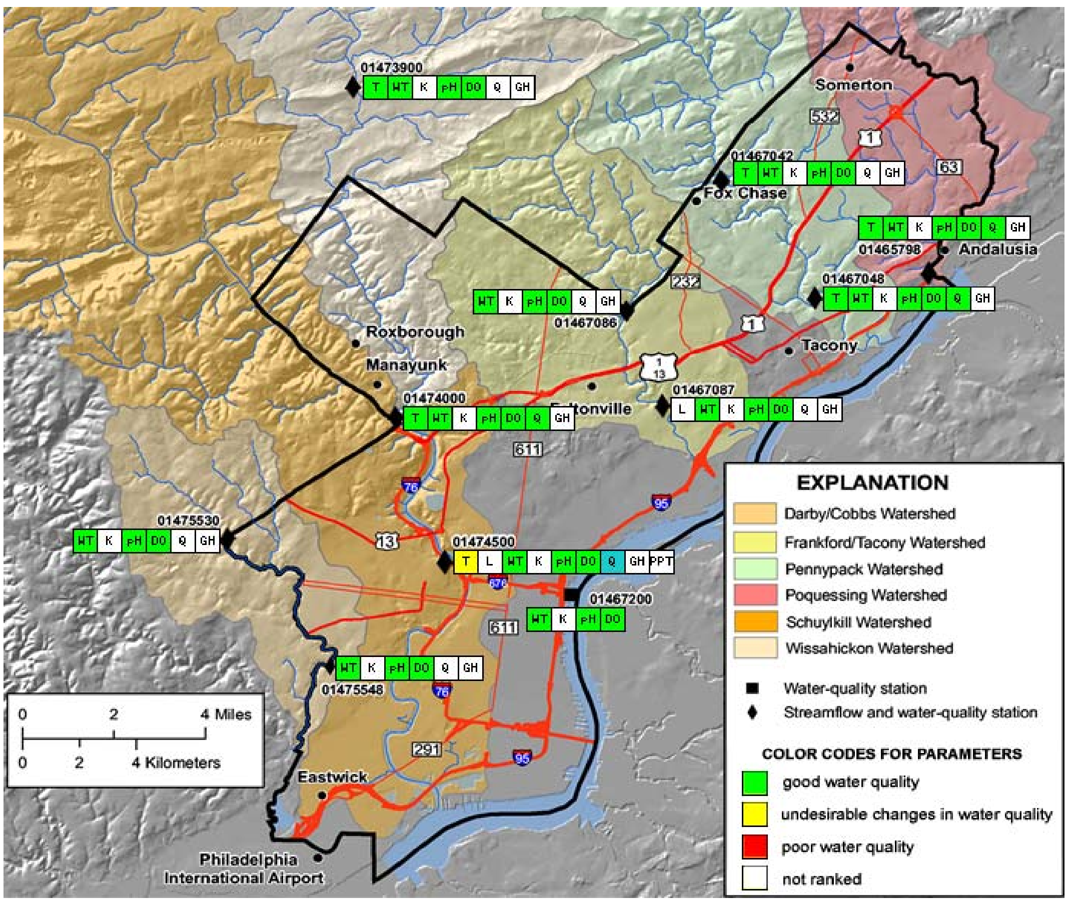


Figure 1. Philadelphia Water Quality Gauge Stations as Viewed on Cooperative USGS-PWD Website (http://pa.water.usgs.gov/pwd/).

Monitoring Locations

The PWD/USGS Cooperative Monitoring Program builds upon the widespread network of USGS gages that were formerly operated throughout Philadelphia. These gages are logically situated and/or have a continuous period of record, making them ideal for water quality monitoring purposes. Within a given watershed, downstream-most historic stations were chosen to represent water quality, as these streams flow through Philadelphia into the receiving waters (*i.e.*, the Schuylkill and Delaware rivers).

Regarding upstream stations, three gages (Pennypack Creek at Pine Rd, Tacony Creek at Adams Ave, and Cobbs Creek at US Rte 1) are strategically located to monitor water quality of the streams as they enter Philadelphia (Figure 1). The upstream Wissahickon Creek monitoring station is located at Rte 73 in Fort Washington, which is approximately 3.7 river miles upstream of the City. This location was chosen due to its extensive period of record (Table 1). Upstream water quality is not measured in the Poquessing-Byberry Creek Watershed. The Schuylkill River gage is in an ideal location to provide data related to the Schuylkill River Fairmount Dam Fish Ladder Renovation Project and was equipped with water quality monitoring instrumentation upon project completion in early 2009.

This annual report summarizes water quality data from July 1, 2013 – June 30, 2014, excluding the period of December 2013 through February 2014, during which time monitoring probes were not deployed in order to protect the equipment from cold temperatures. Per agreement with USGS, water quality data at the Delaware River gage 01467200 was not available for an additional month, from December 2013 through March 2014. Water quality data at the Delaware River gage 014670261 was collected year round. Due to routine maintenance such as cleaning and calibration, gages are periodically taken offline, usually for no more than the span of two hours, and do not collect data.

In order to summarize hydrologic conditions during the monitoring period, daily mean discharge was plotted along with the median of all daily flows for USGS gage 01474000 (Wissahickon Creek at Ridge Ave.). The period of record for this gage is 48 years. The influence of severe storms can be observed in Figure 2; the highest daily mean discharge (2,490 cubic feet per second) was recorded on May 1, 2014.

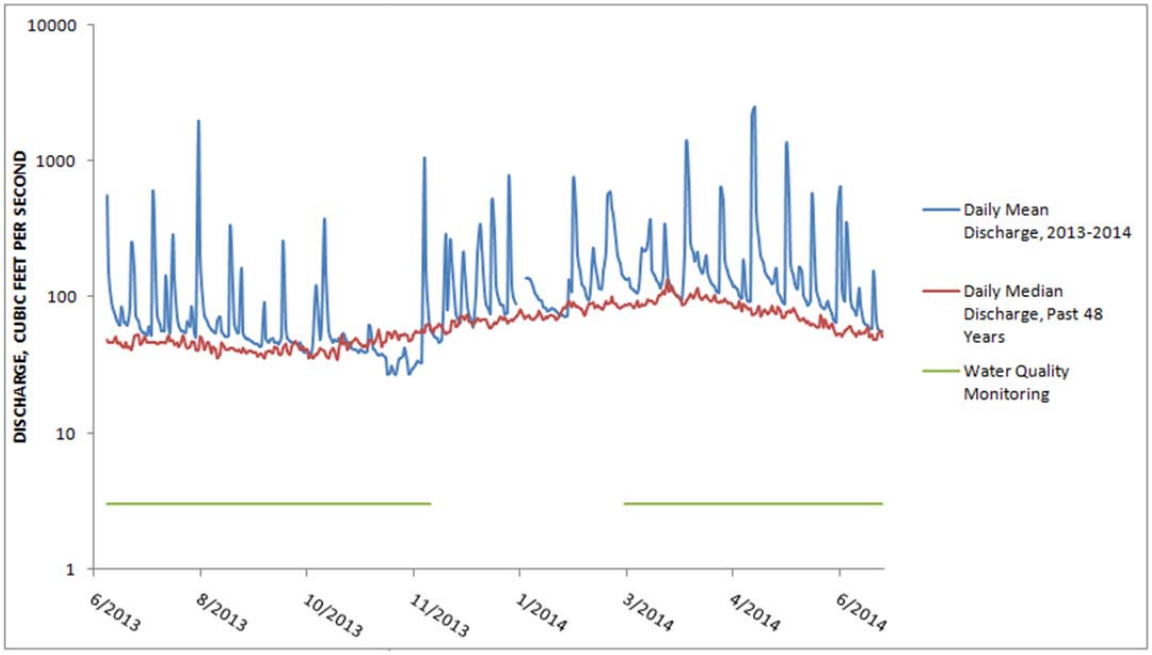


Figure 2. Daily mean flow July 1 2013-June 30 2014 and daily median flow for 48 years of record at USGS gage 01474000 (Wissahickon Creek at Ridge Ave.).

Table 1. PWD/USGS Cooperative Water Quality Monitoring Program Gages

Gage Number	Gage name	Flow Data Record
01465798	Poquessing Creek at Grant Avenue, Philadelphia, PA	July 1965 to Present
01467042	Pennypack Creek at Pine Road, Philadelphia, PA	August 1964 to September 1974; September 2007 to Present
01467048	Pennypack Creek at Lower Rhawn St Br., Philadelphia, PA	June 1965 to Present
01467086	Tacony Creek at County Line, Philadelphia, PA	October 1965 to September 1986; September 2005 to Present
01467087	Frankford Creek at Castor Ave, Philadelphia, PA	July 1982 to Present
014670261	Delaware River near Pennypack Woods, PA	February 2011 to Present
01467200*	Delaware River at Ben Franklin Bridge, Philadelphia, PA	August 1949 to Present
01473900**	Wissahickon Creek at Ft. Washington, PA	September 1961 to September 1968; June 2000 to Present
01474000	Wissahickon Creek at Mouth, Philadelphia, PA	June 1897 to September 1903; January 1905 to July 1906; October 1965 to Present
01474500	Schuylkill River at Philadelphia, PA	October 1931 to Present
01475530	Cobbs Creek at U.S. Highway No. 1, Philadelphia, PA	October 1964 to September 1981; September 2004 to Present
01475548	Cobbs Creek at Mt. Moriah Cemetery, Philadelphia, PA	October 2005 to Present

*Funding for the operation of this gage is provided by USGS and the Delaware River Basin Commission (DRBC)
**Funding for the operation of this gage is provided by DRBC

USGS Gage Data Processing & Analysis Procedures

With 10 USGS gages collecting data for multiple water quality parameters at half-hour intervals, a large amount of data are produced. PWD Office of Watersheds (OOW) staff have developed procedures for the processing and analysis of these data using Microsoft Excel and Access software, as well as R, a free software environment for statistical computing and graphics. Most aspects of the data processing and analysis have been automated with custom Visual Basic and R code.

OOW independently maintains databases of water quality and streamflow via automated regular retrievals of these data from USGS NWIS. On a monthly basis, the databases are queried and results for each gage are imported into MS Excel workbooks. If available, any field data collected during that period (*e.g.*, hand meter readings from field maintenance checks, water quality grab samples, etc.) are also imported. Once all required data have been entered, separate plots are produced for each parameter (dissolved oxygen, turbidity, pH, specific conductance, and temperature) to enable a subjective review of data quality.

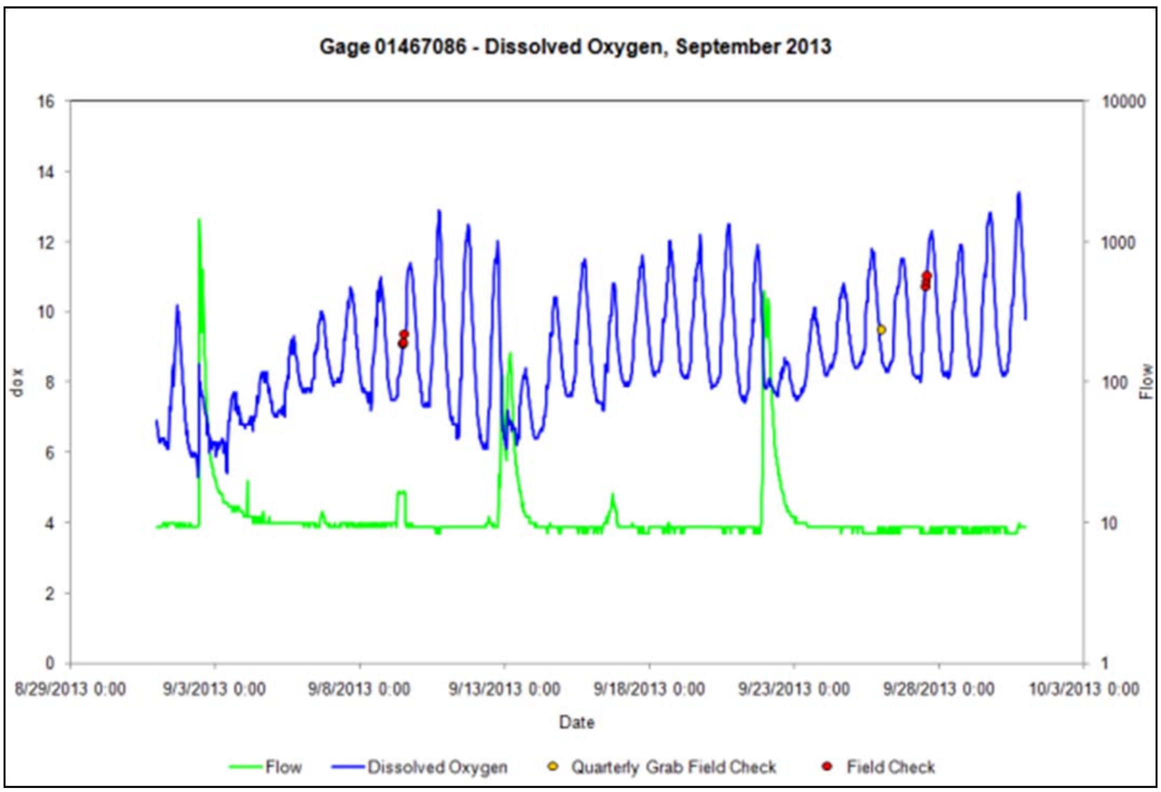


Figure 3. Example of an Excel-generated data processing/analysis plot; Gage 0146786, Dissolved Oxygen, September 2013.

These plots are examined and are the primary basis for the selection of good vs. questionable data for a given month. Intervals of questionable data are located and added to a table of "flagged" data for that particular parameter, which is then used to update the water quality database.

The final step of the procedure utilizes R, a statistical programming language and software environment. The R software code developed by OOW staff analyzes all of the water quality data in a database, as well as the good and questionable flags, and generates statistical and graphic results in a variety of forms. These include monthly plots for all data parameters for each site, showing accepted and questionable data, water quality criteria, grab sample data, and streamflow (Figure 4); assorted statistics including accepted and questionable data comparisons, monthly attainment percentages, and comparisons of wet and dry weather periods; and additional plots, including average dissolved oxygen (DO), percent DO saturation, and pH/percent DO saturation.

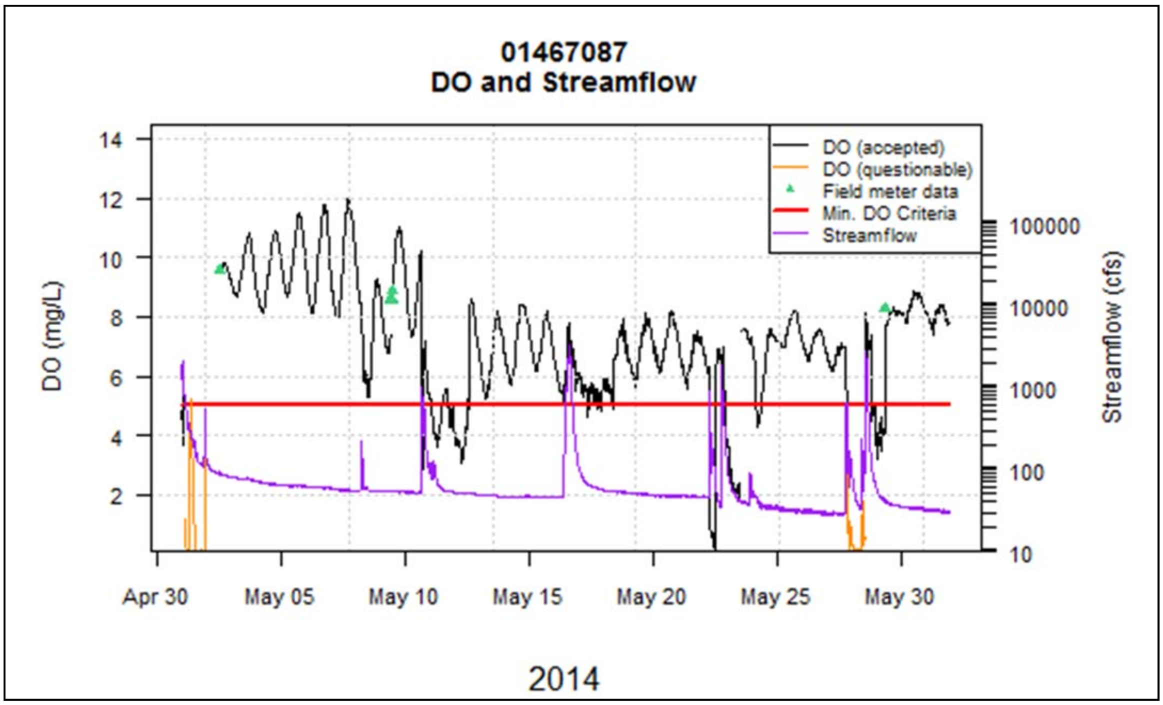


Figure 4. Example of an R-generated plot showing accepted and questionable data, and minimum water quality criteria; Gage 01467087, Dissolved Oxygen, May 2014.

Continuous Water Quality Monitoring Results Annual Summary, July 2013 - June 2014

Dissolved Oxygen

Background

Dissolved oxygen concentrations are a concern in several of Philadelphia's watersheds. Dissolved oxygen concentration is suppressed by high temperatures, respiratory activity of stream organisms, and nitrification and other oxidation reactions. Streams generally develop problems with dissolved oxygen due to water column BOD, sediment oxygen demand (SOD) and eutrophication due to increased nutrient concentration. These processes are inter-related, and physical conditions can also affect dissolved oxygen concentrations.

Designated Uses

Streams in the Philadelphia region are affected by ambient temperatures, which can be quite warm in the spring and summer months. For this reason, these streams cannot support natural self-sustaining populations of cold water fish. Different water quality criteria for dissolved oxygen and temperature are applied to different stream segments. Of the sites that were instrumented for water quality, the Wissahickon and Pennypack Creek gages (*i.e.*, 01473900, 01474000, 01467042, and 01467048) are each designated as a Trout Stocking Fishery (TSF) with conditions appropriate for maintenance of stocked trout over the period February 15 to July 31. Water quality criteria for dissolved oxygen are more stringent for these sites, with a daily instantaneous minimum criterion of 5 mg/L and a 7-day average of 6 mg/L from February 15 to July 31 and 5.5 mg/L the remainder of the year. Dissolved oxygen criteria for Warm Water Fisheries (WWF) are an instantaneous minimum of 5 mg/L and a 7-day average of 5.5 mg/L.

The 7-day average criteria was introduced in 2013 by PA DEP. Prior to this reporting period, DEP specified a daily average criteria for dissolved oxygen (5.0 mg/L for WWF waters; 6.0 mg/L for TSF waters from February 15 to July 31, 5.0 mg/L the remainder of the year). For informational and comparative purposes, this report continues to calculate a daily average, as well as the new 7-day average. It is also noted that the instantaneous minimum DO criterion for WWF waters became more stringent in 2013; it was previously 4.0 mg/L.

The Delaware River gage 01467200 dissolved oxygen criteria are defined by the Delaware River Basin Commission (DRBC) criteria for Zone 3 (DRBC, 2007) with a daily mean of 3.5 mg/L and a seasonal mean (April 1 to June 15, and September 16 to December 31) of 6.5 mg/L. The same seasonal criteria applies to Delaware River gage 014670261 (Zone 2), but there is a more stringent daily mean guideline of 5.0 mg/L (Table 2).

Table 2. PADEP Dissolved Oxygen Water Quality Criteria

Gage number	Designated Use	Minimum Criterion	7-Day Average Criterion	Daily Average Criterion
01465798	WWF	5.0 mg/L	5.5 mg/L	None
014670261	DRBC**	None	None	5.0 mg/L
01467042	TSF*	5.0 mg/L	6.0 mg/L	None
01467048	TSF*	5.0 mg/L	6.0 mg/L	None
01467086	WWF	5.0 mg/L	5.5 mg/L	None
01467087	WWF	5.0 mg/L	5.5 mg/L	None
01467200	DRBC**	None	None	3.5 mg/L
01473900	TSF*	5.0 mg/L	6.0 mg/L	None
01474000	TSF*	5.0 mg/L	6.0 mg/L	None
01474500	WWF	5.0 mg/L	5.5 mg/L	None
01475530	WWF	5.0 mg/L	5.5 mg/L	None
01475548	WWF	5.0 mg/L	5.5 mg/L	None

*TSF criteria for DO only apply from February 15 - July 31. WWF criteria are applicable from August 1 – January 31.
**A seasonal mean criterion of 6.5 mg/L also applies from April 1 - June 15, and September 16 - December 31.

Results

Results were processed as follows for Table 3. The “total hours accepted data” are the total hours of data that were not flagged; that quantity divided by 24 yields the “total days accepted data.” The remainder of the table lists the percent of total hours of data that was flagged, and the percentages of accepted data that attained or failed to attain water quality standards were calculated.

Results were processed as follows for Table 4. If a single day contained at least one flagged measurement, the entire day was considered flagged for calculating the daily mean. Thus the “percent days flagged data” corresponds to the percentage of total days of data that contained at least one flag in a single day. Conversely, if none of the measurements in a single day were flagged, that day was considered one day of accepted data, and the total amount of accepted days was calculated. Finally, the percentages of accepted data that attained or failed to attain water quality standards were calculated.

Results were processed as follows for Tables 5 and 6. If more than 25% of the data in the 7-day window was flagged as questionable, the data point was considered questionable. The 7-day average was calculated as a two-sided moving average. During data processing and analysis, output files are split by calendar year; thus, statistics for 2013 and 2014 appear in separate tables.

Water quality at the downstream Tacony Creek site (gage 01467087) was most likely to exceed DO minimum and 7-day average criteria. At all other sites, the DO minimum criteria were attained at least 98.5% of the time, and the 7-day average criteria were not exceeded. A more in-depth discussion of potential causes of DO problems at gage 01467087 is presented in the Monthly Results section. A notable portion of flagged data at 01467087 and other sites is related to the fouling of sonde pipes due to sediment and debris that inhibit data collection. The DO probes are particularly susceptible to the effects of trapped sediment; when routine cleaning of the sonde pipes show that low DO readings were affected by fouling, the questionable data prior to cleaning is flagged.

Table 3. USGS Gage July 2013 - June 2014 Dissolved Oxygen Minimum Criterion Summary Results

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% days non-attaining	% hrs. attaining
01465798	WWF	6271.5	261.3	3.4	1.5	98.5
014670261*	DRBC	NA	NA	NA	NA	NA
01467042	TSF	6354	264.8	2.1	0.1	99.9
01467048	TSF	6396	266.5	1. 5	0	100
01467086	WWF	6291	262.1	1.3	0.4	99.6
01467087	WWF	5283	220.1	17.1	18.5	81.5
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	6242	260.1	4.2	0	100
01474000	TSF	6582	274.3	0.3	0	100
01474500	WWF	6342	264.3	0.5	0	100
01475530	WWF	6334.5	263.9	0.2	0.1	99.9
01475548	WWF	6241.5	260.1	1.7	1.2	98.8

*No minimum DO criterion applies at gages 01467200 and 014670261

Table 4. USGS Gage July 2013 - June 2014 Dissolved Oxygen Daily Mean Summary Results

Gage number	Designated Use	Total days accepted data	% days flagged data
01465798	WWF	235	13.1
014670261	DRBC	333	8.8
01467042	TSF	229	15.3
01467048	TSF	237	12.4
01467086	WWF	240	9.6
01467087	WWF	186	29.9
01467200	DRBC	212	14.9
01473900	TSF	239	12.0
01474000	TSF	260	5.4
01474500	WWF	252	5.1
01475530	WWF	255	3.5
01475548	WWF	236	10.8

Table 5. USGS Gage July 2013 - December 2013 Dissolved Oxygen 7-Day Average Criterion Summary Results

Gage number	Designated Use	Total hours accepted data	% hours flagged data	% hours non-attaining	% hours attaining
01465798	WWF	3504.5	0	0	100
014670261	DRBC	NA	NA	NA	NA
01467042	TSF	3504.5	0	0	100
01467048	TSF	3458	1.3	0	100
01467086	WWF	3504.5	0	0	100
01467087	WWF	2423.5	30.8	37.5	62.5
01467200	DRBC	NA	NA	NA	NA
01473900	TSF	3291	6.1	0	100
01474000	TSF	3504.5	0	0	100
01474500	WWF	3504.5	0	0	100
01475530	WWF	3504.5	0	0	100
01475548	WWF	3504.5	0	0	100

Table 6. USGS Gage March 2014 - June 2014 Dissolved Oxygen 7-Day Average Criterion Summary Results

Gage number	Designated Use	Total hours accepted data	% hours flagged data	% hours non-attaining	% hours attaining
01465798	WWF	2491	6.1	0	100
014670261	DRBC	NA	NA	NA	NA
01467042	TSF	2501	5.7	0	100
01467048	TSF	2652.5	0	0	100
01467086	WWF	2533.5	0	0	100
01467087	WWF	2050	19.1	12.0	88
01467200	DRBC	NA	NA	NA	NA
01473900	TSF	2676.5	0	0	100
01474000	TSF	2760.5	0	0	100
01474500	WWF	2532.5	0	0	100
01475530	WWF	2505.5	0	0	100
01475548	WWF	2509.5	0	0	100

Table 7. USGS Gage 01467200 and 014670261 Dissolved Oxygen Seasonal Mean Criterion Summary Result

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Seasonal mean	Attained Standard?
01467200	DRBC	1791.5	74.6	1.8	9.0	Yes
014670261	DRBC	1818.0	75.8	0.3	9.2	Yes

pH

Background

pH has been identified as a parameter of potential concern for some of Philadelphia's watersheds, primarily because of algal effects on the dissolved inorganic carbon (DIC) composition of stream water. Algae take up CO_2 during photosynthesis and shift the composition of DIC toward the alkaline carbonates, resulting in occasional failure to attain maximum pH criteria at some sites (Table 8). pH fluctuations are typically observed concomitant with pronounced dissolved oxygen fluctuations, as detailed in the Monthly Results section.

At gages 01467200 and 014670261, pH criteria (regulated by DRBC) are bounded by 6.5 and 8.5. At all other gages, pH criteria are bounded by daily minima and maxima of 6.0 and 9.0, respectively, as defined by PA DEP water quality standards.

Results

Results were processed as follows for Table 8. The "total hours accepted data" are the total hours of data that were not flagged; that quantity divided by 24 yields the "total days accepted data." The remainder of the table lists the percentage of total hours of data that was flagged, the percentages of accepted hours that attained or failed to attain criteria, and the percentages of daily minima and maxima that attained or failed to attain criteria.

Minimum pH criteria were attained at all gages for the reporting time frame. Algal blooms may be responsible for daily maximum pH criterion exceedance at several sites during March and April. Significant (greater than 10%) daily exceedances occurred at upstream and downstream Wissahickon and upstream Tacony sites.

Table 8. USGS Gage July 2013 - June 2014 pH Criteria Summary Results

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining
01465798	6253.5	260.6	3.6	0.1	0.7	0	0	99.9	99.3
014670261	8581	357.5	2.0	0.4	0.8	0	0	99.6	99.2
01467042	6261.5	260.9	3.5	0.4	1.9	0	0	99.6	98.1
01467048	6398.5	266.6	1.4	0.4	1.5	0	0	99.6	98.5
01467086	6329	263.7	0.7	3.6	13.9	0	0	96.4	86.1
01467087	5740.5	239.2	9.9	0.1	0.8	0	0	99.9	99.2
01467200	5912	246.3	1.1	0	0	0	0	100	100
01473900	6241.5	260.1	4.2	2.9	12.6	0	0	97.1	87.4
01474000	6582	274.3	0.3	1.7	10.2	0	0	98.3	89.8
01474500	6094	253.9	4.4	0.8	2.3	0	0	99.2	97.7
01475530	6157.5	256.6	3.0	0	0	0	0	100	100
01475548	6167	257.0	2.9	1.4	5.0	0	0	98.6	95.0

Turbidity

Background

Turbidity in Philadelphia's streams increases with increased flow as inorganic sediment and additional constituents of stormwater runoff are introduced to the stream or scoured/eroded from the stream channel. There are no numeric PA DEP water quality criteria for turbidity, so PWD watershed management plans used a reference value for turbidity that was derived from EPA Guidance document EPA 822-B-00-023 (*i.e.*, 2.825 NTU). This value is surpassed more often in wet weather than in dry weather (Tables 82-83). Turbidity data has also been used to help investigate sediment loading and transport in the Wissahickon Creek Watershed for the Wissahickon Creek Sediment TMDL.

Results

Results were processed as follows for Table 9. The "total hours accepted data" are the total hours of data that were not flagged; that quantity divided by 24 yields the "total days accepted data." The remainder of the table lists the percentage of total hours of data that was flagged, and the percentages of accepted hours that either surpassed or fell below the maximum guideline.

Among the tributary sites, the maximum guideline was most frequently surpassed at the downstream Wissahickon gage, and least frequently surpassed at the upstream Wissahickon gage.

Table 9. USGS Gage July 2013 - June 2014 Turbidity Summary Results

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline
01465798	6256.5	260.7	3.6	29.2	70.8
014670261	8637	359.9	1.4	98.3	1.7
01467042	6326.5	263.6	2.5	35.0	65.0
01467048	6193	258.0	4.6	36.7	63.3
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	5963.5	248.5	8.5	54.7	45.3
01474000	6580.5	274.2	0.3	22.1	77.9
01474500	6224.5	259.4	2.3	66.7	33.3
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA

*Turbidity is not continuously monitored at these locations

Specific Conductance

Background

Specific conductance is a measure of the ability of water to conduct electricity over a given distance, expressed as microsiemens/cm (corrected to 25ºC). Conductivity in Philadelphia streams is extremely sensitive to changes in flow, as stormwater (diluent) usually contains smaller concentrations of dissolved ions than stream baseflow. Stormwater runoff typically lowers conductivity in streams; an exception sometimes occurs in winter or early spring, when road salt applied prior to snowstorms enters the stream in runoff or during snowmelt. Data collected in the report timeframe were generally consistent with earlier observations. When significant changes in conductivity are observed during dry weather, it can be an indicator of anthropogenic influence or pollution in the stream; stations receiving inputs of treated wastewater generally had greater conductivity.

Results

There is no water quality standard for specific conductance. Table 10 merely illustrates the total hours of data that was not flagged and considered "accepted," the equivalent quantity in day-units, and the percentage of total hours of data that was flagged. More detailed results at each site are described in the Monthly Results section.

Table 10. USGS Gage July 2013 - June 2014 Specific Conductance Summary Results

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data
01465798	6378	265.8	1.7
014670261	8641.5	360.1	1.3
01467042	6345	264.4	2.3
01467048	6454.5	268.9	0.6
01467086	6326.5	263.6	0.7
01467087	6162.5	256.8	3.3
01467200	5926	246.9	0.8
01473900	6230.5	259.6	4.4
01474000	6366.5	265.3	3.5
01474500	6357	264.9	0.2
01475530	6196.5	258.2	2.3
01475548	6148.5	256.2	3.2

Temperature

Background

Streams in the Philadelphia region are designated Warm Water Fisheries (WWF) or Trout Stocking Fisheries (TSF), with separate corresponding temperature criteria (Table 11). These criteria are "stepped" (remaining constant for 15- or 30-day intervals), while streams tend to warm up and cool down more gradually due primarily to changes in ambient temperature. (Gages 01467200 and 014670261 are the exceptions and are subject to a DRBC criterion of 30°C maximum). Stream temperatures were observed to exceed these criteria, somewhat frequently in springtime. These exceedances are generally natural, as there are no major sources of heated wastes. It is possible that baseflow diminution is partially responsible for a lack of buffering against temperature increases.

Table 11. PA DEP Temperature Water Quality Criteria

Date range start	Date range end	WWF maximum (°C)	WWF maximum (°F)	TSF maximum (°C)	TSF maximum (°F)
1/1	1/31	4	40	4	40
2/1	2/29	4	40	4	40
3/1	3/31	8	46	8	46
4/1	4/15	11	52	11	52
4/16	4/30	14	58	14	58
5/1	5/15	18	64	18	64
5/16	5/31	22	72	20	68
6/1	6/15	27	80	21	70
6/16	6/30	29	84	22	72
7/1	7/31	31	87	23	74
8/1	8/15	31	87	27	80
8/16	8/30	31	87	31	87
9/1	9/15	29	84	29	84
9/16	9/30	26	78	26	78
10/1	10/15	22	72	22	72
10/16	10/31	19	66	19	66
11/1	11/15	14	58	14	58
11/16	11/30	10	50	10	50
12/1	12/31	6	42	6	42

Results

Results were processed in the same manner as the parameters described above. The highest exceedance rate occurred at the downstream Pennypack Creek gage. Aside from the Delaware River gages, the lowest exceedance rates were observed at the Poquessing, both Cobbs, both Tacony Creek, and the Schuylkill River gages (Table 12). Those six gages are all designated as WWF and have less stringent criteria.

Table 12. USGS Gage July 2013 - June 2014 Temperature Maximum Criteria Summary Results

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. exceedance	% hrs. attaining
01465798	WWF	6334.5	263.9	2.4	9.7	90.3
014670261	DRBC	8643	360.1	1.3	0	100
01467042	TSF	6357.5	264.9	2.1	20.3	79.7
01467048	TSF	6457.5	269.1	0.5	24.8	75.2
01467086	WWF	6330	263.8	0.7	10.1	89.9
01467087	WWF	6201.5	258.4	2.7	11.6	88.4
01467200	DRBC	5936	247.3	0.7	0	100
01473900	TSF	6237	259.9	4.3	17.1	82.9
01474000	TSF	6581	274.2	0.3	17.9	82.1
01474500	WWF	6357	264.9	0.2	6.5	93.5
01475530	WWF	6333.5	263.9	0.2	9.2	90.8
01475548	WWF	6300	262.5	0.8	10.5	89.5

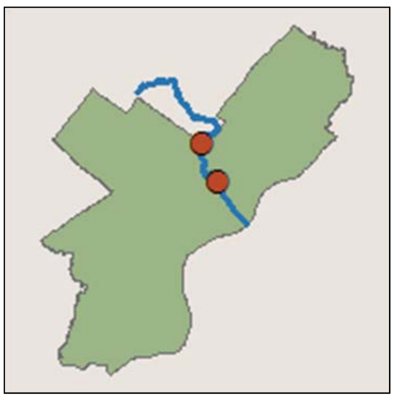
Monthly Results, July 2013 - June 2014

This section summarizes results at the monthly time scale. Results were processed in the same manner as in the previous section. Gages are grouped according to the type of sewer system that impacts water quality at the site.

Gages in Combined Sewer System Watersheds

The combined sewer system serves more than three-quarters of Philadelphia's residents and covers the oldest and densest parts of the city. Combined sewer outfalls affect the Tookany/Tacony-Frankford and Darby-Cobbs watersheds. (The Delaware and Schuylkill rivers also contain combined sewer outfalls but are detailed in a later section focused on large watersheds.) The gages in this section are subject to the deleterious effects of periodic combined sewer overflows during wet weather and snowmelt.

Tookany/Tacony-Frankford Creek (Gages 01467086 and 01467087)



Dissolved oxygen and pH

Dissolved oxygen concentrations were markedly worse between the upstream and downstream Tacony Creek gages. The monthly minima, percentage of hours the minimum criterion was not attained, exceedance of the 7-day average guideline, and percentage of days the daily mean criteria was not attained were typically much worse at the downstream gage (Tables 13-16, Figures 5-8). For example, DO was particularly poor at the downstream Tacony Creek gage during August 2012; the minimum DO criterion was not attained throughout much of the month (Figure 9). Minimum DO exceedances were also observed in the same month at the upstream gage. However, the minimum criterion was usually attained at gage 01467086 (Figure 10). This difference likely reflects the additional stormwater runoff and sewage overflows that entered the creek between the two gages.

The lowest DO concentrations are typically seen in the period after storm events, reflecting both the immediate and lingering, oxygen-depleting effects of stormwater runoff and biochemical oxygen demand (BOD) entering the stream. Diel DO fluctuations are suppressed for a few days following a storm event because the event either scours away algae or temporarily inhibits their growth. As dry weather continues, the algae recover and diel DO and pH fluctuations typically increase, sometimes resulting in non-attainment of pH maximum criteria, as observed at the upstream gage in April 2014 (Figure 11). Percent DO saturation of more than 175% in daylight were also observed at gage 01467086 in April 2014, indicating high levels of algal activity (Figure 12; PAR is defined as photosynthetically active radiation). Diel DO fluctuations tended to increase with prolonged periods of sunlight, further indicating high levels of algal activity.

A lower monthly mean pH was consistently observed at gage 01467087, along with generally less pronounced diel pH fluctuations, probably due to an increased buffering capacity at the downstream gage and a lesser degree of algal growth (Tables 15-16).

Table 13. Gage 01467086 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	740.5	30.9	0.5	0.0	100.0	4.5	11.3	7.2
Aug-13	WWF	742.0	30.9	0.3	0.1	99.9	3.8	14.0	7.7
Sep-13	WWF	717.0	29.9	0.4	0.0	100.0	5.3	13.4	8.8
Oct-13	WWF	743.0	31.0	0.1	0.3	99.7	3.5	14.1	9.4
Nov-13	WWF	695.5	29.0	3.4	0.0	100.0	6.3	17.8	11.6
Mar-14	WWF	514.0	21.4	0.6	0.0	100.0	8.8	18.9	12.7
Apr-14	WWF	716.5	29.9	0.5	0.0	100.0	6.2	19.0	11.4
May-14	WWF	740.5	30.9	0.5	0.3	99.7	3.3	16.2	9.1
Jun-14	WWF	682.0	28.4	5.3	0.0	100.0	5.3	11.9	8.0

Table 14. Gage 01467087 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	676.0	28.2	9.1	35.2	64.8	0.1	7.7	4.4
Aug-13	WWF	601.5	25.1	19.2	16.8	83.2	1.3	9.3	5.8
Sep-13	WWF	554.5	23.1	23.0	1.2	98.8	1.0	9.4	7.0
Oct-13	WWF	588.0	24.5	21.0	1.3	98.7	2.5	11.5	7.8
Nov-13	WWF	560.5	23.4	22.2	6.3	93.7	0.1	11.0	6.9
Mar-14	WWF	260.0	10.8	49.7	0.2	99.8	3.8	15.0	11.7
Apr-14	WWF	643.5	26.8	10.6	4.7	95.3	1.0	12.9	9.1
May-14	WWF	688.5	28.7	7.5	4.9	95.1	0.2	12.0	7.3
Jun-14	WWF	710.5	29.6	1.3	7.4	92.6	1.2	8.4	6.1

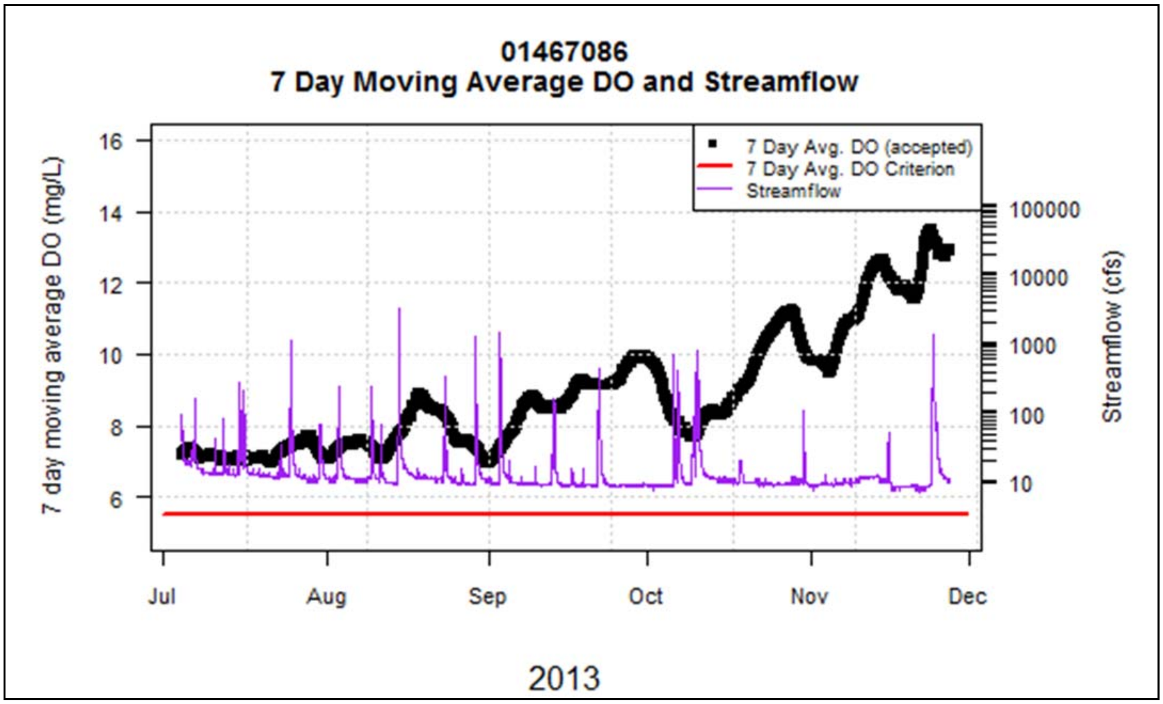


Figure 5. Gage 01467086, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

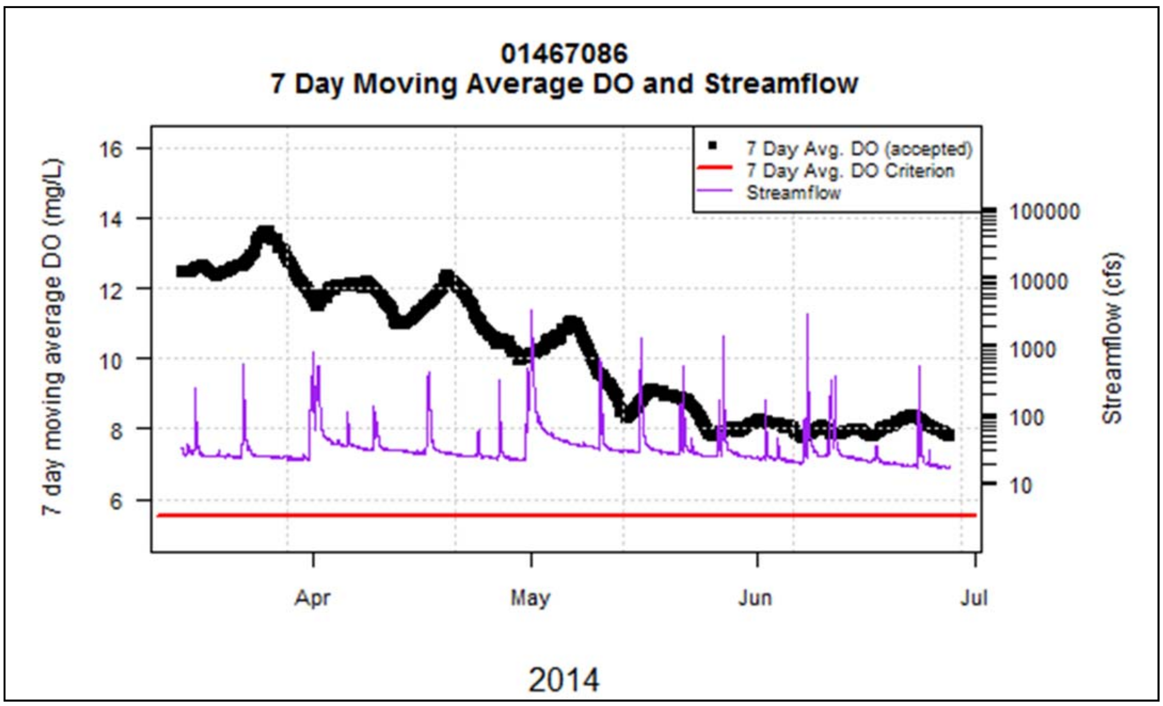


Figure 6. Gage 01467086, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

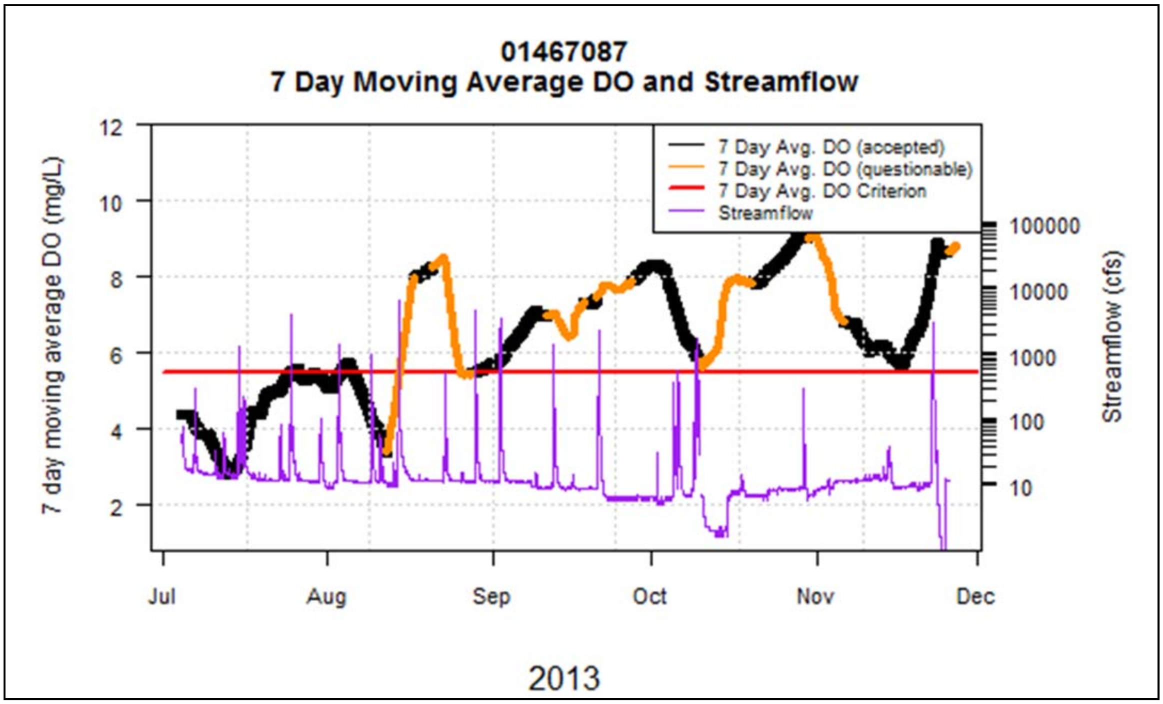


Figure 7. Gage 01467087, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

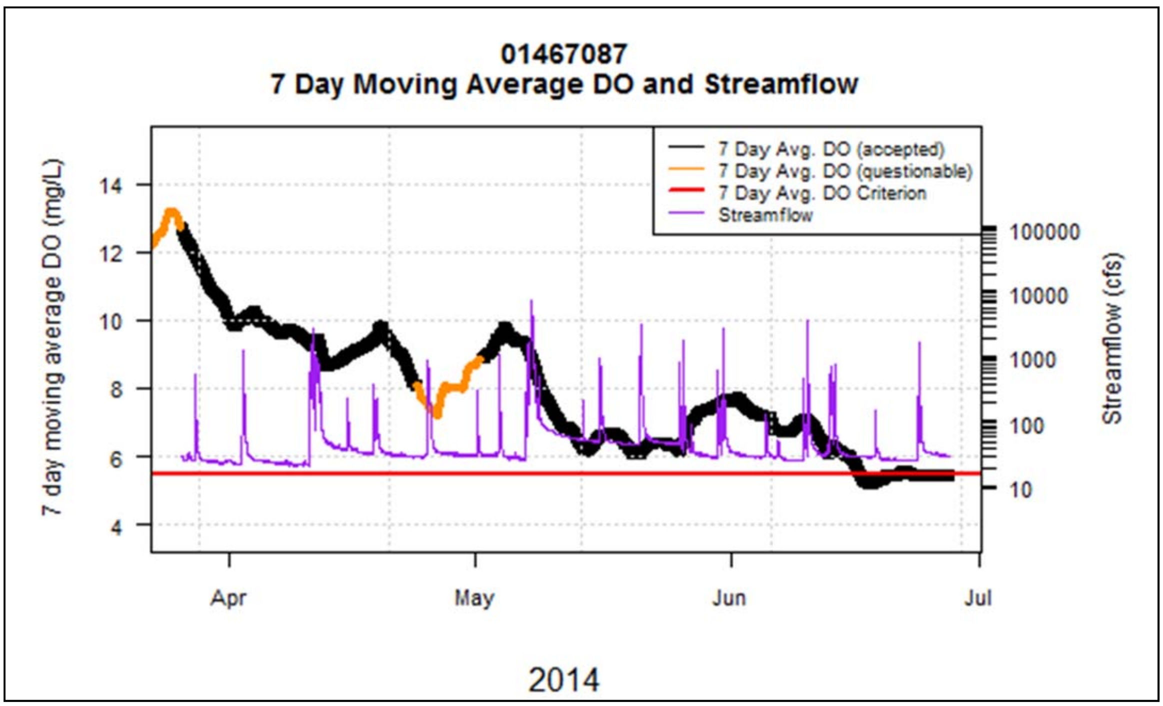


Figure 8. Gage 01467087, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 15. Gage 01467086 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	29.0	6.5	6.6	8.3	7.2
Aug-13	WWF	29.0	6.5	6.3	9.8	7.6
Sep-13	WWF	27.0	10.0	6.5	10.1	8.7
Oct-13	WWF	30.0	3.2	5.9	11.4	9.3
Nov-13	WWF	27.0	10.0	7.6	15.1	11.5
Mar-14	WWF	17.0	21.1	10.6	14.5	12.5
Apr-14	WWF	27.0	10.0	8.0	13.4	11.4
May-14	WWF	28.0	9.7	6.5	11.4	9.1
Jun-14	WWF	26.0	13.3	6.9	8.9	8.0

Table 16. Gage 01467087 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	26.0	16.1	1.4	6.4	4.5
Aug-13	WWF	21.0	32.3	2.4	8.6	5.6
Sep-13	WWF	18.0	40.0	5.8	8.0	7.0
Oct-13	WWF	19.0	38.7	5.0	9.6	8.0
Nov-13	WWF	21.0	30.0	5.1	10.4	7.0
Mar-14	WWF	8.0	62.8	9.2	13.3	11.8
Apr-14	WWF	21.0	30.0	5.6	11.3	9.4
May-14	WWF	25.0	19.4	4.7	10.1	7.3
Jun-14	WWF	27.0	10.0	4.3	8.0	6.0

Table 17. Gage 01467086 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	740.5	30.9	0.5	0.0	0.0	0	0	100.0	100.0	6.9	8.3	7.5
Aug-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.6	8.6	7.5
Sep-13	717.0	29.9	0.4	0.0	0.0	0	0	100.0	100.0	6.3	8.7	7.7
Oct-13	743.0	31.0	0.1	0.0	0.0	0	0	100.0	100.0	6.8	8.7	7.7
Nov-13	717.0	29.9	0.4	0.0	0.0	0	0	100.0	100.0	7.0	8.7	7.7
Mar-14	514.0	21.4	0.6	16.5	68.2	0	0	83.5	31.8	7.2	10.0	8.2
Apr-14	716.5	29.9	0.5	20.2	70.0	0	0	79.8	30.0	7.2	9.8	8.2
May-14	742.5	30.9	0.2	0.1	3.2	0	0	99.9	96.8	7.0	9.1	7.7
Jun-14	696.5	29.0	3.3	0.0	0.0	0	0	100.0	100.0	6.7	8.1	7.4

Table 18. Gage 01467087 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.3	7.5	7.1
Aug-13	739.5	30.8	0.6	0.0	0.0	0	0	100.0	100.0	6.2	7.6	7.1
Sep-13	628.0	26.2	12.8	0.0	0.0	0	0	100.0	100.0	6.5	7.4	7.1
Oct-13	583.5	24.3	21.6	0.0	0.0	0	0	100.0	100.0	6.5	7.6	7.2
Nov-13	624.0	26.0	13.3	0.0	0.0	0	0	100.0	100.0	6.6	7.3	6.9
Mar-14	273.5	11.4	47.0	1.1	14.3	0	0	98.9	85.7	7.2	9.2	8.0
Apr-14	713.0	29.7	1.0	0.0	0.0	0	0	100.0	100.0	6.8	8.9	7.7
May-14	727.0	30.3	2.3	0.0	0.0	0	0	100.0	100.0	6.7	8.0	7.3
Jun-14	710.5	29.6	1.3	0.0	0.0	0	0	100.0	100.0	6.6	7.5	7.1

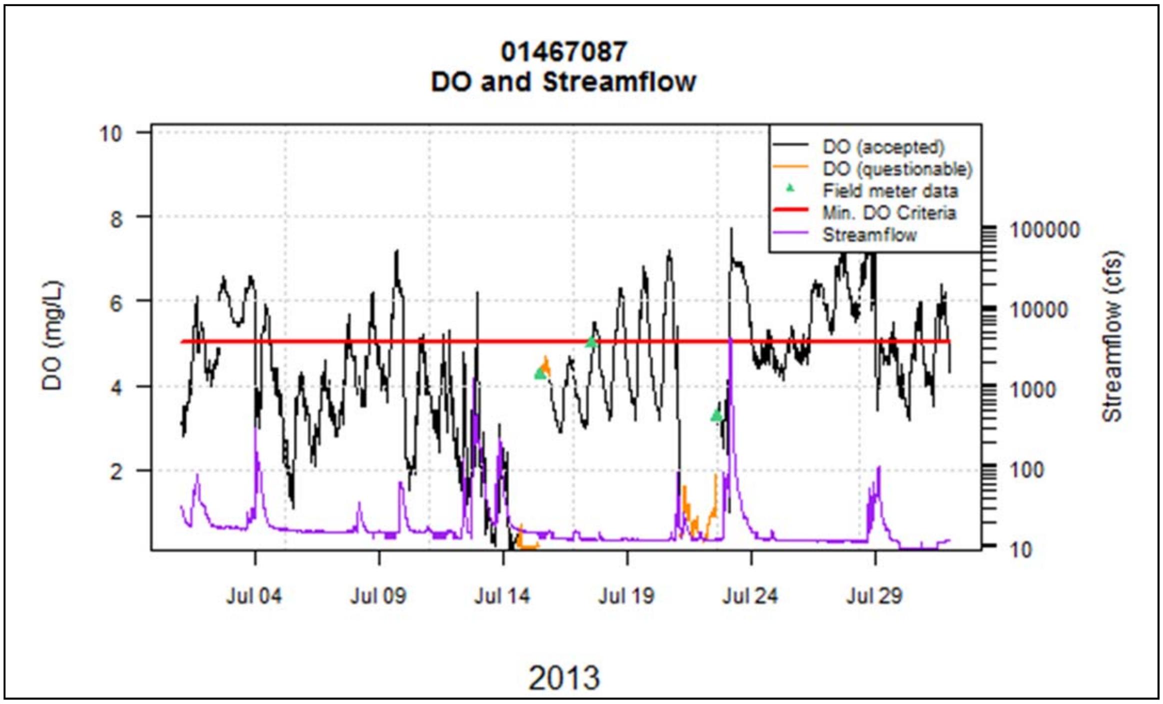


Figure 9. Gage 01467087, Dissolved Oxygen and Streamflow, July 2013.

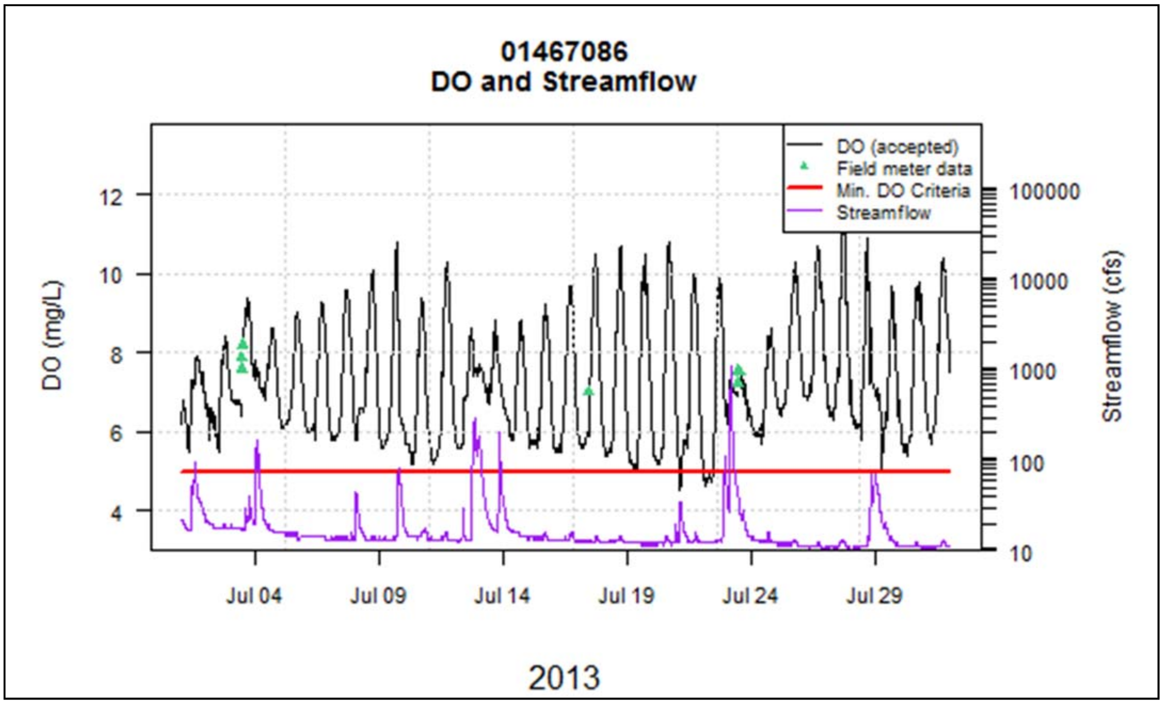


Figure 10. Gage 01467086, Dissolved Oxygen and Streamflow, July 2013.

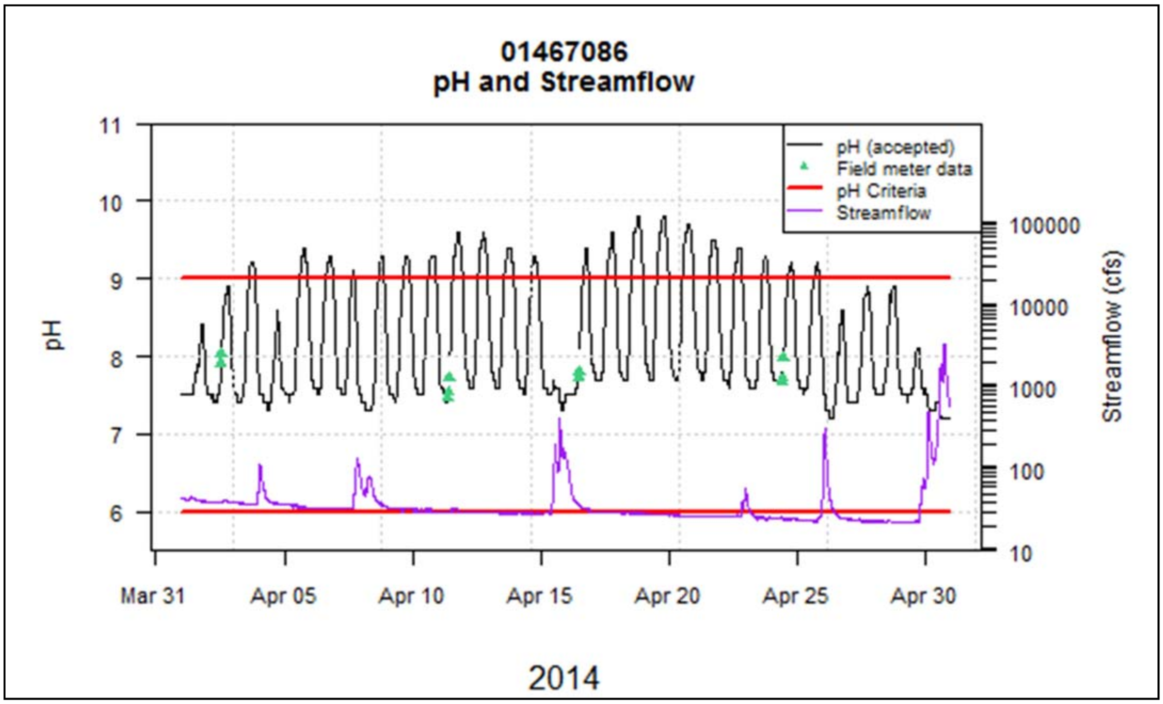


Figure 11. Gage 01467086, pH and Streamflow, April 2014.

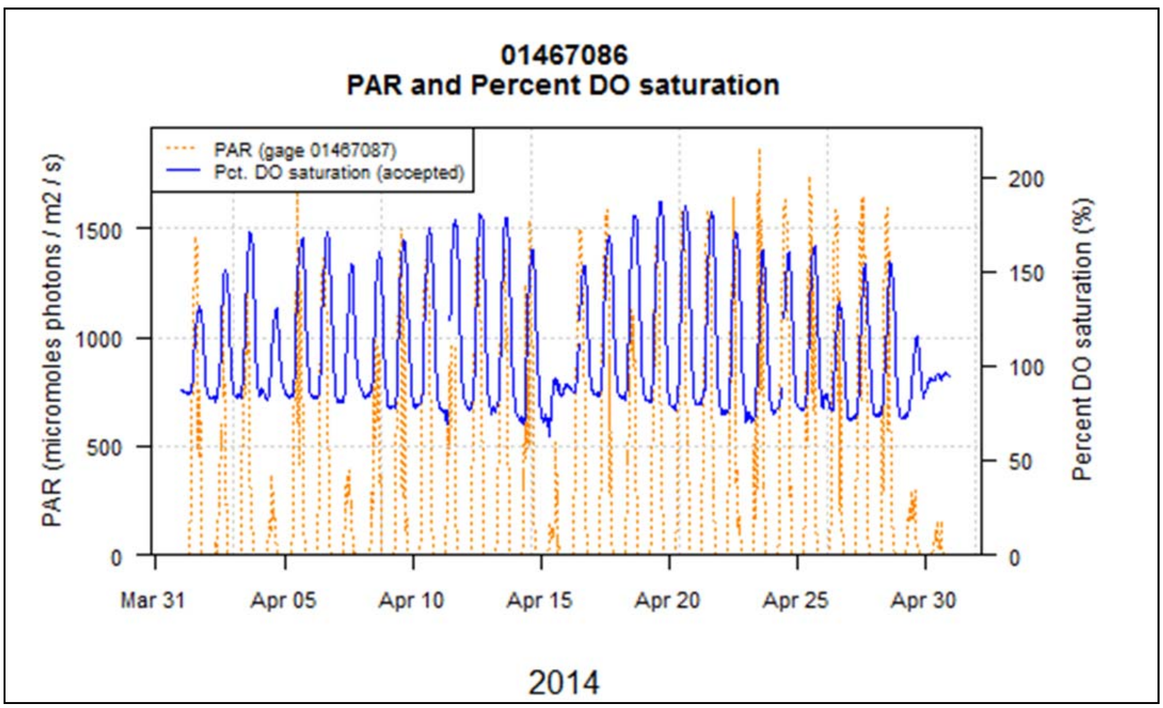


Figure 12. Gage 01467086, PAR and Percent Dissolved Oxygen Saturation, April 2014.

Figure 13. Gage 01467086, Tacony Creek at Adams Ave.

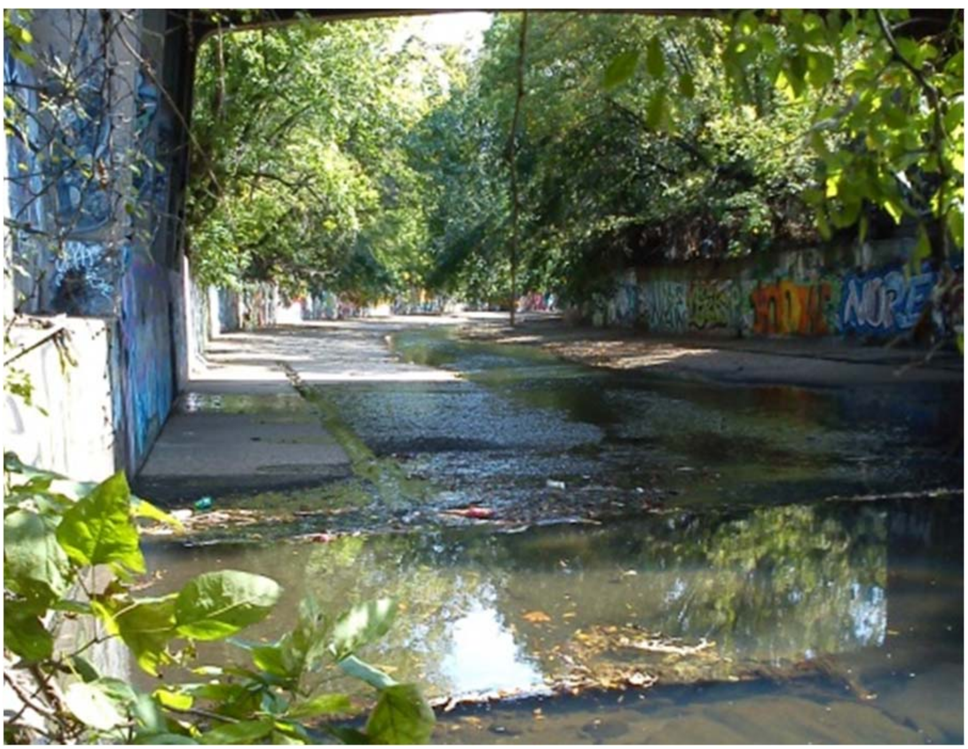


Figure 14. Gage 01467087, Frankford Creek at Castor Ave., looking downstream

Specific Conductance

Specific conductance observations were usually consistent between the two gage sites (Tables 19-20). Mean and maximum values of specific conductance were observed in March and are likely due to the effects of road salt entering the stream.

Table 19. Gage 01467086 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	740.5	30.9	0.5	112.0	687.0	541.5
Aug-13	742.0	30.9	0.3	61.0	693.0	519.4
Sep-13	717.0	29.9	0.4	49.0	687.0	567.4
Oct-13	743.0	31.0	0.1	78.0	695.0	575.7
Nov-13	717.0	29.9	0.4	75.0	703.0	606.8
Mar-14	514.0	21.4	0.6	164.0	1620.0	787.4
Apr-14	716.5	29.9	0.5	63.0	736.0	652.1
May-14	742.5	30.9	0.2	98.0	709.0	602.6
Jun-14	694.0	28.9	3.6	79.0	736.0	600.2

Table 20. Gage 01467087 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	741.5	30.9	0.3	57.0	659.0	475.2
Aug-13	739.5	30.8	0.6	59.0	662.0	448.3
Sep-13	713.5	29.7	0.9	110.0	678.0	493.2
Oct-13	689.0	28.7	7.4	140.0	691.0	563.5
Nov-13	717.0	29.9	0.4	129.0	692.0	597.2
Mar-14	438.5	18.3	15.1	159.0	1440.0	779.8
Apr-14	675.0	28.1	6.3	44.0	723.0	615.3
May-14	738.0	30.8	0.8	90.0	726.0	572.7
Jun-14	710.5	29.6	1.3	87.0	713.0	584.9

Temperature

Monthly mean temperatures observed at the downstream gage were usually higher than at the upstream gage. Consequently, a higher rate of temperature criteria exceedance was typically observed at the downstream gage in March, April and May (Tables 21-22).

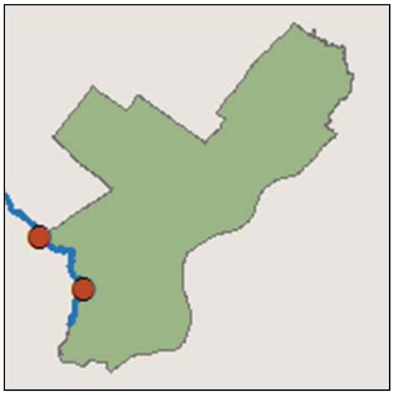
Table 21. Gage 01467086 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	0.0	100.0	0.5	740.5	30.9	19.5	28.8	24.1
WWF	1-Aug	15-Aug	0.0	100.0	0.3	359.0	15.0	18.0	25.0	21.7
WWF	16-Aug	31-Aug	0.0	100.0	0.3	383.0	16.0			
WWF	1-Sep	15-Sep	0.0	100.0	0.6	358.0	14.9	13.5	25.6	18.7
WWF	16-Sep	30-Sep	0.0	100.0	0.3	359.0	15.0			
WWF	1-Oct	15-Oct	1.0	99.0	0.0	360.0	15.0	7.6	22.6	14.6
WWF	16-Oct	31-Oct	0.0	100.0	0.3	383.0	16.0			
WWF	1-Nov	15-Nov	8.6	91.4	0.4	358.5	14.9	0.6	16.2	7.8
WWF	16-Nov	30-Nov	14.1	85.9	0.4	358.5	14.9			
WWF	1-Mar	31-Mar	33.3	66.7	0.4	514.0	21.4	2.2	12.0	7.0
WWF	1-Apr	15-Apr	59.8	40.2	0.4	358.5	14.9	7.2	19.7	12.6
WWF	16-Apr	30-Apr	31.4	68.6	0.6	358.0	14.9			
WWF	1-May	15-May	15.5	84.5	0.4	358.5	14.9	10.8	21.3	16.2
WWF	16-May	31-May	0.0	100.0	0.0	384.0	16.0			
WWF	1-Jun	15-Jun	0.0	100.0	6.0	338.5	14.1	15.4	25.4	20.6
WWF	16-Jun	30-Jun	0.0	100.0	0.3	359.0	15.0			

Table 22. Gage 01467087 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	0.0	100.0	0.3	741.5	30.9	21.6	30.2	25.4
WWF	1-Aug	15-Aug	0.0	100.0	0.7	357.5	14.9	20.2	26.1	22.8
WWF	16-Aug	31-Aug	0.0	100.0	0.5	382.0	15.9			
WWF	1-Sep	15-Sep	0.0	100.0	0.7	357.5	14.9	15.3	26.1	19.7
WWF	16-Sep	30-Sep	0.0	100.0	1.1	356.0	14.8			
WWF	1-Oct	15-Oct	2.5	97.5	7.2	334.0	13.9	8.4	22.8	15.1
WWF	16-Oct	31-Oct	0.0	100.0	8.6	351.0	14.6			
WWF	1-Nov	15-Nov	10.6	89.4	0.6	358.0	14.9	2.0	16.8	8.1
WWF	16-Nov	30-Nov	17.1	82.9	0.3	359.0	15.0			
WWF	1-Mar	31-Mar	28.0	72.0	14.4	441.5	18.4	3.9	11.8	6.9
WWF	1-Apr	15-Apr	68.5	31.5	1.3	355.5	14.8	8.6	18.6	13.1
WWF	16-Apr	30-Apr	42.0	58.0	0.7	357.5	14.9			
WWF	1-May	15-May	26.3	73.7	0.7	357.5	14.9	11.6	21.0	17.0
WWF	16-May	31-May	0.0	100.0	0.4	382.5	15.9			
WWF	1-Jun	15-Jun	0.0	100.0	2.2	352.0	14.7	17.4	25.9	21.6
WWF	16-Jun	30-Jun	0.0	100.0	0.4	358.5	14.9			

Cobbs Creek (Gages 01475530 and 01475548)



Dissolved oxygen and pH

The Cobbs Creek sites usually met the minimum dissolved oxygen criterion and never exceeded the 7-day average guideline (Tables 23-24, Figures 15-19). The daily mean values are presented in Tables 23-24 for informational purposes.

The pattern of dissolved oxygen and pH values between the upstream (01475530) and downstream (01475548) Cobbs Creek gages is likely due to greater algal activity at the downstream gage. During March and April—key months for algal growth—higher pH was observed at the downstream gage (Tables 27-28). Algae remove CO_2 during photosynthesis, raising pH by shifting the dissolved inorganic carbon (DIC) balance toward alkaline carbonates. Furthermore, the diel fluctuations in DO were more pronounced at the downstream gage during these months (Figures 19-20).

A third indicator of increased algal activity at 01475548 is the supersaturation of oxygen caused by photosynthesis. During April, the upstream gage recorded peak DO saturation levels over 120% during the day, while the downstream gage recorded peak DO saturation levels over 150% (Figures 21-22).

Table 23. Gage 01475530 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	742.5	30.9	0.2	0.0	100.0	6.1	10.3	7.7
Aug-13	WWF	741.5	30.9	0.3	0.0	100.0	4.4	11.7	8.2
Sep-13	WWF	719.0	30.0	0.1	0.1	99.9	3.2	11.8	8.9
Oct-13	WWF	742.5	30.9	0.2	0.0	100.0	6.8	13.4	9.5
Nov-13	WWF	719.0	30.0	0.1	0.0	100.0	7.7	15.1	11.1
Mar-14	WWF	489.0	20.4	0.0	0.0	100.0	9.6	15.4	12.1
Apr-14	WWF	719.0	30.0	0.1	0.0	100.0	7.7	14.1	10.6
May-14	WWF	743.0	31.0	0.1	0.0	100.0	7.2	11.5	9.3
Jun-14	WWF	719.0	30.0	0.1	0.0	100.0	6.3	10.3	8.2

Table 24. Gage 01475548 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	705.5	29.4	5.2	0.4	99.6	2.9	10.4	6.8
Aug-13	WWF	741.5	30.9	0.3	0.0	100.0	5.0	12.2	7.9
Sep-13	WWF	694.0	28.9	3.6	0.0	100.0	6.2	11.8	8.3
Oct-13	WWF	740.0	30.8	0.5	0.0	100.0	5.0	13.8	9.3
Nov-13	WWF	719.0	30.0	0.1	0.0	100.0	6.3	14.6	10.4
Mar-14	WWF	493.0	20.5	0.0	0.0	100.0	8.9	18.9	12.9
Apr-14	WWF	713.0	29.7	1.0	0.0	100.0	6.4	17.4	11.0
May-14	WWF	731.5	30.5	1.7	0.0	100.0	4.5	12.3	8.4
Jun-14	WWF	704.0	29.3	2.2	0.1	99.9	3.8	9.6	6.7

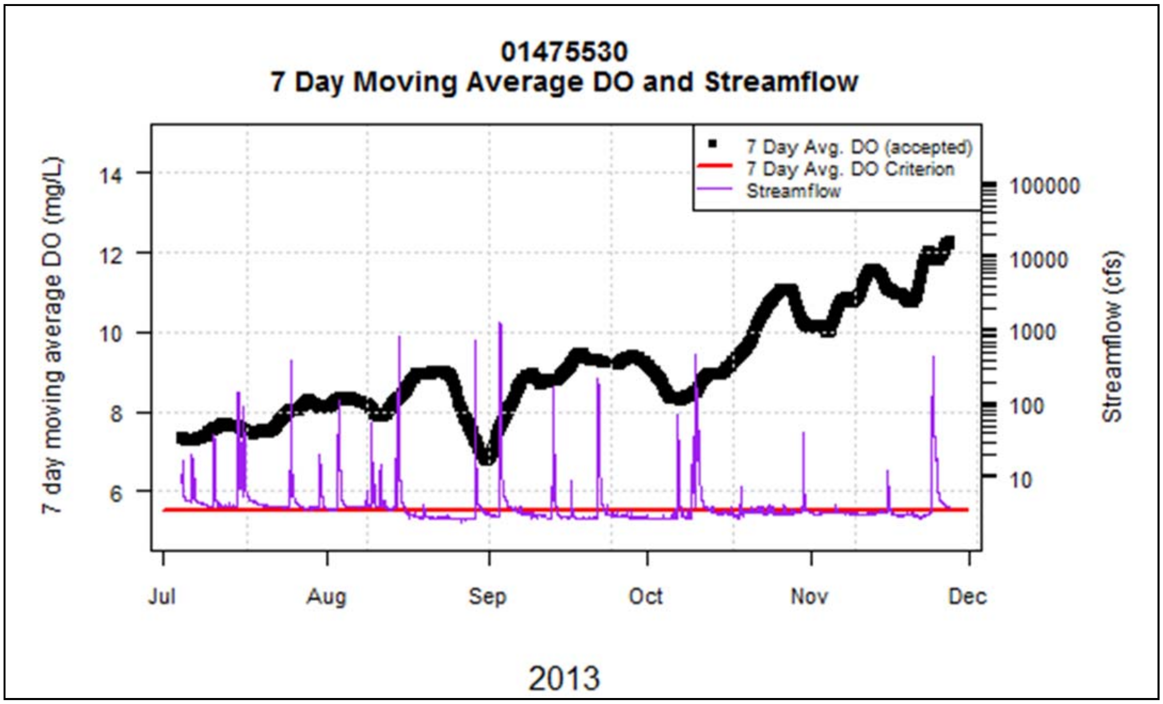


Figure 15. Gage 01475530, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

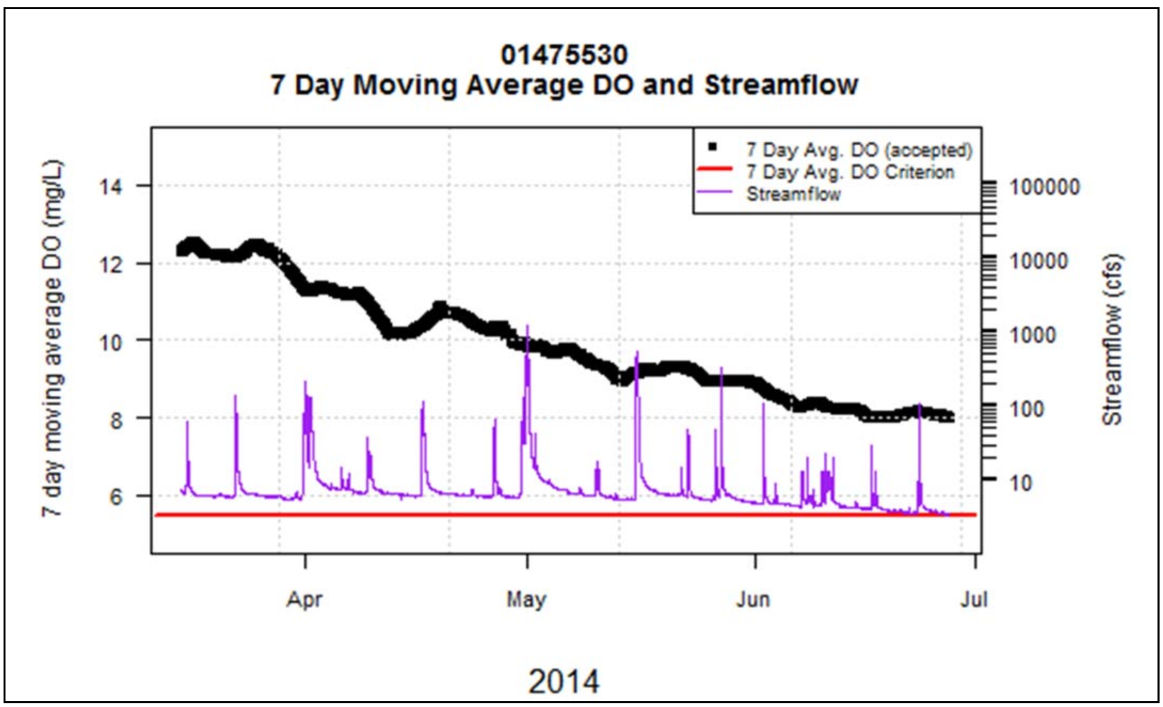


Figure 16. Gage 01475530, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

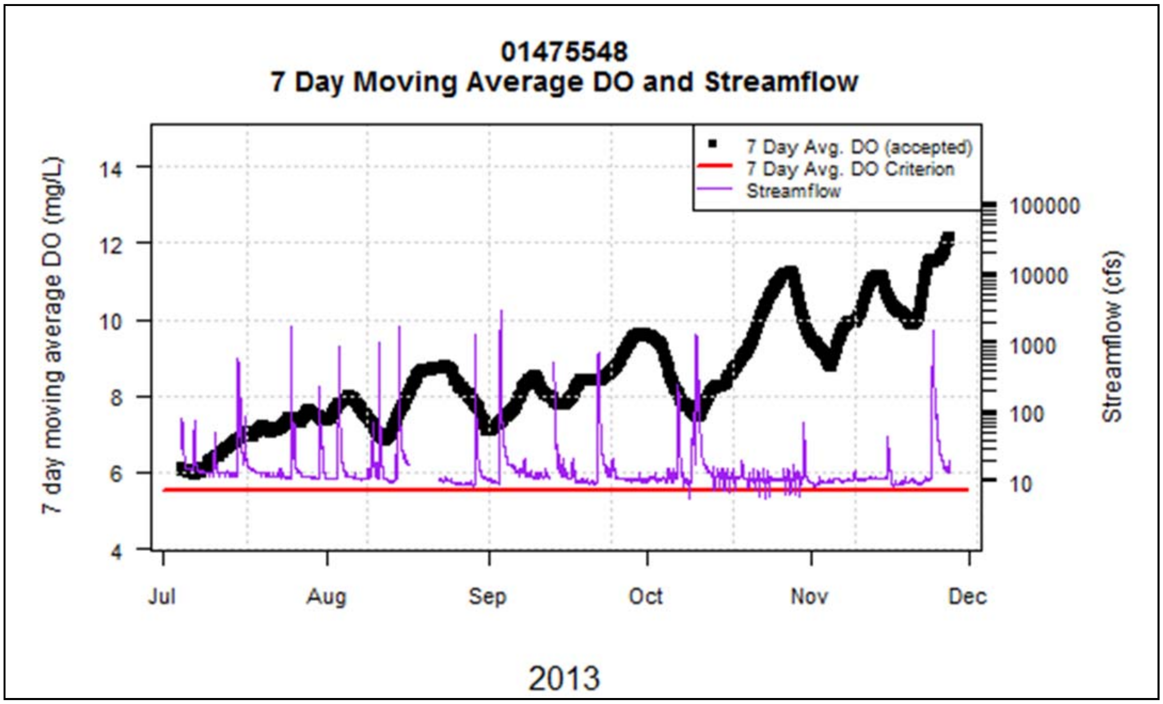


Figure 17. Gage 01475548, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

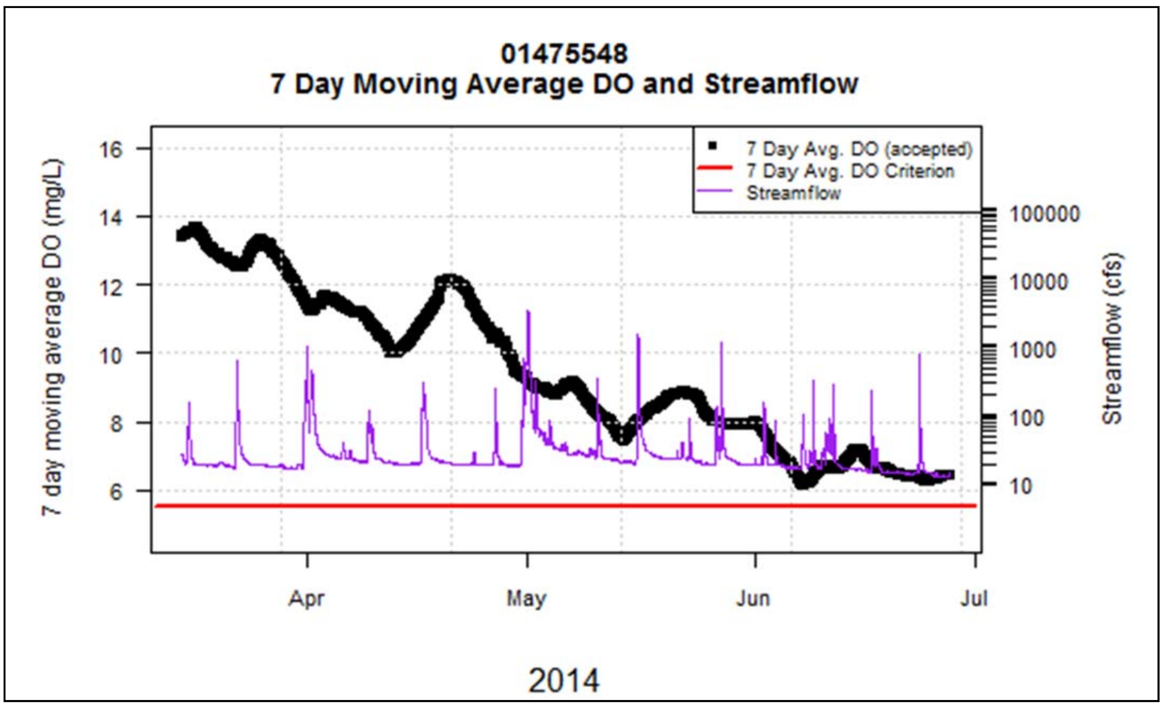


Figure 18. Gage 01475548, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 25. Gage 01475530 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	30.0	3.2	6.9	8.6	7.7
Aug-13	WWF	29.0	6.5	5.2	9.3	8.2
Sep-13	WWF	29.0	3.3	6.8	9.6	8.8
Oct-13	WWF	30.0	3.2	7.5	11.3	9.5
Nov-13	WWF	29.0	3.3	8.5	13.4	11.1
Mar-14	WWF	20.0	1.8	10.8	13.1	12.1
Apr-14	WWF	29.0	3.3	8.8	11.6	10.6
May-14	WWF	30.0	3.2	8.1	9.9	9.3
Jun-14	WWF	29.0	3.3	7.5	9.1	8.2

Table 26. Gage 01475548 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	28.0	9.7	5.6	8.2	6.8
Aug-13	WWF	29.0	6.5	6.0	9.2	7.8
Sep-13	WWF	25.0	16.7	6.6	9.7	8.3
Oct-13	WWF	28.0	9.7	6.4	11.5	9.3
Nov-13	WWF	29.0	3.3	7.3	12.9	10.3
Mar-14	WWF	20.0	2.6	10.9	14.7	12.8
Apr-14	WWF	26.0	13.3	7.2	12.7	10.9
May-14	WWF	25.0	19.4	6.3	9.7	8.3
Jun-14	WWF	26.0	13.3	5.2	8.4	6.7

Table 27. Gage 01475530 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	6.7	7.9	7.4
Aug-13	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.7	8.7	7.5
Sep-13	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	6.6	8.4	7.5
Oct-13	568.5	23.7	23.6	0.0	0.0	0	0	100.0	100.0	6.9	8.4	7.5
Nov-13	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	6.7	8.3	7.4
Mar-14	489.0	20.4	0.0	0.0	0.0	0	0	100.0	100.0	7.1	8.6	7.4
Apr-14	716.5	29.9	0.5	0.0	0.0	0	0	100.0	100.0	6.8	8.8	7.5
May-14	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	6.9	7.8	7.3
Jun-14	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	7.0	7.7	7.3

Table 28. Gage 01475548 pH Criteria Summary Results by Month

Month	total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.5	8.3	7.4
Aug-13	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.5	8.7	7.6
Sep-13	565.5	23.6	21.5	0.0	0.0	0	0	100.0	100.0	6.4	8.2	7.5
Oct-13	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	8.7	7.8
Nov-13	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	6.8	8.3	7.7
Mar-14	493.0	20.5	0.0	6.2	23.8	0	0	93.8	76.2	7.3	9.5	8.1
Apr-14	717.5	29.9	0.3	7.9	26.7	0	0	92.1	73.3	7.1	9.4	8.0
May-14	730.5	30.4	1.8	0.0	0.0	0	0	100.0	100.0	7.0	8.1	7.5
Jun-14	716.5	29.9	0.5	0.0	0.0	0	0	100.0	100.0	6.8	8.0	7.4

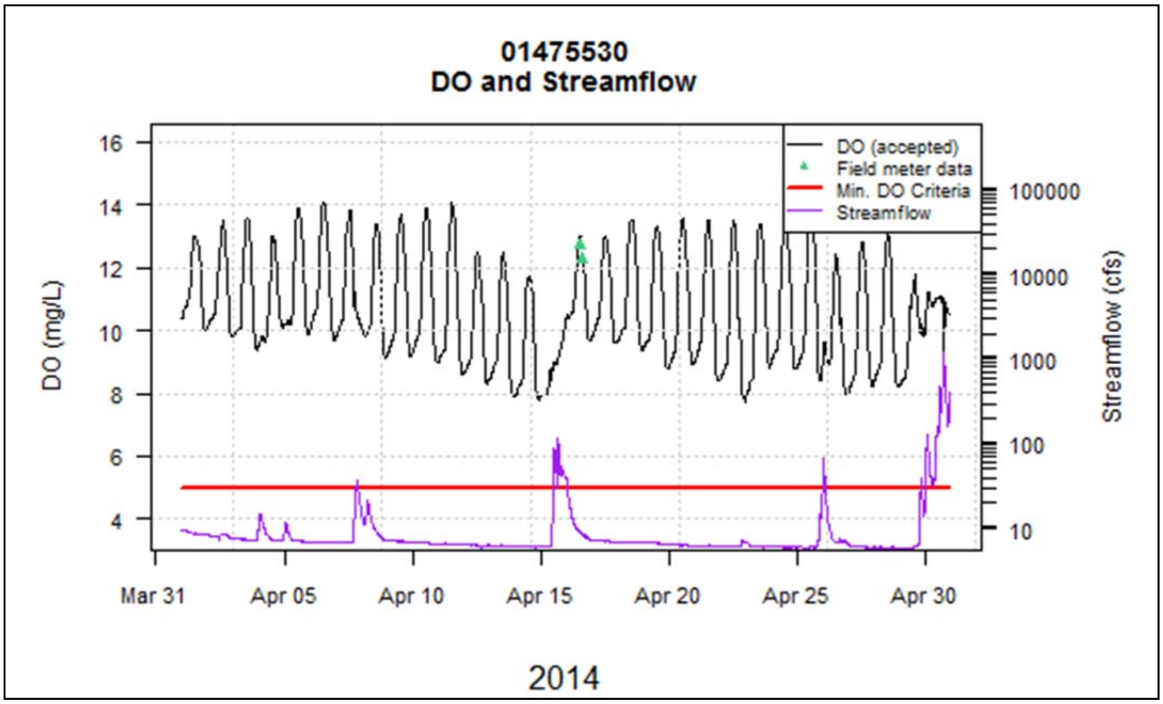


Figure 19. Gage 01475530, Dissolved Oxygen and Streamflow, April 2014.

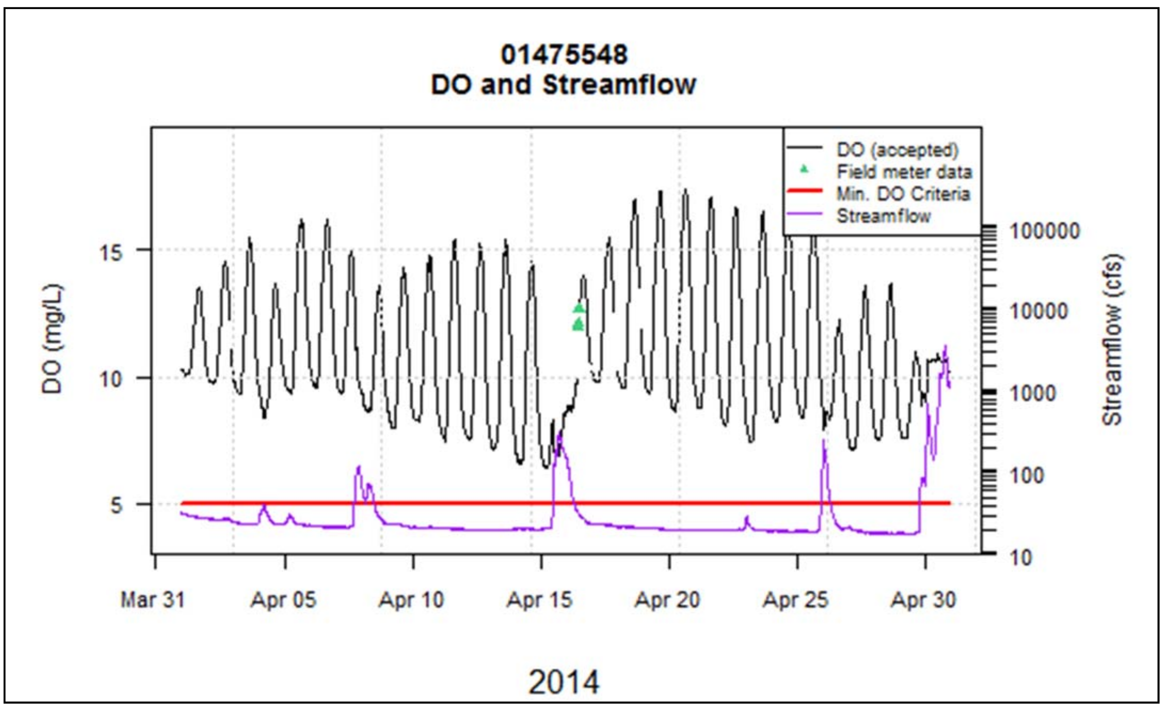


Figure 20. Gage 01475548, Dissolved Oxygen and Streamflow, April 2014.

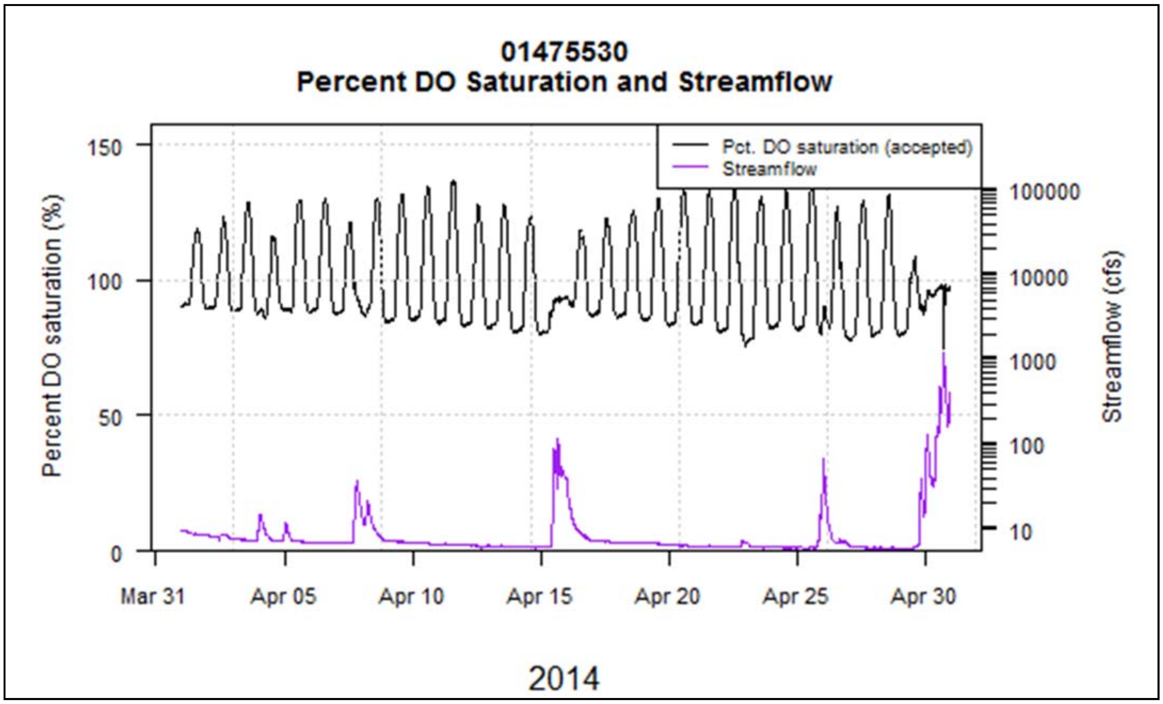


Figure 21. Gage 01475530, Percent DO Saturation and Streamflow, April 2014.

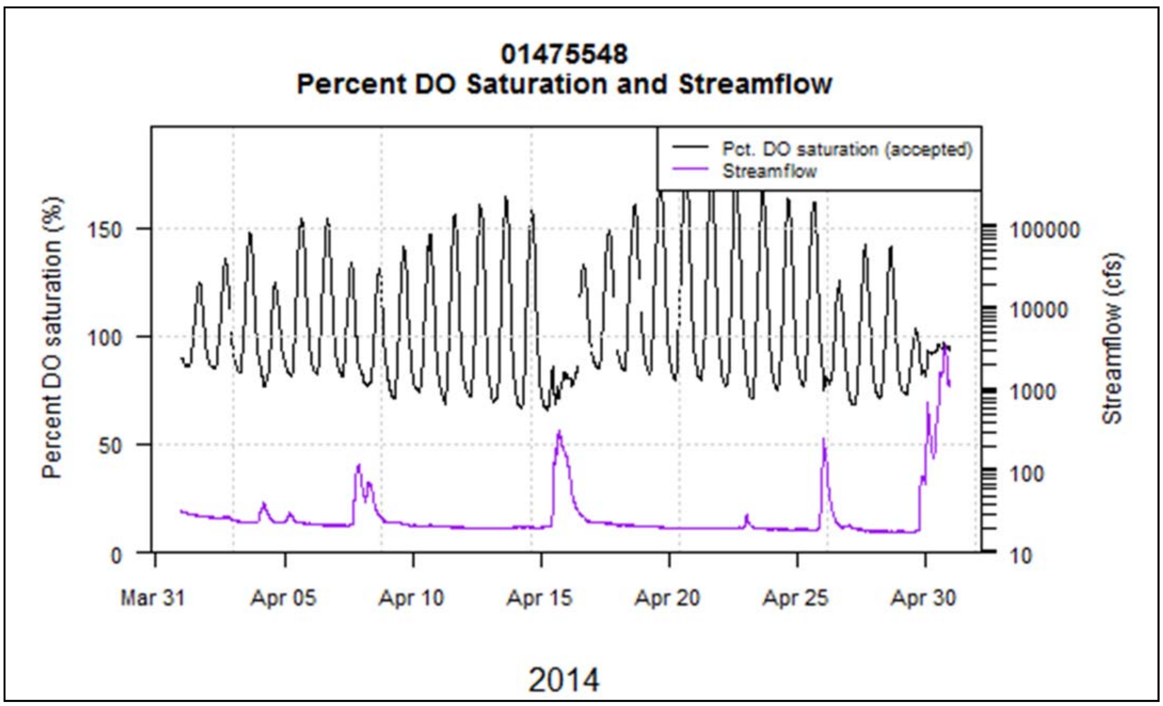


Figure 22. Gage 01475548, Percent DO Saturation and Streamflow, April 2014.

Figure 23. Gage 01475530, Cobbs Creek at Rte. 1, looking upstream

Figure 24. Gage 01475548, Cobbs Creek at Mt. Moriah Cemetery

Specific Conductance

Specific conductance observations were similar to those observed in Tacony Creek, with the exception of consistently higher conductance observed at the downstream gage 01475548 (Tables 29-30). The typical pattern of stormwater lowering conductance levels in the stream is well-observed during the frequent storms that occurred in June (Figures 25-26).

Table 29. Gage 01475530 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	742.5	30.9	0.2	67.0	511.0	366.7
Aug-13	741.5	30.9	0.3	53.0	504.0	419.7
Sep-13	702.0	29.3	2.5	37.0	567.0	404.1
Oct-13	684.0	28.5	8.1	56.0	526.0	434.0
Nov-13	718.5	29.9	0.2	63.0	506.0	427.0
Mar-14	444.5	18.5	9.1	164.0	1690.0	627.3
Apr-14	704.0	29.3	2.2	41.0	659.0	511.4
May-14	742.0	30.9	0.3	71.0	585.0	489.2
Jun-14	717.5	29.9	0.3	144.0	577.0	493.8

Table 30. Gage 01475548 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	742.0	30.9	0.3	123.0	624.0	498.4
Aug-13	642.5	26.8	13.6	68.0	644.0	458.0
Sep-13	694.0	28.9	3.6	79.0	631.0	453.2
Oct-13	692.0	28.8	7.0	161.0	687.0	559.7
Nov-13	719.0	30.0	0.1	92.0	648.0	566.5
Mar-14	493.0	20.5	0.0	222.0	2240.0	840.0
Apr-14	716.5	29.9	0.5	77.0	727.0	605.9
May-14	732.0	30.5	1.6	89.0	678.0	564.3
Jun-14	717.5	29.9	0.3	167.0	664.0	569.1

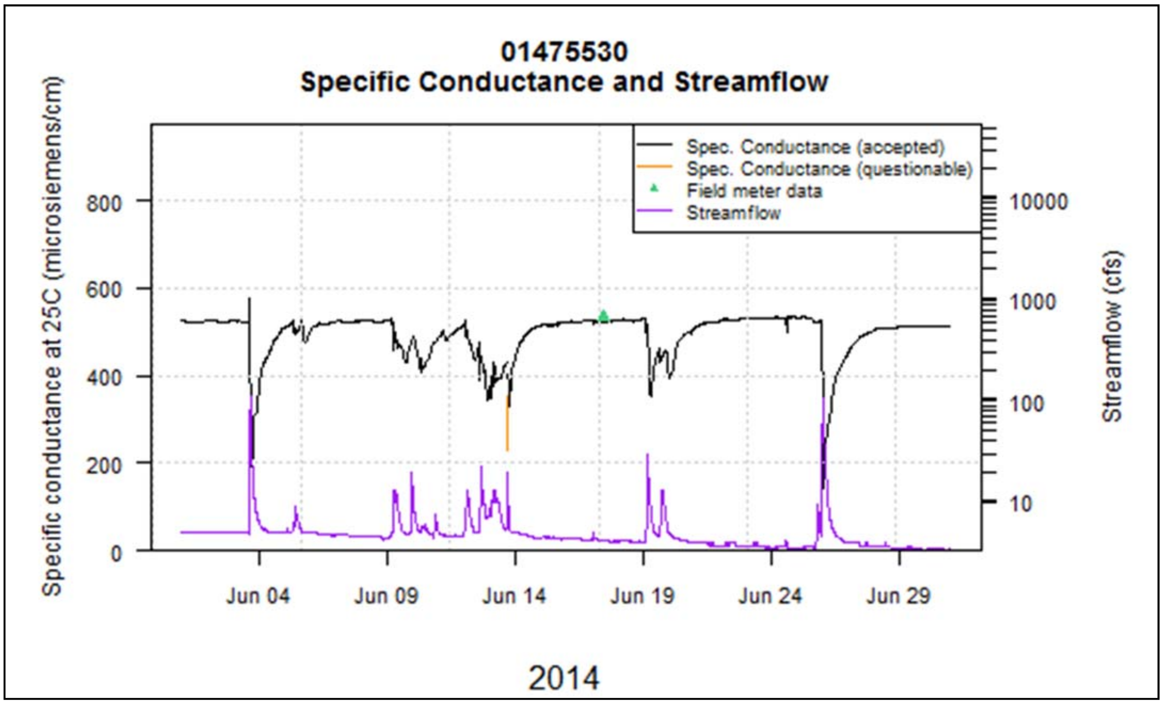


Figure 25. Gage 01475530, Specific Conductance and Streamflow, June 2014.

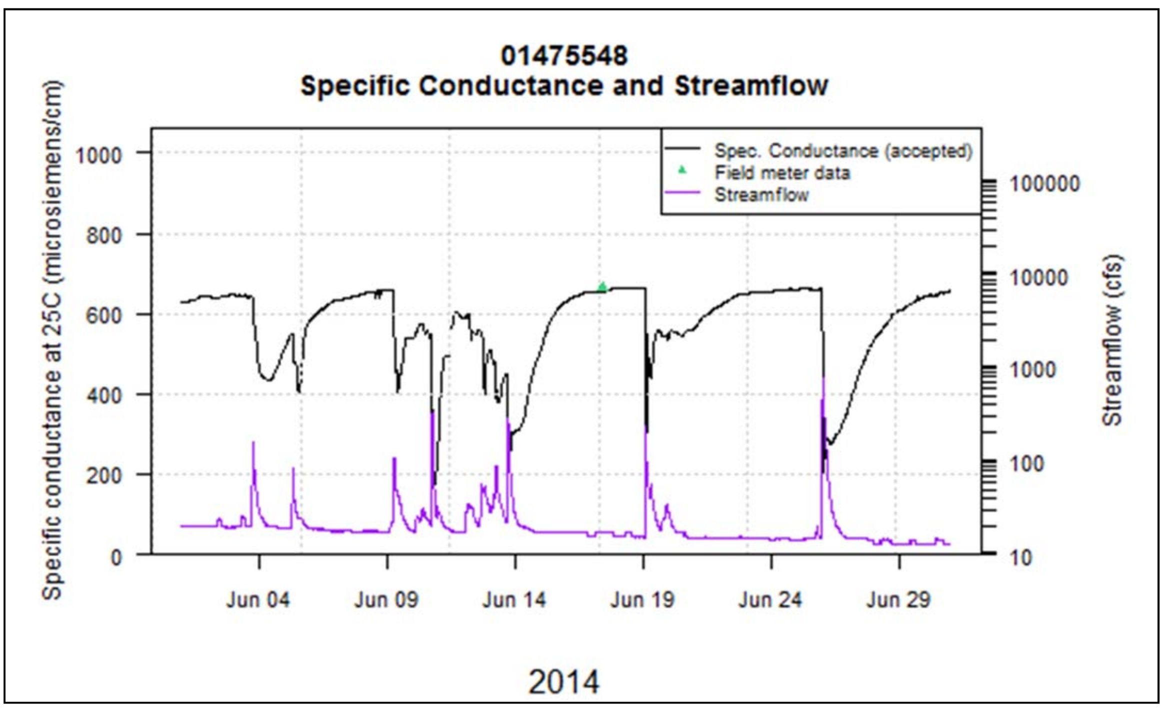


Figure 26. Gage 01475548, Specific Conductance and Streamflow, June 2014.

Temperature

As was also observed in Tacony Creek, slightly higher temperatures were usually recorded at the downstream gage in Cobbs Creek, resulting in more frequent exceedance of temperature maximum criteria at the downstream gage in April and May (Tables 31-32).

Table 31. Gage 01475530 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	0.0	100.0	0.2	742.5	30.9	18.9	26.9	22.8
WWF	1-Aug	15-Aug	0.0	100.0	0.3	359.0	15.0	17.3	24.4	20.6
WWF	16-Aug	31-Aug	0.0	100.0	0.4	382.5	15.9			
WWF	1-Sep	15-Sep	0.0	100.0	0.0	360.0	15.0	13.4	24.2	17.9
WWF	16-Sep	30-Sep	0.0	100.0	0.3	359.0	15.0			
WWF	1-Oct	15-Oct	0.0	100.0	0.0	360.0	15.0	8.2	21.3	14.5
WWF	16-Oct	31-Oct	0.0	100.0	0.4	382.5	15.9			
WWF	1-Nov	15-Nov	8.2	91.8	0.3	359.0	15.0	1.8	16.1	8.3
WWF	16-Nov	30-Nov	15.7	84.3	0.0	360.0	15.0			
WWF	1-Mar	31-Mar	32.1	67.9	0.6	489.0	20.4	2.6	11.8	7.0
WWF	1-Apr	15-Apr	58.2	41.8	0.0	360.0	15.0	7.0	18.8	12.3
WWF	16-Apr	30-Apr	24.1	75.9	0.3	359.0	15.0			
WWF	1-May	15-May	12.4	87.6	0.0	360.0	15.0	10.7	21.6	15.8
WWF	16-May	31-May	0.0	100.0	0.3	383.0	16.0			
WWF	1-Jun	15-Jun	0.0	100.0	0.3	359.0	15.0	14.6	25.3	19.6
WWF	16-Jun	30-Jun	0.0	100.0	0.3	359.0	15.0			

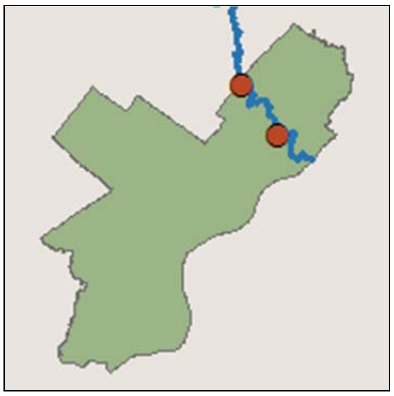
Table 32. Gage 01475548 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	0.0	100.0	0.3	742.0	30.9	20.5	29.0	24.6
WWF	1-Aug	15-Aug	0.0	100.0	0.3	359.0	15.0	18.8	26.4	21.9
WWF	16-Aug	31-Aug	0.0	100.0	0.4	382.5	15.9			
WWF	1-Sep	15-Sep	0.0	100.0	6.1	338.0	14.1	14.3	25.6	18.6
WWF	16-Sep	30-Sep	0.0	100.0	1.1	356.0	14.8			
WWF	1-Oct	15-Oct	0.1	99.9	0.0	360.0	15.0	8.2	22.4	14.8
WWF	16-Oct	31-Oct	0.0	100.0	0.7	381.5	15.9			
WWF	1-Nov	15-Nov	9.9	90.1	0.0	360.0	15.0	1.3	16.1	8.0
WWF	16-Nov	30-Nov	14.6	85.4	0.3	359.0	15.0			
WWF	1-Mar	31-Mar	31.4	68.6	0.0	493.0	20.5	2.6	11.0	6.9
WWF	1-Apr	15-Apr	62.5	37.5	0.0	360.0	15.0	7.9	19.3	12.8
WWF	16-Apr	30-Apr	33.0	67.0	0.7	357.5	14.9			
WWF	1-May	15-May	21.1	78.9	2.5	351.0	14.6	11.6	21.0	16.7
WWF	16-May	31-May	0.0	100.0	0.4	382.5	15.9			
WWF	1-Jun	15-Jun	0.0	100.0	0.4	358.5	14.9	16.0	26.1	21.1
WWF	16-Jun	30-Jun	0.0	100.0	0.1	359.5	15.0			

Gages in Separate Sewer System Watersheds

Gages in the Pennypack, Wissahickon and Poquessing watersheds are situated in the separate sewer system areas of Philadelphia. Although these sites are not affected by combined sewer overflows, discharge of untreated stormwater runoff from stormwater outfalls can negatively affect water quality.

Pennypack Creek (Gages 01467042 and 01467048)



Dissolved oxygen and pH

Both the upstream (01467042) and downstream (01467048) gages of Pennypack Creek showed pronounced diel fluctuations in dissolved oxygen and pH as a result of algal activity. These patterns are most evident during dry weather periods, when algal growth is able to excel because of abundant sunshine and a lack of storm events that might otherwise scour the algal population.

At both upstream and downstream Pennypack Creek gages, periods of dry weather in warm months are conducive to excessive algal growth. During these periods, algal populations seemed to flourish, with daily DO amplitudes sometimes higher than 10 mg/L during April (Figures 33-34).

In April, maximum daily pH fluctuations of approximately 1.5 units were observed (Figures 33-34). Maximum pH criteria exceedance occurred mainly at both gages in the spring. It would be reasonable to conclude that if not for periodic interruptions of algal activity due to rainfall, those extreme fluctuations and chronic pH criteria exceedance would likely occur through the entire season.

Algal communities in the area of both gages recover quickly after storm events, as seen in Figures 33-34. Prior to the storm event in April 2014, both DO and pH showed the typical pronounced fluctuations indicative of strong algal activity. This stopped abruptly with the storm, when much of the algae was likely scoured away and overcast conditions likely inhibited further growth, as indicated by the PAR data at 01467048 for April 2014

(Figure 35). However, within 2-3 days of the conclusion of the rainfall and the return of sunny conditions, fluctuations of DO and pH resumed, indicative of high algal density. This not only demonstrates the resilience of the algal population in this ecosystem, but also a likely abundance of nutrients that allows regrowth to occur so quickly.

Table 33. Gage 01467042 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	TSF	727.5	30.3	2.2	0.0	100.0	6.4	10.2	7.6
Aug-13	TSF	711.5	29.6	4.4	0.0	100.0	6.5	10.9	8.0
Sep-13	TSF	718.5	29.9	0.2	0.0	100.0	6.2	10.5	8.3
Oct-13	TSF	737.0	30.7	0.9	0.0	100.0	5.9	13.3	9.5
Nov-13	TSF	715.5	29.8	0.6	0.0	100.0	4.4	13.9	10.2
Mar-14	TSF	568.0	23.7	10.6	0.0	100.0	9.5	18.2	13.0
Apr-14	TSF	716.5	29.9	0.5	0.0	100.0	6.8	17.8	10.7
May-14	TSF	741.0	30.9	0.4	0.0	100.0	6.7	11.8	8.7
Jun-14	TSF	718.5	29.9	0.2	0.0	100.0	6.2	9.9	7.7

Table 34. Gage 01467048 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	TSF	699.0	29.1	6.0	0.0	100.0	6.0	11.4	7.9
Aug-13	TSF	738.0	30.8	0.8	0.0	100.0	6.4	13.3	8.1
Sep-13	TSF	696.5	29.0	3.3	0.0	100.0	5.9	11.7	8.6
Oct-13	TSF	737.0	30.7	0.9	0.0	100.0	6.1	14.9	9.7
Nov-13	TSF	717.5	29.9	0.3	0.0	100.0	7.7	15.1	11.2
Mar-14	TSF	633.5	26.4	0.2	0.0	100.0	10.5	16.2	12.7
Apr-14	TSF	717.5	29.9	0.3	0.0	100.0	7.4	16.8	11.0
May-14	TSF	740.5	30.9	0.5	0.0	100.0	7.3	14.1	9.4
Jun-14	TSF	716.5	29.9	0.5	0.0	100.0	6.3	10.7	8.3

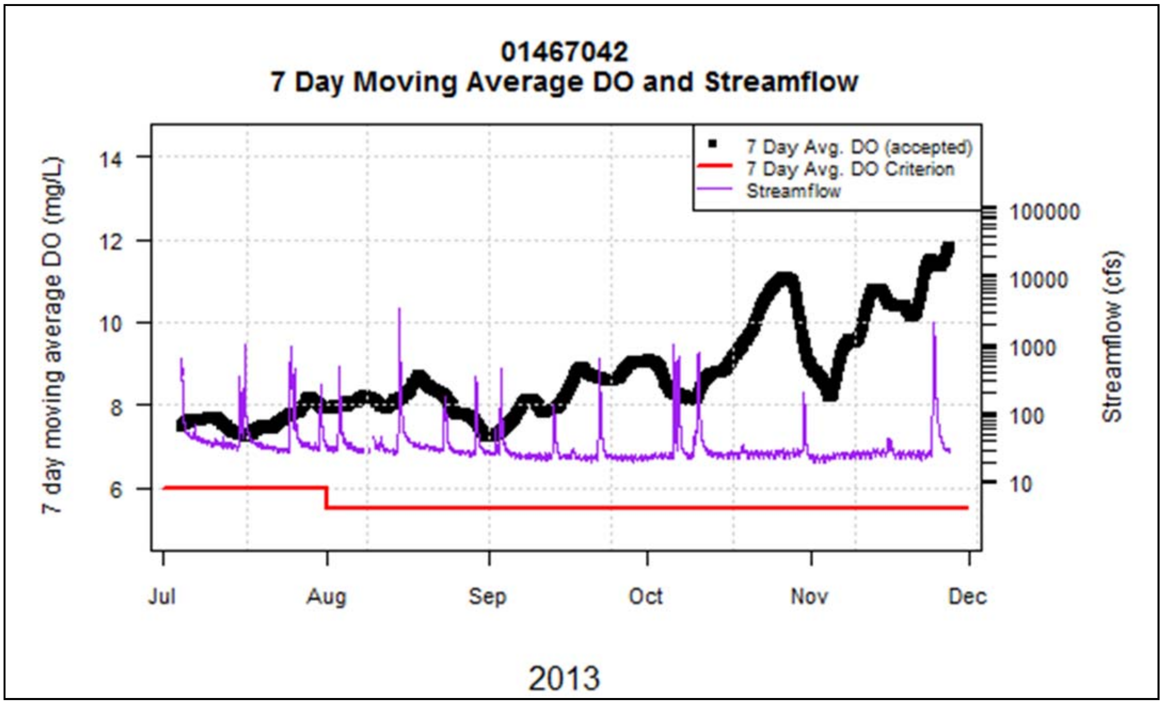


Figure 27. Gage 01467042, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

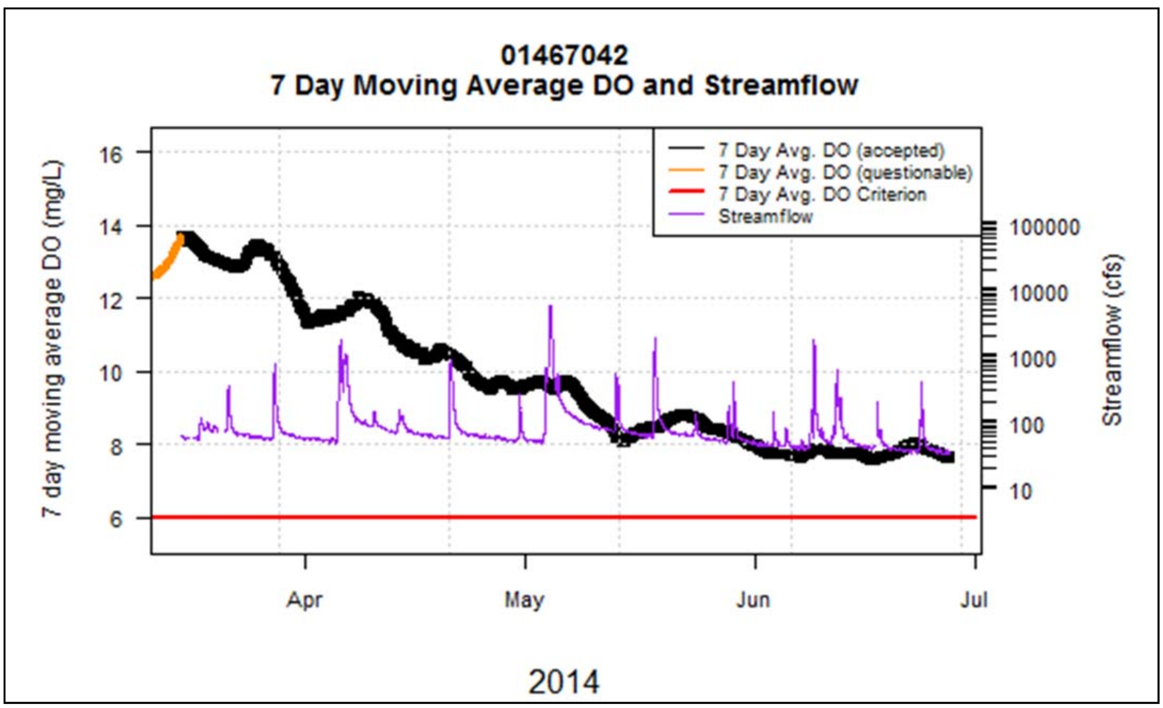


Figure 28. Gage 01467042, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

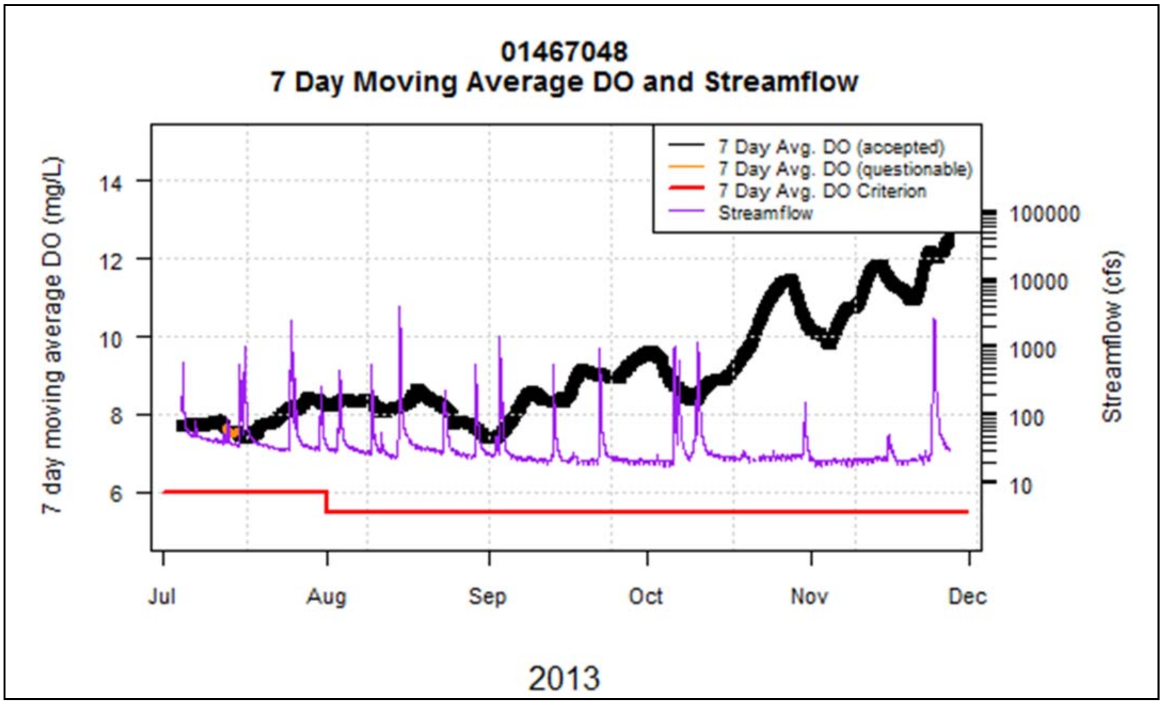


Figure 29. Gage 01467048, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

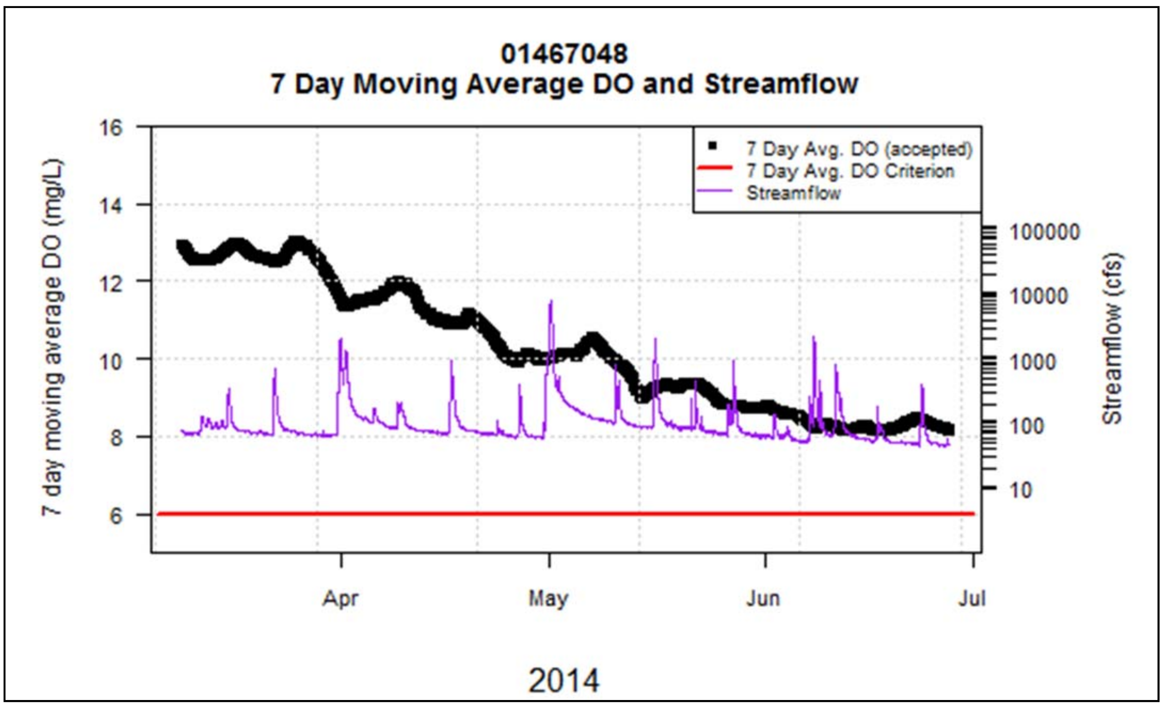


Figure 30. Gage 01467048, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 35. Gage 01467042 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	TSF	18.0	41.9	7.1	8.5	7.6
Aug-13	TSF	24.0	22.6	7.2	9.0	8.0
Sep-13	TSF	29.0	3.3	6.8	9.2	8.3
Oct-13	TSF	28.0	9.7	6.7	11.3	9.5
Nov-13	TSF	26.0	13.3	6.0	12.9	10.3
Mar-14	TSF	20.0	24.5	11.2	14.3	13.0
Apr-14	TSF	28.0	6.7	7.9	12.3	10.7
May-14	TSF	28.0	9.7	7.4	9.9	8.7
Jun-14	TSF	28.0	6.7	7.0	8.4	7.8

Table 36. Gage 01467048 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	TSF	23.0	25.8	7.4	8.7	7.9
Aug-13	TSF	28.0	9.7	7.1	9.2	8.1
Sep-13	TSF	28.0	6.7	7.1	9.6	8.5
Oct-13	TSF	25.0	19.4	7.2	11.7	9.9
Nov-13	TSF	28.0	6.7	8.7	13.3	11.3
Mar-14	TSF	24.0	9.3	11.3	13.7	12.7
Apr-14	TSF	27.0	10.0	8.5	12.2	11.0
May-14	TSF	28.0	9.7	8.1	11.1	9.4
Jun-14	TSF	26.0	13.3	7.7	8.9	8.4

Table 37. Gage 01467042 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hours max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	727.5	30.3	2.2	0.0	0.0	0	0	100.0	100.0	6.9	8.6	7.5
Aug-13	711.5	29.6	4.4	0.0	0.0	0	0	100.0	100.0	7.1	8.7	8.0
Sep-13	718.5	29.9	0.2	0.0	0.0	0	0	100.0	100.0	7.0	7.9	7.6
Oct-13	644.0	26.8	13.4	0.0	0.0	0	0	100.0	100.0	7.3	8.5	7.8
Nov-13	716.0	29.8	0.6	0.0	0.0	0	0	100.0	100.0	7.1	8.1	7.7
Mar-14	568.0	23.7	10.6	0.0	0.0	0	0	100.0	100.0	7.2	9.0	7.9
Apr-14	717.0	29.9	0.4	3.6	16.7	0	0	96.4	83.3	6.7	9.3	7.6
May-14	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	7.9	7.4
Jun-14	717.5	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.1	7.9	7.5

Table 38. Gage 01467048 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	738.5	30.8	0.7	0.0	0.0	0	0	100.0	100.0	6.9	8.6	7.6
Aug-13	738.0	30.8	0.8	0.0	0.0	0	0	100.0	100.0	6.7	8.6	7.5
Sep-13	716.5	29.9	0.5	0.0	0.0	0	0	100.0	100.0	6.6	8.3	7.5
Oct-13	739.0	30.8	0.7	0.0	0.0	0	0	100.0	100.0	6.8	8.7	7.6
Nov-13	717.5	29.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	8.1	7.5
Mar-14	602.0	25.1	5.2	0.0	0.0	0	0	100.0	100.0	7.1	8.9	8.0
Apr-14	717.5	29.9	0.3	3.1	13.3	0	0	96.9	86.7	6.8	9.2	7.9
May-14	740.5	30.9	0.5	0.0	0.0	0	0	100.0	100.0	6.9	8.7	7.5
Jun-14	689.0	28.7	4.3	0.0	0.0	0	0	100.0	100.0	6.9	8.2	7.5

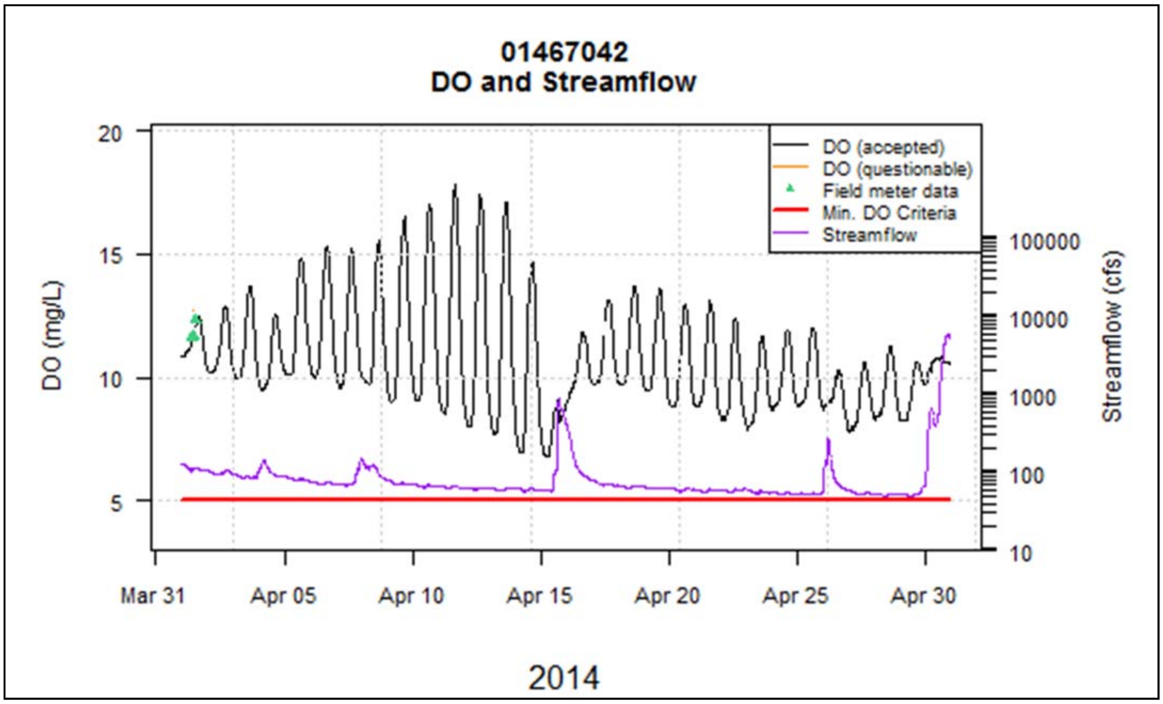


Figure 31. Gage 01467042, Dissolved Oxygen and Streamflow, April 2014.

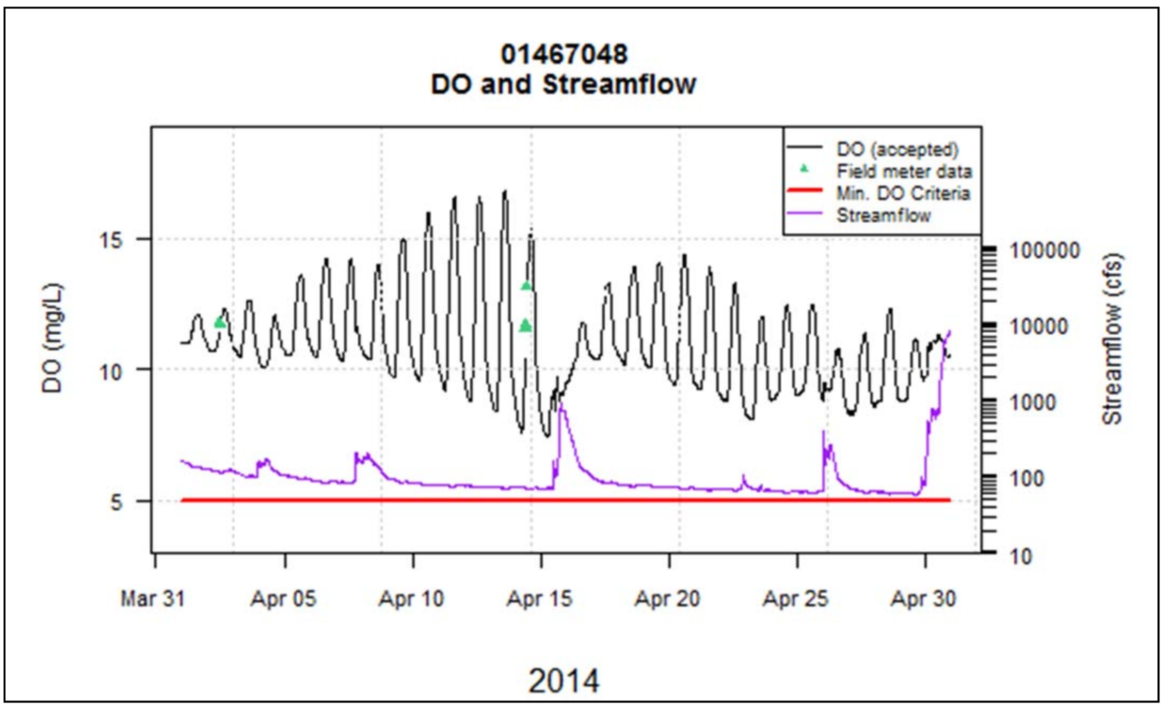


Figure 32. Gage 01467048, Dissolved Oxygen and Streamflow, April 2014.

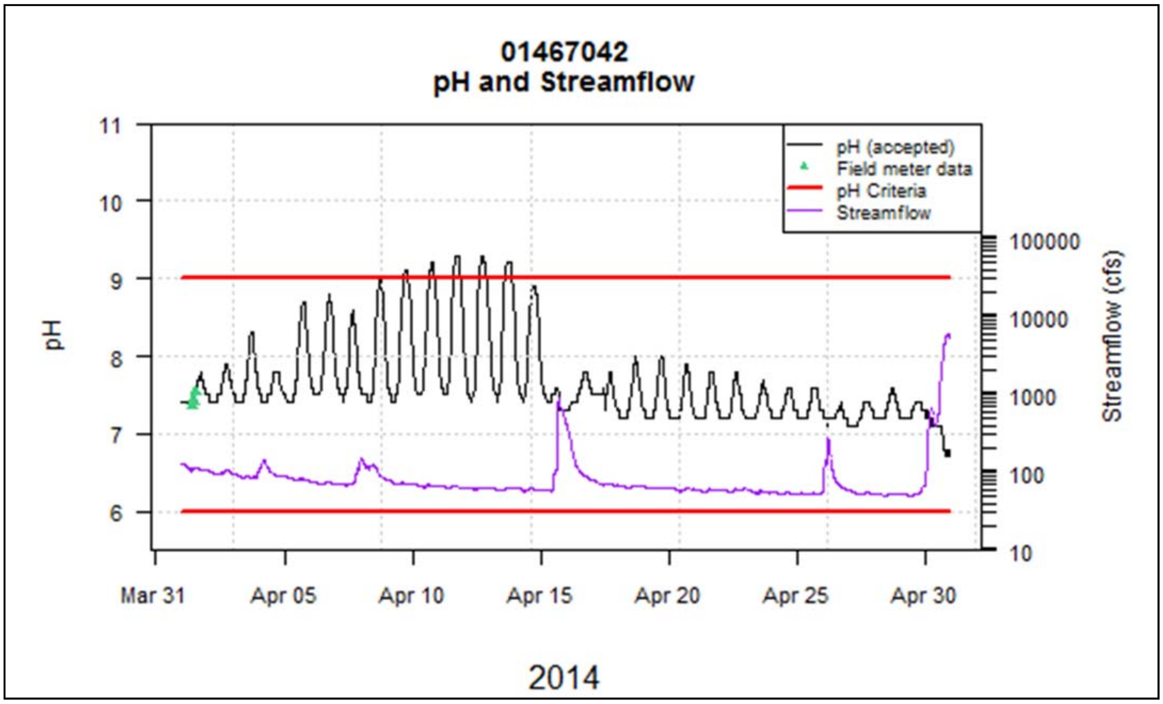


Figure 33. Gage 01467042, pH and Streamflow, April 2014.

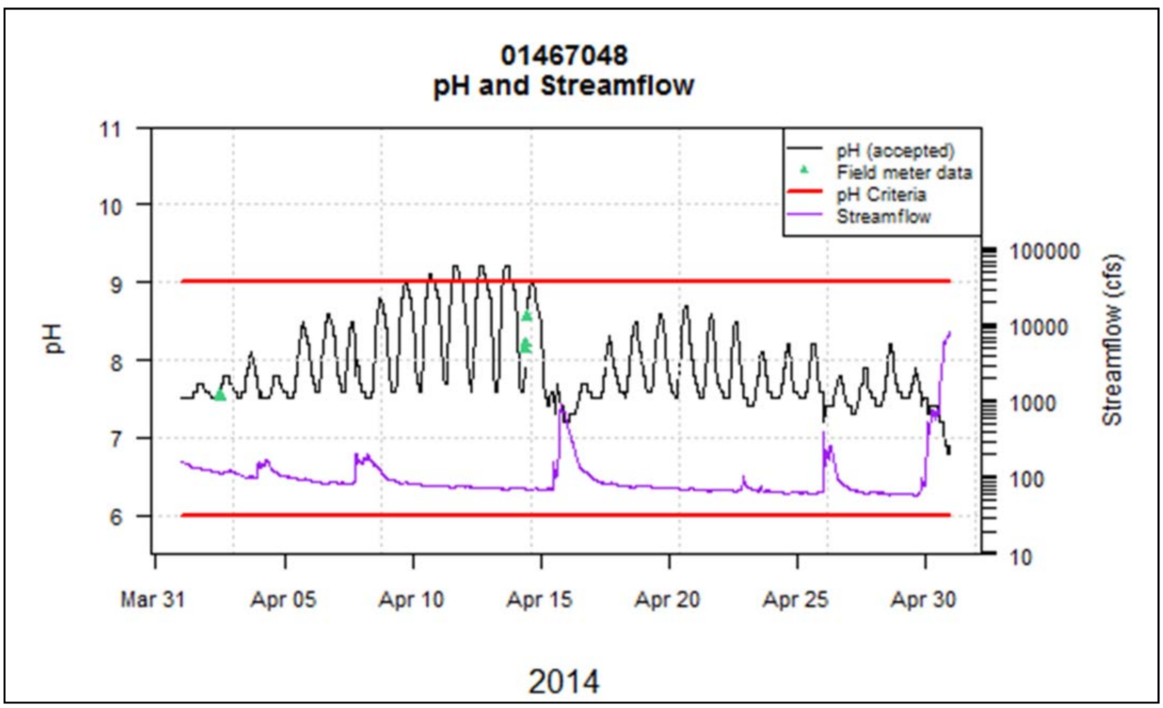


Figure 34. Gage 01467048, pH and Streamflow, April 2014.

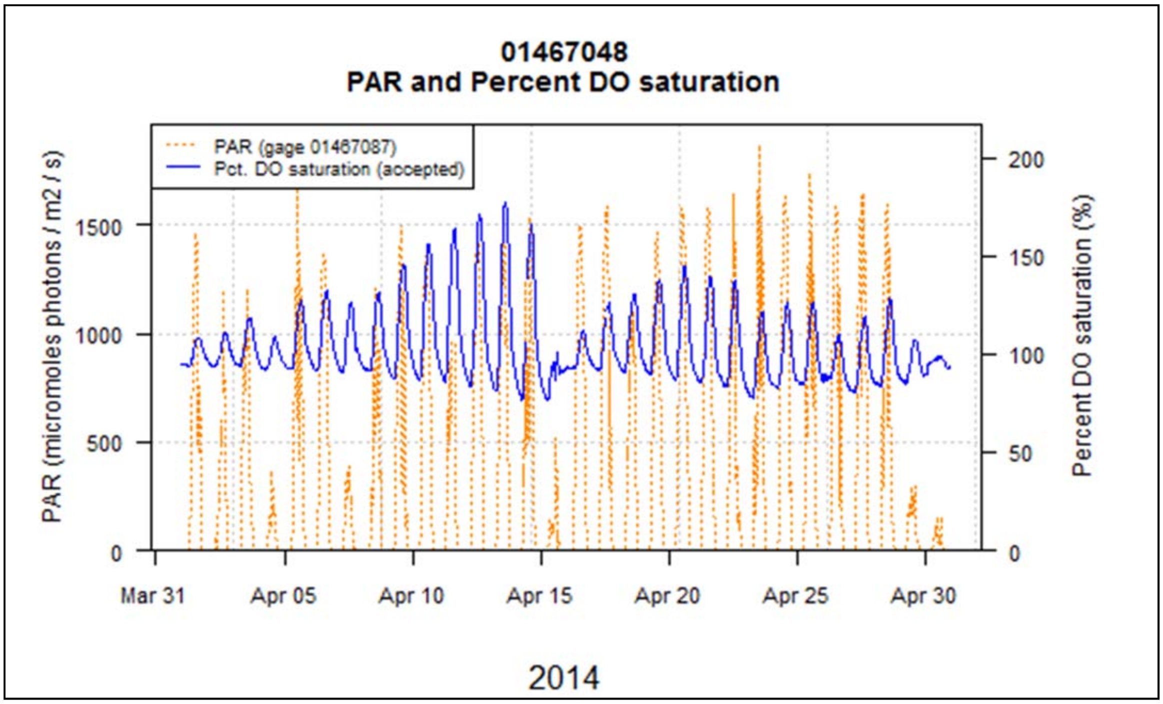


Figure 35. Gage 01467048, PAR and Percent Dissolved Oxygen Saturation, April 2014.

Figure 36. Gage 01467042, Pennypack Creek at Pine Rd., looking upstream

Figure 37. Gage 01467048, Pennypack Creek at Lower Rhawn St. Bridge, looking upstream

Turbidity

Turbidity data at the Pennypack Creek gages tend to reflect streamflow conditions. When there is high flow (*i.e.*, during and after storms), increases in turbidity are common and expected, as sediment in the creek bed is resuspended and particles present in runoff enter the stream (Figure 38). The downstream gage generally exhibited higher turbidity values throughout the year (Tables 39-40).

Table 39. Gage 01467042, Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	699.0	29.1	6.0	41.4	58.6	0.4	190.0	7.8
Aug-13	711.5	29.6	4.4	19.2	80.8	0.3	640.0	5.9
Sep-13	718.0	29.9	0.3	13.4	86.6	0.3	120.0	2.6
Oct-13	737.0	30.7	0.9	72.3	27.7	0.2	280.0	5.3
Nov-13	715.5	29.8	0.6	16.1	83.9	0.6	200.0	4.2
Mar-14	568.0	23.7	10.6	64.3	35.7	0.7	420.0	13.0
Apr-14	718.0	29.9	0.3	20.8	79.2	0.3	490.0	7.2
May-14	741.0	30.9	0.4	34.9	65.1	0.8	200.0	6.1
Jun-14	718.5	29.9	0.2	37.3	62.7	0.3	410.0	5.6

Table 40. Gage 01467048, Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	686.5	28.6	7.7	59.7	40.3	0.6	1100.0	11.8
Aug-13	738.0	30.8	0.8	27.7	72.3	0.4	640.0	8.1
Sep-13	696.5	29.0	3.3	15.6	84.4	0.3	100.0	3.3
Oct-13	739.0	30.8	0.7	18.1	81.9	0.4	130.0	4.3
Nov-13	717.5	29.9	0.3	19.0	81.0	0.5	230.0	4.8
Mar-14	622.5	25.9	2.0	59.5	40.5	1.1	540.0	16.4
Apr-14	717.5	29.9	0.3	30.2	69.8	0.7	380.0	8.7
May-14	740.5	30.9	0.5	65.8	34.2	0.4	420.0	14.3
Jun-14	535.0	22.3	25.7	38.7	61.3	1.4	380.0	10.4

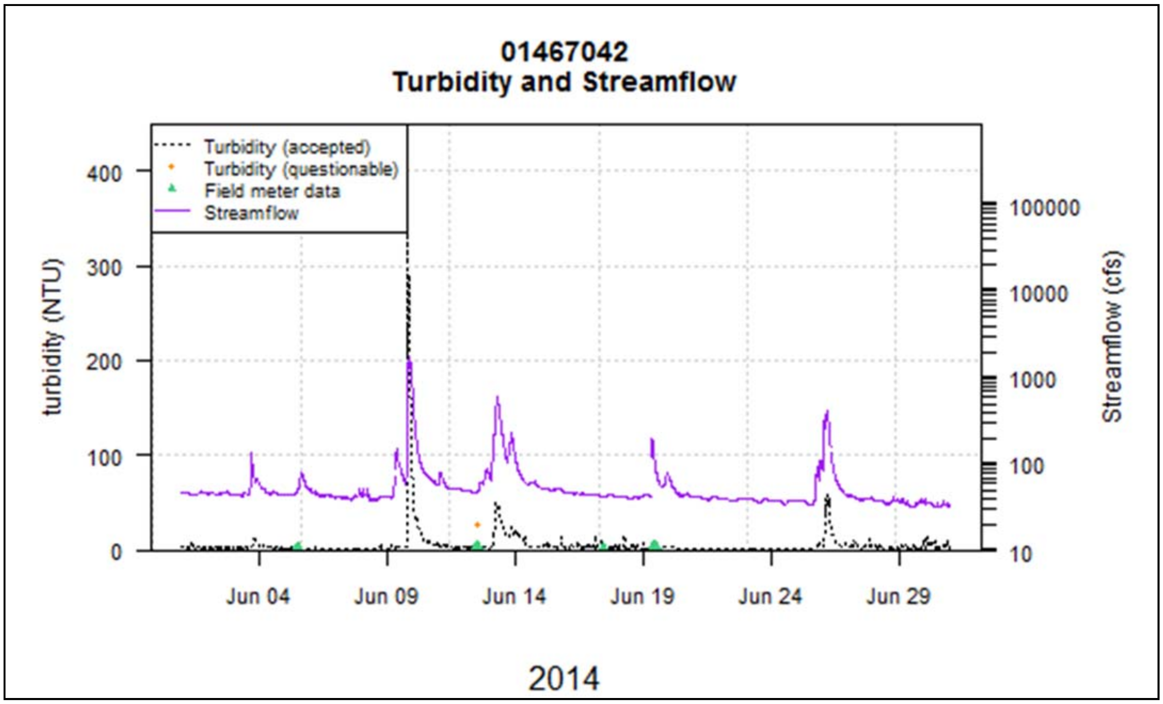


Figure 38. Gage 01467042, Turbidity and Streamflow, June 2014.

Specific Conductance

Specific conductance data were similar to other Philadelphia area streams. Elevated mean and maximum conductance values at both gages in November and March may be evidence of the effects of stormwater runoff and snowmelt containing road salt.

Table 41. Gage 01467042 Specific Conductance Summary Results by Month

Month	Total hours accepted data	Total days accepted data	Percent hours flagged data	Min.	Max.	Mean
Jul-13	727.5	30.3	2.2	140.0	663.0	515.3
Aug-13	711.5	29.6	4.4	82.0	675.0	534.8
Sep-13	718.5	29.9	0.2	240.0	714.0	582.3
Oct-13	737.0	30.7	0.9	189.0	725.0	582.5
Nov-13	716.0	29.8	0.6	110.0	751.0	637.9
Mar-14	568.0	23.7	10.6	246.0	1110.0	820.8
Apr-14	716.0	29.8	0.6	112.0	773.0	674.6
May-14	741.0	30.9	0.4	126.0	677.0	573.9
Jun-14	709.5	29.6	1.5	129.0	754.0	574.1

Table 42. Gage 01467048 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	738.5	30.8	0.7	116.0	636.0	470.9
Aug-13	738.0	30.8	0.8	86.0	618.0	481.1
Sep-13	716.5	29.9	0.5	64.0	696.0	525.1
Oct-13	737.0	30.7	0.9	145.0	698.0	545.5
Nov-13	717.5	29.9	0.3	107.0	729.0	607.2
Mar-14	632.5	26.4	0.4	253.0	1450.0	830.8
Apr-14	717.5	29.9	0.3	86.0	752.0	644.9
May-14	740.5	30.9	0.5	92.0	652.0	541.9
Jun-14	716.5	29.9	0.5	148.0	738.0	545.0

Temperature

Temperature data showed variable attainment of maximum temperature criteria (Tables 43-44). Spring and early summer months are always subject to major air temperature fluctuations, and reliably predicting average stream temperatures during these periods is difficult at best. Maximum criteria for the summer months, for example, do not take into account natural summer temperature peaks. Above normal air temperatures are the likely cause of high stream temperature exceedance rates in July 2013 (Figures 39-40).

Table 43. Gage 01467042 Temperature Summary Results by Maximum Criteria Period

Des. Use	Date range start	Date range end	Percent hours exceedance	Percent hours attaining	Percent hours flagged data	Total hours accepted data	Total days accepted data	Min.	Max.	Mean
TSF	1-Jul	31-Jul	66.7	33.3	2.1	728.5	30.4	19.7	28.5	24.0
TSF	1-Aug	15-Aug	0.0	100.0	7.9	331.5	13.8	18.1	24.0	21.5
TSF	16-Aug	31-Aug	0.0	100.0	1.0	380.0	15.8			
TSF	1-Sep	15-Sep	0.0	100.0	0.0	360.0	15.0	14.3	24.8	18.6
TSF	16-Sep	30-Sep	0.0	100.0	0.4	358.5	14.9			
TSF	1-Oct	15-Oct	0.0	100.0	1.4	355.0	14.8	8.5	22.0	14.7
TSF	16-Oct	31-Oct	0.0	100.0	0.5	382.0	15.9			
TSF	1-Nov	15-Nov	10.2	89.8	1.0	356.5	14.9	1.6	16.3	8.1
TSF	16-Nov	30-Nov	15.6	84.4	0.3	359.0	15.0			
TSF	1-Mar	31-Mar	21.6	78.4	10.7	568.0	23.7	2.6	10.4	6.7
TSF	1-Apr	15-Apr	56.8	43.2	0.3	359.0	15.0	6.4	18.4	12.5
TSF	16-Apr	30-Apr	29.9	70.1	0.3	359.0	15.0			
TSF	1-May	15-May	14.8	85.2	0.4	358.5	14.9	10.1	20.5	16.1
TSF	16-May	31-May	2.5	97.5	0.3	383.0	16.0			
TSF	1-Jun	15-Jun	17.6	82.4	0.0	360.0	15.0	15.4	25.3	20.6
TSF	16-Jun	30-Jun	42.9	57.1	0.3	359.0	15.0			

Table 44. Gage 01467048, Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
TSF	1-Jul	31-Jul	78.1	21.9	0.7	738.5	30.8	20.7	30.1	25.0
TSF	1-Aug	15-Aug	0.0	100.0	0.6	358.0	14.9	19.0	25.9	22.1
TSF	16-Aug	31-Aug	0.0	100.0	1.0	380.0	15.8			
TSF	1-Sep	15-Sep	0.0	100.0	0.0	360.0	15.0	14.6	26.1	19.2
TSF	16-Sep	30-Sep	0.0	100.0	1.0	356.5	14.9			
TSF	1-Oct	15-Oct	0.0	100.0	0.8	357.0	14.9	8.2	22.0	14.9
TSF	16-Oct	31-Oct	0.0	100.0	0.5	382.0	15.9			
TSF	1-Nov	15-Nov	9.8	90.2	0.4	358.5	14.9	1.4	15.8	7.8
TSF	16-Nov	30-Nov	12.4	87.6	0.3	359.0	15.0			
TSF	1-Mar	31-Mar	21.6	78.4	0.4	633.5	26.4	2.2	10.4	6.5
TSF	1-Apr	15-Apr	57.4	42.6	0.6	358.0	14.9	8.0	19.1	12.9
TSF	16-Apr	30-Apr	36.9	63.1	0.1	359.5	15.0			
TSF	1-May	15-May	24.6	75.4	0.6	358.0	14.9	10.0	21.4	16.8
TSF	16-May	31-May	6.5	93.5	0.4	382.5	15.9			
TSF	1-Jun	15-Jun	32.6	67.4	0.4	358.5	14.9	16.2	26.8	21.5
TSF	16-Jun	30-Jun	67.9	32.1	0.6	358.0	14.9			

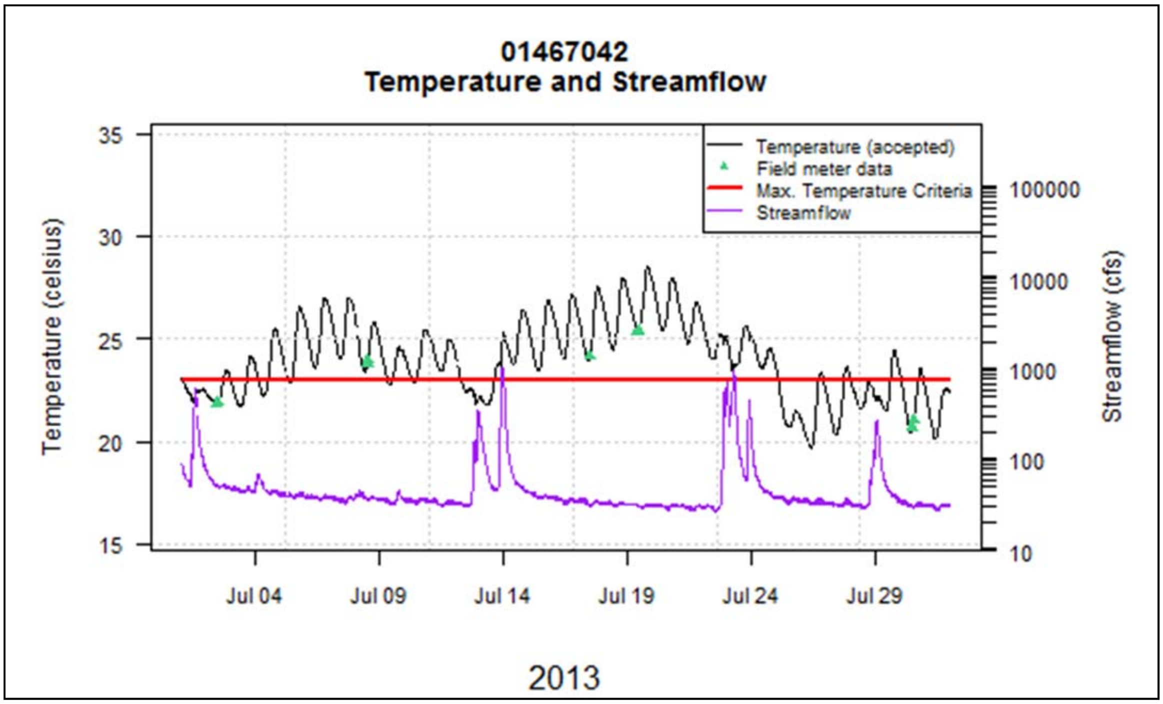


Figure 39. Gage 01467042, Temperature and Streamflow, July 2013.

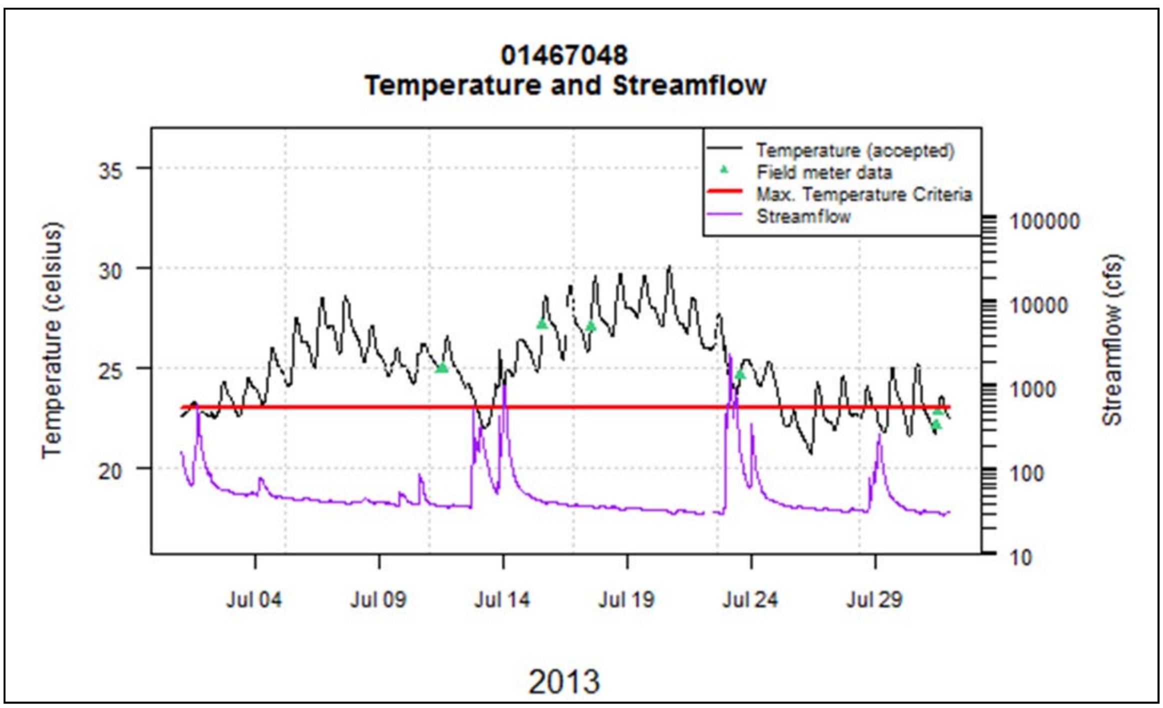
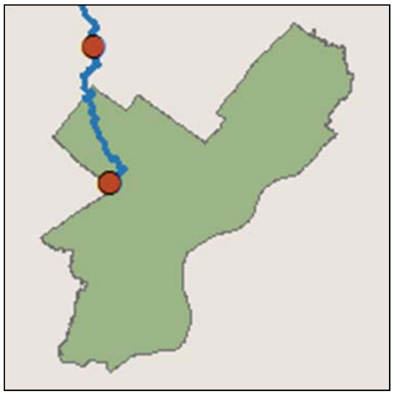


Figure 40. Gage 01467048, Temperature and Streamflow, July 2013.

Wissahickon Creek (Gages 01473900 and 01474000)



Dissolved oxygen and pH

Dissolved oxygen and pH data collected from the Wissahickon Creek gages also show signs of strong algal activity in the form of diel fluctuations. Although these two sites never exceeded the minimum or 7-day average guideline for dissolved oxygen, upper gage (01473900) exhibits some of the most dramatic diel fluctuations of any of the Philadelphia USGS gage sites. In April 2014, dissolved oxygen is seen fluctuating from 7.7 to 20.3 mg/L in a single day/night period (Figure 45), with pH ranging from approximately 7.6 to 9.4 at the same time (Figure 46). Nearly 70 percent of the days in March exceeded pH maxima, a direct result of algal activity (Table 49). Similar conditions existed at the downstream gage, with 58.1 percent of the days in March 2014 exceeding pH maxima at 01474000.

Table 45. Gage 01473900 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	TSF	486.5	20.3	34.6	0.0	100.0	5.5	12.1	7.8
Aug-13	TSF	741.5	30.9	0.3	0.0	100.0	6.0	14.0	8.2
Sep-13	TSF	718.5	29.9	0.2	0.0	100.0	5.3	11.2	8.3
Oct-13	TSF	742.5	30.9	0.2	0.0	100.0	5.1	14.5	9.0
Nov-13	TSF	719.0	30.0	0.1	0.0	100.0	6.2	17.4	10.9
Mar-14	TSF	656.5	27.4	0.4	0.0	100.0	8.9	20.9	13.1
Apr-14	TSF	717.5	29.9	0.3	0.0	100.0	6.4	20.6	11.6
May-14	TSF	742.5	30.9	0.2	0.0	100.0	6.6	16.3	9.4
Jun-14	TSF	717.5	29.9	0.3	0.0	100.0	6.9	9.9	8.1

Table 46. Gage 01474000 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	TSF	742.5	30.9	0.2	0.0	100.0	6.2	12.2	8.6
Aug-13	TSF	742.0	30.9	0.3	0.0	100.0	7.4	13.9	9.2
Sep-13	TSF	717.5	29.9	0.3	0.0	100.0	7.2	11.5	9.1
Oct-13	TSF	742.0	30.9	0.3	0.0	100.0	7.0	13.1	9.9
Nov-13	TSF	717.0	29.9	0.4	0.0	100.0	8.9	14.7	11.9
Mar-14	TSF	743.0	31.0	0.0	0.0	100.0	10.8	18.9	13.5
Apr-14	TSF	716.5	29.9	0.5	0.0	100.0	7.7	15.3	10.9
May-14	TSF	742.5	30.9	0.2	0.0	100.0	8.0	13.3	9.7
Jun-14	TSF	719.0	30.0	0.1	0.0	100.0	7.3	11.8	8.8

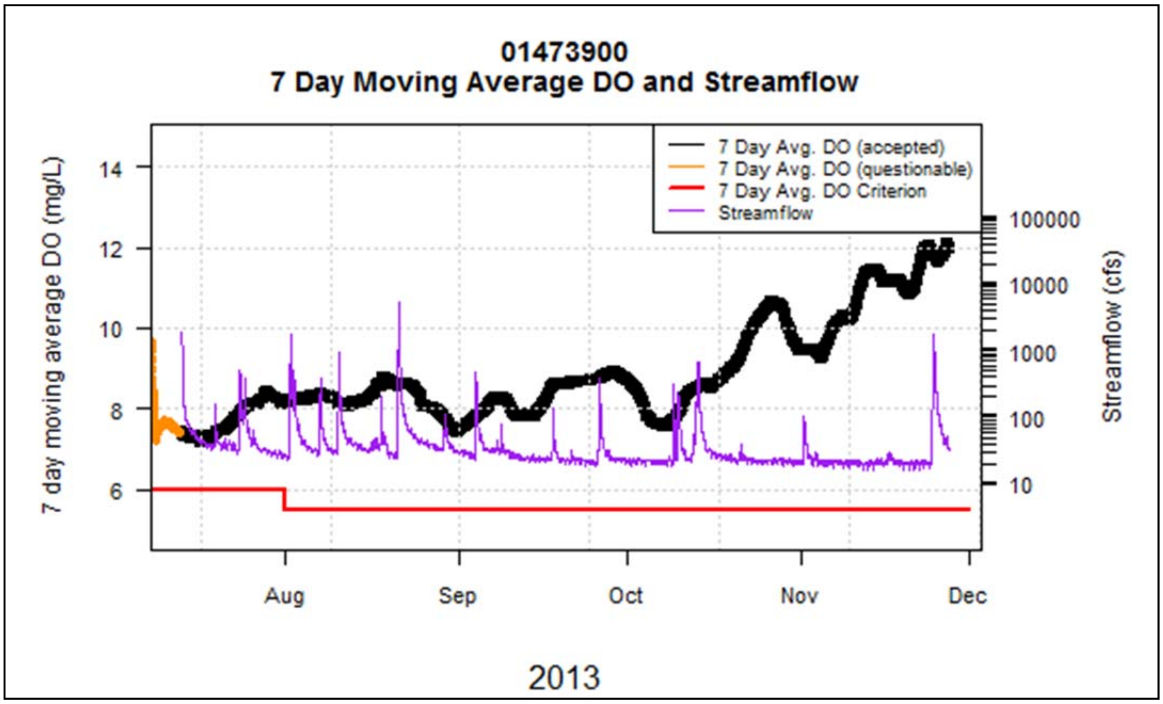


Figure 41. Gage 01473900, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

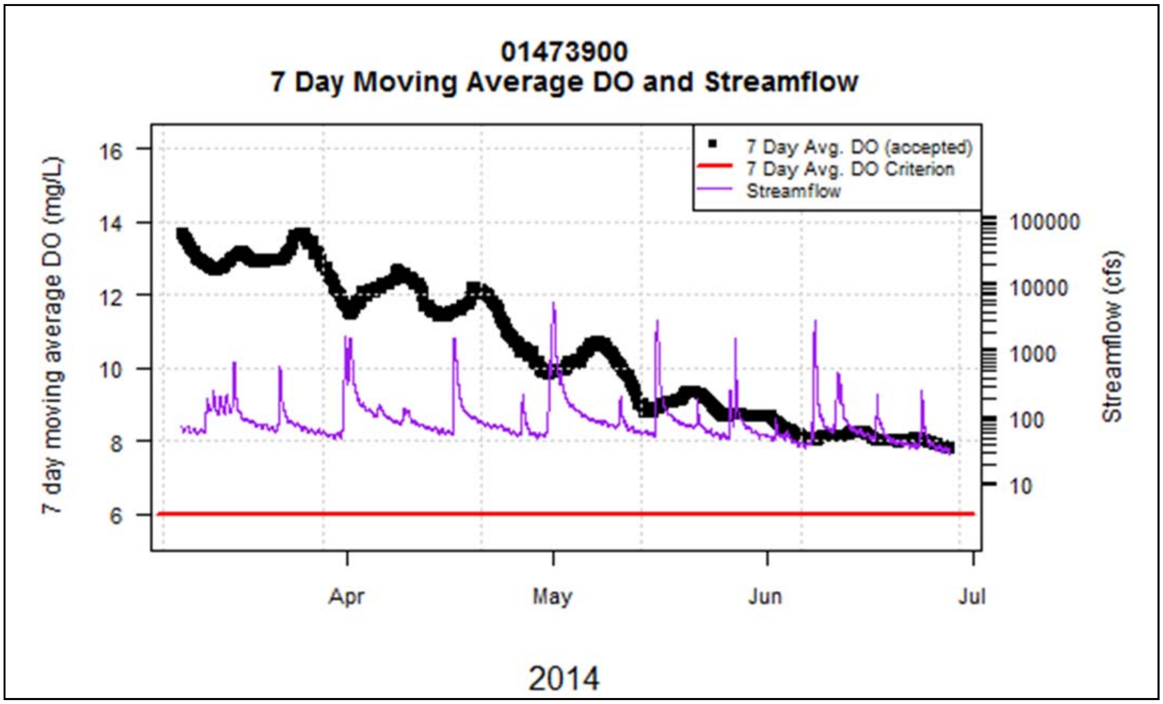


Figure 42. Gage 01473900, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

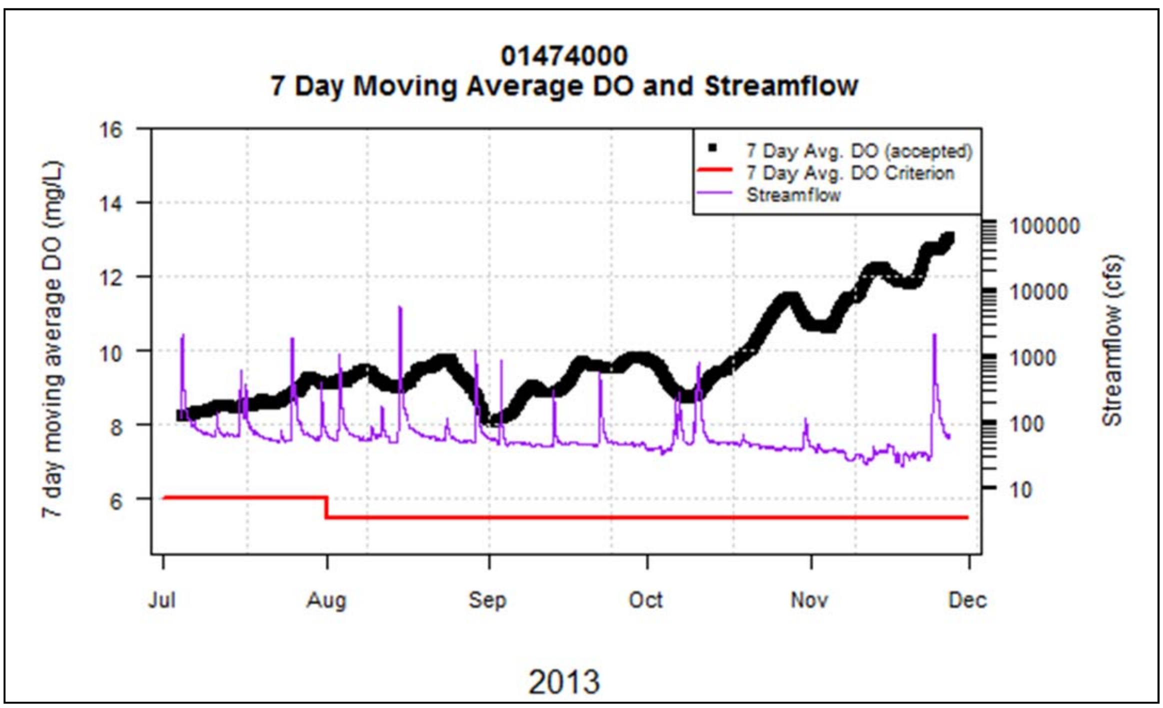


Figure 43. Gage 01474000, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

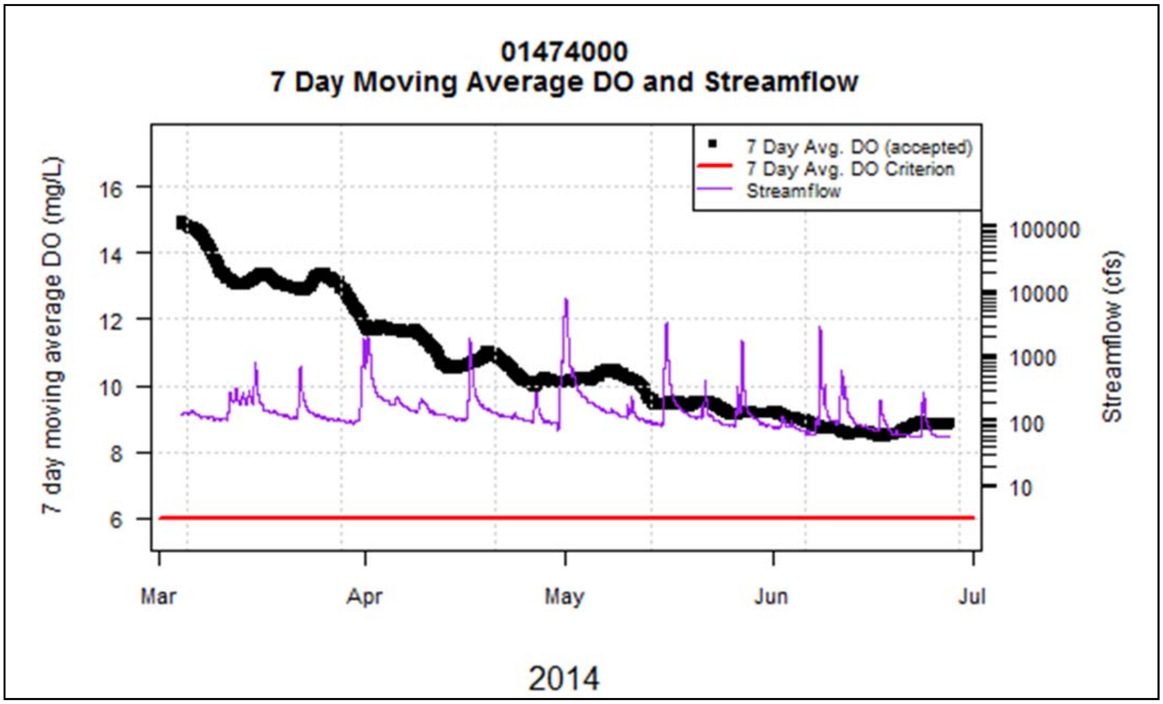


Figure 44. Gage 01474000, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 47. Gage 01473900 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	TSF	18.0	41.9	6.8	8.8	7.8
Aug-13	TSF	29.0	6.5	6.8	9.2	8.2
Sep-13	TSF	28.0	6.7	6.5	9.0	8.3
Oct-13	TSF	29.0	6.5	6.1	10.9	8.9
Nov-13	TSF	29.0	3.3	7.6	13.5	10.9
Mar-14	TSF	23.0	16.2	10.7	14.8	13.1
Apr-14	TSF	27.0	10.0	7.9	13.1	11.6
May-14	TSF	29.0	6.5	7.5	11.1	9.4
Jun-14	TSF	27.0	10.0	7.5	8.8	8.1

Table 48. Gage 01474000 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	TSF	30.0	3.2	8.0	9.7	8.6
Aug-13	TSF	30.0	3.2	8.0	10.2	9.2
Sep-13	TSF	27.0	10.0	7.5	10.0	9.1
Oct-13	TSF	29.0	6.5	7.8	11.6	9.9
Nov-13	TSF	27.0	10.0	9.6	13.7	11.9
Mar-14	TSF	30.0	3.1	11.6	15.6	13.5
Apr-14	TSF	28.0	6.7	8.5	12.2	10.9
May-14	TSF	30.0	3.2	8.4	10.9	9.7
Jun-14	TSF	29.0	3.3	8.1	9.3	8.7

Table 49. Gage 01473900 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	486.5	20.3	34.6	0.0	0.0	0	0	100.0	100.0	7.2	8.5	7.8
Aug-13	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.9	8.7	7.8
Sep-13	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.2	8.2	7.6
Oct-13	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	6.6	8.4	7.6
Nov-13	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	6.8	8.6	7.7
Mar-14	657.5	27.4	0.2	13.6	67.9	0	0	86.4	32.1	7.4	9.5	8.2
Apr-14	717.5	29.9	0.3	12.8	46.7	0	0	87.2	53.3	6.9	9.5	8.1
May-14	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	8.7	7.4
Jun-14	717.5	29.9	0.3	0.0	0.0	0	0	100.0	100.0	6.7	7.6	7.3

Table 50. Gage 01474000 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	7.3	8.8	8.1
Aug-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.9	8.8	8.1
Sep-13	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.3	8.5	8.1
Oct-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	7.6	8.7	8.1
Nov-13	717.0	29.9	0.4	0.0	0.0	0	0	100.0	100.0	7.5	8.5	8.2
Mar-14	743.0	31.0	0.0	9.8	58.1	0	0	90.2	41.9	7.5	9.3	8.5
Apr-14	716.0	29.8	0.6	5.2	33.3	0	0	94.8	66.7	7.0	9.2	8.3
May-14	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	7.0	8.8	7.9
Jun-14	719.0	30.0	0.1	0.0	0.0	0	0	100.0	100.0	7.2	8.7	8.0

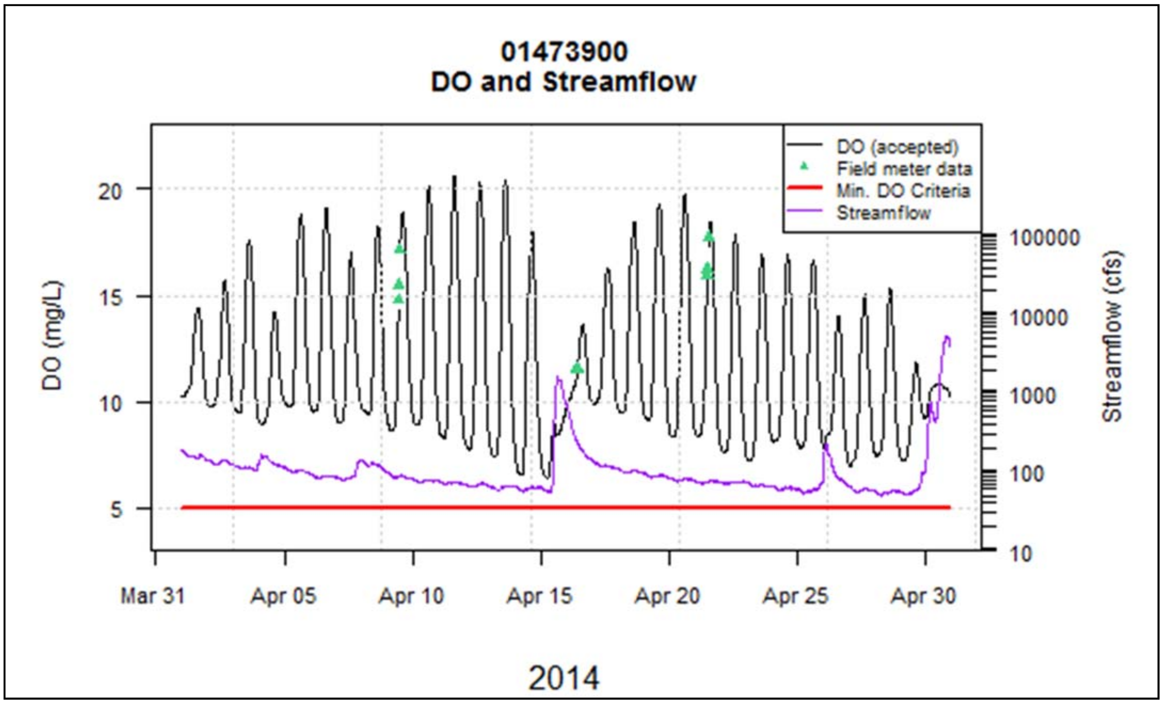


Figure 45. Gage 01473900, Dissolved Oxygen and Streamflow, April 2014.

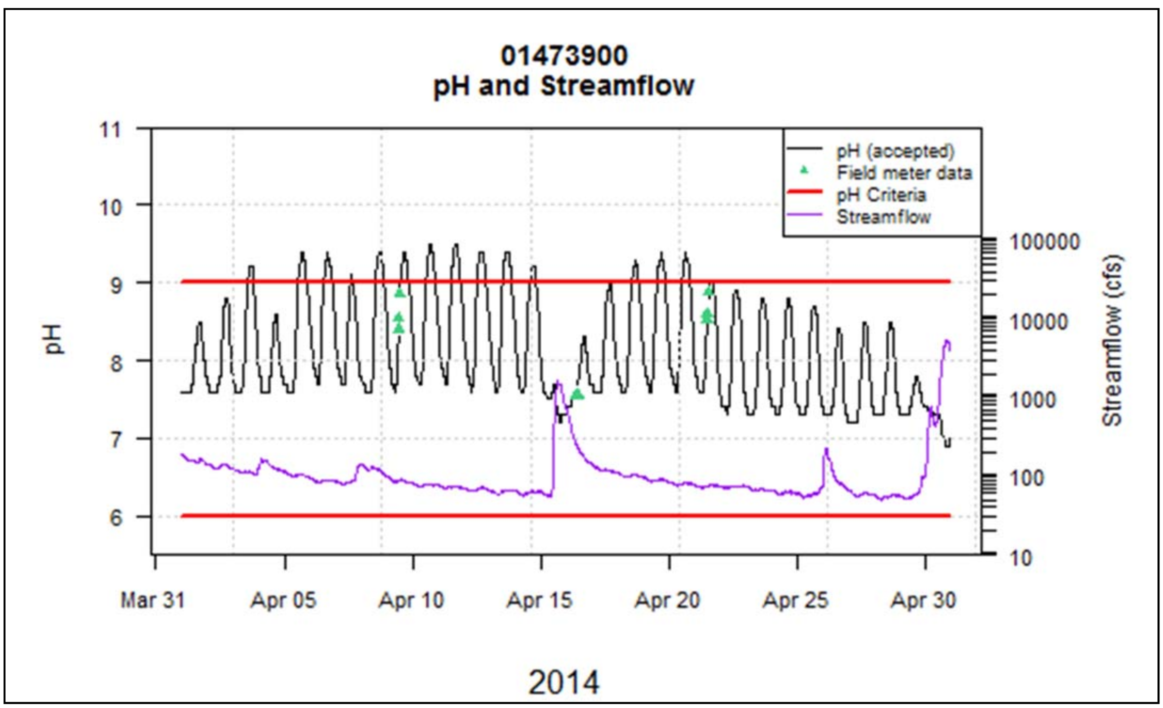


Figure 46. Gage 01473900, pH and Streamflow, April 2014.

Figure 47. Gage 01473900, Wissahickon Creek at Ft.Washington, looking downstream

Figure 48. Gage 01474000, Wissahickon Creek at mouth, looking downstream

Turbidity

Turbidity in the Wissahickon, as with most of Philadelphia's streams, increases drastically with increased flow from rainfall. Turbidity was generally higher at the lower gauge (01474000), where it averaged well above the guideline. However, the upper gauge (01473900) saw greater spikes in turbidity during storms (Tables 51-52). It is possible that these spikes represent a temporarily fouled sensor (i.e., sediment or debris obscures the optical probe for turbidity), but the general rule in QAQC procedures is not to flag turbidity spikes that recede to normal levels on their own. If the sensor remains fouled after a storm or a field check confirms aberrant values, the data is flagged as in Figure 49.

Table 51. Gage 01473900 Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	486.5	20.3	34.6	60.0	40.0	1.0	230.0	9.2
Aug-13	741.5	30.9	0.3	42.1	57.9	0.5	340.0	7.1
Sep-13	718.0	29.9	0.3	47.4	52.6	1.0	79.0	3.8
Oct-13	742.5	30.9	0.2	57.0	43.0	0.8	190.0	5.1
Nov-13	718.5	29.9	0.2	18.2	81.8	0.8	160.0	4.0
Mar-14	583.0	24.3	11.5	57.3	42.7	1.6	300.0	13.7
Apr-14	714.0	29.8	0.8	89.3	10.7	2.0	1220.0	37.1
May-14	660.5	27.5	11.2	80.5	19.5	1.6	1280.0	10.7
Jun-14	599.0	25.0	16.8	43.2	56.8	0.2	450.0	9.9

Table 52. Gage 01474000 Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	742.5	30.9	0.2	19.7	80.3	0.2	270.0	6.0
Aug-13	741.5	30.9	0.3	18.4	81.6	0.0	710.0	8.0
Sep-13	718.0	29.9	0.3	12.7	87.3	0.1	130.0	2.8
Oct-13	742.0	30.9	0.3	12.6	87.4	0.0	75.0	2.1
Nov-13	716.5	29.9	0.5	16.3	83.7	0.0	190.0	4.5
Mar-14	743.0	31.0	0.0	39.6	60.4	1.4	380.0	11.7
Apr-14	716.0	29.8	0.6	26.4	73.6	1.1	330.0	9.0
May-14	742.0	30.9	0.3	35.0	65.0	0.6	210.0	8.7
Jun-14	719.0	30.0	0.1	18.0	82.0	0.4	270.0	4.8

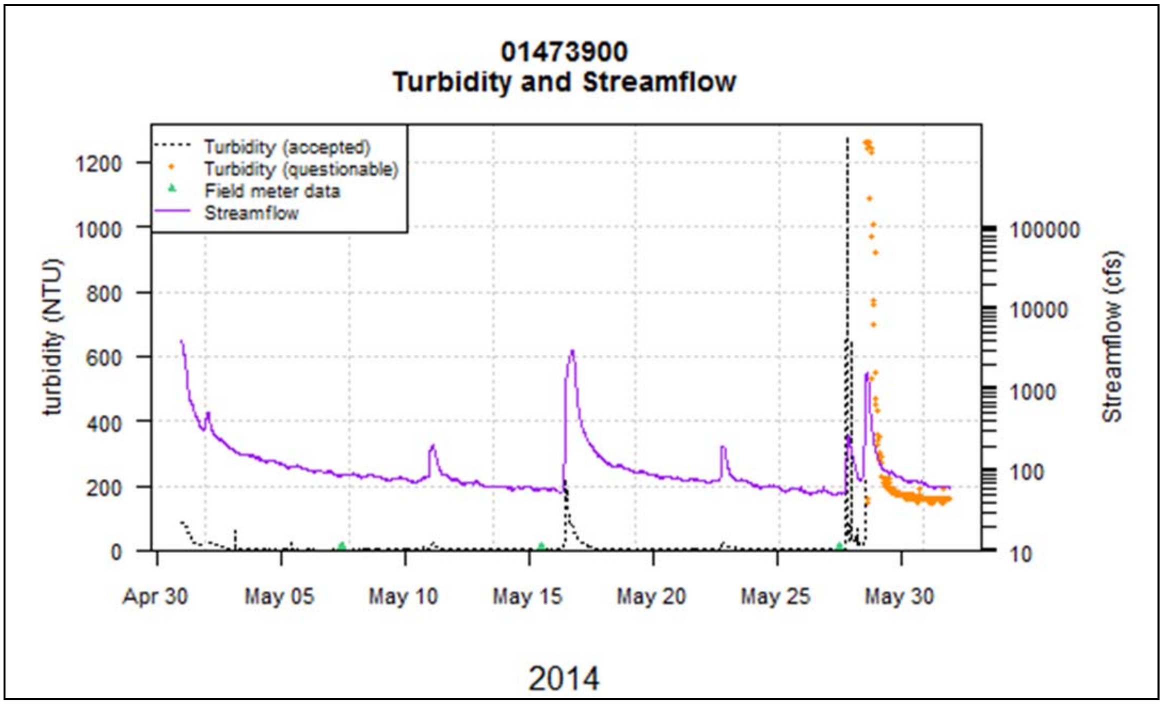


Figure 49. Gage 01473900, Turbidity and Streamflow, May 2014.

Specific Conductance

Specific conductance data at the Wissahickon Creek gage sites generally follow the established pattern in other Philadelphia streams: Runoff from rain events dilutes the stream and decreases conductivity. However, a reversal in this trend sometimes occurs during winter storms, when it is presumed that the application of road salt (sodium chloride) prior to the storm washes into Wissahickon Creek and causes conductivity to increase in conjunction with streamflow (Figure 50). This pattern is also observed in absence of storms in March, when higher conductivity in the stream is likely attributable to road salt present in snowmelt.

Table 53. Gage 01473900 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	486.5	20.3	34.6	126.0	825.0	603.0
Aug-13	741.5	30.9	0.3	73.0	859.0	641.8
Sep-13	718.0	29.9	0.3	254.0	885.0	771.7
Oct-13	742.5	30.9	0.2	224.0	965.0	789.4
Nov-13	719.0	30.0	0.1	135.0	1030.0	864.7
Mar-14	657.5	27.4	0.2	285.0	1280.0	825.1
Apr-14	706.0	29.4	1.9	86.0	808.0	710.9
May-14	742.0	30.9	0.3	132.0	755.0	623.1
Jun-14	717.5	29.9	0.3	127.0	786.0	667.1

Table 54. Gage 01474000 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	742.5	30.9	0.2	161.0	787.0	595.0
Aug-13	742.0	30.9	0.3	91.0	814.0	619.2
Sep-13	718.0	29.9	0.3	276.0	828.0	698.3
Oct-13	742.0	30.9	0.3	279.0	858.0	729.2
Nov-13	502.0	20.9	30.3	168.0	920.0	740.3
Mar-14	743.0	31.0	0.0	294.0	1280.0	817.3
Apr-14	716.0	29.8	0.6	103.0	818.0	679.5
May-14	742.0	30.9	0.3	99.0	740.0	605.1
Jun-14	719.0	30.0	0.1	157.0	771.0	663.8

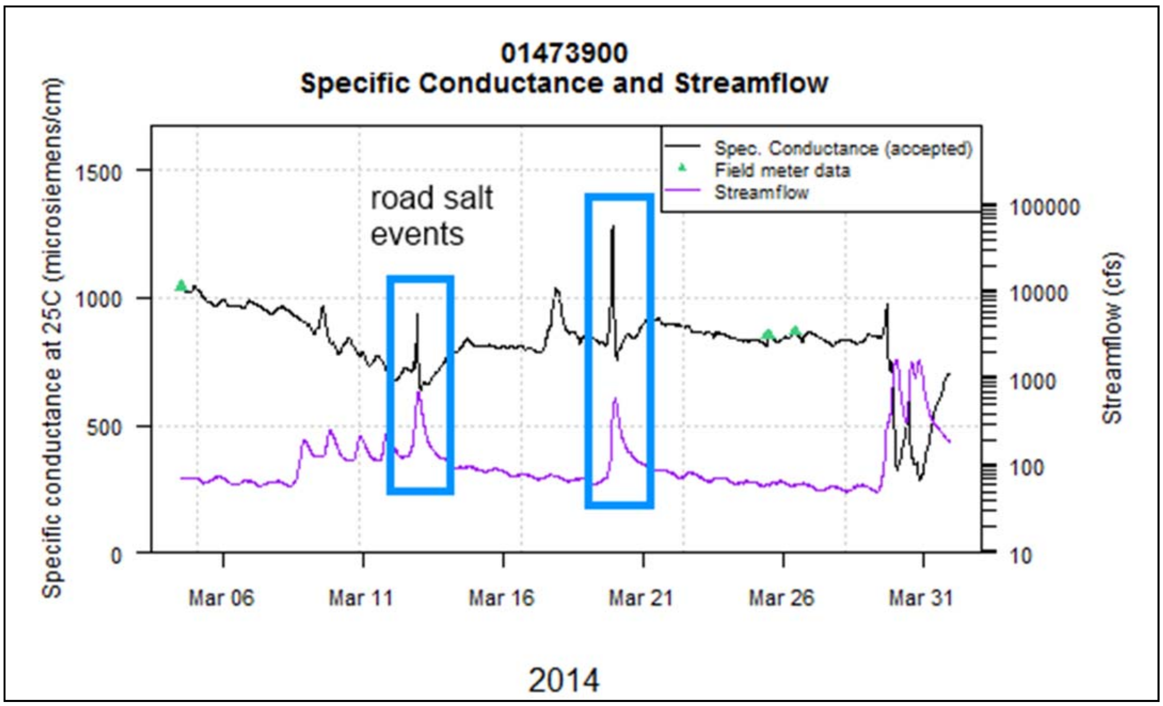


Figure 50. Gage 01473900, Specific Conductance and Streamflow, March 2014.

Temperature

Temperature trends and exceedance rates in Wissahickon Creek Watershed were similar to those observed in Pennypack Creek, with frequent exceedances during the spring and summer in conjunction with higher ambient air temperatures (Tables 55-56, Figures 51-52).

Table 55. Gage 01473900 Temperature Summary Results by Month by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
TSF	1-Jul	31-Jul	62.8	37.2	34.7	486.0	20.3	19.9	27.8	23.8
TSF	1-Aug	15-Aug	0.0	100.0	0.7	357.5	14.9	18.0	24.1	21.4
TSF	16-Aug	31-Aug	0.0	100.0	0.3	383.0	16.0			
TSF	1-Sep	15-Sep	0.0	100.0	0.3	359.0	15.0	14.2	24.8	18.8
TSF	16-Sep	30-Sep	0.0	100.0	0.1	359.5	15.0			
TSF	1-Oct	15-Oct	0.1	99.9	0.3	359.0	15.0	8.5	22.1	15.2
TSF	16-Oct	31-Oct	0.0	100.0	0.4	382.5	15.9			
TSF	1-Nov	15-Nov	12.7	87.3	0.6	358.0	14.9	2.3	16.2	8.8
TSF	16-Nov	30-Nov	22.8	77.2	0.3	359.0	15.0			
TSF	1-Mar	31-Mar	19.8	80.2	0.4	657.5	27.4	2.0	10.3	6.4
TSF	1-Apr	15-Apr	53.5	46.5	0.3	359.0	15.0	7.2	18.2	12.3
TSF	16-Apr	30-Apr	27.8	72.2	0.4	358.5	14.9			
TSF	1-May	15-May	16.0	84.0	0.4	358.5	14.9	10.1	21.8	16.1
TSF	16-May	31-May	1.2	98.8	0.4	382.5	15.9			
TSF	1-Jun	15-Jun	7.0	93.0	0.3	359.0	15.0	15.5	24.4	20.3
TSF	16-Jun	30-Jun	34.6	65.4	0.4	358.5	14.9			

Table 56. Gage 01474000 Temperature Summary Results by Month by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
TSF	1-Jul	31-Jul	65.2	34.8	0.3	742.0	30.9	20.5	28.1	24.1
TSF	1-Aug	15-Aug	0.0	100.0	0.0	360.0	15.0	18.7	24.0	21.4
TSF	16-Aug	31-Aug	0.0	100.0	0.5	382.0	15.9			
TSF	1-Sep	15-Sep	0.0	100.0	0.1	359.5	15.0	14.6	24.2	18.6
TSF	16-Sep	30-Sep	0.0	100.0	0.6	358.0	14.9			
TSF	1-Oct	15-Oct	0.0	100.0	0.3	359.0	15.0	8.3	20.7	14.5
TSF	16-Oct	31-Oct	0.0	100.0	0.3	383.0	16.0			
TSF	1-Nov	15-Nov	2.2	97.8	0.6	358.0	14.9	3.0	14.2	7.9
TSF	16-Nov	30-Nov	7.4	92.6	0.3	359.0	15.0			
TSF	1-Mar	31-Mar	12.2	87.8	0.1	743.0	31.0	0.8	9.3	5.8
TSF	1-Apr	15-Apr	54.6	45.4	0.6	358.0	14.9	8.2	18.1	12.5
TSF	16-Apr	30-Apr	26.8	73.2	0.6	358.0	14.9			
TSF	1-May	15-May	15.8	84.2	0.4	358.5	14.9	9.9	20.3	16.3
TSF	16-May	31-May	2.0	98.0	0.0	384.0	16.0			
TSF	1-Jun	15-Jun	11.8	88.2	0.3	359.0	15.0	16.4	25.0	20.8
TSF	16-Jun	30-Jun	47.9	52.1	0.0	360.0	15.0			

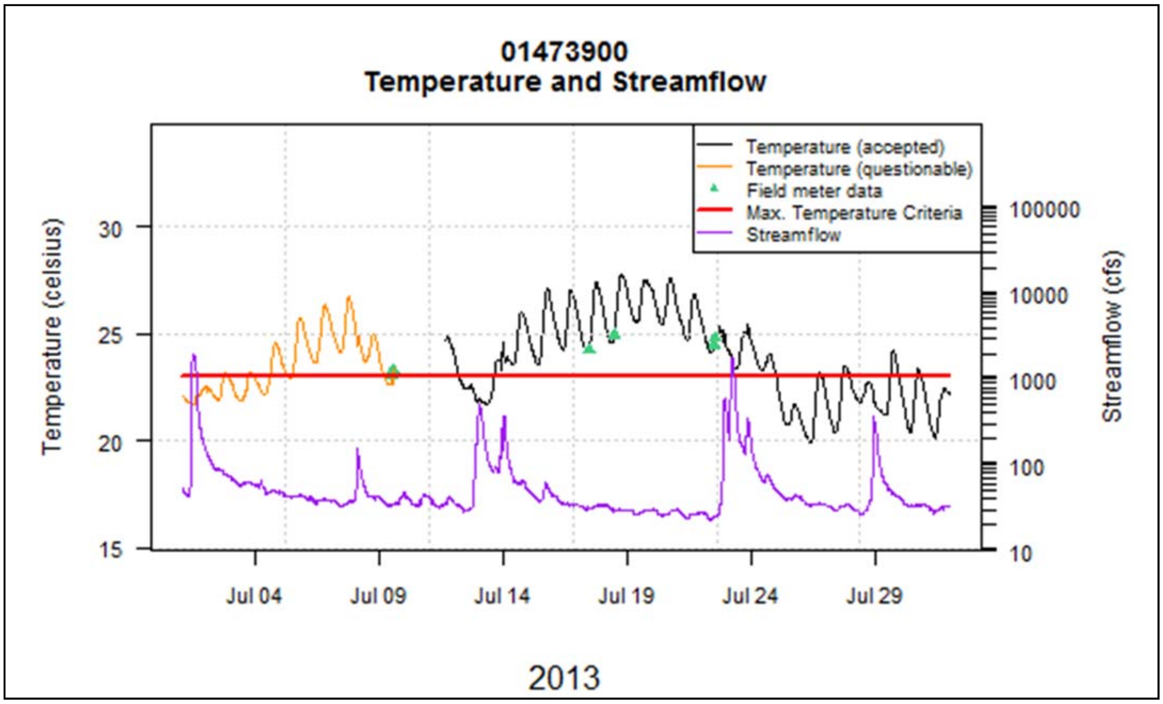


Figure 51. Gage 01473900, Temperature and Streamflow, July 2013.

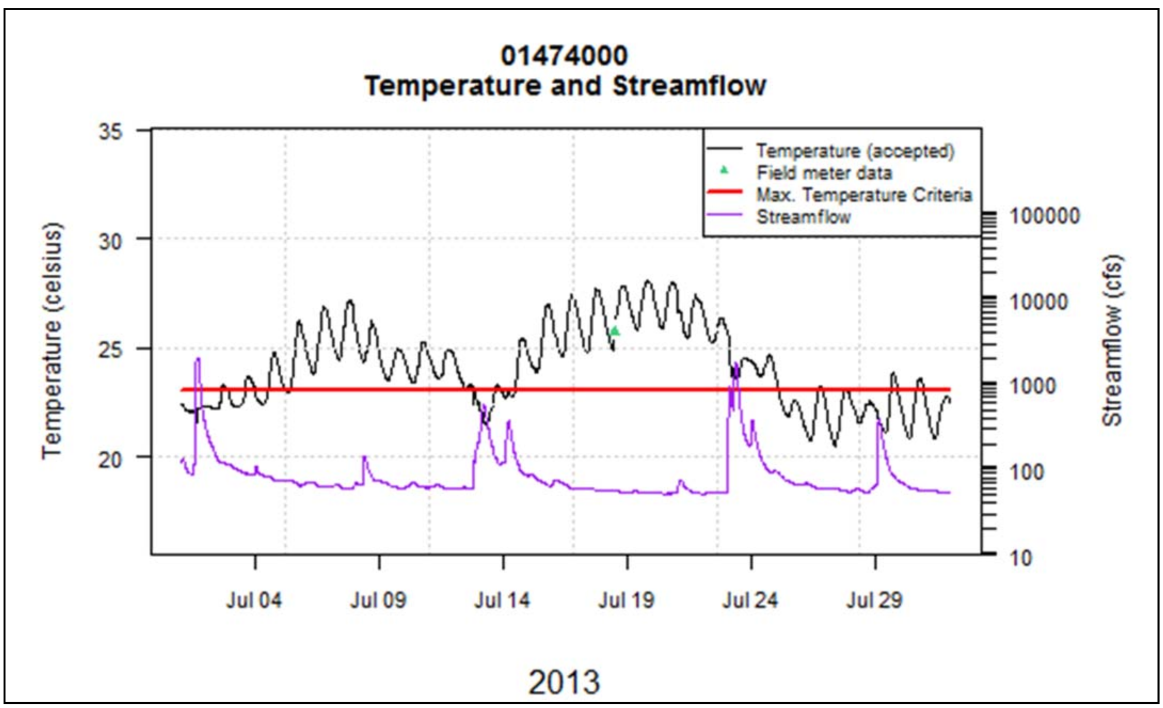


Figure 52. Gage 01474000, Temperature and Streamflow, July 2013.

Poquesssing Creek (Gage 01465798)

Dissolved oxygen and pH

Dissolved oxygen and pH at this gage site were usually within acceptable ranges and seldom fell below the minimum DO criterion or exceeded the pH maximum criterion (Tables 57-59, Figures 53-54). Data collected from Poquessing Creek did exhibit classic signs of algal activity, as indicated by diel fluctuations in both DO and pH (Figure 39).

As seen with previous sites, the algal activity and related diel fluctuations in DO and pH are only suppressed by storm events. These suppressions, however, are only very temporary. Given an adequate period of uninterrupted algal growth, such as occurred in April 2012 (Figure 40), one can expect steadily increasing DO and pH fluctuations. June was the only month during which the minimum and mean DO criteria were not fully attained at 01465798.

Table 57. Gage 01465798 Dissolved Oxygen Min. Criteria Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	653.0	27.2	12.2	0.5	99.5	3.5	11.6	7.2
Aug-13	WWF	726.0	30.3	2.4	2.0	98.0	2.7	14.6	8.0
Sep-13	WWF	718.0	29.9	0.3	0.0	100.0	4.2	12.6	8.6
Oct-13	WWF	727.5	30.3	2.2	0.3	99.7	2.8	13.6	9.4
Nov-13	WWF	716.0	29.8	0.6	0.0	100.0	5.1	13.1	9.7
Mar-14	WWF	621.5	25.9	2.0	0.0	100.0	9.0	17.8	12.7
Apr-14	WWF	716.5	29.9	0.5	0.0	100.0	6.3	17.5	11.0
May-14	WWF	741.5	30.9	0.3	0.0	100.0	4.6	14.1	8.6
Jun-14	WWF	716.5	29.9	0.5	0.0	100.0	5.0	12.3	7.7

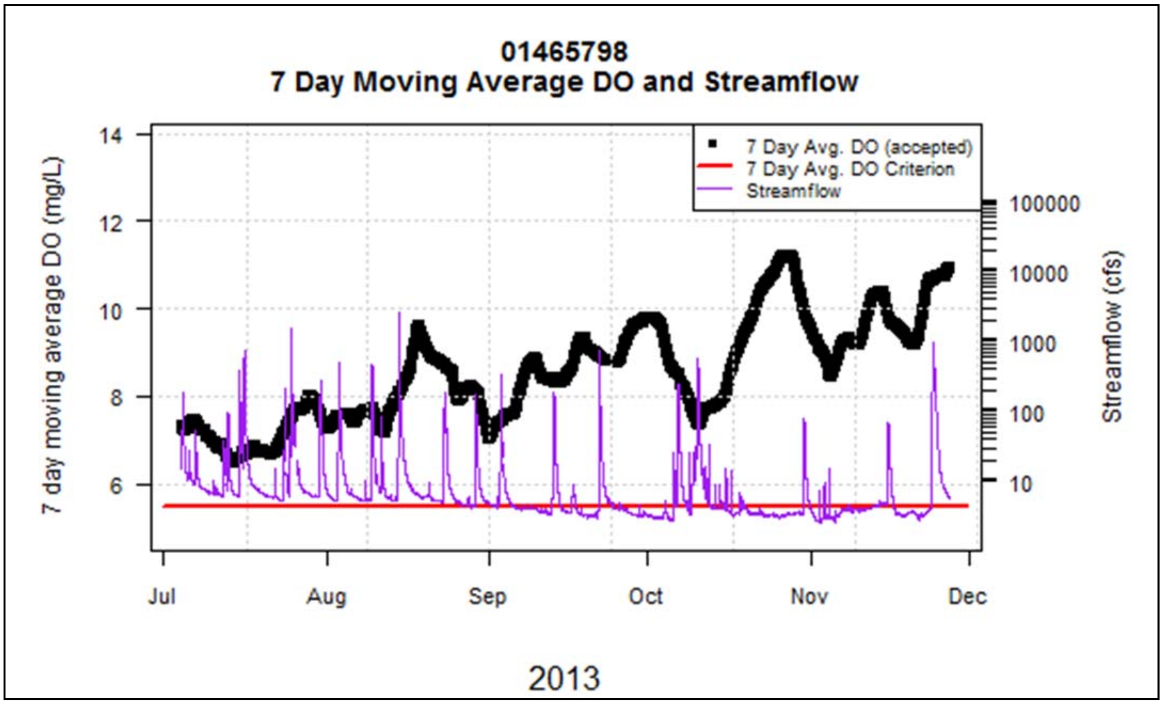


Figure 53. Gage 01465798, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

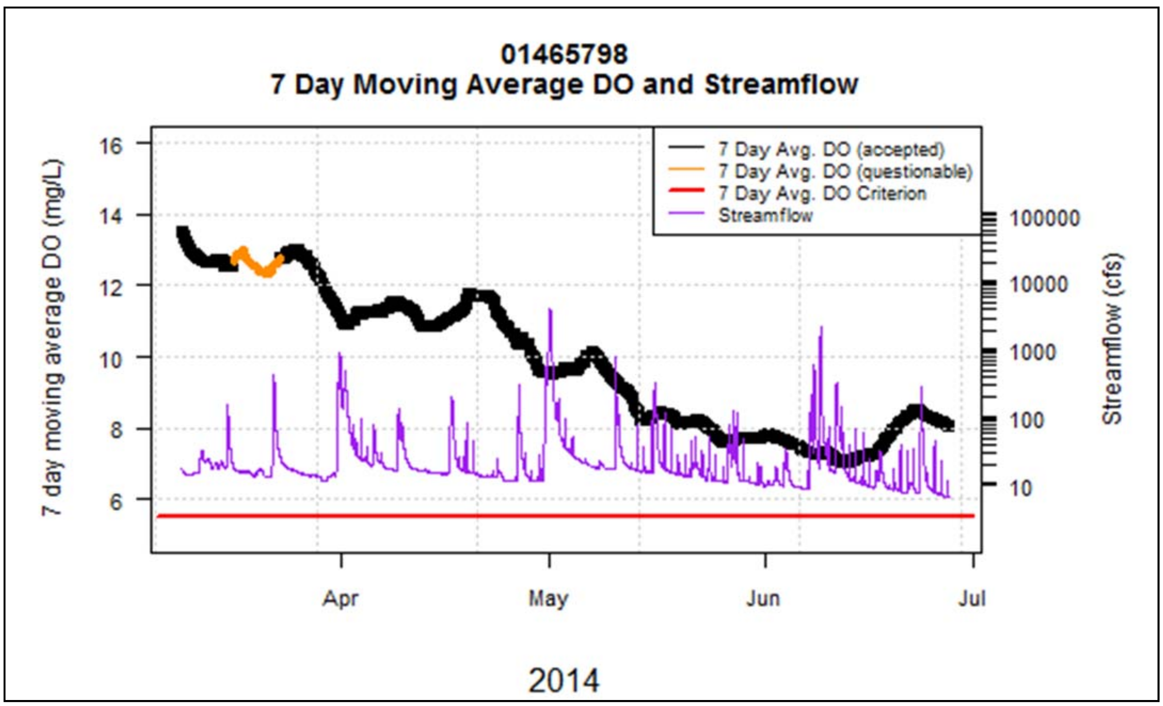


Figure 54. Gage 01465798, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 58. Gage 01465798 Dissolved Oxygen Mean Criteria Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	24.0	22.6	6.0	8.6	7.2
Aug-13	WWF	29.0	6.5	5.7	10.8	8.1
Sep-13	WWF	29.0	3.3	6.3	10.1	8.6
Oct-13	WWF	24.0	22.6	6.8	11.9	9.9
Nov-13	WWF	27.0	10.0	7.0	11.6	9.7
Mar-14	WWF	22.0	16.7	10.6	14.5	12.6
Apr-14	WWF	27.0	10.0	7.8	12.5	11.0
May-14	WWF	28.0	9.7	6.8	10.6	8.6
Jun-14	WWF	27.0	10.0	6.4	9.2	7.7

Table 59. Gage 01465798 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	699.0	29.1	6.0	0.0	0.0	0	0	100.0	100.0	6.6	8.1	7.4
Aug-13	742.5	30.9	0.2	0.1	3.2	0	0	99.9	96.8	6.7	9.1	7.4
Sep-13	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	8.3	7.3
Oct-13	731.5	30.5	1.7	0.0	0.0	0	0	100.0	100.0	6.5	8.3	7.3
Nov-13	716.0	29.8	0.6	0.0	0.0	0	0	100.0	100.0	6.9	7.4	7.2
Mar-14	627.0	26.1	1.1	0.6	3.7	0	0	99.4	96.3	7.3	9.2	7.7
Apr-14	658.5	27.4	8.5	0.0	0.0	0	0	100.0	100.0	6.9	9.0	7.5
May-14	741.5	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.8	8.0	7.1
Jun-14	690.0	28.8	4.2	0.0	0.0	0	0	100.0	100.0	6.2	8.4	7.3

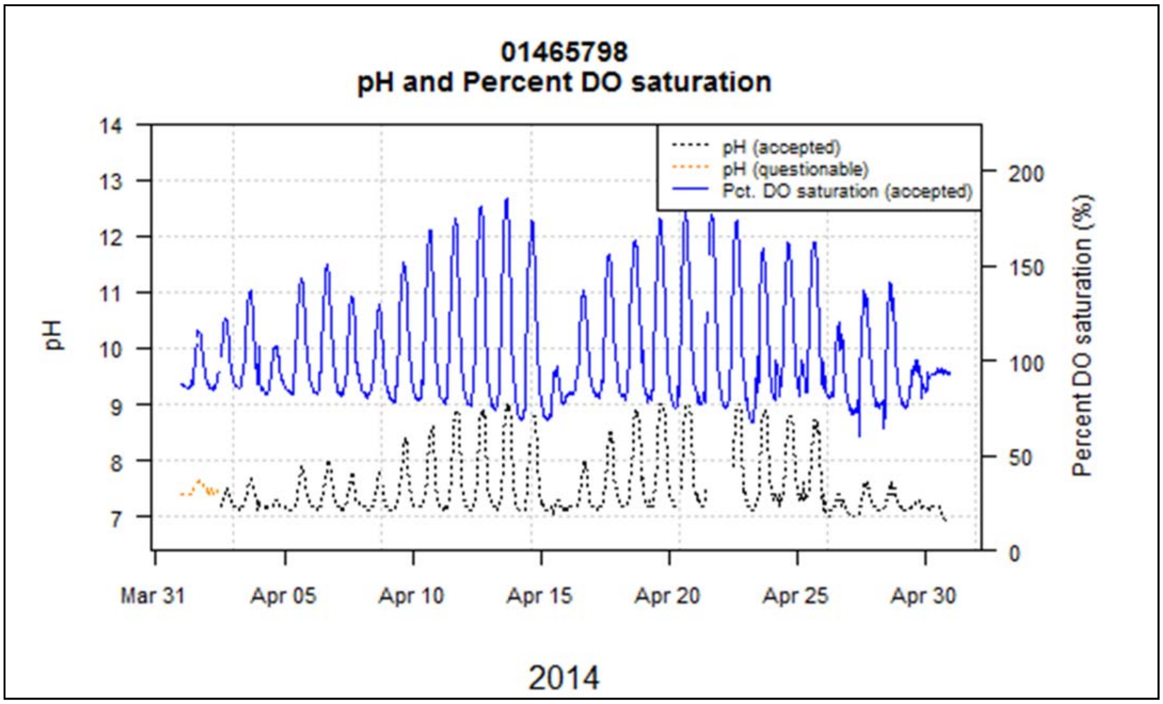


Figure 55. Gage 01465798, pH and Percent DO Saturation, April 2014.

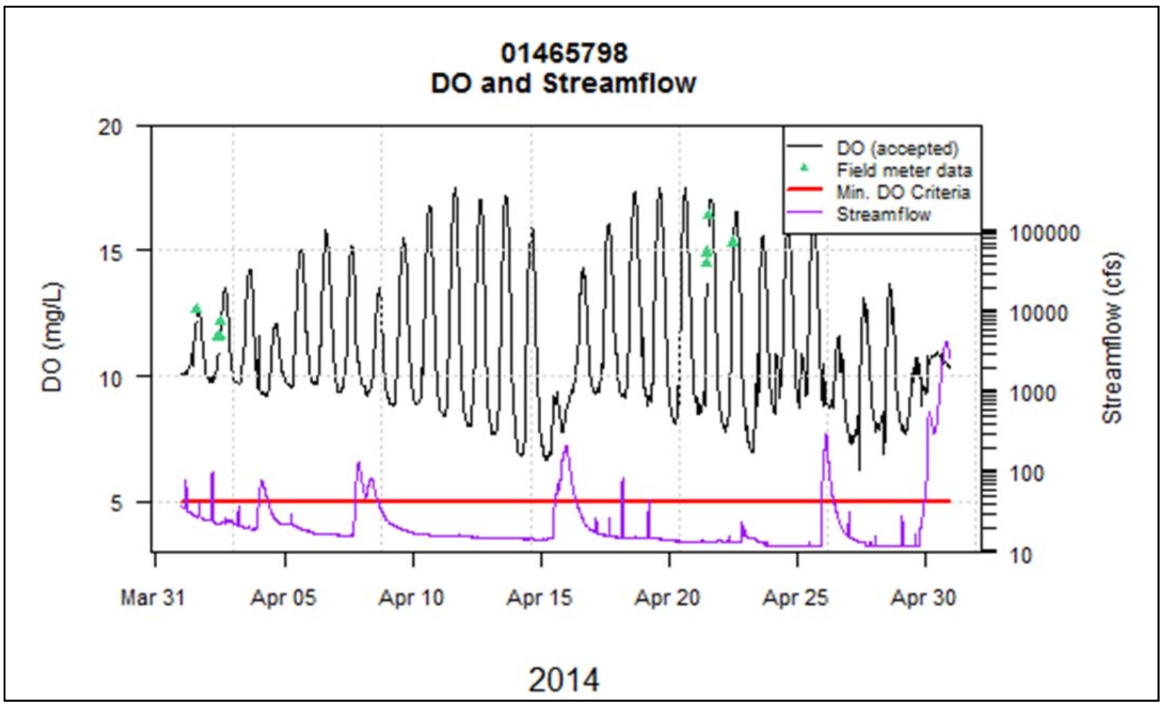


Figure 56. Gage 01465798, DO and Streamflow, April 2014.

Figure 57. Gage 01465798, Poquessing Creek at Grant Ave., looking upstream

Turbidity

As in other Philadelphia streams, high turbidity levels accompanied storm events and increased streamflow.

Table 60. Gage 01465798 Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	659.5	27.5	11.4	34.5	65.5	0.0	240.0	6.2
Aug-13	708.5	29.5	4.8	38.2	61.8	0.9	1230.0	25.1
Sep-13	718.0	29.9	0.3	19.6	80.4	0.7	150.0	4.4
Oct-13	723.5	30.1	2.8	12.3	87.7	0.4	94.0	2.5
Nov-13	716.0	29.8	0.6	18.4	81.6	0.3	140.0	3.5
Mar-14	627.0	26.1	1.1	28.2	71.8	1.0	510.0	16.1
Apr-14	716.5	29.9	0.5	33.1	66.9	1.1	880.0	9.4
May-14	741.5	30.9	0.3	50.2	49.8	1.1	260.0	10.4
Jun-14	716.5	29.9	0.5	31.2	68.8	0.7	470.0	14.7

Specific Conductance

Specific conductance data were similar to other Philadelphia streams, with evidence of road salt causing higher specific conductance in early March.

Table 61. Gage 01465798 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	741.0	30.9	0.4	81.0	661.0	417.2
Aug-13	742.5	30.9	0.2	66.0	641.0	417.0
Sep-13	718.0	29.9	0.3	78.0	710.0	474.6
Oct-13	730.5	30.4	1.8	79.0	686.0	536.4
Nov-13	715.0	29.8	0.7	76.0	687.0	548.3
Mar-14	627.0	26.1	1.1	269.0	2170.0	1132.0
Apr-14	716.5	29.9	0.5	85.0	889.0	728.9
May-14	741.5	30.9	0.3	115.0	718.0	597.1
Jun-14	716.5	29.9	0.5	92.0	714.0	571.9

Temperature

Temperature exceedance rates observed in Poquessing Creek were similar to those in other WWF designated-use creeks (*e.g.*, Tacony and Cobbs Creeks).

Table 62. Gage 01465798 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	0.0	100.0	0.4	741.0	30.9	19.8	30.3	24.8
WWF	1-Aug	15-Aug	0.0	100.0	0.4	358.5	14.9	18.5	25.6	22.0
WWF	16-Aug	31-Aug	0.0	100.0	0.0	384.0	16.0			
WWF	1-Sep	15-Sep	0.0	100.0	0.0	360.0	15.0	13.9	26.4	19.0
WWF	16-Sep	30-Sep	0.0	100.0	0.6	358.0	14.9			
WWF	1-Oct	15-Oct	1.0	99.0	0.6	358.0	14.9	8.1	22.3	15.0
WWF	16-Oct	31-Oct	0.0	100.0	7.6	355.0	14.8			
WWF	1-Nov	15-Nov	8.4	91.6	4.0	345.5	14.4	0.9	15.6	7.9
WWF	16-Nov	30-Nov	14.6	85.4	4.6	343.5	14.3			
WWF	1-Mar	31-Mar	21.5	78.5	1.4	627.0	26.1	0.5	10.9	6.2
WWF	1-Apr	15-Apr	57.7	42.3	0.6	358.0	14.9	7.1	20.0	12.7
WWF	16-Apr	30-Apr	34.4	65.6	0.4	358.5	14.9			
WWF	1-May	15-May	22.1	77.9	0.3	359.0	15.0	10.7	21.9	16.8
WWF	16-May	31-May	0.0	100.0	0.4	382.5	15.9			
WWF	1-Jun	15-Jun	0.0	100.0	0.1	359.5	15.0	15.8	26.7	21.3
WWF	16-Jun	30-Jun	0.0	100.0	0.8	357.0	14.9			

Gages in Large Watersheds

Schuylkill River (Gage 01474500)

An intense storm on April 30 - May 1 resulted in flooding near the Schuylkill River gage 01474500 and at many other locations upstream. At 01474500 (150 feet upstream of the Fairmount Dam), a maximum discharge of 88,500 cubic feet per second was recorded. Maximum gage height reached 13.91 feet, nearly three feet above the flood stage.

Dissolved oxygen and pH

DO water quality criteria were never exceeded at this location (Table 63, Figures 58-59). pH criteria were exceeded in June 2014 (Table 65). Supersaturated DO conditions were observed concomitant with daily pH peaks around 9.0 at the end of June (Figure 60), indicating high algal activity.

Table 63. Gage 01474500 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining	Min	Max	Mean
Jul-13	WWF	742.0	30.9	0.3	0.0	100.0	6.2	10.4	7.5
Aug-13	WWF	742.5	30.9	0.2	0.0	100.0	6.7	8.9	7.8
Sep-13	WWF	717.5	29.9	0.3	0.0	100.0	7.0	9.9	8.4
Oct-13	WWF	728.5	30.4	2.1	0.0	100.0	7.3	11.0	9.4
Nov-13	WWF	718.0	29.9	0.3	0.0	100.0	9.7	13.0	11.3
Mar-14	WWF	515.5	21.5	0.1	0.0	100.0	12.0	13.9	12.8
Apr-14	WWF	718.0	29.9	0.3	0.0	100.0	9.2	12.5	10.9
May-14	WWF	742.5	30.9	0.2	0.0	100.0	8.4	12.3	9.9
Jun-14	WWF	717.5	29.9	0.3	0.0	100.0	7.4	18.6	10.3

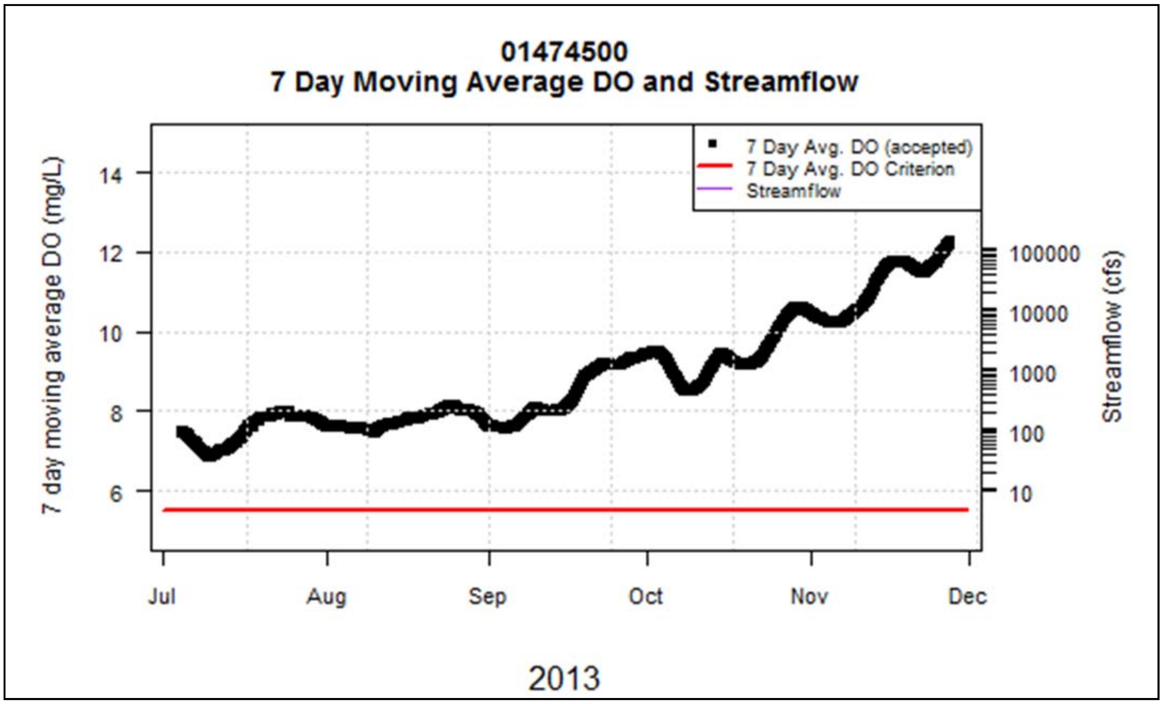


Figure 58. Gage 01474500, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2013.

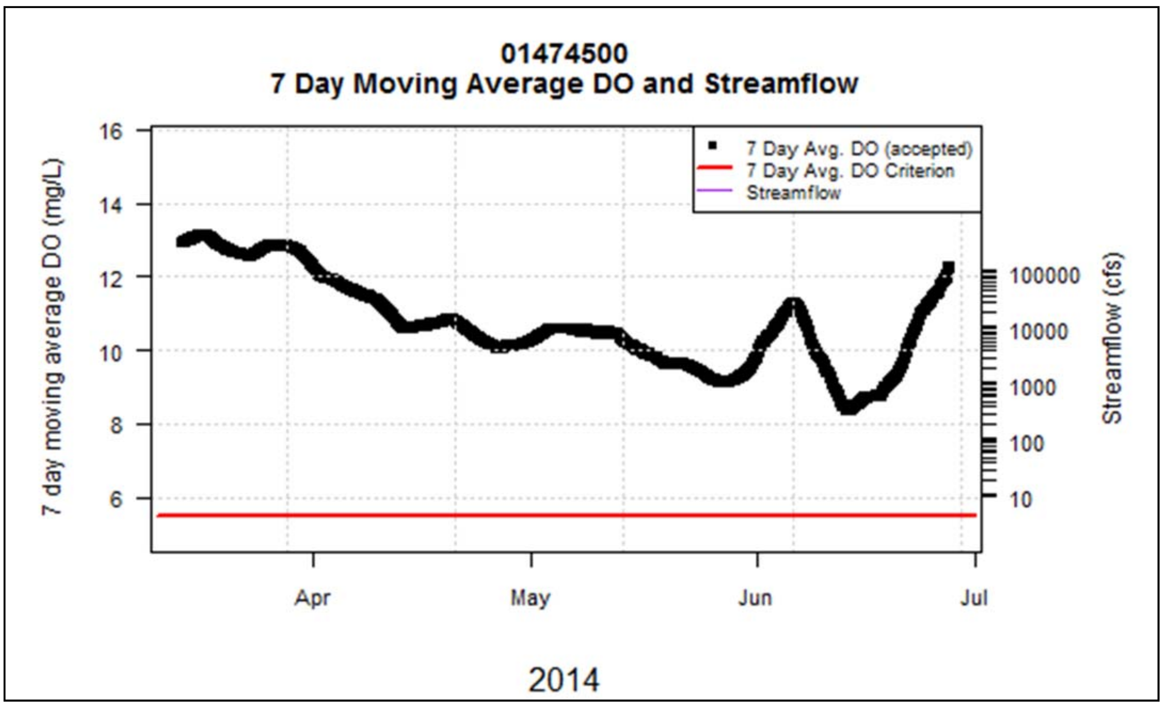


Figure 59. Gage 01474500, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2014.

Table 64. Gage 01474500 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	Min.	Max.	Mean
Jul-13	WWF	30.0	3.2	6.8	8.4	7.5
Aug-13	WWF	30.0	3.2	7.4	8.4	7.8
Sep-13	WWF	28.0	6.7	7.2	9.4	8.4
Oct-13	WWF	29.0	6.5	7.6	10.8	9.4
Nov-13	WWF	29.0	3.3	10.0	12.9	11.3
Mar-14	WWF	20.0	7.0	12.1	13.5	12.8
Apr-14	WWF	29.0	3.3	9.7	12.4	10.9
May-14	WWF	29.0	6.5	8.7	10.8	9.9
Jun-14	WWF	28.0	6.7	7.7	13.6	10.3

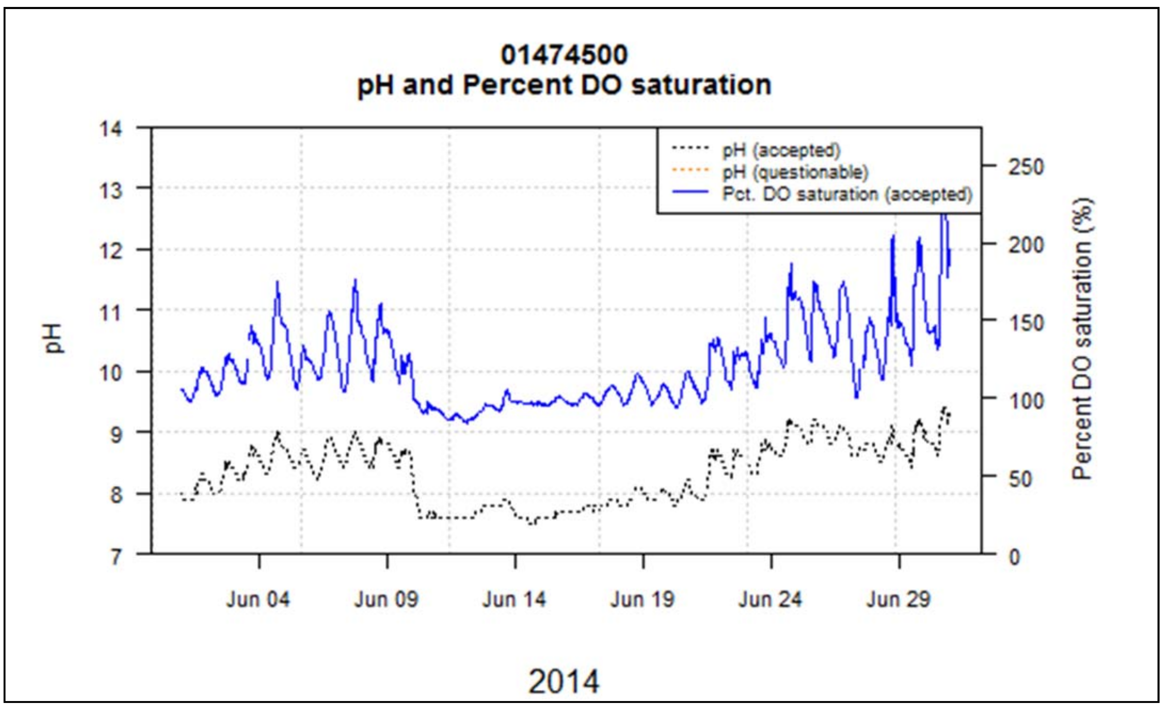


Figure 60. Gage 01474500, pH and Percent Dissolved Oxygen Saturation, June 2014.

Table 65. Gage 01474500 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	7.2	8.6	7.7
Aug-13	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	7.4	8.2	7.9
Sep-13	599.0	25.0	16.8	0.0	0.0	0	0	100.0	100.0	7.6	8.3	8.0
Oct-13	743.5	31.0	0.1	0.0	0.0	0	0	100.0	100.0	7.7	8.3	8.0
Nov-13	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.9	8.6	8.2
Mar-14	515.5	21.5	0.1	0.0	0.0	0	0	100.0	100.0	7.6	8.6	8.0
Apr-14	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.3	8.3	7.9
May-14	599.0	25.0	19.5	0.0	0.0	0	0	100.0	100.0	7.3	8.6	7.8
Jun-14	716.5	29.9	0.5	6.4	20.0	0	0	93.6	80.0	7.5	9.4	8.3

Temperature

Table 66. Gage 01474500 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
WWF	1-Jul	31-Jul	2.2	97.8	0.3	742.0	30.9	23.4	31.9	26.6
WWF	1-Aug	15-Aug	0.0	100.0	0.0	360.0	15.0	22.0	26.5	24.1
WWF	16-Aug	31-Aug	0.0	100.0	0.4	382.5	15.9			
WWF	1-Sep	15-Sep	0.0	100.0	0.0	360.0	15.0	18.8	26.4	22.1
WWF	16-Sep	30-Sep	0.0	100.0	0.7	357.5	14.9			
WWF	1-Oct	15-Oct	10.2	89.8	0.1	359.5	15.0	10.8	23.2	16.7
WWF	16-Oct	31-Oct	0.0	100.0	0.0	384.0	16.0			
WWF	1-Nov	15-Nov	0.0	100.0	0.6	358.0	14.9	3.4	13.4	8.7
WWF	16-Nov	30-Nov	0.0	100.0	0.0	360.0	15.0			
WWF	1-Mar	31-Mar	0.0	100.0	0.1	515.5	21.5	3.1	7.5	5.8
WWF	1-Apr	15-Apr	39.1	60.9	0.6	358.0	14.9	7.1	16.7	12.2
WWF	16-Apr	30-Apr	31.5	68.5	0.0	360.0	15.0			
WWF	1-May	15-May	29.8	70.2	0.4	358.5	14.9	9.6	21.2	16.9
WWF	16-May	31-May	0.0	100.0	0.0	384.0	16.0			
WWF	1-Jun	15-Jun	0.0	100.0	0.3	359.0	15.0	18.5	27.5	23.1
WWF	16-Jun	30-Jun	0.0	100.0	0.4	358.5	14.9			

Figure 61. Gage 01474500, Schuylkill River at the Fairmount Dam, looking upstream

Turbidity

Turbidity levels at the Schuylkill gage were less susceptible to extreme peaks due to storms and increased flow, with the exception of major events such as the intense storm on April 30 - May 1.

Table 67. Gage 01474500 Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	736.5	30.7	1.0	65.4	34.6	0.0	90.0	7.5
Aug-13	742.5	30.9	0.2	32.1	67.9	0.0	150.0	5.7
Sep-13	697.0	29.0	3.2	1.9	98.1	0.0	4.9	1.3
Oct-13	738.5	30.8	0.7	74.1	25.9	1.3	81.0	9.0
Nov-13	718.0	29.9	0.3	38.9	61.1	1.2	24.0	4.1
Mar-14	414.5	17.3	19.7	100.0	0.0	3.2	150.0	17.4
Apr-14	718.0	29.9	0.3	100.0	0.0	5.4	480.0	19.2
May-14	742.5	30.9	0.2	99.9	0.1	0.0	500.0	22.5
Jun-14	717.0	29.9	0.4	100.0	0.0	3.3	68.0	7.9

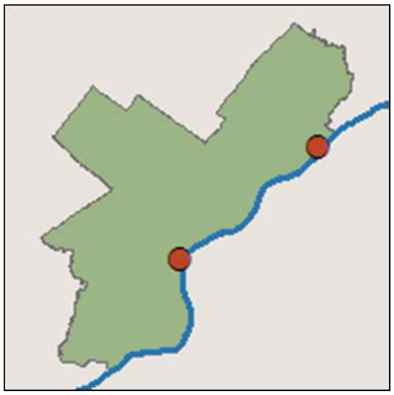
Specific Conductance

The Schuylkill River generally exhibits intermediate conductance, lower than the small Philadelphia tributary streams described elsewhere in this report, but greater than that observed in the Delaware River. Observed differences are likely due to geology and preponderance of anthropogenic sources in the respective watersheds.

Table 68. Gage 01474500 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	742.0	30.9	0.3	210.0	478.0	357.6
Aug-13	742.5	30.9	0.2	167.0	497.0	409.4
Sep-13	717.5	29.9	0.3	398.0	602.0	512.6
Oct-13	743.5	31.0	0.1	262.0	615.0	480.1
Nov-13	718.0	29.9	0.3	345.0	603.0	534.7
Mar-14	515.5	21.5	0.1	277.0	532.0	376.2
Apr-14	718.0	29.9	0.3	167.0	417.0	352.7
May-14	742.5	30.9	0.2	125.0	405.0	320.8
Jun-14	717.5	29.9	0.3	241.0	459.0	381.5

Delaware River (Gages 01467200 and 014670261)



Dissolved oxygen and pH

The DRBC DO daily mean and pH criteria for Zone 3 was attained at Gage 01467200 for the entire reporting period (Tables 69 and 71). The Zone 2 DO daily mean criteria was most never exceeded at Gage 014670261, and the maximum pH guideline was exceeded in March (Tables 70 and 72). In 2014, the collection of data at gage 01467200 began March 27. Thus, data for that month is incomplete for that location. Data is collected year round at 014670261.

Figure 62. Delaware River at Ben Franklin Bridge, near Gage 01467200

Table 69. Gage 01467200 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	% days non-attaining	% days attaining	Daily Avg. Min.	Daily Avg. Max.	Daily Avg. Mean	Min.	Max
Jul-13	DRBC	29.0	6.5	0.0	100.0	5.0	7.2	5.9	4.2	7.8
Aug-13	DRBC	28.0	9.7	0.0	100.0	4.8	6.9	5.7	4.1	7.5
Sep-13	DRBC	25.0	16.7	0.0	100.0	4.7	5.5	5.2	3.7	6.1
Oct-13	DRBC	28.0	9.7	0.0	100.0	5.3	7.5	6.4	4.0	8.2
Nov-13	DRBC	29.0	3.3	0.0	100.0	7.3	10.7	8.8	6.5	10.9
Mar-14	DRBC	3.0	45.5	0.0	100.0	12.3	12.7	12.6	12.1	12.9
Apr-14	DRBC	25.0	16.7	0.0	100.0	9.4	12.3	10.7	9.0	12.8
May-14	DRBC	27.0	12.9	0.0	100.0	6.8	9.6	8.3	6.3	9.9
Jun-14	DRBC	18.0	40.0	0.0	100.0	6.2	8.2	7.4	5.3	9.0

Table 70. Gage 014670261 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Total days accepted data	% days flagged data	% days non-attaining	% days attaining	Daily Avg. Min.	Daily Avg. Max.	Daily Avg. Mean	Min.	Max
Jul-13	DRBC	30.0	3.2	0.0	100.0	6.0	8.0	6.7	5.4	8.9
Aug-13	DRBC	26.0	16.1	0.0	100.0	6.8	8.8	7.5	6.0	9.8
Sep-13	DRBC	28.0	6.7	0.0	100.0	6.0	7.7	6.7	5.6	8.1
Oct-13	DRBC	25.0	19.4	0.0	100.0	7.2	8.9	8.1	6.7	9.1
Nov-13	DRBC	28.0	6.7	0.0	100.0	8.7	12.1	10.0	8.5	12.3
Dec-13	DRBC	30	3.2	0.0	100.0	11.8	13.7	12.7	11.6	13.9
Jan-14	DRBC	26	16.1	0.0	100.0	12.8	14.0	13.4	12.7	14
Feb-14	DRBC	27	3.6	0.0	100.0	12.9	13.7	13.4	12.8	13.7
Mar-14	DRBC	28.0	9.6	0.0	100.0	11.5	13.6	12.8	11.1	13.8
Apr-14	DRBC	27.0	10.0	0.0	100.0	9.4	11.4	10.5	9.2	11.6
May-14	DRBC	29.0	6.5	0.0	100.0	7.7	9.8	8.6	7.3	10.0
Jun-14	DRBC	29.0	3.3	0.0	100.0	7.0	8.8	7.8	6.6	9.8

Table 71. Gage 01467200 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	743.5	31.0	0.1	0.0	0.0	0	0	100.0	100.0	6.8	7.4	7.0
Aug-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	6.9	7.4	7.1
Sep-13	707.0	29.5	1.8	0.0	0.0	0	0	100.0	100.0	6.9	7.2	7.0
Oct-13	743.5	31.0	0.1	0.0	0.0	0	0	100.0	100.0	7.0	7.3	7.2
Nov-13	718.0	29.9	0.3	0.0	0.0	0	0	100.0	100.0	7.2	7.6	7.4
Mar-14	120.5	5.0	8.7	0.0	0.0	0	0	100.0	100.0	7.6	8.0	7.8
Apr-14	717.0	29.9	0.4	0.0	0.0	0	0	100.0	100.0	7.0	7.7	7.3
May-14	741.0	30.9	0.4	0.0	0.0	0	0	100.0	100.0	6.8	7.3	7.0
Jun-14	685.0	28.5	4.9	0.0	0.0	0	0	100.0	100.0	7.0	7.5	7.2

Table 72. Gage 014670261 pH Criteria Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining	Min.	Max.	Mean
Jul-13	743.0	31.0	0.1	0.0	0.0	0	0	100.0	100.0	6.8	8.2	7.6
Aug-13	680.5	28.4	8.5	0.0	0.0	0	0	100.0	100.0	7.2	8.2	7.5
Sep-13	718.5	29.9	0.2	0.0	0.0	0	0	100.0	100.0	7.3	7.6	7.4
Oct-13	742.0	30.9	0.3	0.0	0.0	0	0	100.0	100.0	7.3	7.8	7.6
Nov-13	718.5	29.9	0.2	0.0	0.0	0	0	100.0	100.0	7.4	8.4	7.6
Dec-13	743.5	31.0	0.1	0.0	0.0	0	0	100.0	100.0	7.3	7.7	7.5
Jan-14	647	27.0	13.0	0.0	0.0	0	0	100.0	100	7.1	7.6	7.5
Feb-14	670	27.9	0.3	0.0	0.0	0	0	100.0	100	7.3	7.7	7.5
Mar-14	741.0	30.9	0.3	5.0	9.7	0	0	95.0	90.3	7.5	8.8	7.9
Apr-14	716.0	29.8	0.6	0.0	0.0	0	0	100.0	100.0	7.2	7.8	7.4
May-14	742.5	30.9	0.2	0.0	0.0	0	0	100.0	100.0	7.1	7.5	7.3
Jun-14	718.5	29.9	0.2	0.0	0.0	0	0	100.0	100.0	7.3	8.0	7.5

Temperature

Temperature criteria for the Delaware River were never exceeded at either gage.

Table 73. Gage 01467200 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
DRBC	1-Jul	31-Jul	0.0	100.0	0.1	743.0	31.0	23.4	28.6	26.4
DRBC	1-Aug	31-Aug	0.0	100.0	0.4	741.0	30.9	23.8	26.4	24.8
DRBC	1-Sep	30-Sep	0.0	100.0	1.8	707.0	29.5	20.4	25.3	23.0
DRBC	1-Oct	31-Oct	0.0	100.0	0.2	742.5	30.9	14.4	21.8	18.5
DRBC	1-Nov	30-Nov	0.0	100.0	0.2	718.5	29.9	5.9	15.0	10.9
DRBC	26-Mar	31-Mar	0.0	100.0	12.9	115.0	4.8	5.1	6.2	5.7
DRBC	1-Apr	30-Apr	0.0	100.0	0.1	719.0	30.0	5.9	13.5	10.4
DRBC	1-May	31-May	0.0	100.0	0.2	742.5	30.9	11.0	19.0	16.0
DRBC	1-Jun	30-Jun	0.0	100.0	1.7	707.5	29.5	18.6	25.6	22.5

Table 74. Gage 014670261 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% hrs. exceedance	% hrs. attaining	% hrs. flagged data	Total hrs. accepted data	Total days accepted data	Min.	Max.	Mean
DRBC	1-Jul	31-Jul	0.0	100.0	0.1	743.0	31.0	22.6	29.3	26.5
DRBC	1-Aug	31-Aug	0.0	100.0	0.7	739.0	30.8	23.2	26.0	24.4
DRBC	1-Sep	30-Sep	0.0	100.0	0.2	718.5	29.9	19.5	25.4	22.6
DRBC	1-Oct	31-Oct	0.0	100.0	0.1	743.0	31.0	13.3	21.6	17.8
DRBC	1-Nov	30-Nov	0.0	100.0	0.2	718.5	29.9	4.2	14.5	9.7
DRBC	1-Dec	31-Dec	0.0	100.0	0.1	743.5	31.0	1.0	4.8	3.0
DRBC	1-Jan	31-Jan	0.0	100.0	13.0	647.5	27.0	0.0	2.9	1.0
DRBC	1-Feb	28-Feb	0.0	100.0	0.2	670.5	27.9	0.0	3.1	0.8
DRBC	1-Mar	31-Mar	0.0	100.0	0.2	741.5	30.9	0.7	7.0	3.9
DRBC	1-Apr	30-Apr	0.0	100.0	0.4	717.0	29.9	6.0	13.9	10.6
DRBC	1-May	31-May	0.0	100.0	0.2	742.5	30.9	10.8	19.7	16.2
DRBC	1-Jun	30-Jun	0.0	100.0	0.2	718.5	29.9	19.1	26.1	22.8

Specific Conductance

The Delaware River exhibits much lower conductivity than the small Philadelphia tributary streams described elsewhere in this report. This is likely caused by differences in geology and proportionally fewer anthropogenic sources in the less-developed Delaware River watershed.

Table 75. Gage 01467200 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	1486.0	31.0	0.1	129.0	226.0	184.9
Aug-13	1485.0	30.9	0.2	176.0	254.0	220.2
Sep-13	1422.0	29.6	1.3	227.0	289.0	250.5
Oct-13	1486.0	31.0	0.1	261.0	327.0	290.0
Nov-13	1437.0	29.9	0.2	269.0	386.0	326.8
Mar-14	241.0	5.0	8.7	250.0	295.0	271.3
Apr-14	1437.0	29.9	0.2	160.0	266.0	192.3
May-14	1487.0	31.0	0.1	136.0	245.0	191.7
Jun-14	1382.0	28.8	4.0	200.0	283.0	239.9

Table 76. Gage 014670261 Specific Conductance Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Min.	Max.	Mean
Jul-13	1486.0	31.0	0.1	123.0	233.0	183.9
Aug-13	1478.0	30.8	0.7	154.0	266.0	213.2
Sep-13	1437.0	29.9	0.2	208.0	272.0	231.8
Oct-13	1486.0	31.0	0.1	245.0	321.0	264.5
Nov-13	1435.0	29.9	0.3	238.0	321.0	286.8
Dec-13	1487.0	31.0	0.1	184.0	556.0	291.0
Jan-14	1294.0	27.0	13.0	177.0	673.0	239.8
Feb-14	1341.0	27.9	0.2	253.0	663.0	432.0
Mar-14	1483.0	30.9	0.2	236.0	464.0	314.8
Apr-14	1434.0	29.9	0.4	153.0	313.0	197.0
May-14	1485.0	30.9	0.2	122.0	283.0	195.6
Jun-14	1437.0	29.9	0.2	177.0	275.0	230.1

Turbidity

Turbidity guidelines at 014670261 were almost always exceeded throughout the year. Turbidity is not continuously measured at 01467200.

Table 77. Gage 014670261 Turbidity Summary Results by Month

Month	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline	Min.	Max.	Mean
Jul-13	743	31.0	0.1	98.9	1.1	1.4	62	9.7
Aug-13	735.5	30.6	1.1	97.0	3.1	1.5	53	7.6
Sep-13	718.5	30.0	0.2	100	0	3	22	7.4
Oct-13	742.5	30.9	0.2	99.9	0.1	2.5	23	7.3
Nov-13	718	29.9	0.3	99.8	0.2	2.5	32	8.6
Dec-13	743.5	31.0	0.1	100.0	0.0	4.0	34	9.0
Jan-14	647.5	27.0	13.0	97.2	2.8	1.9	120	10.1
Feb-14	671	28.0	0.1	99.7	0.3	2.6	32	6.8
Mar-14	741	30.9	0.3	90.6	9.4	2.1	57	6.6
Apr-14	716	29.8	0.6	97.3	2.7	2.3	42	7.5
May-14	742	30.9	0.3	100	0.0	3.2	93	12.3
Jun-14	718.5	29.9	0.2	99.4	0.6	2.1	41	7.7

Wet Weather and Dry Weather Results

Annual Summary, July 2013 - June 2014

Water quality data was also categorized as wet or dry for the purpose of evaluating weather effects on water quality, and specifically the incidence of non-attainment of water quality criteria. A wet weather condition was defined as rainfall greater than 0.05 inches in the preceding 72 hours, as measured at the nearest PWD rain gage.

In general, more frequent non-attainment of DO criteria was observed in wet weather due to the tendency of storm events to decrease DO via the introduction of stormwater runoff and BOD (Tables 78-79). The turbidity maximum guideline was also usually more frequently surpassed in wet weather (Tables 84-85). Conversely, the pH maximum criterion was more frequently exceeded in dry weather due to the effects of algal growth (Tables 82-83). Temperature criteria were more likely to be exceeded at Trout-Stocking Fishery (TSF) gages due to more stringent seasonal criteria (Tables 88-89).

Table 78. USGS Gage July 2013 - June 2014 Dissolved Oxygen Minimum Criterion Summary Results During Wet Weather

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining
01465798	WWF	3468	144.5	5.4	2.6	97.4
01467042	TSF	3747.5	156.1	1.0	0.2	99.8
01467048	TSF	3591.5	149.6	2.1	0	100
01467086	WWF	3712.5	154.7	0.8	0.5	99.5
01467087	WWF	2797.5	116.6	23.3	27.0	73.0
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	3454.5	143.9	6.5	0	100
01474000	TSF	3696	154	0.2	0	100
01474500	WWF	3338	139.1	0.1	0	100
01475530	WWF	3414.5	142.3	0.1	0.2	99.8
01475548	WWF	3763.5	156.8	1.6	1.9	98.1
014670261*	DRBC	NA	NA	NA	NA	NA

*No minimum DO criterion applies at these locations.

Table 79. USGS Gage July 2013 - June 2014 Dissolved Oxygen Minimum Criterion Summary Results During Dry Weather

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. non-attaining	% hrs. attaining
01465798	WWF	2803.5	116.8	0.5	0.2	99.8
01467042	TSF	2606.5	108.6	0.9	0	100
01467048	TSF	2804.5	116.9	0.4	0	100
01467086	WWF	2578.5	107.4	2.0	0.2	99.8
01467087	WWF	2485.5	103.6	7.1	8.9	91.1
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	2787.5	116.1	1.1	0	100
01474000	TSF	2886	120.25	0.3	0	100
01474500	WWF	3004	125.2	0.9	0	100
01475530	WWF	2920	121.7	0.3	0	100
01475548	WWF	2478	103.3	0.5	0	100
014670261*	DRBC	NA	NA	NA	NA	NA

*No minimum DO criterion applies at these locations.

Table 80. USGS Gage July 2013 - June 2014 Dissolved Oxygen Daily Mean Criterion Summary Results During Wet Weather

Gage number	Designated Use	Total days accepted data	% days flagged data
01465798	WWF	125	9.4
01467042	TSF	140	0.7
01467048	TSF	134	2.9
01467086	WWF	142	0.7
01467087	WWF	99	28.3
01467200	DRBC	117	0.8
01473900	TSF	131	7.1
01474000	TSF	138	0
01474500	WWF	126	0
01475530	WWF	126	0
01475548	WWF	139	2.1
014670261	DRBC	195	0

Table 81. USGS Gage July 2013 - June 2014 Dissolved Oxygen Daily Mean Criterion Summary Results During Dry Weather

Gage number	Designated Use	Total days accepted data	% days flagged data
01465798	WWF	102	1.0
01467042	TSF	90	0
01467048	TSF	103	0
01467086	WWF	90	4.3
01467087	WWF	87	7.4
01467200	DRBC	106	0
01473900	TSF	104	1.9
01474000	TSF	105	0
01474500	WWF	112	0.9
01475530	WWF	106	0
01475548	WWF	86	0
014670261	DRBC	130	0

Table 82. USGS Gage July 2013 - June 2014 pH Criteria Summary Results During Wet Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining
01465798	3471.5	144.6	5.3	0	0	0	0	100	100
01467042	3727	155.3	1.5	0.2	1.1	0	0	99.8	98.9
01467048	3593	149.7	2.1	0.1	0.6	0	0	100.0	99.4
01467086	3729.5	155.4	0.3	2.8	11.5	0	0	97.2	88.5
01467087	3220	134.2	11.7	0	0	0	0	100	100
01467200	3092.5	128.9	0.8	0	0	0	0	100	100
01473900	3455.5	144.0	6.5	2.2	8.7	0	0	97.8	91.3
01474000	3696.5	154.0	0.2	1.1	5.4	0	0	98.9	94.6
01474500	3266	136.1	2.3	0.2	1.2	0	0	99.8	98.8
01475530	3325	138.5	2.7	0	0	0	0	100	100
01475548	3816	159	0.3	0.5	2.6	0	0	99.5	97.4
014670261	5084.5	211.9	0.7	0.7	1.2	0	0	99.3	98.8

Table 83. USGS Gage July 2013 - June 2014 pH Criteria Summary Results During Dry Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. max. non-attaining	% days max. non-attaining	% hrs. min. non-attaining	% days min. non-attaining	% hrs. attaining	% days attaining
01465798	2782	115.9	1.2	0.2	1.3	0	0	99.8	98.7
01467042	2534.5	105.6	3.6	0.7	2.2	0	0	99.3	97.8
01467048	2805.5	116.9	0.4	0.7	2	0	0	99.3	98
01467086	2599.5	108.3	1.2	4.8	12.7	0	0	95.2	87.3
01467087	2520.5	105.0	5.8	0.1	1.5	0	0	99.9	98.5
01467200	2819.5	117.5	0.7	0	0	0	0	100	100
01473900	2786	116.1	1.2	3.8	12.2	0	0	96.2	87.8
01474000	2885.5	120.2	0.3	2.4	11.8	0	0	97.6	88.2
01474500	2828	117.8	6.7	1.3	2.7	0	0	98.7	97.3
01475530	2832.5	118.0	3.2	0	0	0	0	100	100
01475548	1475548	2351	98.0	5.6	3.0	7.4	0	0	97.0
014670261	3496.5	145.7	0.8	0.0	0.5	0	0	100.0	99.5

Table 84. USGS Gage July 2013 - June 2014 Turbidity Summary Results During Wet Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline
01465798	3483	145.1	5.0	50.0	50.0
01467042	3739.5	155.8	1.2	43.8	56.2
01467048	3505	146.0	4.5	55.4	44.6
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	3250.5	135.4	12.0	72.0	28.0
01474000	3696.5	154.0	0.2	35.9	64.1
01474500	3293	137.2	1.5	81.6	18.4
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA
014670261	5115.5	213.1	0.1	99.1	0.9

*Turbidity not continuously monitored at this location

Table 85. USGS Gage July 2013 - June 2014 Turbidity Summary Results During Dry Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. above max. guideline	% hrs. below max. guideline
01465798	2773.5	115.6	1.5	3.0	97.0
01467042	2587	107.8	1.6	22.2	77.8
01467048	2688	112	4.5	12.4	87.6
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	2713	113.0	3.8	33.9	66.1
01474000	2884	120.2	0.4	4.5	95.5
01474500	2931.5	122.1	3.3	49.9	50.1
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA
014670261	3521.5	146.7	0.1	97.1	2.9

*Turbidity not continuously monitored at this location

Table 86. USGS Gage July 2013 - June 2014 Specific Conductance Summary Results During Wet Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data
01465798	3575	149.0	2.5
01467042	3747	156.1	1.0
01467048	3650	152.1	0.5
01467086	3729.5	155.4	0.3
01467087	3543	147.6	2.8
01467200	3100.5	129.2	0.5
01473900	3455	144.0	6.5
01474000	3657	152.4	1.2
01474500	3338	139.1	0.1
01475530	3336.5	139.0	2.4
01475548	3711.5	154.6	3.0
014670261	5120.5	213.4	0

Table 87. USGS Gage July 2013 - June 2014 Specific Conductance Summary Results During Dry Weather

Gage number	Total hrs. accepted data	Total days accepted data	% hrs. flagged data
01465798	2803	116.8	0.5
01467042	2598	108.3	1.2
01467048	2804.5	116.9	0.4
01467086	2597	108.2	1.3
01467087	2619.5	109.1	2.1
01467200	2825.5	117.7	0.4
01473900	2775.5	115.6	1.6
01474000	2709.5	112.9	6.4
01474500	3019	125.8	0.4
01475530	2860	119.2	2.3
01475548	2437	101.5	2.1
014670261	3521	146.7	0.1

Table 88. USGS Gage July 2013 - June 2014 Temperature Maximum Criteria Summary Results During Wet Weather

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. exceedance	% hrs. attaining
01465798	WWF	3561.5	148.4	2.8	10.8	89.2
01467042	TSF	3751	156.3	0.9	21.8	78.2
01467048	TSF	3652	152.2	0.5	29.0	71.0
01467086	WWF	3729.5	155.4	0.3	10.6	89.4
01467087	WWF	3585	149.4	1.7	14.2	85.8
01467200	DRBC	3113.5	129.7	0.1	0	100
01473900	TSF	3452	143.8	6.6	18.3	81.7
01474000	TSF	3695.5	154.0	0.2	20.5	79.5
01474500	WWF	3338	139.1	0.1	6.0	94.0
01475530	WWF	3413.5	142.2	0.1	9.7	90.3
01475548	WWF	3817.5	159.1	0.2	10.3	89.7
014670261	DRBC	5120	213.3	0.0	0	100

Table 89. USGS Gage July 2013 - June 2014 Temperature Maximum Criteria Summary Results During Dry Weather

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	% hrs. exceedance	% hrs. attaining
01465798	WWF	2773	115.5	1.5	8.3	91.7
01467042	TSF	2606.5	108.6	0.9	18.2	81.8
01467048	TSF	2805.5	116.9	0.4	19.5	80.5
01467086	WWF	2600.5	108.4	1.1	9.3	90.7
01467087	WWF	2616.5	109.0	2.2	8.0	92.0
01467200	DRBC	2822.5	117.6	0.5	0	100
01473900	TSF	2785	116.0	1.2	15.6	84.4
01474000	TSF	2885.5	120.2	0.3	14.6	85.4
01474500	WWF	3019	125.8	0.4	7.1	92.9
01475530	WWF	2920	121.7	0.3	8.7	91.3
01475548	WWF	2482.5	103.4	0.3	10.8	89.2
014670261	DRBC	3523	146.8	0.0	0	100

References

Delaware River Basin Commission, 2007. Delaware River Basin Water Code: 18 CFR Part 410 (With Amendments Through September 27, 2006). West Trenton, NJ.

Appendix J-
PWD/USGS Groundwater Monitoring Program

Background

The basis of PWD's CSO LTCPU wet weather source control strategy is the "capture" and infiltration of as much rainwater as possible with green stormwater infrastructure (GSI). The direct benefits of such an effort are a reduction of stormwater discharged directly to streams, as well as the increased recharge of stormwater to supplement groundwater resources. Increased infiltration, though advantageous in several respects, must be carefully planned and closely monitored to avoid unwanted impacts. Increasing groundwater levels in areas where the depth to water is shallow could result in the saturation of soils close to the surface, potentially causing basement flooding. In addition, building foundations could be impacted by rising groundwater levels.

The adaptive management approach being employed for the LTCPU is an iterative process strongly dependent on monitoring. In order to quantify the impact of this long-term effort on groundwater resources, it is necessary to monitor groundwater levels in Philadelphia. PWD has partnered with USGS to increase the geographic scope and frequency of groundwater monitoring in the Philadelphia region. A City-wide groundwater level monitoring network will provide long-term monthly data documenting current water levels and trends in groundwater elevations throughout the City, helping to track the impacts of widespread implementation of stormwater management practices (SMPs) and global climate change.

Data from the groundwater monitoring network will also be used to calibrate a Philadelphia groundwater model and update the USGS groundwater contour map of Philadelphia (Paulachok 1984). In addition to this City-wide, long term groundwater monitoring program, PWD is conducting site-scale monitoring to address the effectiveness of individual SMPs. The City-wide groundwater monitoring network and site-scale monitoring at GSI facilities provide complementary information regarding the effects of stormwater management practices at different spatial and temporal scales.

Methods

PWD and USGS identified existing wells that would be suitable for the network and obtained permission for site access. Once wells were identified and accessible, well condition and suitability for inclusion in the monitoring network were investigated by continuous water level monitoring and remote video camera inspection when accessible. Wells that met acceptance criteria were added to the monitoring network. After examining readily available information about existing wells, PWD elected to drill additional wells in order to provide better spatial distribution of wells in the monitoring network. USGS staff conduct groundwater observations monthly and upload water level data to the NWIS web server. PWD staff periodically download water level data from NWIS and summarize these data annually.

Well Network Establishment

Existing wells in the Philadelphia area were identified by USGS and PWD through digital and paper archives as well as through contacting representatives of other City agencies and large institutional landowners (*e.g.*, Philadelphia Fire Department, Philadelphia Department of Parks and Recreation, Philadelphia Gas Works, Southeastern Pennsylvania Transportation Authority, etc.). Priority was given to wells on publicly-owned or large institutional land uses in order to help ensure that wells would remain accessible in the future. The primary goal was to develop a network of wells with a spatial distribution and density sufficient to assess groundwater levels throughout the City of Philadelphia. Other criteria for establishment of the well network were:

- Sufficient density of wells in critical areas with a shallow water table
- No bias given to combined-sewered or separate-sewered areas
- Denser distribution of monitoring wells in the Northern Piedmont Ecoregion to reflect its more varied groundwater contours.

Wells that met acceptance criteria were assigned USGS location codes and added to the USGS well monitoring network and National Water Information System (NWIS) database. The well monitoring network contains 19 active sites that are monitored monthly. Additional sites are expected to be added once landowner access agreements are finalized or new wells are drilled.

Video Camera Inspection

The availability of well attribute information varied from well to well and in most cases the physical characteristics and condition of candidate wells to be added to the network was unknown. USGS staff perform remote video camera inspection, when possible, to determine physical characteristics such as screened intervals, total depth, depth to bottom of casing, and the location of potential water-bearing zones within the bore hole. Wells narrower than 4" diameter and wells with pumps or other plumbing could not accommodate the camera equipment and were not inspected with this method.

Continuous Water Level Monitoring

Monthly measurements are appropriate for monitoring long term trends in groundwater levels. However, it is important to verify that these monthly observations are representative of the unconfined aquifer and not influenced by anthropogenic activity or other conditions. USGS staff used data logging pressure transducers (LevelTroll model 500, In-Situ, Inc.) to conduct continuous water level monitoring in candidate wells. These sensors are vented to the surface of the well to provide atmospheric pressure correction. Continuous monitoring was carried out across all wells in the network to identify any aberrant trends, such as those that might be caused by local pumping operations. Sensors were deployed for three-month periods on a rotating schedule with five wells actively monitored at a time. Wells that appear to be influenced by permanent pumping operations will be removed from the monitoring network (*e.g.*, permanent wells dewatering the stadiums). Wells that are temporarily affected by local, dewatering operations (*e.g.*, a short term construction site), will remain in the system, but data collected during the period when dewatering operations affected the well will not be used in estimates of current water levels and water level trends.

Routine Groundwater Observations

USGS staff conduct groundwater observations monthly at each well using a water sensor and graduated tape. Equipment is sterilized in 10% bleach solution prior to and after measurements are taken in order to prevent introducing or transferring contamination between wells. Well level measurements are converted to elevation above the North American Vertical Datum of 1988 (NAVD88) based upon the known elevation correction factor for each well. Water level data are recorded on site in field notebooks along with any pertinent field notes and then uploaded to the NWIS web server. PWD periodically downloads data from NWIS and summarizes these data annually.

Monitoring Well Locations

Currently the well monitoring network contains 19 active sites that are monitored monthly. (Table 1, Figure 1). PWD is in the process of drilling additional wells on City-owned property in order to meet spatial distribution and other well network criteria. Of the 19 active wells, seven are located within the Middle Atlantic Coastal Plain Ecoregion, while the remaining 12 wells are located in the Northern Piedmont (Omernik 1987). As stated above, higher well density is required in the latter region to reflect the more complex geology and interactions with groundwater.

Table 1. PWD-USGS Groundwater Monitoring Well Network Locations

Site ID	Site Name	Lat.	Long.	Established	Observations
USGS-395342075102101	PH 12*	39.895	-75.172	10/22/1978	123
USGS-395353075151501	PH 1052	39.898	-75.254	3/7/2011	27
USGS-395408075104001	PH 63	39.902	-75.177	9/14/1954	45
USGS-395416075150301	PH 1053	39.904	-75.251	4/24/2003	27
USGS-395516075113901	PH 1051	39.921	-75.194	--	29
USGS-395656075100401	PH 136	39.949	-75.167	12/6/1978	38
USGS-395859075085401	PH 1042	39.983	-75.148	2/14/2011	31
USGS-395942075144301	MG 2164	39.995	-75.245	2/14/2011	40
USGS-400211075093701	PH 1050	40.036	-75.16	--	29
USGS-400217075142101	PH 540	40.038	-75.239	3/29/1948	30
USGS-400229075104601	PH 1043**	40.041	-75.179	2/14/2011	39
USGS-400308074592201	PH 397	40.052	-74.989	1/4/1979	44
USGS-400311075101301	PH 1040	40.053	-75.17	2/17/2011	42
USGS-400327075152201	PH 1044	40.057	-75.256	3/16/2011	35
USGS-400424075104901	PH 550	40.073	-75.18	--/--/1906	35
USGS-400512075033401	PH 1045	40.087	-75.059	7/18/2011	36
USGS-400516075033201	PH 1046	40.088	-75.059	7/18/2011	29
USGS-400524075042601	MG 2195	40.09	-75.074	--	1
USGS-400527075042801	MG 2193	40.091	-75.074	--	29
USGS-400527075042802	MG 2194	40.091	-75.074	--	36
USGS-400644074590801	PH 1041	40.112	-74.986	2/17/2011	40

* Former Philadelphia County observation well, destroyed by construction activity, will be replaced with new well in same location
** Philadelphia County observation well

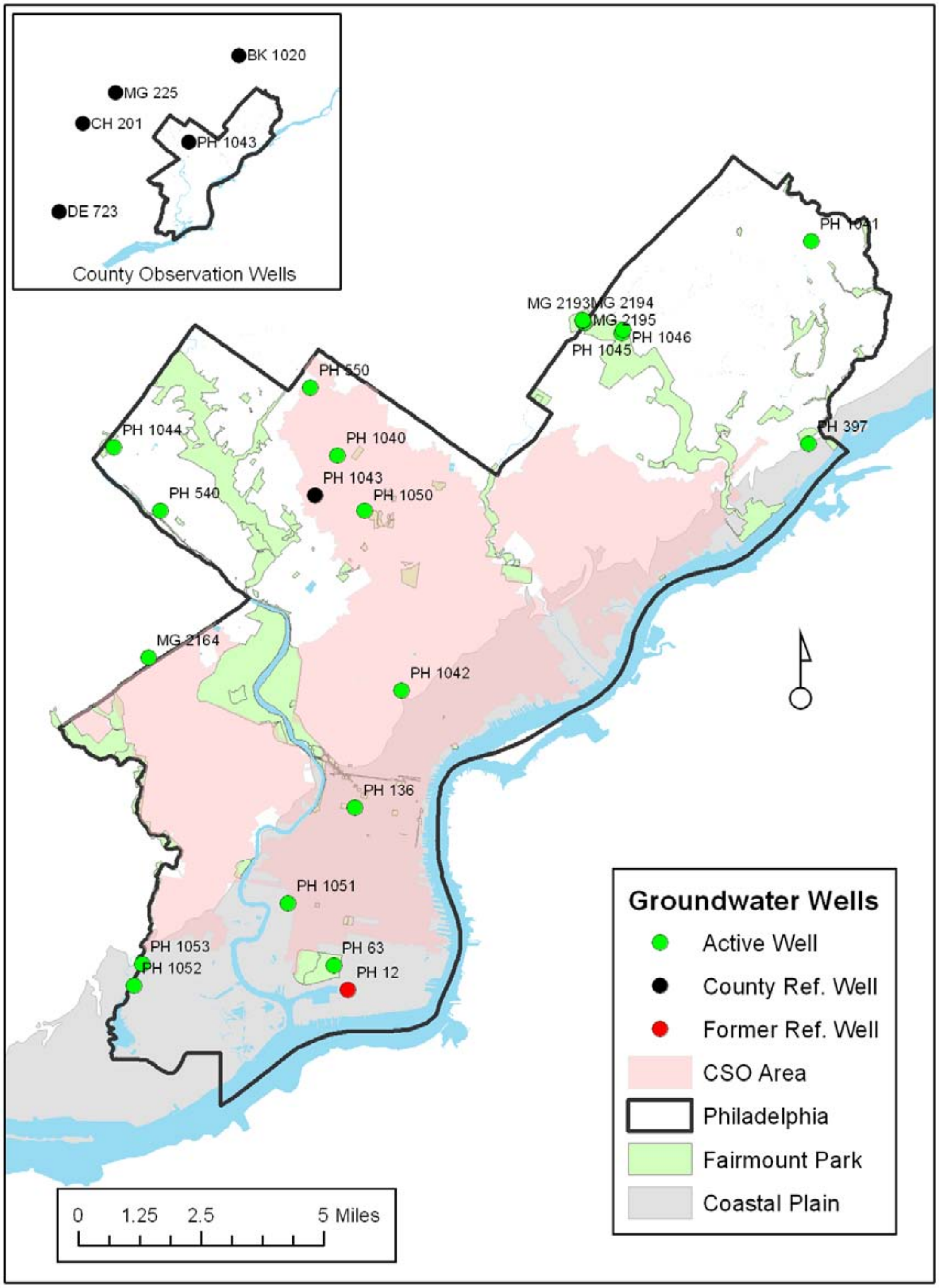


Figure 1. PWD-USGS Groundwater Monitoring Well Network Locations and (inset) County Reference Well Locations

Wells were also classified according to predominant underlying geology and type of sewer system, *i.e.*, CSO or separate-sewered (Table 2, Figure 1). Another consideration for siting new wells was the potential influence of buried utilities and historic creek beds. During the period of rapid expansion of Philadelphia's grid-like network of streets, historic streams were encased in large brick sewers and buried in order to level and prepare land for development. Recent groundwater mapping and modeling work suggests that these brick sewers strongly influence local groundwater elevations (Paulachok 1991, Maimone et al. 2011).

Table 2. PWD-USGS Groundwater Well Geology and Sewer System Type Classification

Site ID	Site Name	Sewer Type	Geology
USGS-395342075102101	PH 12	Separate	Trenton Gravel
USGS-395353075151501	PH 1052	Separate	Trenton Gravel
USGS-395408075104001	PH 63	Separate	Trenton Gravel
USGS-395416075150301	PH 1053	Separate	Trenton Gravel
USGS-395516075113901	PH 1051	CSO	Magothy Raritan Potomac
USGS-395656075100401	PH 136	CSO	Trenton Gravel
USGS-395859075085401	PH 1042	CSO	Pennsauken and Bridgeton Formation
USGS-395942075144301	MG 2164	Separate	Granitic Gneiss and Granite
USGS-400211075093701	PH 1050	CSO	Wissahickon Formation
USGS-400217075142101	PH 540	Separate	Wissahickon Formation
USGS-400229075104601	PH 1043	CSO	Wissahickon Formation
USGS-400308074592201	PH 397	Separate	Trenton Gravel
USGS-400311075101301	PH 1040	CSO	Wissahickon Formation
USGS-400327075152201	PH 1044	Separate	Wissahickon Formation
USGS-400424075104901	PH 550	CSO	Wissahickon Formation
USGS-400512075033401	PH 1045	Separate	Granitic Gneiss and Granite
USGS-400516075033201	PH 1046	Separate	Granitic Gneiss and Granite
USGS-400524075042601	MG 2195	Separate	Wissahickon Formation
USGS-400527075042801	MG 2193	Separate	Wissahickon Formation
USGS-400527075042802	MG 2194	Separate	Wissahickon Formation
USGS-400644074590801	PH 1041	Separate	Wissahickon Formation

USGS maintains at least one reference well in most Pennsylvania counties. Reference wells located in neighboring counties (Figure 1, Table 3) may be used as regional reference wells for data analyses. Continuous hourly data are collected at well DE 723 in Delaware County. Reference wells in Chester, Bucks and Montgomery counties are not monitored continuously.

direction (monotonic trend) over time. The magnitude (*i.e.*, slope) of the trend is also determined. The test is nonparametric, therefore non-normal data can be analyzed (Helsel *et al.* 2006). USEPA (2009) advises that at least 10-12 measurements are needed, whereas Helsel and Hirsch (2002) recommends that the product of number of years and number of seasons be greater than 25. Helsel *et al.* (2006) further

Table 3. Regional County Observation Wells

Site ID	Site Name	Lat.	Long.	Est.	Observations
USGS-400453075255601	CH 201 Chester County Observation Well	40.136	-75.351	06/19/1978	427
USGS-400808075210401	MG 225 Montgomery County Observation Well	40.199	-75.052	08/15/1956	150
USGS-401157075032001	BK 1020 Bucks County Observation Well	40.081	-75.432	04/13/1968	146
USGS-395512075293701	DE 723 Delaware County Observation Well	39.920	-75.493	1983	172

Data Analysis

USEPA (2009) published detailed guidance on statistical analysis of groundwater contaminant concentrations. In many of the examples, the same logic and techniques could apply to analysis of groundwater levels. In the case of the Philadelphia groundwater monitoring network, the goal is to understand if groundwater levels are changing over time, at either a single well or group of wells. The main statistical tests to be utilized are a) Seasonal Kendall Test, and b) ANOVA. The tests are briefly described below.

The Seasonal Kendall test performs the Mann-Kendall (MK) trend test for individual seasons of the year, where season is defined by the user. It then combines the individual results into one overall test for whether the dependent variable (*i.e.*, groundwater level) changes in a consistent

caution that with more than 10 years of data, adjusted p-values should be calculated to account for the possibility of serial correlation. The Seasonal Kendall test can be applied to data from a single well, not multiple wells. To examine seasonal trends across multiple wells, the Covariance-Sum test is used (Lettenmaier 1988), which is essentially the execution of multiple seasonal Kendall tests and calculation of the covariances between them. To analyze regional trends over time from a group of wells, the Regional Kendall test can be applied. The Regional Kendall test essentially functions the same way as the Seasonal Kendall test, except the data is categorized by region rather than season.

An alternate method to analyze temporal trends on either a single well or group of wells is the analysis of variance (ANOVA). For a single well or group of wells with data subdivided by season, a one-way ANOVA would examine the significance of seasonality as a statistical factor. A two-way ANOVA would be applied to include location or region as a statistical factor. Either form of ANOVA assumes that the datasets are normally distributed with constant variance. Group residuals should be tested for normality and for equality of variance. If the data cannot be transformed to a normal distribution, the nonparametric Kruskal-Wallis test can be used instead to detect significance of the specified statistical factor (USEPA 2009).

Well Monitoring Data Summary

Well monitoring data were summarized from July 2012 to June 2013 (Tables 4-5). These data are presented as an update of the program status. Additional data analysis will be completed as part of the groundwater model calibration and groundwater map update reports. Groundwater trends will be analyzed further once a sufficient amount of data has been collected (See Data Analysis section).

Table 4. PWD-USGS Groundwater Monitoring Well Data 7/2013-6/2014, Depth to Water Level (Feet below Land Surface).

Site ID	J	A	S	O	N	D	J	F	M	A	M	J
395342075102101												
395408075104001	5.91	5.43	5.47	5.81	5.95	5.73	5.75	6.15	4.46	5.31	5.08	5.1
395656075100401	31.55	31.45				31.42			30.94			31.21
395859075085401	14.74	9.07	8.49	9.66	10.13	9.38	8.27	8.66	10.9	8.03	8.08	8.44
395942075144301	16.25	17.6	15.74	17.07	16.27	14.77	13.26	12.73	11.81	12.14	11.27	13.52
400229075104601	15.22	16.01	16.26	16.12	16.9	15.5	13.32	14.26	13.23	12.97	13.29	14.3
400308074592201	5.76	5.75	6.31	7.19	6.77	7.89	6	4.84	3.43	2.81	3.05	3.1
400311075101301	10.43	11.46	11.95	12.1	12.52	10.96	9.11	9.44	9.01	8.79	8.94	9.44
400327075152201	57.32	63.51	66.85	69.91	71.18	72.35	55.68	56.45	54.19	53.97	53.45	55.8
400424075104901	17.64	18.62	18.95	19.57	20.16	20.11	18.14	17.42	16.1	15.35	14.75	15.72
400512075033401	35.67	36.05	37.02	35.9	33.18	36.86	34.87	35.02	34.27	25.57	33.45	34.82
400516075033201	27.45	28.36								25.57	24.38	27.93
400644074590801	17.65	18.05	17.73	18.23	19.57	19.46	21.41	21.39	18.45	17.45	15.64	16.48
395353075151501	14.82	14.55	14.82	15.4	15.9	16.09	15.42	14.97	14.2	13.62	12.6	13.63
395416075150301	7.7	7.89	8.13	9.11	10.33	10.46	8.39	8.83	7.71	6.83	7.06	7.28
395516075113901	28.38	28.41	27.95	28.04	28.25	28.65	28.05	28.5	28.67	27.98	27.82	27.94
400211075093701	14.15	14.07	14.02	13.94	14.39	14.32	14.4	14.23	14.32	13.91	13.84	13.82
400217075142101	30.31	29.38	30.11	29.86	30.11	29.21	32.48	29.32	29.46	28.83	27.72	30.31
400524075042601												
400527075042801	20.19	20.24	21.03	21.57	22.22	20.54	19.83	19.98	18.9	19.1	18.94	19.47
400527075042802	19.5	20.22	22.5	24.52	24.71	22.76	17.94	18.19	14.98	15.39	14.81	15.75

Table 5. Regional County Observation Well Data 7/2013-6/2014

Site ID	J	A	S	O	N	D	J	F	M	A	M	J
400453075255601	19.97	19.17	21.61	22.3	23.31	21.74		18.77	18.5	18.12	17.97	20.04
400808075210401		5.87		12.2			7.46	7.31	5.5		7.83	
401157075032001		31		35.21	36.54	33.77	26.91	28.5		25.67	27.11	
395512075293701	6.46		7.01	7.14		6.42		6.02		5.1		5.19

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Appendix K – PWD Wadeable Streams Benthic Macroinvertebrate and Physical Habitat Assessments

PWD Wadeable Streams Benthic Macroinvertebrate and Physical Habitat Assessments

Background

Since 1999, the Philadelphia Water Department (PWD) has been using benthic macroinvertebrate sampling and instream physical habitat assessments in order to characterize watershed conditions and track trends in watershed health. Assessments are performed by the staff of PWD's Bureau of Laboratory Services (BLS) using PADEP Instream Comprehensive Evaluation (ICE) methods. As benthic invertebrates may be exposed to both short and long-duration stressors, data collected through this program are pertinent to all targets of PWD's Integrated Watershed Management Plan (IWMP) Strategy.

Common Acronyms Used in This Report

IBI - Index of Biotic Integrity, a biological assessment tool to indicate the capability of a stream to support a healthy aquatic community.
ICE - Instream Comprehensive Evaluation, a protocol to survey and evaluate wadeable streams.
PTV - Pollution Tolerance Values, a numeric measure of an organism's ability to withstand environmental degradation.
EPT - Ephemeroptera + Plecoptera + Trichoptera, the common names for pollution-sensitive mayflies, stoneflies and caddisflies.

Assessment Study Design

In recent years, agencies tasked with evaluating water quality have attempted to incorporate statistical sampling designs, or a "probabilistic" approach, to selecting sampling sites (Paulsen 2008, Borsuk *et al*. 2001) rather than relying on fixed sites. Statistical sampling design is particularly important when the goal of monitoring is to make an estimate of the percentage of waters affected by pollution. Another advantage of probabilistic study design is that the assessment units are distributed over a larger geographic area. When monitoring efforts are directed at individual watersheds on a rotating basis, as has been the case with PWD programs, the possibility arises that larger scale patterns may be missed. For example, the effects of floods or drought conditions are widespread, but only the watershed that is being monitored within the same time period will have data reflecting these effects. Disadvantages of a probabilistic approach include the technical demands of establishing and randomly selecting from geographic data sets containing all possible sampling locations as well as additional field reconnaissance work when conduct the actual monitoring.

The current PWD monitoring strategy is intended to be a compromise, recognizing the benefits of collecting data from randomly selected sites but also the importance of maintaining a consistent monitoring effort at selected locations over time. This plan is based on a similar monitoring program implemented by USGS in Chester County (Reif 2002, Reif 2004). The plan also reflects the manpower constraints of collecting and processing samples with the PADEP ICE protocol. It is hoped that this compromise approach (Table 1) will achieve some of the benefits of a randomized approach, while providing periodic re-evaluation of our watersheds required to inform the watershed planning process and comply with environmental mandates.

Stream Conditions

This report summarizes results from samples that were collected between March 12 and April 4, 2013. PWD is not aware of any spills, discharges or unusual conditions that would tend to cause misleading results.

Table 1. PWD Proposed Wadeable Streams Assessments Schedule

Period	Monitoring Activity (number of samples)
2011	USGS gage samples (8); Randomly selected sites (16)
2012	Cobbs Creek Assessment (6*); USGS gage samples (9); Random (10)
2013	Tookany/Tacony Creek (10*) USGS gage samples (8); Random (7)
2014	Wissahickon Creek Tributaries (11) USGS gage samples (9); Random (5)
2015	Wissahickon Creek (12*) USGS gage samples (9); Random (4)
2016	Pennypack Creek Tributaries
2017	Pennypack Creek
2018	Poquessing Creek

* Number of monitoring sites excludes USGS gage site in target watershed

Methods

Benthic Macroinvertebrate Sample Collection

Using the PADEP Instream Comprehensive Evaluation (ICE) protocol (PADEP 2009), macroinvertebrate samples were collected by placing a handheld D-frame net (500µm) at the downstream portion of a riffle. Stream substrate directly upstream of the D-frame net was then disturbed for approximately one minute to a depth of approximately 10 cm as substrate allowed. This procedure was repeated at other riffle locations of variable flow within the 100-m reach such that the sample at each station was a composite of six riffle samples. Composited samples from each biological monitoring location were then preserved in 95% ETOH (ethyl alcohol) and returned to the laboratory in polyethylene containers.

Benthic Macroinvertebrate Laboratory Procedures

Benthic macroinvertebrate samples were processed according to PADEP ICE protocols (PADEP 2009). Each composited sample was placed into an 18 x 12 x 3.5-inch pan marked with 28 four-square-inch grids. Four grids were randomly selected by drawing numbers. All material was extracted from the selected grids using a four-square-inch circular "cookie cutter," and placed into another identical empty pan. From this second pan, organisms were picked from randomly selected grids or “plugs” until a minimum of 200, but not more than 240, individuals were subsampled. This procedure was a misinterpretation of the actual technique, which stipulates a count of 200 (+/- 20%) individuals. When picking either the four initial “plugs” or additional plugs results in subsampling more than 240 individuals, the PADEP ICE protocol outlines a procedure for redistributing the subsample into a clean, gridded pan and “back counting” grids until a subsample consisting of 200 (+/-20%) is obtained. Invertebrates were identified under magnification, with taxonomic classification following PADEP 2009 guidelines.

Habitat Assessment

After collecting benthic invertebrates, biologists surveyed habitat features within the monitoring station and recorded scores for 12 habitat attributes according to the PADEP ICE protocol (Table 2). Biologists completed the survey independently and then discussed the interpretation of individual habitat attribute scores, averaging individual scores when necessary.

Table 2. PA DEP ICE Protocol Habitat Metrics

Habitat Parameter	Description
Instream Cover (Fish)	Mix of boulder, cobble or other stable habitat
Epifaunal Substrate	Length/width of riffles; characterization of boulders, gravel, cobble
Embeddedness	Presence/absence of fine sediment around boulders, gravel, cobble
Velocity/Depth Regimes	Presence/absence of four velocity/depth regimes
Channel Alteration	Degree of channelization or dredging
Sediment Deposition	Measure of sediment deposits, degree of change at the bottom
Frequency of Riffles	Occurrence of riffles and distance between riffles
Channel Flow Status	Degree to which water fills the available channel
Condition of Banks	Stability of streambanks and presence of erosion or bank failure
Bank Vegetative Protection	Percentage of streambank surface covered by vegetation
Grazing or Other Disruptive Pressure	Degree to which vegetation disrupted by grazing or mowing
Riparian Vegetative Zone Width	Width of riparian zone and determination of impact on vegetation by human activities

Data Analysis

Benthic macroinvertebrate and habitat data were compiled in a Microsoft Access database and queries were used to calculate scoring metrics. Individual metric standardized scores and the PADEP Index of Biotic Integrity (IBI) were calculated using the ICE protocol (Table 3).

Table 3. PADEP ICE Protocol Metrics and Metric Standardization Values

Metric	Standardization Value
Total Taxa Richness	33
EPT Taxa Richness (PTV 0-4)	19
Beck's Index, version 3	38
Hilsenhoff Biotic Index	1.89
Shannon Diversity	2.86
Percent Sensitive Individuals (PTV 0-3)	84.5

Monitoring Locations

Assessments were performed at eight USGS gage sites and 17 randomly chosen sites from PWD's watershed assessment site network between 3/12/2013 and 4/4/2013 (Figure 1, Tables 4-5). USGS stream gaging stations are used as long term monitoring points at which streamflow and continuous water chemistry data are collected (refer to PWD-USGS Cooperative Water Quality Monitoring appendix). Water chemistry grab sampling for nutrient and bacterial parameters is also conducted at these USGS gage stations on a quarterly basis (refer to PWD Quarterly Dry Weather Water Quality Monitoring appendix). Combining different forms of monitoring at the same station allows for better integration of information and may enable more sophisticated analyses in the future.

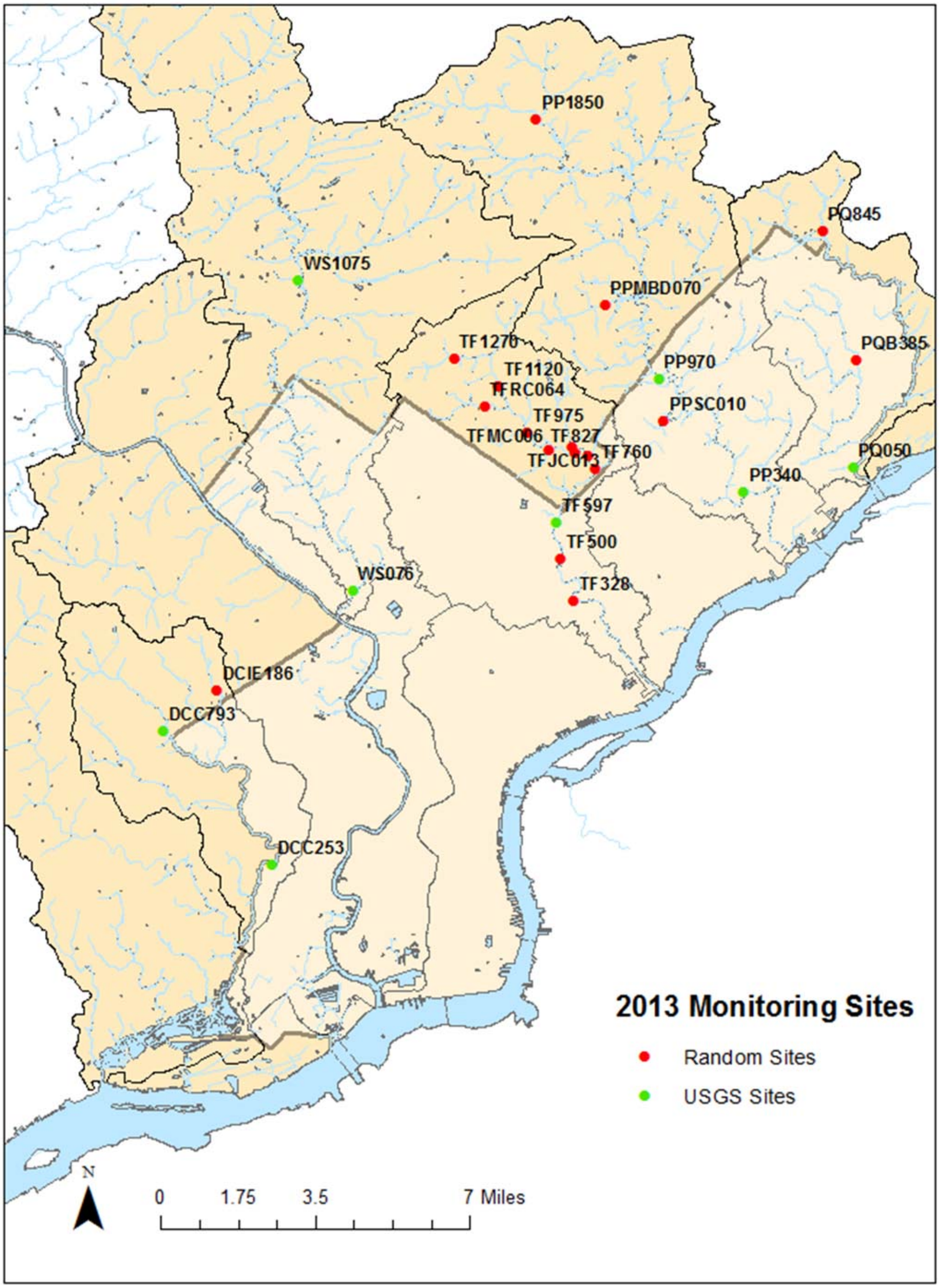

Figure 1. PWD Wadeable Streams Assessment Locations - Spring 2013

Figure 2. PWD Wadeable Streams Assessment Locations for Targeted Watershed - Spring 2013

Table 4. PWD-USGS Cooperative Monitoring Program Monitoring Locations

Site ID	USGS Gage	Site Description	Drainage Area (mi^2)
DCC253	01475548	Cobbs Creek at Mount Moriah Cemetery	19.78
DCC793	01475530	Cobbs Creek at City Line Ave.	4.6
PP340	01467048	Pennypack Creek at Lower Rhawn St bridge	49.84
PP970	01467042	Pennypack Creek at Pine Rd.	39.34
PQ050	01465798	Poquessing Creek at Holy Family College	21.67
TF597	01467086	Tacony Creek below Adams Ave. Bridge	16.25
WS076	01474000	Wissahickon Creek at Ridge Ave.	63.22
WS1075	01473900	Wissahickon Creek at Ft. Washington	40.44

Table 5. Randomly Selected Monitoring Locations - Spring 2013

Site ID	Site Description	Drainage Area (mi^2)
DCIE186	Lankenau Hospital parking area	1.2
PP1850	2900 ft downstream of Briar Mill Rd bridge	8.5
PPSC010	500 ft upstream of Pennypack confluence	0.51
PPMB070	Between Mill & Valley Rd bridges	2.45
PQB385	250 ft upstream of Academy Rd bridge	1.97
PQ845	500 ft downstream of Philmont Rd bridge	1.5
TF324	165 ft downstream of T14	30.05
TF500	350 ft downstream of Tabor Rd, adjacent to Smylie Rd	17.37
TF760	Ashbourne Rd bridge	14.31
TF827	550 ft downstream of Jenkintown Rd bridge	13.39
TF975	50 ft downstream of High School Rd bridge	9.16
TF1120	Upstream side of Route 73 (Washington Ln) bridge	5.36
TF1270	Upstream of E Waverly Rd	1.89
TFBC010	350 ft upstream of Tacony confluence	0.64
TFJC013	450 ft upstream of Tookany Cr. Pky. bridge	1.78
TFMC006	600 ft downstream of Ashbourne Rd bridge	1.65
TFRC064	800 ft downstream of Washington Ln. bridge	1.63

Table 6. Mainstem Monitoring Locations - Spring 2013

Site ID	Site Description	Drainage Area (mi^2)
TF1120	Upstream side of Route 73 (Washington Ln) bridge	5.36
TF1270	Upstream of E Waverly Rd	1.89
TF975	50 ft downstream of High School Rd bridge	9.16
PP340	Pennypack Creek at Lower Rhawn St. bridge	49.84
PP970	Pennypack Creek at Pine Rd.	39.34
PP1850	2900 ft DS of Briar Mill Rd bridge	8.5
WS1075	Wissahickon Creek at Ft. Washington	40.44
DCC793	Cobbs Creek at City Line Ave.	4.6
WS076	Wissahickon Creek at Ridge Ave.	63.22
TF597	Tacony Creek below Adams Ave. Bridge	16.25
TF827	550 ft downstream of Jenkintown Rd bridge	13.39
TF500	350 ft downstream of Tabor Rd, adjacent to Smylie Rd	17.37
TF324	165 ft downstream of T14	30.05
TF760	Ashbourne Rd bridge	14.31
PQ845	500 ft downstream of Philmont Rd bridge	1.5
PQ050	Poquessing Creek at Holy Family College	21.67
DCC253	Cobbs Creek at Mount Moriah Cemetery	19.78
DCC793	Cobbs Creek at City Line Ave.	4.6

Table 7. Tributary Monitoring Locations - Spring 2013

Site ID	Site Description	Drainage Area (mi^2)
TFMC006	600 ft downstream of Ashbourne Rd bridge	1.65
PPSC010	500 ft upstream of Pennypack confluence	0.51
PPMB070	Between Mill & Valley Rd bridges	2.45
PQB385	250 ft upstream of Academy Rd bridge	1.97
TFBC010	350 ft upstream of Tacony confluence	0.64
TFJC013	450 ft upstream of Tookany Cr. Pky. bridge	1.78
TFRC064	800 ft downstream of Washington Ln. bridge	1.63
DCIE186	Lankenau Hospital parking area	1.2

Benthic Macroinvertebrate Monitoring Results - Spring 2013

A total of 5,525 benthic macroinvertebrates from 38 taxa were collected from the 25 sampling sites. When compared to PADEP ICE protocol metric reference conditions, all assessment sites were classified as impaired. Not one of the sites achieved 63% comparability of the reference IBI for attaining the designated use (Figure 3). All sites fell far below 50% comparability, meaning that they are not meeting the Aquatic Life Use (ALU) designation. Percent comparability with the standard reference IBI score ranged from 14% to 29%. All sites were characterized by low taxa richness, low or absent modified EPT taxa, and elevated Hilsenhoff Biotic Index scores (Table 8, Figures 3-8).

Table 8. PADEP ICE Metric Scores

Site ID	Taxa Richness	EPT richness (PTV 0-4)	% Sensitive individuals	Beck's Index	HBI	Shannon Index	IBI score
DCC253	10	1	0.000	0	6.00	1.046	20.2
DCC793	12	1	9.569	0	5.37	1.744	28.5
DCIE186	8	1	4.566	0	5.37	1.340	23.1
TF324	7	0	0.000	0	6.38	0.764	15.4
TF1120	10	1	3.756	0	5.49	1.338	23.7
WS1075	12	0	2.146	0	5.45	1.580	25.0
WS076	15	2	0.889	0	5.76	1.268	25.6
PP1850	17	1	0.870	1	5.79	1.780	29.1
PP340	14	1	1.299	2	5.87	0.926	23.0
PP970	10	2	1.852	1	5.70	0.781	21.0
PPSC010	13	1	0.461	0	5.99	0.835	20.6
PPMB070	12	2	2.092	1	5.65	1.135	24.2
PQB385	8	0	5.909	0	5.85	0.743	18.1
PQ845	8	0	1.255	0	5.97	0.329	14.5
PQ050	7	0	0.000	0	5.93	0.464	14.6
TFRC064	11	1	9.314	0	5.61	1.394	25.4
TFJC013	11	2	1.702	3	5.83	0.660	21.4
TFBC010	9	1	1.914	0	5.81	1.120	20.9
TFMC006	11	1	17.051	0	5.44	1.214	26.2
TF975	13	1	2.899	0	5.69	1.425	25.2
TF827	13	1	1.310	0	5.62	1.211	23.8
TF1270	10	0	1.905	0	6.00	0.465	16.4
TF500	11	1	0.000	0	5.86	0.933	20.4
TF760	10	1	1.923	0	5.79	1.231	22.1
TF597	8	1	5.333	0	5.52	1.262	22.5

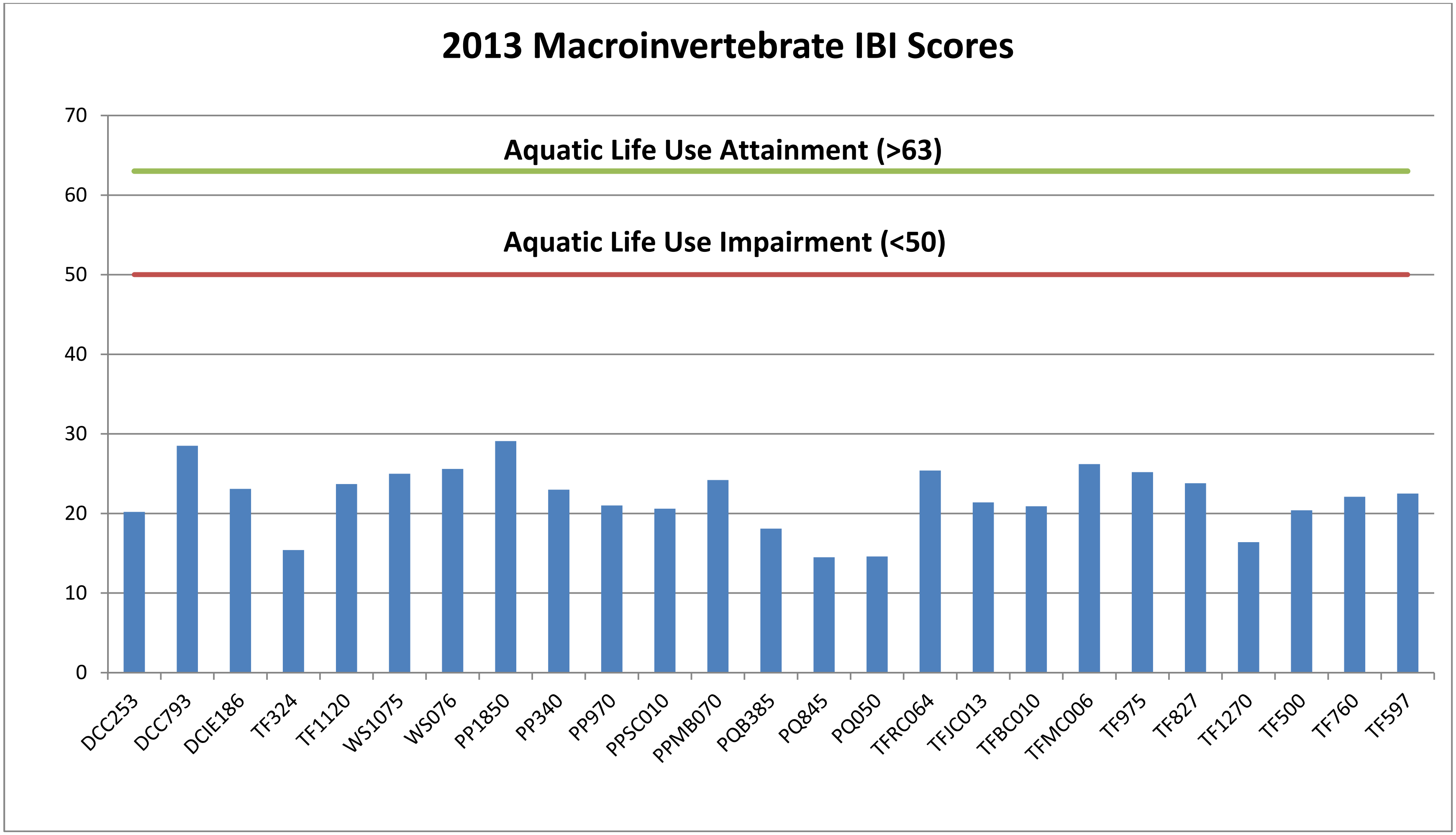

Figure 3. Macroinvertebrate IBI Scores - Spring 2013

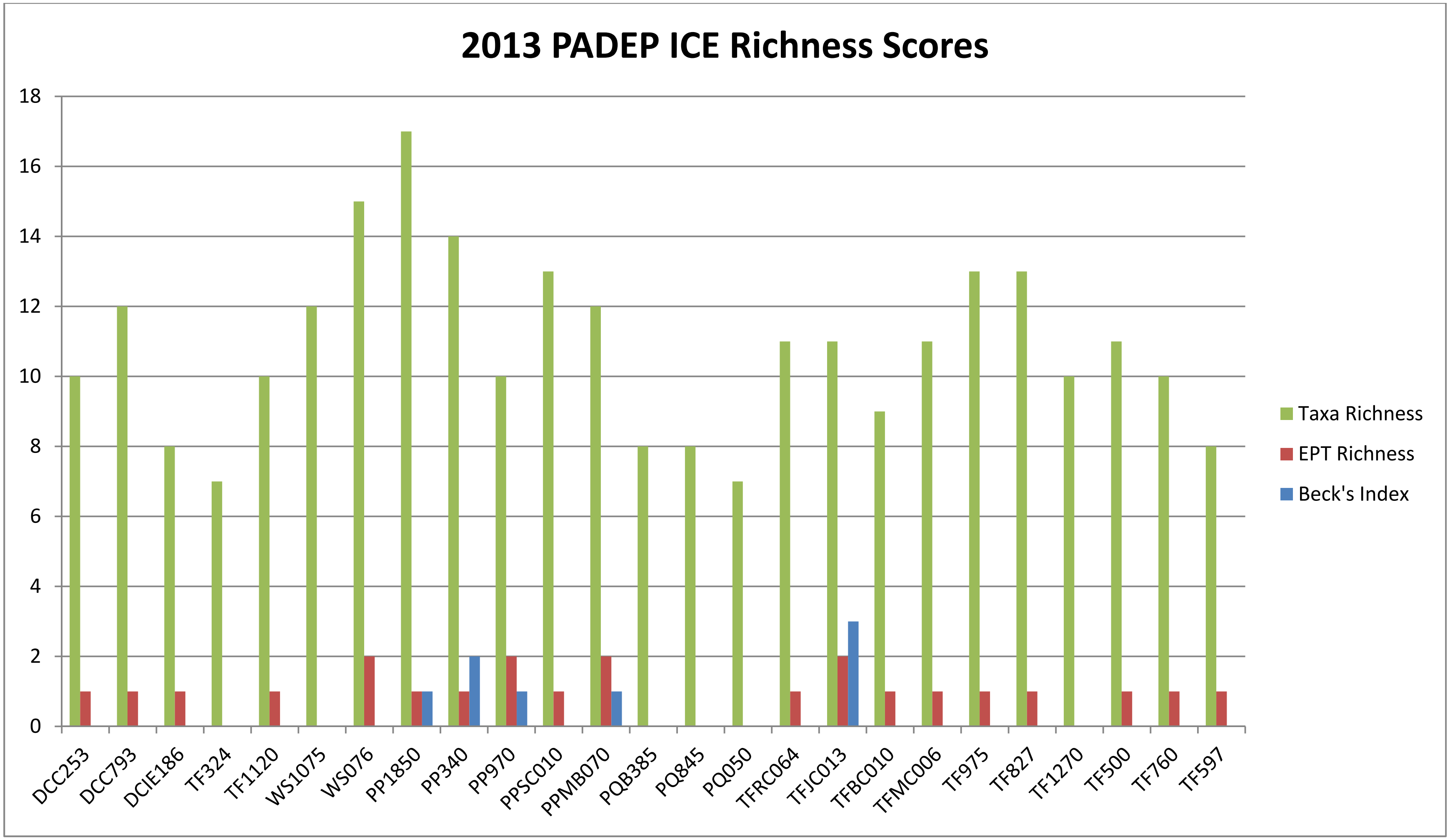

Figure 4. PADEP ICE Richness Scores - Spring 2013

Out of the 25 sites assessed, very sensitive taxa (pollution tolerance value ≤2) were present at only 5 sites (PP1850, PP340, PP970, PPMB070, TFJC013). The most common very sensitive taxa was *Ancyronyx* (Coleoptera; Elmidae), which was present at 3 sites and has a pollution tolerance value of 2. Site TFJC013 did not contain any Elmidae *Ancyronyx*, but had the highest Beck's Index score (n=3) due to the presence of *Glossosoma* (Trichoptera; Glossosomatidae), which has a pollution tolerance value of zero. Overall diversity was very low among all sites.

The Shannon Diversity Index scores for all sites ranged from 0.33 to1.78, compared to the reference metric value of 2.86. The site with the greatest diversity was PP1850 (SDI=1.78), with a taxa richness (n=17), EPT taxa richness (n=1), and HBI (5.79). Scores for the Percent Intolerant Taxa metric (PTV = 0 to 3) ranged from 0% to 17.1% and fell below the PADEP reference standard of 84.5%.

The Hilsenhoff Biotic Index (HBI) is a metric used to determine the overall pollution tolerance of a site's benthic macroinvertebrate community. This community composition and tolerance metric generally increases with increasing ecosystem stress, resulting in increasing dominance of pollution-tolerant organisms. Oriented toward the detection of organic pollution, HBI scores can range from zero (very sensitive) to 10 (very tolerant). The average HBI for all sites was 5.75, and scores at the 25 assessment sites ranged from 5.72 to 6.53 (Figure 5).

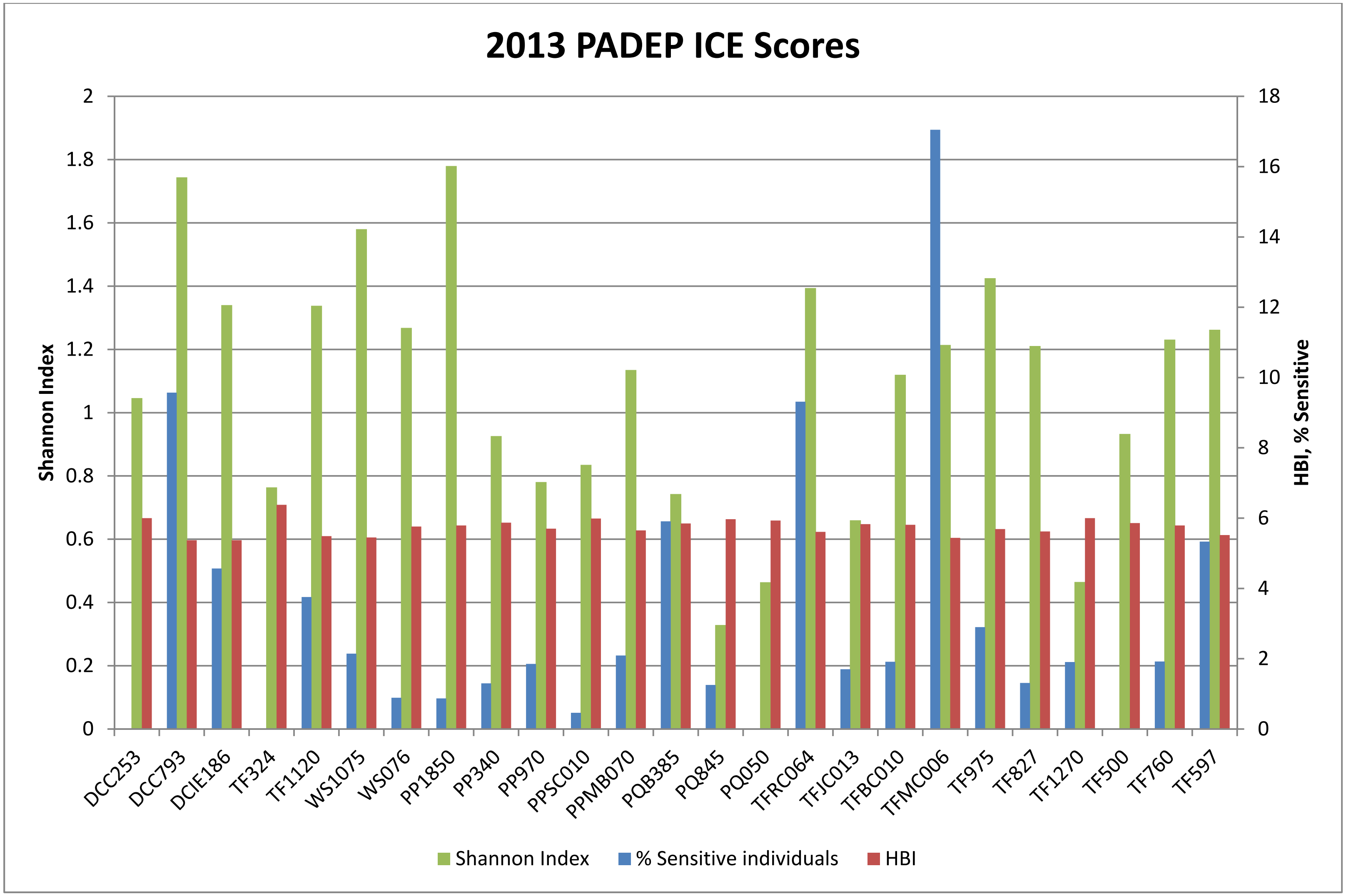

Figure 5. PADEP ICE Scores - Spring 2013

In addition to metrics used to classify sites as being impaired with respect to regional or statewide reference conditions, additional attributes of macroinvertebrate community structure were also considered. With regard to trophic structure (*i.e.*, the distribution of feeding strategies), generalist feeders (73.52%) and filterers (21.85%) dominated at all assessment sites (Figure 6).

Specialized feeders—a group that is generally more sensitive to perturbation than generalist feeders—were absent or found in low abundance. Scrapers comprised only 3.24% of all taxa. The scrapers in question were usually not sensitive insect larvae but rather aquatic snails and *Stenelmis* (Coleoptera; Elmidae). Other functional feeding groups, predators (1.18%) and shredders (0.22%), were observed in the macroinvertebrate assessment but to a much lesser extent. Analysis of the aquatic trophic structure can indicate potential stressors such as sedimentation/siltation and eutrophication, and it may identify food resource limitations. However, it cannot distinguish between the interactions of the two factors.

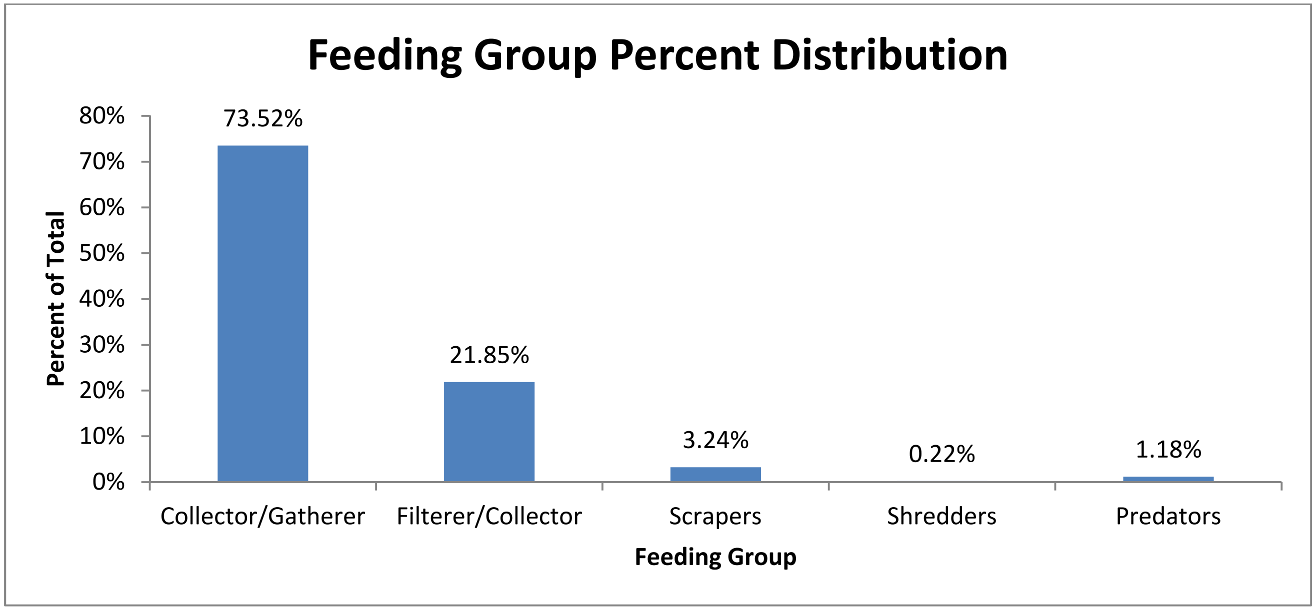

Figure 6. Feeding Group Percent Distribution - Spring 2013

Tolerance/intolerance measures are intended to be representative of relative sensitivity to perturbation and may include numbers of pollution tolerant and intolerant taxa or percent composition (Barbour *et al*., 1999). The proportion of moderately tolerant individuals at all sites averaged 89.7%, with a range of 77.8% to 97.9%. The site with the greatest proportion of moderately tolerant taxa was PQ845, with 97.9% dominance directly related to a high number of Chironomidae (94.1%) found within the sorted sample. Overall, Chironomids (Figure 7) were the dominant taxon at all but one of the assessment locations (WS1075, where Chironomids were outnumbered by moderately tolerant *Hydropsyche*). The proportional dominance of Chironomids is evidence of increasingly homogenous community assemblages within the selected monitoring sites. Chironomids and other pollution-tolerant, generalist species increase in proportional dominance with increased disturbance due to the loss of optimal habitat conditions for less tolerant, more specialized species.

Figure 7. Chironomid, or non-biting midge
Photo: Simon Johnston

Tolerant taxa accounted for an average of 2.09% of all taxa, and the proportion of tolerant taxa at each monitoring site ranged from 0%-10.83%. Intolerant taxa were also poorly represented, averaging 8.24% of all taxa collected at the sites. The proportion of intolerant taxa at each site ranged from 0% to 18.66%.

Sensitive taxa (pollution tolerance values ≤ 3) were collected at 21 of the 25 sites (Table 9). The rarity of sensitive taxa suggests a response to watershed wide perturbation, such as water quality degradation. Other potential explanations for the rarity of sensitive taxa are habitat degradation caused by fine sediment delivered to the stream channel via bank erosion or stormwater runoff and changes in seasonal base flow and temperature that tend to accompany urbanization. *Antocha* (Diptera; Tipulidae pollution tolerance value n=3) was found at 20 sites and was the most commonly collected sensitive taxon.

Table 9. Sensitive Taxa Collected

Site	Order	Family	Genus	HBI
TFRC064	Diptera	Tipulidae	*Antocha*	3
TF1270	Diptera	Tipulidae	*Antocha*	3
TF1120	Diptera	Tipulidae	*Antocha*	3
TF760	Diptera	Tipulidae	*Antocha*	3
TF975	Diptera	Tipulidae	*Antocha*	3
TFBC010	Diptera	Tipulidae	*Antocha*	3
TFJC013	Diptera	Tipulidae	*Antocha*	3
TFJC013	Trichoptera	Glossosomatidae	*Glossosoma*	0
TFMC006	Diptera	Tipuilidae	*Antocha*	3
TF827	Diptera	Tipulidae	*Antocha*	3
TF597	Diptera	Tipulidae	*Antocha*	3
PPMB070	Diptera	Tipulidae	*Antocha*	3
PPMB070	Coleoptera	Elmidae	*Ancyronyx*	2
PPMB070	Trichoptera	Uenoidae	*Neophylax*	3
PPSC010	Diptera	Tipulidae	*Antocha*	3
PP1850	Diptera	Tipulidae	*Antocha*	3
PP1850	Coleoptera	Elmidae	*Ancyronyx*	2
PP970	Plecoptera	Nemouridae	*Amphinemura*	3
PP970	Diptera	Tipulidae	*Antocha*	3
PP970	Coleoptera	Elmidae	*Macronychus*	2
PP340	Coleoptera	Elmidae	*Macronychus*	2
PP340	Coleoptera	Elmidae	*Ancyronyx*	2
PP845	Diptera	Tipulidae	*Antocha*	3
PQB385	Diptera	Tipulidae	*Antocha*	3
DCC793	Diptera	Tipulidae	*Antocha*	3
DCIW186	Diptera	Tipulidae	*Antocha*	3
WS1075	Diptera	Tipulidae	*Antocha*	3
WS076	Diptera	Tipulidae	*Antocha*	3

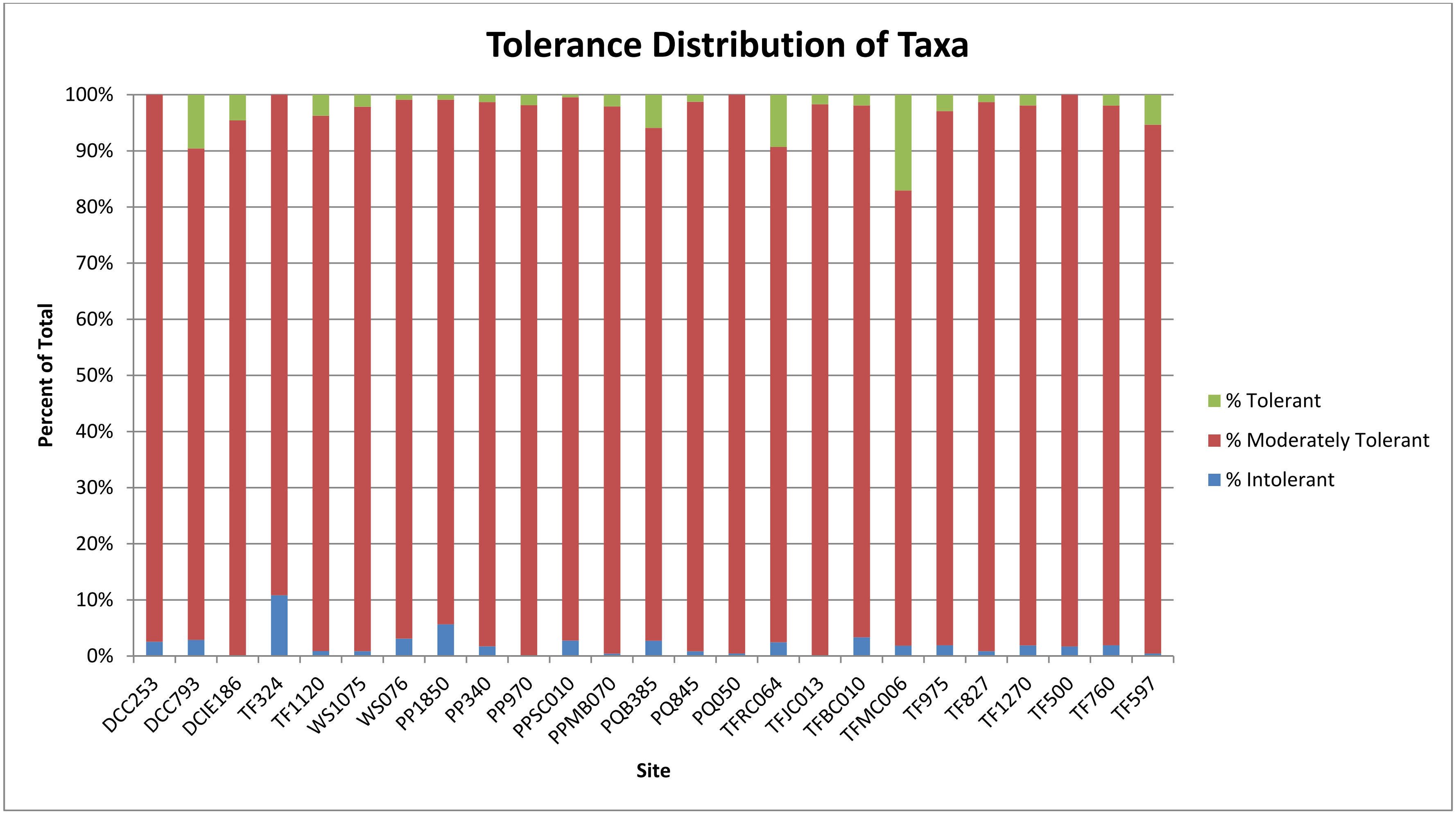

Figure 8. Tolerance Distribution of Taxa - Spring 2013

Table 10. 2013 Benthic Macroinvertebrate Taxa List

Order	Family	Genus
Amphipoda	Crangonyctidae	*Crangonyx*
Amphipoda	Gammaridae	*Gammarus*
Bivalvia	Corbiculidae	*Corbicula*
Coleoptera	Elmidae	*Ancyronyx*
Coleoptera	Elmidae	*Stenelmis*
Coleoptera	Elmidae	*Macronychus*
Coleoptera	Psephenidae	*Psephenus*
Coleoptera	Psephenidae	*Ectopria*
Diptera	Chironomidae	*spp*
Diptera	Tipulidae	*Antocha*
Diptera	Tipulidae	*Tipula*
Diptera	Simuliidae	*Simulium*
Diptera	Empididae	*Hemerodromia*
Diptera	Psychodidae	*Psychoda*
Diptera	Empididae	*Clinocera*
Diptera	Tipulidae	*Limonia*
Diptera	Empididae	*Chelifera*
Diptera	Ceratopogonidae	*Culicoides*
Diptera	Psychodidae	*Pericoma*
Ephemeroptera	Heptageniidae	*Stenacron*
Ephemeroptera	Baetidae	*Baetis*
Gastropoda	Planorbidae	*sp*
Gastropoda	Physidae	*sp*
Gastropoda	Ancylidae	*sp*
Gastropoda	Hydrobiidae	*sp*
Hirudinea	n/a	*n/a*
Isopoda	Asellidae	*Caecidotea*
Lepidoptera	Pyralidae	*Petrophila*
Nematoda	n/a	n/a
Oligochaeta	n/a	n/a
Plecoptera	Nemouridae	*Amphinemura*
Trichoptera	Hydropsychidae	*Hydropsyche*
Trichoptera	Hydropsychidae	*Cheumatopsyche*
Trichoptera	Hydroptilidae	*Leucotrichia*
Trichoptera	Philopotamidae	*Chimarra*
Trichoptera	Glossosomatidae	*Glossosoma*
Trichoptera	Uenoidae	*Neophlax*
Turbellaria	Planariidae	*sp*

Although it is much too early to draw conclusions regarding trends at the eight long-term PWD-USGS cooperative monitoring sites, IBI and taxa richness results are shown below (Figures 9-10). Many factors contribute to interannual variability in the data, and it is hoped that future work will provide some insight into long-term trends.

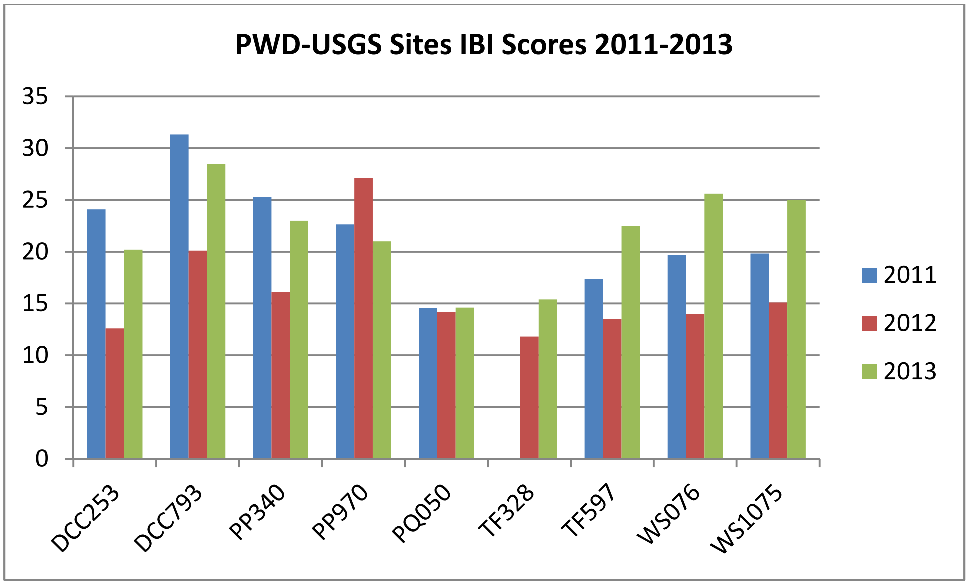

Figure 9. Comparison of IBI Scores at PWD-USGS Sites, 2011-2013*

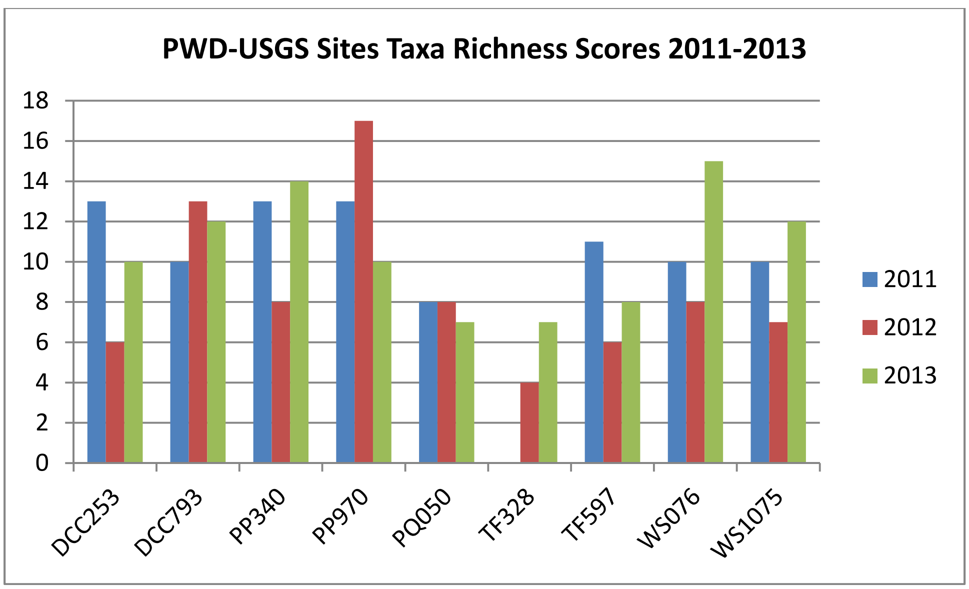

Figure 10. Comparison of Taxa Richness Scores at PWD-USGS Sites, 2011-2013*

*Samples for TF328 2012 were taken from nearby site TF324.

Physical Habitat Monitoring Results - Spring 2013

Habitat impairments such as hydrologic extremes (*i.e.*, low base flow and accentuated flow during storm events), physical obstructions, and sedimentation/siltation appear to be the major environmental stressors on the aquatic ecosystem. Accumulation of sediment in the interstitial spaces of riffles has been shown to limit available habitat and possibly smother benthic invertebrate life stages (Runde and Hellenthal, 2000). No site received an optimal score for embeddedness or sediment deposition for habitat (Table 11, Figures 11-12). The Tacony Creek site TF328 had the worst total habitat scores of all sites, while Pennypack tributary site PPMB070 located in Meadow Brook) had the best scores for all sites.

Table 11. Physical Habitat Scores at All Monitoring Sites - Spring 2013

Site ID	Instream	Epifaunal	Embed	Veldep	Chanalt	Seddep	Riffreq	Chanflo	Bankcond	Vegpro	Graze	Ripveg	Total Score
DCC253	7	7	5	7	11	12	9	12	12	11	12	13	118
DCC793	13	10	10	12	16	9	13	9	9	14	15	16	146
DCIE186	7	7	5	8	7	11	12	10	9	7	5	5	93
PP340	11	11	7	12	12	3	13	10	11	15	16	14	135
PP970	16	14	13	14	16	6	15	8	7	12	8	16	145
PP1850	15.5	13.5	10	13	16	13.5	12.5	13	9.5	13	8	10	147.5
PPSC010	6.5	6.5	4.5	7.5	9.5	4	10.5	6.5	5	13	10	13.5	97
PPMB070	15	14.5	13.5	16	15	11.5	16.5	10.5	12	12.5	7	5	149
WS076	9	8	8	12	7	5	4	10	4	4	7	8	86
WS1075	8	8	5	11	14	7	6	16	10	14	14	17	130
PQ052	9	8	7	10	13	5	8	9	5	12	12	13	111
PQB385	7	7	6.5	7	14	9.5	9	9.5	5	9.5	11	9.5	104.5
PQ845	7	7	8	6.5	14.5	7	5.5	7.5	9	13	16	16	117
TF324	4	2	3	7	5	7	4	8	5	5	6	6	62
TF500	5	7	5	7	12	4	5	7.5	8.5	9	11.5	12.5	94
TF597	6	6	5	7	7	5	5	7	10	11	10	14	93
TF760	6	8	5	9	4	5	11	10	5	8	9	5	85
TF827	9.5	9.5	9	11.5	8	7	10.5	7.5	6.5	11.5	7	7.5	105
TF975	5	6	4	7	9	4	12	8	5	9	10	6	85
TF1120	6	6	4	7	5	5	8	8	12	5	6	5	77
TF1270	4.5	6	4.5	6	12	6.5	4.5	8	11.5	12.5	9	8	93
TFBC010	6	8	9	10	11	6	8	8	7	10	10	10	103
TFJC013	8	7.5	9.5	11	9	7.5	11	11.5	10	11	5.5	4.5	106
TFMC006	6	6	5	7	5	7	9	10	9	14	6	6	90
TFRC064	6	7.5	7	7.5	7.5	6	16	8	6	8	6.5	6	92

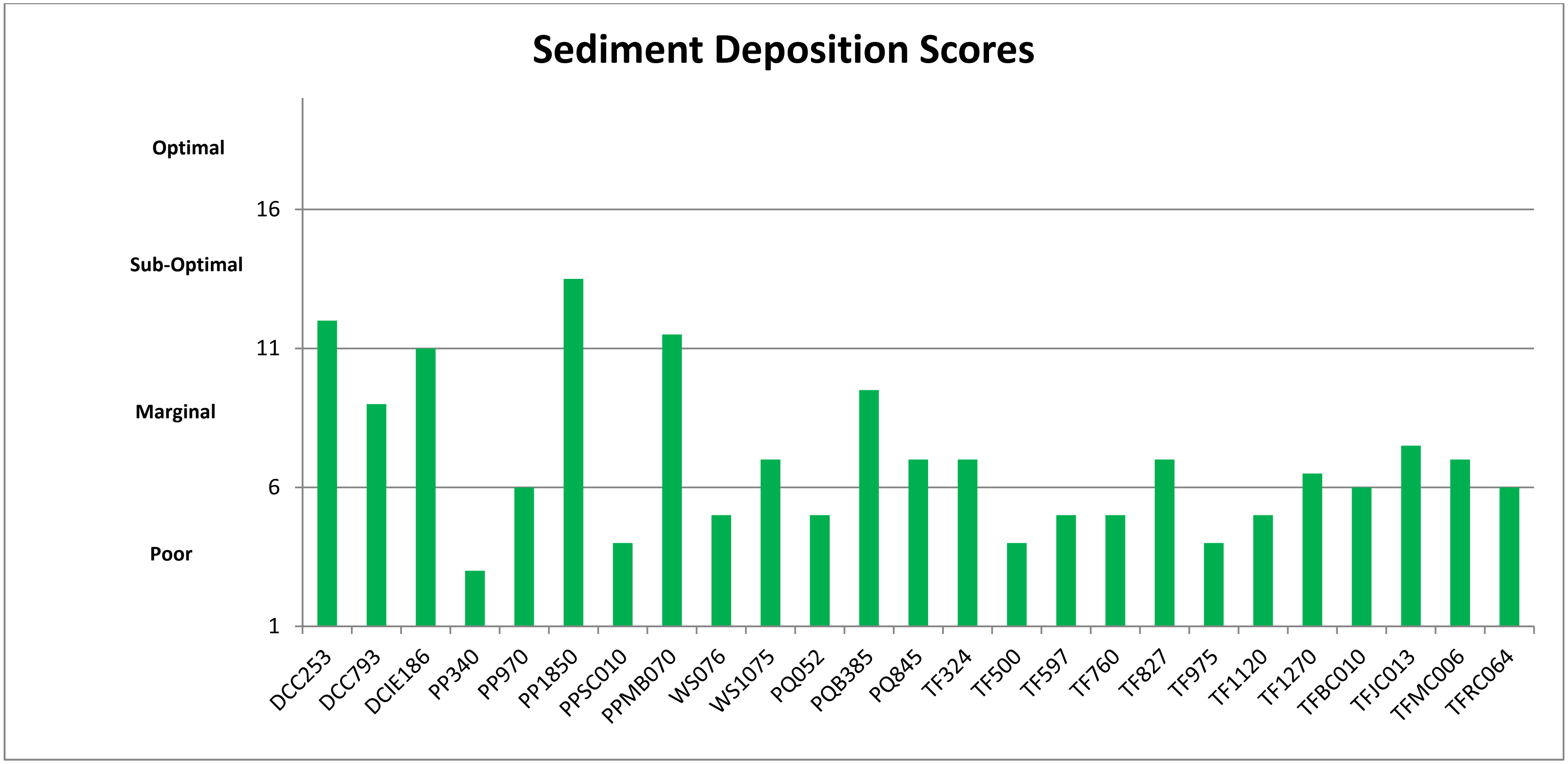

Figure 11. Sediment Deposition Scores - Spring 2013

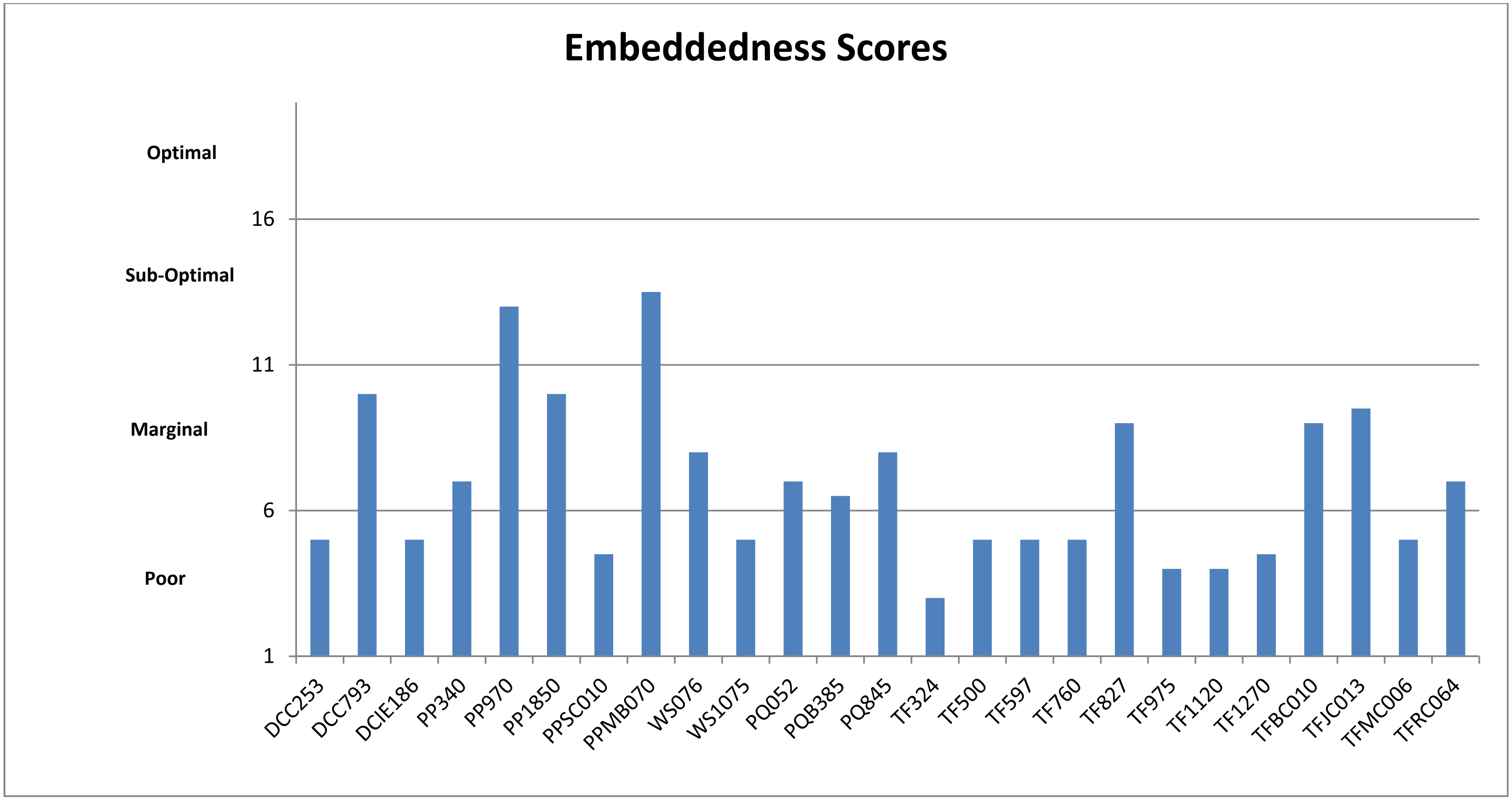

Figure 12. Embeddedness Scores - Spring 2013

Although it is much too early to draw conclusions regarding trends at the eight long-term PWD-USGS cooperative monitoring sites, embeddedness and sediment deposition results are shown below (Figures 12-13). Many factors contribute to interannual variability in the data, and it is hoped that future work will provide some insight into long-term trends.

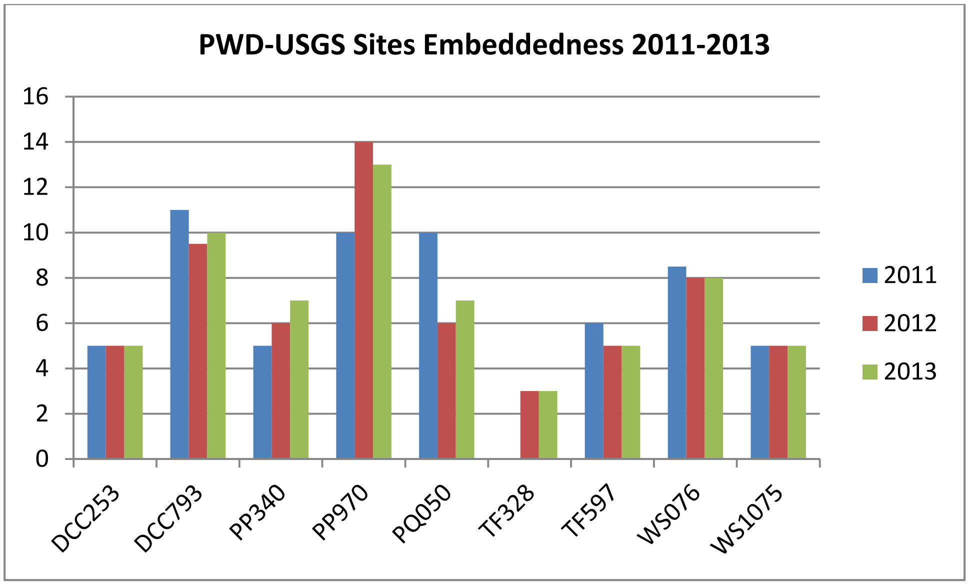

Figure 13. Comparison of PWD-USGS Sites Embeddedness Scores, 2011-2013*

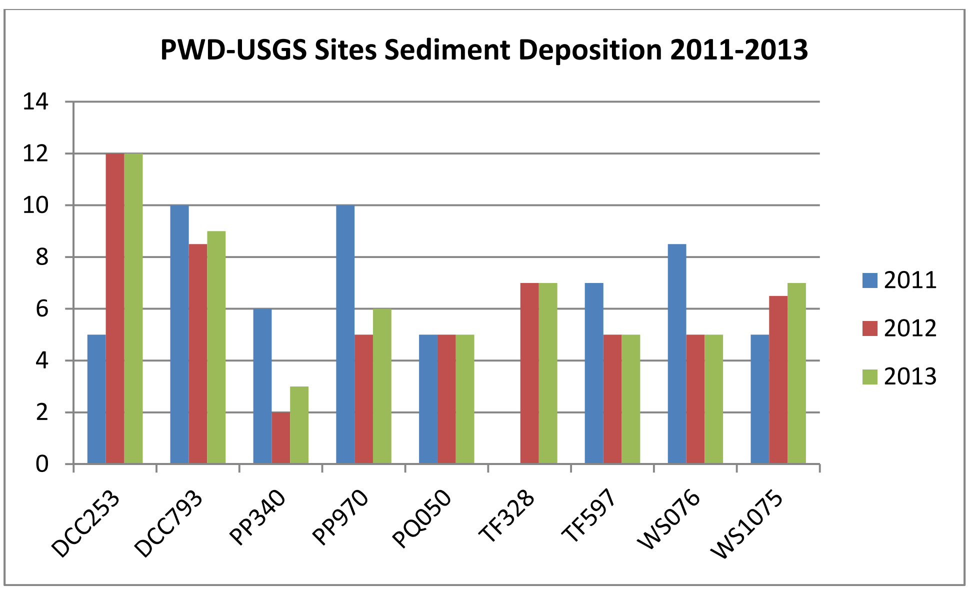

Figure 14. Comparison of PWD-USGS Sites Sediment Deposition Scores, 2011-2013*

* Samples for TF328 2012 were taken from nearby site TF324.

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APPENDIX L –
FY2014 NPDES PERMITTED DISCHARGERS

NPDES PERMITTED DISCHARGERS SUMMARY TABLE

CATEGORY	QUANTITY	Combined Sewershed	Separate Sewershed	Non-Contributing Sewershed	N/A*
NPDES Permits Associated with Industrial Activities (PAG-03)	104	33	34	30	4
NPDES Permit Associated with Industrial Site Runoff (Individual)	11	1	2	7	1
NPDES Permits Associated with Industrial Activities with No Exposure Certification	27	8	14	5	0
Total Industrial NPDES Permitees	**142**	**42**	**50**	**41**	**5**

*NPDES Permittees with N/A status do not provide enough information on efacts website to determine sewershed location.

NPDES PERMITS ASSOCIATED WITH INDUSTRIAL ACTIVITIES (PAG-03)

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
1	586424	121 POINT BREEZE TERMINAL LLC	6310 W PASSYUNK AVE PHILADELPHIA, PA 19153-3517	Non-Contributing	New	6/6/2011	10/25/2011	Issued
2	586722	ABF FREIGHT SYS INC.	4000 RICHMOND ST PHILADELPHIA, PA 19137	Non-Contributing	New	1/28/2013	4/22/2013	Issued
3	605147	ACADEMY RECYCLING INC	8901 TORRESDALE AVE PHILADELPHIA, PA 19154	Separate	Renewal	11/16/2010	3/7/2011	Issued
4	548665	AIRBORNE EXPRESS INC	1101 N CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19125	Non-Contributing	New	7/9/2001	9/26/2001	Issued
5	551938	ALLEGHENY IRON & METAL CO	TACONY ST & ADAMS AVE PHILADELPHIA, PA 19124	Non-Contributing	Renewal	3/23/2011	5/16/2011	Issued
6	587759	ALLIED TRANSP INC	1801 W INDIANA AVE PHILADELPHIA, PA 19132	Combined	New	3/28/2011	9/26/2011	Issued
7	251065	ALLIED TUBE & CONDUIT PLT	11350 NORCOM RD PHILADELPHIA, PA 19154	Separate	Renewal	6/14/2010	8/26/2010	Issued
8	622142	ALLIED TUBE & CONDUIT CORP	11500 NORCOM RD PHILA, PA 19154	Separate	Renewal	1/7/2014	2/27/2014	Issued
9	535434	AMER AUTO PARTS	3501 S 61ST ST PHILADELPHIA, PA 19153	Non-Contributing	New	5/17/2000	6/12/2000	Issued
10	745265	ANGEL MARTINEZ DBA CLEARFIELD RECYCLING	547 W CLEARFIELD ST PHILA, PA 19133	Combined	New	2/18/2011	3/28/2012	Issued
11	731173	ARCA ADVANCED PROC LLC	4301 N DELAWARE AVE BLDG A PHILADELPHIA, PA 19137	Non-Contributing	New	3/1/2010	5/11/2010	Issued
12	490762	ARDEX LAB INC	2050 BYBERRY RD PHILADELPHIA, PA 19116	Non-Contributing	Renewal	5/3/2011	8/30/2012	Issued
13	552535	ATLANTIC AVIATION CORP	8375 ENTERPRISE AVE PHILA INT AIRPORT PHILADELPHIA, PA 19153	Separate	Renewal	3/5/2014	4/30/2014	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
14	692332	ATLANTIC USED AUTO PARTS INC	6544 ESSINGTON AVE PHILA, PA 19153	Combined	Renewal	6/26/2014	N/A	Pending
15	649262	ATLANTIC USED AUTO PARTS INC	6030 W PASSYUNK AVE PHILA, PA 19153	Separate	New	1/11/2005	3/10/2005	Issued
16	535667	B & L AUTO PARTS INC	3404 S 61ST ST PHILADELPHIA, PA 19153	Separate	Renewal	5/22/2007	7/31/2007	Issued
17	520590	BFI TRANSF SYS OF PA LLC	2904 S CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19148-5106	Non-Contributing	Renewal	7/13/2011	7/10/2012	Issued
18	549621	BFI WASTE SVC OF PA LLC		N/A	Renewal	7/30/2001	9/28/2001	Issued
19	520590	BFI WASTE SVC OF PA LLC		N.A	Renewal	9/20/2001	10/16/2001	Issued
20	722443	BLUE MOUNTAIN LLC	2904 ELLSWORTH ST PHILA, PA 19146	Combined	New	6/12/2009	8/20/2009	Issued
21	445688	BOTTLING GROUP LLC	11701 ROOSEVELT BLVD PHILADELPHIA, PA 19154-2108	Separate	Renewal	7/20/2011	10/6/2011	Issued
22	637575	BRUCE PAUL AUTO PARTS	2157 E LEHIGH AVE PHILA, PA 19125	Combined	New	8/12/2004	9/28/2004	Issued
23	457088	BUDD CO	2450 HUNTINGPARK AVE PHILADELPHIA, PA 19129	Combined	New	3/1/2000	5/9/2000	Issued
24	649579	BUTCHS AUTO PARTS	3301 S 61ST ST PHILA, PA 19142	Separate	New	1/19/2005	3/22/2005	Issued
25	719784	CANADIAN PACIFIC RAILWAY	LANGLEY AVE PHILA, PA 19148	Non-Contributing	New	4/7/2009	7/7/2009	Issued
26	448636	CLEAN EARTH OF PHILA LLC	3201 S 61ST ST PHILADELPHIA, PA 19153-3502	Non-Contributing	Renewal	3/8/2011	6/6/2011	Issued
27	464838	COVANTA 4RECOVERY PHILA LLC	10 HIGHLAND AVENUE CHESTER, PA, 19013	Separate	Renewal	1/24/2014	3/21/2014	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
28	705203	CSX INTERMODAL INC	3400 S CHRISTOPHER COLUMBUS BLVD PHILA, PA 19148	Non-Contributing	Renewal	11/13/2013	2/19/2014	Issued
29	671510	DAVES DELAWARE VALLEY TOWING INC	6159 PASSYUNK AVE PHILA, PA 19153	Non-Contributing	Renewal	3/28/2014	5/8/2014	Issued
30	454305	DEGUSSA FLAVORS & FRUIT SYS	1741 TOMLINSON RD PHILADELPHIA, PA 19116-3847	Non-Contributing	Renewal	7/6/2001	9/6/2001	Issued
31	689836	DELAVAU LLC	10101 ROOSEVELT BLVD PHILA, PA 19154	Non-Contributing	Renewal	8/31/2012	12/28/2012	Issued
32	721397	DELCO METALS INC	3053 N 2ND ST PHILA, PA 19133	Combined	New	5/15/2009	7/23/2009	Issued
33	666386	DHL EXPRESS USA INC	7600 HOLSTEIN AVE PHILA, PA, 19153	Separate	Renewal	4/17/2013		Pending
34	661259	BILL'S AUTO PARTS	6235 PASSYUNK AVE PHILA, PA 19153	Non-Contributing	Renewal	8/3/2010	10/13/2010	Issued
35	662034	DRIVE LINE AUTO PARTS INC	6221D W PASSYUNK AVE PHILA, PA 19153	Non-Contributing	New	10/5/2005	12/6/2005	Issued
36	538933	DRIVE TRAIN EXCHANGE INC DBA VENICE AUTO PARTS	PO BOX 5346 6219 W PASSYUNK AVE PHILADELPHIA, PA 19153	Non-Contributing	Renewal	7/1/2005	9/7/2005	Issued
37	634921	ESSINGTON AVENUE AUTO PARTS INC	6746 ESSINGTON AVE PHILA, PA 19153	Combined	Renewal	7/7/2014	None	Pending
38	452251	EXELON GENERATION CO LLC	3901 N DELAWARE AVE PHILADELPHIA, PA 19137	Separate	Renewal	9/22/2011	12/2/2011	Issued
39	509966	FC HAAB CO INC	SCHUYLKILL AVE & MORRIS ST PHILADELPHIA, PA 19145	N/A	Renewal	3/18/2013	6/3/2013	Issued
40	505635	FEDEX CORP	3600 GRAYS FERRY AVE PHILADELPHIA, PA 19146	Combined	New	4/30/2002	6/10/2002	Issued
41	648642	FEDEX GROUND PACKAGE SYSTEM INC	14300 TOWNSEND RD PHILA, PA 19154	Separate	Renewal	6/5/2014	N/A	Pending

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
42	720412	FIFTH STREET AUTO PARTS INC	310-400 W ALLEGHENY AVE PHILADELPHIA, PA 19133	Combined	New	6/2/2009	8/7/2009	Issued
43	721840	FIFTH STREET AUTO PARTS INC	3105 N FIFTH ST PHILA, PA 19133	Combined	New	6/2/2009	8/7/2009	Issued
44	535448	FIORES AUTO PARTS	3300 S 61ST ST PHILADELPHIA, PA 19153	Separate	New	5/19/2000	6/12/2000	Issued
45	638399	FREDDIES AUTO PARTS INC. DBA CARTEL AUTO PARTS	6330 W PASSYUNK AVE PHILA, PA 19153	Non-Contributing	Renewal	10/28/2009	10/7/2011	Issued
46	714382	GREENWICH TERM LLC	3301 S COLUMBUS BLVD PHILA, PA 19148	Non-Contributing	Renewal	1/6/2014	2/27/2014	Issued
47	637349	HAROLDS USED AUTO PARTS INC	5347 WHITBY AVE PHILA, PA 19143	Combined	Renewal	10/29/2009	5/25/2010	Issued
48	726099	KAN CO METALS	2275 BRIDGE ST FRANKFORD BUS ARSENAL, BLDG 308 PHILA, PA 19137	Combined	New	9/21/2009	5/26/2010	Issued
49	586759	HONEYWELL INTL INC	MARGARET & BERMUDA STS PHILADELPHIA, PA 19137-1193	Combined	Renewal	8/2/2012	3/6/2013	Issued
50	646250	JACKS AUTO GLASS INC	3517-3555 S 61ST ST PHILA, PA 19153	Separate	Renewal	9/29/2009	5/25/2010	Issued
51	651700	JIMS AUTO RECYCLING INC	6299 W PASSYUNK AVE PHILA, PA 19153	Non-Contributing	Renewal	7/11/2014	N/A	Pending
52	662289	JKLS AUTO SALES & PARTS INC	6796 ESSINGTON AVE PHILA, PA 19153-3408	Separate	New	10/13/2005	12/16/2005	Issued
53	538470	JTS USED AUTO PARTS	107 W SHUNK ST PHILADELPHIA, PA 19148-4728	Combined	Renewal	9/19/2005	10/31/2005	Issued
54	649260	K&A AUTO SALVAGE INC	2160-66 E SOMERSET ST PHILA, PA 19134	Combined	New	1/11/2005	3/10/2005	Issued
55	631355	KNOCK OUT AUTO PARTS LLC	3201 E TIOGA ST PHILADELPHIA, PA 19134	Combined	New	11/29/2004	2/3/2005	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
56	457087	MONDELEZ GLOBAL LLC	12000 ROOSEVELT BLVD PHILADELPHIA, PA 19116-3001	Separate	Transfer	11/16/2012	1/14/2013	Issued
57	734583	KUUSAKOSKI PHILADELPHIA LLC	3150 ORTHODOX ST PHILADELPHIA, PA 19137	Non-Contributing	New	6/8/2011	7/26/2011	Issued
58	264142	L3 COMMUNICATIONS CORP	13500 ROOSEVELT BLVD PHILADELPHIA, PA 19116-4299	Separate	Rescission	5/16/2006	8/3/2006	Replaced
59	538933	LKQ PENN MAR INC	PO BOX 5346 6219 W PASSYUNK AVE PHILADELPHIA, PA 19153	Separate	Renewal	9/2/2010	10/29/2010	Issued
60	668302	LUONG ANH DBA A&H AUTO PARTS	6255 PASSYUNK AVE PHILA, PA 19153	Separate	New	3/1/2006	5/9/2006	Issued
61	535716	OSCAR'S AUTO PARTS	6145 W PASSYUNK AVE PHILADELPHIA, PA 19153	Separate	Renewal	9/1/2010	11/1/2010	Issued
62	458567	METRO MACH CORP	PORTER AVE & FOOT OF 4TH PIER 5 BLDG 669 PHILADELPHIA, PA 191125087	N/A	New	4/29/1998	5/14/1998	Issued
63	502601	NDV SCRAP METAL INC	3630 N 2ND ST PHILADELPHIA, PA 19140-4605	Combined	New	2/12/2009	6/30/2009	Issued
64	552397	ORTHODOX AUTO CO INC	5247 UNRUH AVE PHILADELPHIA, PA 19135-2912	Combined	Renewal	12/17/2010	3/4/2011	Issued
65	693079	PAGE WILLIAM DBA L&B AUTO PARTS	3508 S 61ST ST PHILA, PA 19153	Separate	New	7/31/2007	10/4/2007	Issued
66	631881	PASCO INC	7250 PASCHALL AVE PHILADELPHIA, PA 19142-1065	Combined	Renewal	7/18/2011	4/24/2012	Issued
67	679091	PENNSYLVANIA AUTO SALVAGE INC	4001 ASHLAND ST PHILA, PA 19124	Separate	New	9/29/2006	12/6/2006	Issued
68	539767	PERFECSEAL INC	9800 BUSTLETON AVE PHILADELPHIA, PA 19115-2101	Separate	Renewal	6/22/2010	8/26/2010	Issued
69	554980	NE PHILADELPHIA AIRPORT (PNE)	9800 ASHTON RD PHILADELPHIA, PA 19114	Non-Contributing	Renewal	8/18/2011	11/29/2011	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
70	456902	PHILA GAS WORKS	3100 PASSYUNK AVE PHILADELPHIA, PA 19145	Non-Contributing	Renewal	3/7/2011	6/1/2011	Issued
71	560320	CLEARFIELD RECYCLING	532 W ANNSBURY ST PHILADELPHIA, PA 19140	Combined	New	9/9/2004	11/17/2004	Issued
72	454293	REPUBLIC SVC INC	2960 ORTHODOX ST PHILADELPHIA, PA 19137	Combined	Renewal	6/20/2012	12/13/2012	Issued
73	464838	REPUBLIC SVC INC	3600 SOUTH 26TH ST PHILADELPHIA, PA 19145	Non-Contributing	New	6/8/2007	8/15/2007	Issued
74	549621	REPUBLIC SVC OF PA LLC	3000 E HEDLEY ST, PHILADELPHIA, PA 19137	Separate	Renewal	6/1/2012	12/6/2012	Issued
75	536055	RICHARDSAPEX INC	4202-24 MAIN ST PHILADELPHIA, PA 19127	Separate	Renewal	2/9/2011	3/24/2011	Issued
76	649992	SAMMYS AUTO PARTS INC	3405 S 61ST ST PHILADELPHIA, PA 19153-3524	Separate	New	1/27/2005	3/27/2006	Issued
77	587049	SAVAGE SVC CORP	52 E OREGON AVE PHILADELPHIA, PA 19148	Combined	New	6/2/2010	8/9/2010	Issued
78	694988	SCHWEPPE WILLIAM DBA ALLIED AUTO PARTS	4175 TORRESDALE AVE PHILA, PA 19124	Combined	New	10/29/2007	2/14/2008	Issued
79	445659	SD RICHMAN SONS INC	2435 WHEATSHEAF LN PHILADELPHIA, PA 19137-1027	Separate	Renewal	3/7/2011	6/9/2011	Issued
80	647520	SEPTA	2705 ROBERTS AVE PHILA, PA 19129	Separate	Renewal	1/6/2014	4/8/2014	Issued
81	648412	SMURFIT STONE CONTAINER CORP	9820 BLUEGRASS RD PHILADELPHIA, PA 19114	Separate	Renewal	1/12/2010	4/1/2010	Issued
82	509902	SPC CORPORATION	26TH ST & PENROSE AVE PHILADELPHIA, PA 19145	Combined	Renewal	11/15/2011	3/20/2012	Issued
83	690391	SPINA AUTO PARTS & TRUCK SALES	6650 ESSINGTON AVE PHILA, PA 19153	Combined	New	5/31/2007	8/28/2007	Issued
84	445940	STEFFA METALS CO INC	2180 CHURCH ST PHILADELPHIA, PA 19124-4052	Combined	New	10/21/2009	9/8/2010	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
85	653688	STEVES AUTO PARTS II	3331 S 61ST ST PHILADELPHIA, PA 19153-3513	Separate	New	4/20/2005	6/27/2005	Issued
86	455797	SUN CHEM CORP GPI DIV	3301 HUNTING PARK AVE PHILADELPHIA, PA 19132	Separate	Renewal	10/5/2009	6/3/2010	Issued
87	586759	PHILA REFINERY POINT BREEZE	3144 PASSYUNK AVENUE PHILADELPHIA, PA 19145	Non-Contributing	Renewal	10/30/2007	1/3/2008	Issued
88	454305	SWEET OVATIONS LLC	1741 TOMLINSON RD PHILA, PA 19116-3847	Non-Contributing	Renewal	3/4/2011	6/6/2011	Issued
89	656377	T&E AUTO PARTS	6219 PASSYUNK AVE PHILADELPHIA, PA 19153-3509	Separate	New	6/16/2005	8/16/2005	Issued
90	781668	THE VANE BROTHERS CO	4700 BASIN BRIDGE RD THE NAVY YARD PHILADELPHIA, PA 19112	Non-Contributing	New	3/14/2014	4/22/2014	Issued
91	442760	TRANSFLO TERM SVC INC	36TH & MOORE ST PHILADELPHIA, PA 19145	Combined	Renewal	7/16/2001	9/28/2001	Issued
92	586521	TRANSFLO TERM SVC INC	52 EAST OREGON AVE PHILA, PA 19148	Combined	Renewal	9/17/2012	3/22/2013	Issued
93	504239	UNITED COLOR MFG INC	2940 E TIOGA ST PHILADELPHIA, PA 19134	Combined	Renewal	11/23/2010	3/15/2011	Issued
94	262184	UNITED METAL TRADERS INC	5240 COMLY ST PHILADELPHIA, PA 19135-4315	Combined	Renewal	6/27/2014	N/A	Pending
95	553177	US POSTAL SVC	1900 BYBERRY RD PHILA, PA 19116-9997	Non-Contributing	Renewal	8/20/2010	10/26/2010	Issued
96	656720	US POSTAL SVC LLC	7500 LINDBERGH BLVD PHILADELPHIA, PA 19176-9998	Separate	New	3/29/2012	6/22/2012	Issued
97	702103	VANE LINE BUNKERING INC	4925 FORT MIFFLIN RD PHILADELPHIA, PA 19153-3889	Non-Contributing	Renewal	1/28/2014	4/22/2014	Issued
98	651604	NICE GUYS AUTO PARTS	3511 S 61ST ST PHILA, PA 19153	Non-Contributing	New	3/9/2005	4/20/2005	Issued
99	520417	WASTE MGMT OF PA INC	5109 BLEIGH AVE PHILADELPHIA, PA 19136	Separate	Amendment	3/11/2014	3/11/2014	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
100	514031	WASTE MGMT OF PA INC	3605 GREYS FERRY AVE PHILADELPHIA, PA 19146	Combined	Renewal	2/9/2011	3/24/2011	Issued
101	496238	WESTWAY TERM CO LLC	2900 E ALLEGHENY AVE PHILADELPHIA, PA 19134	Combined	New	8/20/2012	10/9/2012	Issued

NPDES PERMITS ASSOCIATED WITH INDUSTRIAL SITE RUNOFF (INDIVIDUAL)

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
1	485306	SEPTA VICTORY AVE TERM	110 & 103 VICTORY AVE UPPER DARBY, PA 19082	Non-Contributing	New	10/19/1995	5/6/1996	Issued
2	271474	PHILA INTL AIRPORT	PHILA INTL AIRPORT 8000 ESSINGTON AVE PHILADELPHIA, PA 19153	Separate	Renewal	4/16/2012	1/18/2013	Issued
3	456930	PHILA ENERGY SOLUTIONS REFINING & MKTG LLC	6310 W PASSYUNK AVE PHILADELPHIA, PA 19153-3517	Non-Contributing	Renewal	11/23/2005	7/3/2006	Issued
4	456930	PHILA ENERGY SOLUTIONS REFINING & MKTG LLC	3144 PASSYUNK AVENUE PHILADELPHIA, PA 19145	Non-Contributing	Rescission	6/6/2011	7/27/2011	Replaced
5	635633	JDM MATERIALS GRANT AVE PLT	2750 GRANT AVE PHILADELPHIA, PA 19114	Non-Contributing	Renewal	2/7/2011	8/16/2011	Issued
6	635658	JDM MATERIALS CO BARTRAM BATCH PLT	PENROSE FERRY RD PHILADELPHIA, PA 19153	N/A	Renewal	2/7/2011	8/16/2011	Issued
7	498403	AKER PHILA SHIPYARD	2100 KITTY HAWK AVE PHILADELPHIA, PA 19112-1808	Non-Contributing	Renewal	11/2/2011	3/14/2013	Issued
8	246431	WHITE PINES PARTNERS GC	1 RED LION RD PHILADELPHIA, PA 19115	Separate	Renewal	7/2/2013	N/A	Pending
9	456904	AMTRAK - RACE ST/ PENN COACH YARD FAC.	30TH & RACE ST BOX 48 PCY PHILADELPHIA, PA 19104	Non-Contributing	Renewal	3/29/2012	3/11/2013	Issued
10	271623	ROHM & HAAS PHILADELPHIA PLT	5000 RICHMOND ST PHILADELPHIA, PA 19137-1815	Non-Contributing	Renewal	2/14/2013	8/13/2013	Issued
11	452917	PLAINS PRODUCTS TERMINALS, LLC	1630 S 51ST ST PHILADELPHIA, PA 19143-5831	Combined	Renewal	12/20/2013	6/9/2014	Issued

NPDES PERMITS ASSOCIATED WITH INDUSTRIAL ACTIVITIES WITH NO EXPOSURE CERITIFICATION

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
1	629489	PACKAGING COORDINATORS INC	3001 RED LION RD PHILADELPHIA, PA 19114	Separate	New	12/8/2004	2/1/2005	Issued
2	508898	PEARL PRESSMAN LIBERTY	7625 SUFFOLK AVE PHILADELPHIA, PA 19153-3020	Separate	New	5/10/2005	3/9/2006	Issued
3	735074	COILPLUS PENNSYLVANIA DIVISION OF COILPLUS INC.	5135 BLEIGH AVE PHILA, PA 19136	Separate	New	5/27/2010	8/23/2010	Issued
4	714922	EFORCE COMPLIANCE	3114 GRAYS FERRY AVE PHILADELPHIA, PA 19146	Combined	New	8/1/2011	10/17/2011	Issued
5	452177	EXELON GENERATION CO LLC	1325 N BEACH ST PHILADELPHIA, PA 191250000	Non-Contributing	New	1/28/2010	2/4/2010	Issued
6	505635	FEDEX CORP	3600 GRAYS FERRY AVE PHILADELPHIA, PA 19146	Combined	New	10/23/2008	12/10/2008	Issued
7	456934	FIBREFLEX PKG & MFG CO INC	5101 UMBRIA ST PHILADELPHIA, PA 19128-4345	Separate	New	4/1/2011	7/28/2011	Issued
8	780546	HILLOCK ANODIZING INC	7363A TULIP ST PHILADELPHIA, PA 19136	Combined	New	1/23/2014	4/22/2014	Issued
9	506357	HP HOOD LLC	10975 DUTTON RD PHILADELPHIA, PA 191543288	Non-Contributing	New	3/3/2014	7/1/2014	Issued
10	682698	INNOVATION PRINTING & COMMUNICATION	11601 CAROLINE RD PHILADELPHIA, PA 19154	Separate	New	11/17/2008	1/23/2009	Issued
11	516971	JOWITT & RODGERS CO	9400 STATE ROAD PHILADELPHIA, PA 19114-3019	Separate	New	6/3/2013	10/2/2013	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
12	264142	L3 COMMUNICATIONS CORP	13500 ROOSEVELT BLVD PHILADELPHIA, PA 19116-4201	Separate	New	6/18/2013	1/9/2014	Issued
13	741504	MATERIALS PROCESSING, LLC	10551 DECATUR RD PHILADELPHIA, PA 19154	Separate	New	1/27/2011	3/2/2011	Issued
14	240580	MUTUAL PHARM CO INC	7722 DUNGAN RD PHILADELPHIA, PA 19111-2733	Separate	New	4/8/2009	6/11/2009	Issued
15	509397	MUTUAL PHARMACEUTICAL CO INC	1100 ORTHODOX ST PHILADELPHIA, PA 19124	Combined	New	2/28/2014	3/25/2014	Returned
16	712726	NATL PUB CO	11311 ROOSEVELT BLVD PHILADELPHIA, PA 19154-2105	Non-Contributing	New	9/29/2008	11/5/2008	Issued
17	491656	PECO ENERGY CO	2800 CHRISTIAN ST PHILADELPHIA, PA 19146	Combined	New	2/1/2008	4/17/2008	Issued
18	669352	PREFERRED FREEZER SVC LLC	3101 S 3RD ST PHILADELPHIA, PA 19148	Combined	New	6/23/2010	8/16/2010	Issued
19	517090	RR DONNELLEY	9985 GANTRY RD PHILADELPHIA, PA 19115	Separate	New	7/11/2012	10/11/2012	Issued
20	510837	SANDMEYER STEEL CO	10060 SANDMEYER LN PHILADELPHIA, PA 19116	Separate	New	4/24/2014	6/20/2014	Issued
21	587889	SMITH EDWARDS DUNLAP CO	2867 E ALLEGHENY AVE PHILADELPHIA, PA 19134-5903	Combined	New	4/4/2011	7/7/2011	Issued
22	511279	SOUTHERN GRAPHIC SYS	2781 ROBERTS AVE PHILADELPHIA, PA 19129	Separate	Renewal	8/10/2010	10/29/2010	Issued
23	747121	SPECTRUM CONTROL INC	2707 BLACK LAKE PLACE PHILADELPHIA, PA 19154-1008	Separate	New	4/6/2011	6/16/2011	Issued
24	738507	TASTY BAKING CO INC	4300 S 26TH ST PHILA, PA 19112	Non-Contributing	New	12/30/2010	2/1/2011	Issued

	NPDES ID	FACILITY NAME	ADDRESS	SEWERSHED	APPLICATION DESCRIPTION	DATE RECEIVED	DATE DISPOSED	PERMIT STATUS
25	504239	UNITED COLOR MFG INC	2940 E TIOGA ST PHILADELPHIA, PA 19134	Combined	New	1/27/2005	3/29/2005	Denied
26	656720	US POSTAL SVC	7500 LINDBERGH BLVD PHILADELPHIA, PA 19176-9998	Separate	New	12/16/2011	1/23/2012	Denied
27	238770	VEOLIA ES TECH SOLUTIONS LLC	3100 HEDLEY ST PHILADELPHIA, PA 19135-1540	Non-Contributing	New	5/21/2014	6/26/2014	Issued

*Permitters may apply to multiple categories

APPENDIX M -
FY 2014 Defective Lateral Quarterly Reports

Sewer Maintenance Unit

Defective Connections Group

Fiscal Year 2014 Annual Report

Reggie Williams

I. BACKGROUND INFORMATION

A. Phase I Stormwater Regulations

In 1990, the Environmental Protection Agency (EPA) promulgated Stormwater Regulations that required National Pollutant Discharge Elimination System (NPDES) permits for stormwater discharges from large (populations in excess of 250,000) and medium-sized (populations between 100,000 and 250,000) municipalities with separate storm sewer systems, (MS4)[1]. The City of Philadelphia with a 1990 population of 1.4 million was one of two NPDES Stormwater Phase I permittees in Pennsylvania. The other permittee was the City of Allentown.

B. NPDES Permit for Stormwater

The City of Philadelphia received its first NPDES Stormwater Permit under the 1990 Federal Regulations as issued by the Pennsylvania Department of Environmental Protection (PA DEP) in September 1995. This permit had a 5-year term. Among other requirements, the permit required the city to reduce stormwater based pollution of local streams, creeks and rivers, from (1) residential and commercial areas, (2) construction sites, (3) industrial sites and (4) defective lateral connections.

The renewal of the NPDES Stormwater Permit that expired in September 2000 was approved by the PA DEP in September 2005. The new permit provides for the same scope and requirements for the Defective Laterals Detection and Abatement Program as the previous permit and incorporates some provisions from the Consent Order and Agreement (COA) of July 1998 although the COA was successfully completed on March 18, 2004.

With the Water Department's internal reorganization and creation of the Office of Watersheds (OOW) in January 1999, the responsibilities numbered (1) through (3) above, along with the periodic reporting thereon was transferred to the OOW. The Defective Connections group continues to pursue the 4th objective of NPDES Permit, namely the detection of defective laterals that cause sanitary wastewater to be carried to the local streams and rivers. The Plumbing Repair Programs unit is responsible for abating the defective laterals detected.

II. DEFECTIVE LATERALS DETECTION AND ABATEMENT PROGRAM

A. Scope of Investigations

The MS4 impacts the areas of the city where there are two separate sewers in the street. The sanitary sewer system, which consists of a network of pipes of smaller diameter, carries domestic wastewater to the City's three Water Pollution Control Plants located in the Northeast, Southeast and Southwest sections. The storm sewer system consists of pipes of larger diameter but significantly shorter lengths and transports the stormwater to the nearest natural waterways. In general, the relatively newer sections of the city in the northeast, northwest and southwest are served by a MS4.

[1] Municipal Separate Storm Sewer System

Due to problems generally attributed to improper installation or lack of oversight during construction, sanitary wastewater from some properties can be transported into the storm sewers and from there, to the streams and rivers. This intrusion of sanitary wastewater causes pollution of the streams and rivers, which are the source of city's water supply. The polluted streams and rivers also endanger the physical health and safety of residents and users of the streams. The NPDES Permit requires the city to identify and abate the plumbing connections (defective laterals) that cause the sanitary wastewater to drain into the streams.

The investigations of stream pollution are triggered by the presence of a dry weather discharge from the storm sewer outfalls into the streams. There are over 400 stormwater outfalls in city's MS4 system of which some 200 have exhibited some dry weather flow.

It should be mentioned however, that not all dry weather discharge from an outfall comes from sanitary wastewater incursion; some may come from underground natural streams or from groundwater inflow. Additional testing of chemical and biochemical composition of samples collected from the outfalls determines whether or not stream pollution may be caused by defective laterals.

B. Outfall Inspections and Sampling

A systematic sampling of the quality of dry weather flow from the 200 plus wet outfalls was performed in 1991 as part of the initial NPDES permit application process. This program attempted to document the amount of flow (gph) and in many cases, fecal coliform count (number of fecal colonies per ml of water). The outfall sampling results were updated in 1998 when additional observations of fluoride levels (mg/l) were included to provide some indication of the origin of water seen in the outfalls. This is based on the fact that the natural water coming from streams or ground water seepage does not contain any significant fluorides, but the City water contains 0.7 mg/l of fluorides.

The more likely outcomes of fluoride and fecal count analyses are interpreted as follows:

i. **High fluoride level with high fecal count:** possible intrusion of sanitary wastewater into the storm sewer
ii. **Low fluoride level with high fecal count:** possible transport of surface contamination in the non-domestic discharge
iii. **High fluoride with low fecal count**: possible water main leak

The Leak Detection unit is alerted when the condition listed at (iii) above is encountered.

As a part of the MS4 permit, all stormwater outfalls are to be inspected once every five years. If there is dry-weather flow present then the outfall is to be sampled and tested for fecal presence and fluoride levels. In addition, the priority outfalls of the watersheds are to be sampled on a quarterly basis. Outfall inspections and sampling are handled by the Industrial Waste unit. Laboratory analysis is completed by the Bureau of Laboratory Services.

During FY2014, 45 outfall inspections were conducted and 40 samples were taken due to observed dry-weather flow as part of the Priority Outfall Sampling program. During FY2014, 6 outfall inspections were conducted and 6 samples were taken due to observed dry-weather flow as part of the Permit Inspection program.

C. Field Screening

The object of field screening is to identify the areas in a sewershed that are suspected of contributing to stream pollution through defective laterals. The field screening begins systematically at an outfall that shows a dry weather flow[2].

Proceeding upstream from the outfall, the storm sewer manholes are successively opened and observed for the presence of flow. The term "**flow**" has been widened to include "**wet**" stormwater manholes on the assumption that the wetness was caused by earlier active flow. These observations are continued upstream along a specified sewer line and stop when a stormwater manhole no longer exhibits any flow or wetness. The field screening is then continued along another tributary sewer and eventually through the entire sewershed of the outfall.

D. Identification of Defective Laterals

1) Dye Tests

Dye testing is a process by which a cross-connected lateral at a property that carries sanitary wastewater to a storm sewer is identified.

(a) Initial Dye Test

Before a test is conducted, the fresh air inlets (FAIs) located at the curbside of the property are identified as being the sanitary or storm FAIs. The dye test protocol adopted by the City requires the presence of two properly functioning FAIs for successful initial tests. If one or no FAI is seen at a property or one or both of the FAIs are clogged or damaged, the initial dye test is aborted with a notation "**Inconclusive**".

During the initial dye test, a water-soluble fluorescent dye is placed in the fresh air inlets (FAIs). The dye is then washed down with water.

In the case of a **"Camera Assisted Dye Test"** the emergence of the dye is observed in the **storm sewer** by a closed circuit television camera positioned in the storm sewer in front of the stormwater lateral connection of the property. Possible observations include:

(i) Green dye placed in storm FAI is seen in the storm sewer
(ii) Green dye paced in storm FAI is not seen in the storm sewer
(iii) Red dye placed in the sanitary FAI is seen in the storm sewer
(iv) Red dye placed in the sanitary FAI is not seen in the storm sewer.

The above observations are interpreted as follows:

1) Combination of (i) and (ii): **Proper connection**
2) Combination of (i) and (iii): **Probable cross connection**
3) Combination of (ii) and (iv): **Inconclusive result**
4) Combination of (ii) and (iii): **Probable cross connection**

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[2] A dry weather flow is defined as one that is detected after an elapse of 72 hours of a continuous dry spell from the previous rainfall event.

In certain cases, the use of the closed circuit television camera is not possible. In such cases, the initial tests are conducted manually.

In a **"Manual Dye Test"**, a green dye placed in the storm FAI is drained and observed in the **storm sewer**. At the same time, a red dye is placed and drained in the sanitary FAI and observed in the **sanitary sewer**. If the green dye appears in the sanitary sewer, irrespective of the red dye's appearance in the storm sewer, the conclusion arrived at is "**Proper Connection**". If the green dye is not seen in the sanitary sewer, the test is repeated by placing and draining more dye from the sanitary FAI and observing its emergence in the **storm sewer**. This result signifies the presence of a "**Cross Connection**". All other combinations of observations in the Manual Dye Test are held to be "**Inconclusive**".

The initial dye tests, whether conducted manually or by a camera are intended to be least intrusive to the water customers. During these initial tests, no entry into the home is involved. In order to provide water for dye tests at the FAIs, field crews use portable water equipment. The Defective Connections group has two vehicles (Econoline vans) each retrofitted with 200 gallon water supply tanks.

(b) Confirmation Dye Test

A confirmation dye test is conducted in case of an Inconclusive test or a Possible cross connection. This test is conducted after a second notification to the customer has been sent. This test is **intrusive**; admission inside the home is required to conduct the testing.

The confirmation dye test is conducted **manually** by placing and flushing the fluorescent dye in household plumbing fixtures, such as a toilet. The emergence of the dye is then observed in the **sanitary sewer**.

If the dye does appear in the sanitary sewer, it is concluded that the property tested has a "**Proper Connection**." If on the other hand the dye from the household plumbing does not appear in the sanitary sewer, then and only then an observation is made in the storm sewer. The presence of the dye in the storm sewer confirms the existence of a "**Cross Connection.**"[3]

(c) Notification of Defect

When a confirmation dye test indicates that there exists a cross connection at the subject property, the property owner is advised that if the property qualifies as a residential property (with no more than 4 units in one of which the owner has his/her residence), the city will make repairs to the defective lateral(s) at no cost to the property owner. If later on it is discovered that the property does not fall within this category, the customer is informed by a follow up notice of his responsibility to repair the defect at their cost.

The Plumbing Repair Programs unit handles customer communications and is responsible for the abatement of these defects.

2) Customer Notifications

[3] This step was modified in CY2001 to conduct the tests from **all** plumbing fixtures, including any in the basement in order to identify the existence of an internal cross connection, where all fixtures but one are properly connected to the sanitary sewer, with one offending connection to the storm sewer.

(a) Initial Notification

The identification of the defective laterals begins after delineating the parts of a sewershed suspected of contributing dry weather flow to the MS4 system, after field screening. All property holders in the specified area receive an initial notification letter, generated through the Oracle-based DLS computer program. The notification provides an introduction of the program and requests the customer's cooperation in enabling dye tests at their property. A dye test is conducted after an initial notification is sent out to a customer. There are three possible outcomes of a dye test:

(i) A test is conducted and no cross connection is found. In this case, a result of "No Cross Connection" is entered in the database and the case is closed.

(ii) A test is conducted and it is concluded that there might exist a cross connection that results in the transport of sanitary wastewater into the storm sewer. This condition requires additional tests to confirm the existence of a cross connection.

(iii) A test cannot be conducted due to any of a variety of reasons, such as FAIs were not conclusively identified, were clogged, etc. This situation also warrants additional tests to conclude whether or not a cross connection exists.

(b) Confirmation Notification

In either of case (ii) or (iii) above, a follow up notification is sent out to the customer, informing them of the results of the previous attempt and requesting them to be available at a specified date for additional "Confirmation" tests at their property. Of course, if the date provided by the City is not suitable to the customer, they can schedule an alternative appointment that suits them.

Dye tests are then conducted at the property from within the customer's premises as described earlier. The results of the tests, (a) a Proper Connection or (b) a Cross Connection, are entered in the DLS computer program.

(c) Water Shutoff Notification

Not all dye tests are completed as a result of confirmation notifications. Some customers ignore the scheduled date and fail to make an alternative appointment. In such cases an informatory note is left at the property and a follow up attempt for tests is made. If this also results in no test, another notification is sent out informing the customer that if they do not make a firm appointment by a specified date (usually within two calendar weeks of the notification date), their water service would be scheduled to be turned off by the Customer Service unit. Of course if the customers do respond and make an appointment for dye tests, the service shutoff is withdrawn and tests are completed as soon as possible.

(d) Miscellaneous Closures

In some cases, where there was no response to dye test requests or water service shutoff notifications due to properties being vacant or abandoned, the cases were closed with a notation "**Miscellaneous Closure**". A miscellaneous closure is activated because of any of the following reasons:

- No active water service to the premises

- Property abandoned, empty or unoccupied
- No billing to the property per Revenue Department
- No sewer connection

From time to time, the miscellaneously closed accounts are revisited. If we find that the reason that caused the account to be originally closed is no longer valid, a dye test is conducted and the property is then re-classified according to the test results.

III. PRIORITY OUTFALLS

During FY2014, the emphasis of the Defective Laterals Detection and Abatement program has been on outfalls on the Priority Score List. The Priority Score List ranks all outfalls sampled with dry-weather flow based on a preset formula that includes the fecal coliform results, the estimated volume of flow, whether the outfall discharges to a drinking water source water, and a complaint factor. The Priority Score List is periodically updated based on the results of the (Permit) Outfall Inspection and Sampling Program described earlier. This list was updated in July 2013.

IV. SUMMARY OF DYE TESTS AND ABATEMENTS

Table 1 provides a summary of the work performed in detecting and abating defective laterals. It shows the cumulative numbers since the inception of the project in 1994, and the progress that was attained during FY2014.

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Table 1.
Updated Progress on Dye Tests in Philadelphia MS4 Area

	Since Inception of the Program	**During Fiscal 2014**
Dye Tests Initiated	53,836	2,643
No Cross Connections Found	51,461	2,576
Cross Connections Identified	1,315	49
Completed Tests	52,776	2,625
Abatements Completed	1,304	58

Of the 58 abatements above (in FY2014), 47 were residential properties. The cost for these abatements was $ 395,137.77. Additionally, 11 commercial properties were abated at a cost of $ 46,976.00.

V. MISCELLANEOUS

Estimates of Pollution Removed

The following data provides a rough measure of the effectiveness of the Defective Connections group's positive contribution to improving the local environment:

- Number of Cross Connections Abated

Since Inception of the Program	1,304
During FY2014	58

- Estimated gallons of Polluted Water Prevented from entering the stormwater outfalls[4]

Since Inception of the Program	183.2 million gallons per year
During FY2014	8.1 million gallons per year

VI. STAFF LEVELS

Because of the high priority assigned to the Defective Connections group, the availability of manpower is extremely important. The sanctioned personnel for the unit is as follows:

One **Water Conveyance Supervisor**

Two **Field Representative Supervisors**

Four **SM Crew Chief Is / Science Technicians**
One position vacant

Eight **Utility Representatives**
Two positions vacant

One **Clerk Typist II**

The above field and office staffs are organized under the Water Conveyance Supervisor. This position is responsible for all aspects of the unit. The two Field Representative Supervisors are each responsible for two field crews, four crews in all. Each crew is led by a SM Crew Chief I / Science Technician and has two Utility Representatives.

In addition to the field staff, the Defective Connections group has the following position which provides general support:

Clerk Typist II: The CT II handles the intricacies of the DLS database, creation of various correspondences related to dye tests, and follows-up with the field staff.

The CT II also handles a variety of communications with the customers, makes appointments, and follows-up with delinquent customers. They also maintain the record of water shutoff warnings and miscellaneous closures.

At the end of FY2014, 13 of the 16 approved positions in the Defective Connections group were filled.

[4] Based on an average use of 110 gallons per capita per day, over a family size of 3.5 persons.

APPENDIX N -
SW Outfall Priority Score- 3/31/2013

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code			Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
1	Q-	117-04		SE of Stevens Rd & Regina St		54,000	0.18	9,180	495,720,000	9	1	2	17.4	11/08/11
2	P-	113-04		NE of Gorman St & Northeast Ave	Y	3,600	0.31	53,000	190,800,000	8	1	2	16.6	10/22/09
3	P-	109-01		SE of Bartlett St & Fenwick Rd	Y	54,000	0.28	2,420	130,680,000	8	1	2	16.2	03/05/13
4	P-	099-02		S of Solly Ave & Solly Pl	Y	1,800	0.92	60,000	108,000,000	8	1	2	16.1	08/30/11
5	W-	076-14		SW of Cherokee St & Hartwell Ln		480	0.76	188,000	90,240,000	8	1	2	15.9	02/26/02
6	P-	116-01		S of Rennard & Nandina Sts	Y	600	0.67	94,000	56,400,000	8	1	2	15.5	08/24/11
7	W-	086-02		Winston & Cresheim Valley Rds (E of creek)	Y	600	0.26	74,000	44,400,000	8	1	2	15.3	10/05/09
8	Q-	107-02		NE of Greendale & Parkview Rds	Y	350	0.32	86,000	30,100,000	7	1	2	15.0	06/21/10
9	P-	108-13		E of Bloomfield Ave & Verree Rd (off Grant Ave)		360	0.25	81,000	29,160,000	7	1	2	14.9	08/13/09
10	W-	086-04		SE of Cresheim Valley Rd & Anderson St		100	0.10	200,000	20,000,000	7	1	2	14.6	06/05/06
11	Q-	101-09		E of Ditman & Eden Sts	Y	240	0.38	77,000	18,480,000	7	1	2	14.5	05/26/10
12	W-	076-10		SW of Valley Green Rd & Wolcott Dr	Y	180	0.84	98,000	17,640,000	7	1	2	14.5	09/27/06
13	S-	046-09		Ford & Wentworth Rds	Y	240	0.11	73,000	17,520,000	7	1	2	14.5	08/26/09
14	Q-	121-02		NE of Kovtas & Poquessing Creek Drs	Y	180	0.24	90,000	16,200,000	7	1	2	14.4	08/31/09
15	Q-	106-09		Churchill & Wessex Lns	Y	300	0.76	47,000	14,100,000	7	1	2	14.3	07/16/10
16	Q-	113-10		E of Foster & Dedaker Sts (manhole sample)	Y	180	0.72	67,000	12,060,000	7	1	2	14.2	06/22/10
17	S-	051-08	*	Main St & Shurs Ln (also known as R-20)	Y	600	1.04	20,000	12,000,000	7	1	2	14.2	11/16/09
18	S-	059-01		SE of Parker Ave & Umbria St	Y	120	0.34	85,000	10,200,000	7	1	2	14.0	11/03/09
19	P-	105-02		W of Mather St & Winchester Ave		30	0.92	100	3,000	3	2	2	13.9	11/17/09
20	W-	086-07		N of Cresheim Valley Rd & Crittenden St		30	0.45	100	3,000	3	2	2	13.9	11/17/09
21	W-	084-02		NE of Lykens Ln & Bells Mill Rd		600	0.23	14,400	8,640,000	7	1	2	13.9	06/06/06
22	P-	113-08		S of Verree Rd & Greymont St	Y	900	0.20	8,400	7,560,000	7	1	2	13.8	08/24/11
23	P-	108-15		E of Verree & Marchman Rds (off Grant Ave)	Y	600	0.26	11,600	6,960,000	7	1	2	13.7	05/22/06
24	W-	067-01		Gorgas Ln & Henry Ave	Y	300	0.29	23,000	6,900,000	7	1	2	13.7	04/25/12
25	Q-	121-03		NE of Liberty Ln and Poquessing Creek Dr		300	1.02	22,000	6,600,000	7	1	2	13.6	07/11/11
26	P-	100-16		SE of Maxwell & Tremont Sts	Y	30	0.31	200,000	6,000,000	7	1	2	13.6	08/05/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
27	P-	109-02	Bustleton Ave & Norwalk Rd	Y	30	0.60	200,000	6,000,000	7	1	2	13.6	04/24/08
28	Q-	106-04	SE of Berea & Glenn Sts	Y	600	0.55	9,364	5,618,400	7	1	2	13.5	11/03/09
29	P-	108-17	W of Welsh Rd & Rising Sun Ave		180	0.74	31,000	5,580,000	7	1	2	13.5	07/07/11
30	Q-	106-17	E of Rayland Rd & Helmer Dr (outfall submerged)	Y	120		44,000	5,280,000	7	1	2	13.4	07/09/07
31	S-	051-05	W of Main & Cotton Sts (aka Main & Gay Sts)	Y	120	0.22	38,000	4,560,000	7	1	2	13.3	09/15/09
32	P-	099-05	NE of Strahle & Horrocks Sts	Y	180	0.29	25,000	4,500,000	7	1	2	13.3	08/26/09
33	P-	091-11	Rowland & Solly Aves	Y	240	0.14	18,000	4,320,000	7	1	2	13.3	08/24/09
34	W-	077-01	NW of Emlen St & Cresheim Rd	Y	180	0.36	24,000	4,320,000	7	1	2	13.3	11/09/09
35	Q-	110-16	E of Chalfont Dr & Keswick Rd	Y	60	0.33	70,000	4,200,000	7	1	2	13.2	08/14/06
36	Q-	102-02	SE of St Denis Dr & Hegerman St	Y	60	0.36	60,000	3,600,000	7	1	2	13.1	08/27/09
37	Q-	106-21	W of W Keswick Rd & Morrell Ave	Y	30	0.55	104,000	3,120,000	6	1	2	13.0	05/08/06
38	W-	076-04	Summit Ave & Cadillac Ln		600	0.11	5,000	3,000,000	6	1	2	13.0	10/23/07
39	S-	046-04	S of Kelly Dr & Nicetown Ln		300	0.13	10,000	3,000,000	6	1	2	13.0	09/12/06
40	D-	092-05	SE of Delaware & Linden Aves (tidal influence)	Y	30	0.88	89,000	2,670,000	6	1	2	12.9	11/23/10
41	Q-	115-05	Calpine & Ramer Rds	Y	360	0.14	6,700	2,412,000	6	1	2	12.8	12/08/09
42	P-	100-09	N of Ashton Rd & Jenny Pl (SW)		120	0.32	20,000	2,400,000	6	1	2	12.8	04/28/10
43	W-	060-09	Hermit & Daniel Sts	Y	120	0.68	20,000	2,400,000	6	1	2	12.8	05/11/10
44	Q-	106-11	Morrell Ave & Churchill Ln (manhole sample)	Y	120	0.17	20,000	2,400,000	6	1	2	12.8	09/22/09
45	S-	051-02	SW of Seville & Cresson Sts		180		13,000	2,340,000	6	1	2	12.7	07/08/10
46	P-	099-04	SW of Evarts & Tolbut Sts		30	0.48	72,000	2,160,000	6	1	2	12.7	11/23/10
47	W-	086-06	W of Stenton Ave & Ivy Hill Rd	Y	600	0.20	3,500	2,100,000	6	1	2	12.6	05/05/10
48	Q-	110-18	E of Keswick Rd & Helmer Dr	Y	100	0.28	20,000	2,000,000	6	1	2	12.6	10/03/07
49	P-	105-06	W of Old Bustleton Ave & Gregg St	Y	300	0.20	6,500	1,950,000	6	1	2	12.6	07/12/06
50	Q-	101-03	E of Academy & Fordham Rds	Y	100	0.38	18,600	1,860,000	6	1	2	12.5	06/06/06
51	Q-	121-01	E of Ina Dr & Stevens Rd	Y	100	0.11	18,000	1,800,000	6	1	2	12.5	10/23/07
52	Q-	110-17	E of Keswick & Carey Rds	Y	480	0.79	3,500	1,680,000	6	1	2	12.5	07/07/10

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
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53	Q-	120-10	NW of Trevose & Southampton Rds	Y	240	0.15	6,700	1,608,000	6	1	2	12.4	08/25/09
54	W-	068-05	SE of Lincoln Dr & Washington Ln	Y	60	0.29	26,000	1,560,000	6	1	2	12.4	06/22/10
55	P-	100-19	Willits & Cloverly Rds	Y	60	0.22	26,000	1,560,000	6	1	2	12.4	08/25/09
56	Q-	106-03	SE of Berea & Glenn Sts	Y	600	0.16	2,420	1,452,000	6	1	2	12.3	03/18/13
57	Q-	117-03	NW of Audubon Ave & Byberry Rd	Y	360	0.26	3,900	1,404,000	6	1	2	12.3	05/26/10
58	Q-	110-20	SE of Keswick Rd & Helmer Dr	Y	60	0.73	20,000	1,200,000	6	1	2	12.2	07/01/10
59	Q-	106-08	Churchill & Wessex Lns	Y	300	0.15	4,000	1,200,000	6	1	2	12.2	04/29/10
60	W-	076-13	SE of Summit Ave & Cadillac Ln (Wise's Mill Rd) (manhole sample)	Y	600	0.20	2,000	1,200,000	6	1	2	12.2	07/23/10
61	P-	099-03	E of Castor Ave & Tustin St	Y	120	0.79	10,000	1,200,000	6	1	2	12.2	07/12/10
62	P-	113-07	W of Bustleton Ave & Red Lion Rd	Y	100	0.25	8,700	870,000	6	1	2	11.9	10/23/07
63	S-	051-03	SW of Main & Cotton Sts	Y	30	0.10	29,000	870,000	6	1	2	11.9	08/27/09
64	Q-	106-05	SE of Chesterfield Rd & Berea St	Y	120	0.46	7,000	840,000	6	1	2	11.8	06/29/10
65	P-	091-12	Navron & Longford Sts		30	1.06	27,000	810,000	6	1	2	11.8	08/21/06
66	Q-	115-01	N of Balston & Acona Rds	Y	300	0.10	2,420	726,000	6	1	2	11.7	03/11/13
67	W-	077-02	Lincoln & Cresheim Valley Drs	Y	120	0.12	5,100	612,000	6	1	2	11.6	09/30/09
68	Q-	106-18	W of Inwood Ln & Waldermire Dr	Y	100	0.31	6,000	600,000	6	1	2	11.6	06/15/05
69	Q-	101-10	Torresdale Ave & Fitler St	Y	30	0.94	20,000	600,000	6	1	2	11.6	07/01/10
70	W-	076-12	NE of St Martin's Ln & Huron St		30	0.48	20,000	600,000	6	1	2	11.6	07/06/10
71	P-	108-14	NE of Verree & Marchman Rds	Y	120	0.20	4,900	588,000	6	1	2	11.5	05/26/10
72	P-	113-01	SE of Northeast Ave & Red Lion Rd	Y	100	0.20	5,800	580,000	6	1	2	11.5	07/30/08
73	S-	059-07	Main St & Green Ln		30	0.86	19,000	570,000	6	1	2	11.5	10/23/07
74	S-	046-06	Kelly Dr & S Ferry Rd	Y	60	0.48	9,500	570,000	6	1	2	11.5	05/05/10
75	P-	104-06	W of Hower Ln & Rising Sun Ave	Y	3	0.77	184,000	552,000	6	1	2	11.5	05/24/06
76	P-	105-01	SE of Goodnaw St & Roosevelt Blvd	Y	200	0.20	2,700	540,000	6	1	2	11.5	04/21/10
77	Q-	101-05	SE of Grant Ave & Fordham Rd	Y	600		900	540,000	6	1	2	11.5	07/08/10
78	P-	100-02	S of Roosevelt Blvd & Winchester Ave		120	0.94	4,400	528,000	6	1	2	11.4	07/18/11

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
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79	W-	086-01	Winston & Cresheim Valley Rds (W of creek)	Y	240	0.22	2,000	480,000	6	1	2	11.4	09/12/06
80	Q-	114-06	NW of Comly & Thornton Rds	Y	1,200	0.20	400	480,000	6	1	2	11.4	06/22/10
81	Q-	101-17	NE of Rowena Dr & Brook Ln (at Morrell Ave) (manhole sample)	Y	120	0.15	3,900	468,000	6	1	2	11.3	09/08/09
82	Q-	110-07	N of Academy Rd & Chalfont Dr	Y	120	0.30	3,500	420,000	6	1	2	11.2	09/09/09
83	Q-	117-01	Woodhaven Rd & Pandrail Pl	Y	60	0.21	6,700	402,000	6	1	2	11.2	08/31/09
84	W-	067-02	NE of Fountain St & Henry Ave	Y	100	0.11	4,000	400,000	6	1	2	11.2	10/03/07
85	Q-	110-12	W of Salina & Newberry Rds (manhole sample)	Y	1,000	0.98	400	400,000	6	1	2	11.2	09/10/02
86	P-	100-21	Wooden Bridge & Cloverly Rds	Y	240	0.25	1,560	374,400	6	1	2	11.1	04/29/10
87	Q-	106-16	W of Greenacre Rd & Waldermere Dr	Y	300	0.57	1,209	362,700	6	1	2	11.1	10/13/09
88	P-	091-01	NE of Sandyford Ave & Brous St (sample ifo channel)	Y	120	0.20	3,000	360,000	6	1	2	11.1	05/10/10
89	P-	104-10	NE of Bustleton & Benton Aves	Y	600	0.27	580	348,000	6	1	2	11.1	04/07/10
90	W-	060-01	NW of Oros Rd & Roxborough Ave	Y	300	0.20	1,120	336,000	6	1	2	11.1	03/11/13
91	Q-	110-15	N of Waldermire Dr & Byrne Rd	Y	60	0.28	5,200	312,000	5	1	2	11.0	07/12/10
92	P-	108-03	NW of Bridle & Millwood Rds	Y	60	0.20	5,100	306,000	5	1	2	11.0	04/23/10
93	P-	091-07	E of Lexington St & Holme Ave (outfall submerged)		15	0.14	20,000	300,000	5	1	2	11.0	04/29/10
94	P-	103-03	N of Hoffnagle St & Rockwell Ave	Y	120	0.19	2,000	240,000	5	1	2	10.8	09/09/09
95	W-	060-03	NE of Oros Rd & Walnut Ln	Y	360	0.87	636	228,960	5	1	2	10.7	06/22/10
96	P-	100-08	SE of Danbury & Maxwell Sts		30	0.14	6,300	189,000	5	1	2	10.6	05/23/06
97	P-	112-04	W of Oakfield Ln & Kismet Rd	Y	30	0.57	6,300	189,000	5	1	2	10.6	05/05/10
98	P-	083-03	S of Ashburner St & State Rd	Y	30	0.20	5,800	174,000	5	1	2	10.5	04/28/10
99	Q-	120-08	NW of Trevose Rd & Edison Ave (outfall submerged)		30	0.35	5,700	171,000	5	1	2	10.5	08/07/09
100	P-	108-24	S of Verree Rd & Pine Hill Ave	Y	300	0.09	520	156,000	5	1	2	10.4	05/08/06
101	Q-	114-12	S of Medford & Woodhaven Rds	Y	30	0.20	5,100	153,000	5	1	2	10.4	08/27/09
102	W-	075-01	NE of Henry & Port Royal Aves		60	0.12	2,500	150,000	5	1	2	10.4	09/13/05
103	P-	108-09	NE of Delia Ln & Darlington Rd (off Grace Ln)		1,500	0.51	100	150,000	5	1	2	10.4	07/21/10
104	P-	104-09	NW of Algon Ave & Placid St		60	0.47	2,420	145,200	5	1	2	10.3	03/11/13

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
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105	Q-	115-11	E of Vinton & Teton Rds	Y	60	0.13	2,400	144,000	5	1	2	10.3	05/09/06
106	W-	076-01	NW of Scotia Rd & Inverness Ln		30	0.18	4,800	144,000	5	1	2	10.3	08/24/09
107	Q-	115-09	SW of Vinton & Medford Rds	Y	60	0.19	2,400	144,000	5	1	2	10.3	08/26/09
108	P-	105-13	NE of Grant Ave & Blue Grass Rd		180	0.20	700	126,000	5	1	2	10.2	07/09/10
109	W-	067-03	SE of Fountain St & Henry Ave	Y	1,200	0.27	105	126,000	5	1	2	10.2	03/18/13
110	S-	052-04	S of Midvale & Ridge Aves		30	0.23	4,100	123,000	5	1	2	10.2	06/30/10
111	Q-	110-06	W of Academy Rd & Chalfont Dr	Y	300	0.08	410	123,000	5	1	2	10.2	06/21/06
112	W-	060-05	SE of Oros Rd & Walnut Ln	Y	120	0.21	1,000	120,000	5	1	2	10.2	09/09/09
113	S-	059-03	S of Umbria & Fountain Sts (off Wright St)	Y	180	0.18	610	109,800	5	1	2	10.1	05/22/06
114	P-	104-07	E of Arnold St & Rising Sun Ave	Y	360	0.20	300	108,000	5	1	2	10.1	11/16/09
115	W-	067-04	Henry Ave & Hermitage St	Y	30	0.24	3,300	99,000	5	1	2	10.0	08/25/09
116	P-	101-01	Woodbridge & Saxton Rds	Y	100	0.12	980	98,000	5	1	2	10.0	07/12/06
117	S-	058-01	SW of Unbria St & Domino Ln	Y	30	0.10	3,100	93,000	5	1	2	9.9	08/31/09
118	P-	091-10	SE of Winchester Ave & Welsh Rd (S of creek)	Y	30	0.16	3,000	90,000	5	1	2	9.9	07/06/10
119	Q-	101-19	NE of Rowena Dr & Brook Ln (above Morrell Ave)		100	0.22	900	90,000	5	1	2	9.9	08/29/06
120	S-	066-01	Nixon St & Shawmont Ave		30	0.60	2,900	87,000	5	1	2	9.9	04/29/10
121	S-	059-02	SW of Umbria & Fountain Sts	Y	15	0.58	5,600	84,000	5	1	2	9.8	07/09/10
122	Q-	115-12	N of Academy Rd & Nanton Dr	Y	180	0.23	460	82,800	5	1	2	9.8	05/24/06
123	Q-	121-05	NE of Milford St & Poquessing Creek Dr	Y	360	0.85	220	79,200	5	1	2	9.8	07/13/11
124	W-	060-02	Walnut Ln & Johnson St	Y	100	0.15	760	76,000	5	1	2	9.8	08/31/06
125	Q-	113-09	E of Stevens Rd & Sanibel St	Y	180	0.12	400	72,000	5	1	2	9.7	09/09/09
126	S-	052-03	Kelly Dr & Falls Rd		8	0.80	8,000	64,000	5	1	2	9.6	05/02/06
127	W-	067-06	NE of Henry Ave & Hermitage St	Y	1	0.28	60,000	60,000	5	1	2	9.6	08/02/11
128	W-	084-01	NE of Manatawa Ave & Caledonia St		600	0.77	100	60,000	5	1	2	9.6	06/22/10
129	Q-	120-01	NW of Denise Dr & Depue Ave		600	0.47	100	60,000	5	1	2	9.6	07/16/98
130	P-	091-06	E of Lexington St & Holme Ave (outfall submerged)	Y	60	0.25	1,000	60,000	5	1	2	9.6	09/09/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
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131	W-	085-01	E of Wissahickon Turnpike & Bells Mill Rd		600	1.10	100	60,000	5	1	2	9.6	09/08/09
132	Q-	106-14	W of Waldermire Dr & Red Lion Rd		1	0.48	60,000	60,000	5	1	2	9.6	08/02/11
133	Q-	119-01	S of Townsend & Meeting House Rds (creek inflow)	Y	120	0.20	480	57,600	5	1	2	9.5	04/28/10
134	P-	101-02	NW of Brookdale & Annapolis Rds (sample ifo channel)	Y	120	0.20	460	55,200	5	1	2	9.5	05/11/10
135	Q-	106-15	W of Waldermire Dr & Red Lion Rd		100	0.12	550	55,000	5	1	2	9.5	06/05/06
136	W-	085-02	S of Seminole St & Rex Ave		30	0.12	1,800	54,000	5	1	2	9.5	09/03/09
137	P-	106-02	SE of Grant Ave & Ashton Rd		30	0.13	1,700	51,000	5	1	2	9.4	09/03/09
138	Q-	110-11	NE of Comly & Tara Rds	Y	300	0.24	140	42,000	5	1	2	9.2	06/06/06
139	Q-	106-12	Nottingham Ln & Morrell Ave	Y	30	0.15	1,400	42,000	5	1	2	9.2	11/10/09
140	P-	091-04	SE of Lexington & Rhawn Sts		60	0.89	700	42,000	5	1	2	9.2	07/21/10
141	P-	099-01	NE of Stanwood St & Tabor Ave		1	0.56	37,000	37,000	5	1	2	9.1	07/18/11
142	S-	059-09	Main St & Green Ln	Y	60	0.24	600	36,000	5	1	2	9.1	09/09/09
143	W-	068-08	Wissahickon & Mt Airy Aves	Y	60	0.20	600	36,000	5	1	2	9.1	07/09/10
144	S-	051-07	Main & Kalos Sts	Y	30	0.20	1,130	33,900	5	1	2	9.1	05/20/10
145	Q-	114-07	SW of Townsend & Thornton Rds (sample ifo channel)		60	0.82	560	33,600	5	1	2	9.1	05/26/10
146	T-	080-01	W of Newtown Ave & Robbins St	Y	300	1.01	110	33,000	5	1	2	9.0	09/10/02
147	Q-	107-07	S of Clarenden Ave & Knights Rd	Y	30	0.17	1,100	33,000	5	1	2	9.0	08/27/09
148	P-	105-10	SE of Blue Grass Rd & Grant Ave		30	0.12	1,000	30,000	4	1	2	9.0	09/03/09
149	P-	091-03	Ryan & Lexington Aves	Y	30	0.32	1,000	30,000	4	1	2	9.0	06/28/10
150	P-	105-07	SE of Grant Ave & Blue Grass Rd		300	0.24	100	30,000	4	1	2	9.0	09/15/09
151	Q-	120-02	S of Bustleton Ave & Petoni Pl		300	0.20	100	30,000	4	1	2	9.0	07/09/10
152	P-	103-01	N of Grant Ave & Pine Rd	Y	300	0.09	100	30,000	4	1	2	9.0	05/10/06
153	W-	060-10	W of Rittenhouse St & Wissahickon Ave	Y	300	0.88	100	30,000	4	1	2	9.0	11/03/09
154	S-	059-05	Main St & Leverington Ave		300	0.16	100	30,000	4	1	2	9.0	09/22/09
155	Q-	110-14	E of Academy & Brandon Rds	Y	300	0.12	100	30,000	4	1	2	9.0	09/22/09
156	P-	113-06	NE of Gorman St & Northeast Ave	Y	120	0.11	200	24,000	4	1	2	8.8	09/08/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code			Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
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157	P-	091-08		NW of Rowland & Hartel Aves	Y	240	0.31	100	24,000	4	1	2	8.8	08/17/09
158	P-	100-01		W of Woodward St & Winchester Ave	Y	60	0.35	400	24,000	4	1	2	8.8	04/12/10
159	P-	112-03		NW of Oakfield Ln & Kismet Rd		60	0.20	400	24,000	4	1	2	8.8	06/30/10
160	W-	076-07		SE of Glengarry & St Andrew Rds		60	0.24	300	18,000	4	1	2	8.5	08/31/09
161	W-	068-02		Greene St & S Mt Pleasant Rd		180	0.17	100	18,000	4	1	2	8.5	08/27/09
162	T-	089-04		W of Franklin Ave & County Line	Y	100	0.63	170	17,000	4	1	2	8.5	08/17/06
163	P-	108-16		W of Welsh Rd & Rising Sun Ave	Y	30	0.48	545	16,350	4	1	2	8.4	09/22/09
164	D-	036-02		Delaware Ave & Spring Garden St	Y	600	0.20	27	16,200	4	1	2	8.4	04/07/10
165	Q-	101-20		SE of Outlook Ave & Lansford St	Y	30	0.14	520	15,600	4	1	2	8.4	07/06/10
166	P-	109-03		Bustleton Ave & Norwalk Rd		7	0.78	2,000	14,000	4	1	2	8.3	08/30/11
167	W-	095-01		NE of Germantown & Hillcrest Aves		15	0.22	845	12,675	4	1	2	8.2	04/13/10
168	P-	083-04		State Rd & Ashburner St		120	0.10	100	12,000	4	1	2	8.2	10/21/09
169	P-	109-04		NW of Bustleton & Haldeman Aves		220	0.18	50	11,000	4	1	2	8.1	04/21/10
170	Q-	110-13		E of Academy & Brandon Rds		30	0.15	330	9,900	4	1	2	8.0	05/30/06
171	S-	046-07		Neill Dr & Conshohocken Ave		900	0.41	101,000	90,900,000	8	1	1	8.0	01/23/08
172	P-	100-03		Roosevelt Blvd & Winchester Ave		15	0.52	630	9,450	4	1	2	8.0	05/10/06
173	T-	089-01		NW of Passmore St and Newtown Ave	Y	60	0.84	145	8,700	4	1	2	7.9	05/03/11
174	W-	068-04		Lincoln Dr & Johnson St		1	0.95	7,300	7,300	4	1	2	7.7	06/20/11
175	S-	059-04		S of Umbria St & Leverington Ave	Y	10	0.76	690	6,900	4	1	2	7.7	06/12/06
176	T-	096-01		E of Cheltenham & Gowen Aves	Y	60	0.10	100	6,000	4	1	2	7.6	10/21/09
177	P-	105-08		SE of Grant Ave & Blue Grass Rd		30	0.32	200	6,000	4	1	2	7.6	10/14/09
178	Q-	113-11		W of Bennett Rd & Roosevelt Blvd		600	0.11	10	6,000	4	1	2	7.6	10/04/06
179	W-	076-09		SW of Valley Green Rd & Wolcott Dr		600	0.90	10	6,000	4	1	2	7.6	07/06/10
180	Q-	101-16		N of Rowena Dr & Brook Ln	Y	60	0.20	100	6,000	4	1	2	7.6	07/27/10
181	P-	104-11	*	Parkhollow & Ridge Run Lns		60	0.65	100	6,000	4	1	2	7.6	06/21/10
182	W-	060-11		W of Lincoln Dr & Harvey St	Y	60	0.34	100	6,000	4	1	2	7.6	09/22/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
183	P- 108-21		N of Northeast & Rising Sun Aves (off Glenhope Rd)		30	0.16	200	6,000	4	1	2	7.6	09/03/09
184	P- 106-01		NE of Grant Ave & Ashton Rd		60	0.21	100	6,000	4	1	2	7.6	11/17/09
185	T- 080-02		W of Newtown Ave & Higbee St (manhole sample)	Y	100		60	6,000	4	1	2	7.6	05/01/06
186	P- 082-02	*	State Rd & Pennypack Creek (manhole sample)		350	0.32	86,000	30,100,000	7	1	1	7.5	06/21/10
187	T- 088-01		NW of 7th & Cheltenham Aves	Y	30	0.20	162	4,860	4	1	2	7.4	05/10/10
188	T- 079-01		E of Godfrey Ave & Crescentville Rd	Y	120	0.13	40	4,800	4	1	2	7.4	05/11/06
189	S- 014-01		61st St & Passyunk Ave		60	0.14	80	4,800	4	1	2	7.4	09/30/09
190	P- 082-01		Cottage St & Holmesburg Ave (manhole sample)		180	0.89	83,000	14,940,000	7	1	1	7.2	07/05/11
191	W- 068-07		Hortter St & Park Line Dr		300	0.08	10	3,000	3	1	2	7.0	05/23/06
192	T- 098-01		NE of Filmore St & Shelmire Ave		300	0.20	10	3,000	3	1	2	7.0	05/10/10
193	S- 046-02		E of Country Club Rd & Conshohocken Ave		300	0.10	10	3,000	3	1	2	7.0	04/12/10
194	Q- 110-10		SW of Comly & Tara Rds		30	0.35	100	3,000	3	1	2	7.0	08/17/09
195	Q- 114-04		SW of Comly & Caroline Rds		30	0.20	100	3,000	3	1	2	7.0	11/23/09
196	W- 068-03		Wissahickon Ave & Mt Pleasant Pl		30	0.26	100	3,000	3	1	2	7.0	10/14/09
197	W- 076-08		Wolcott Dr & Cornelia Pl	Y	30	0.50	100	3,000	3	1	2	7.0	09/22/09
198	Q- 120-12	*	Laura Ln & Laura Pl		30	0.92	100	3,000	3	1	2	7.0	11/17/09
199	Q- 120-13	*	Bustleton Ave & Laura Ln		30	0.45	100	3,000	3	1	2	7.0	11/17/09
200	P- 091-09		SE of Winchester Ave & Welsh Rd (N of creek)	Y	300	0.71	20,000	6,000,000	7	1	1	6.8	10/03/07
201	P- 100-04		SW of Blue Grass Rd & Winchester Ave	Y	15	0.20	135	2,025	3	1	2	6.6	05/20/10
202	P- 104-03		S of Meeting House & Verree Rds		30	0.20	64	1,920	3	1	2	6.6	04/07/10
203	W- 086-03		N of Devon St & Woodbrook Ln (manhole sample)		100	0.20	28,000	2,800,000	6	1	1	6.4	07/16/10
204	S- 046-01		N of Conshohocken & Windermere Aves		60	0.27	27	1,620	3	1	2	6.4	03/11/13
205	T- 097-02		Cheltenham Ave & Durad St		120	0.56	20,000	2,400,000	6	1	1	6.4	10/02/07
206	T- 079-02		Adams Ave & Crescentville Rd		100	0.33	17,000	1,700,000	6	1	1	6.2	09/28/06
207	T- 080-03		Newtown & Cheltenham Aves		120	0.20	10	1,200	3	1	2	6.2	04/23/10
208	T- 089-03		County Line & Washington Ave		120	0.22	10	1,200	3	1	2	6.2	05/18/06

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
209	Q-	102-05	E of Grant Ave & James St (at State Rd & Creek)		72,000	0.43	18	1,296,000	6	1	1	6.1	01/08/13
210	M-	005-01	Enterprise Ave & Fort Mifflin Rd (sample from creek)		150	0.16	8,100	1,215,000	6	1	1	6.1	09/19/11
211	S-	010-02	W of Pattison Ave & Broad St		360	0.26	3,000	1,080,000	6	1	1	6.0	09/27/06
212	T-	056-01	NW of Tulip & Ashland Sts (manhole sample)		10	0.24	100	1,000	3	1	2	6.0	11/07/11
213	S-	024-01	University Ave & 34th St		100	0.09	10	1,000	3	1	2	6.0	05/18/06
214	S-	046-03	Conshohocken Ave & Country Club Rd		100	0.20	10	1,000	3	1	2	6.0	04/21/10
215	T-	097-01	NW of Cheltenham Ave & Vernon Rd		60	0.32	12,000	720,000	6	1	1	5.9	09/19/11
216	D-	093-01	NE of Delaware & Arendell Aves (tide going out)		30	0.43	20,000	600,000	6	1	1	5.8	10/02/07
217	A-	004-01	84th St & Buist Ave		100	0.20	4,000	400,000	6	1	1	5.6	07/16/10
218	C-	032-01	Haverford Ave & 69th St		60	0.22	10	600	3	1	2	5.6	07/01/10
219	C-	032-02	Pennwood & Brockton Rds	Y	60	0.90	10	600	3	1	2	5.6	05/20/10
220	D-	017-01	E of Delaware & Packer Aves		100	0.20	3,100	310,000	5	1	1	5.5	12/03/08
221	D-	026-01	Delaware Ave & Bainbridge St		360	0.17	840	302,400	5	1	1	5.5	10/04/06
222	D-	026-02	Delaware Ave & Kenilworth St		60	0.20	9	540	3	1	2	5.5	05/20/10
223	D-	026-03	Delaware Ave & Monroe St		4	0.93	60,000	240,000	5	1	1	5.4	07/05/11
224	D-	026-04	Delaware Ave & Fitzwater St		60	0.31	1,800	108,000	5	1	1	5.0	04/30/02
225	D-	026-05	Delaware Ave & Lombard St		30	0.20	3,000	90,000	5	1	1	5.0	07/01/10
226	D-	031-01	Delaware Ave & Church St		30	0.47	10	300	2	1	2	5.0	04/28/10
227	D-	031-02	Delaware Ave & Walnut St		30	0.73	10	300	2	1	2	5.0	04/22/04
228	D-	036-01	Delaware Ave & Noble St (N)		30	0.12	10	300	2	1	2	5.0	04/12/10
229	D-	036-03	Delaware Ave & Noble St (S)		30	0.12	10	300	2	1	2	5.0	04/12/10
230	D-	037-01	Dyott & Beach Sts		7	0.17	27	189	2	1	2	4.6	01/08/13
231	D-	056-09	Pratt & Belgrade Sts		180		1	180	2	1	2	4.5	09/05/06
232	D-	074-01	E of Bleigh St & Delaware Ave		100	0.10	130	13,000	4	1	1	4.1	10/02/07
233	M-	002-01	Island and Enterprise Aves (N)		120	0.38	100	12,000	4	1	1	4.1	12/02/09
234	M-	002-02	Island and Enterprise Aves (S)		30	0.20	330	9,900	4	1	1	4.0	07/09/10

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code			**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
235	M-	002-03		Executive & Enterprise Aves		100	0.25	80	8,000	4	1	1	3.9	07/10/06
236	M-	002-04		Island and Enterprise Aves (NE)		100	0.14	60	6,000	4	1	1	3.8	10/02/07
237	M-	005-02	*	Mingo & Bartram Aves (E) (sample from creek)		360	0.79	10	3,600	4	1	1	3.6	09/25/06
238	M-	005-03	*	Mingo & Bartram Aves (W)		300	0.14	10	3,000	3	1	1	3.5	09/27/06
239	P-	100-17		Willits & Reyrson Rds	Y	39		1	39	2	1	2	3.2	10/15/03
240	P-	083-01		State Rd & Pennypack Creek		2	0.89	10	20	1	1	2	2.6	07/13/11
241	P-	083-02		NE of Holmesburg Ave & State Rd		1	0.10	20	20	1	1	2	2.6	04/21/10
242	P-	090-01		NE of Roosevelt Blvd & Shelmire Ave		60	0.90	2	120	2	1	1	2.1	10/02/07
243	P-	090-02		S of Roosevelt Blvd & Brous Ave	Y	No flow			-	-	1	2	-	08/27/09
244	P-	091-02		N of Sandyford & Ryan Aves	Y	No flow			-	-	1	2	-	10/05/09
245	P-	091-05		NW of Albion St & Winchester St		No flow			-	-	1	2	-	04/28/10
246	P-	091-13		Holme Ave & Longford St		No flow			-	-	1	2	-	08/26/09
247	P-	092-01		Pennypack St & Deer Ln (manhole sample)		No flow			-	-	1	2	-	06/29/10
248	P-	092-02		Pennypack St & Rose Ln (manhole sample)		No flow			-	-	1	2	-	04/29/10
249	P-	092-03		Crispen St & Harvard Pl (S)		No flow			-	-	1	2	-	11/16/09
250	P-	092-04		Crispen St & Harvard Pl (N)		No flow			-	-	1	2	-	09/15/09
251	P-	100-05		W of Taunton & Hargrave Sts	Y	No flow			-	-	1	2	-	09/09/09
252	P-	100-06		Macon & Tolbut Sts	Y	No flow			-	-	1	2	-	10/05/09
253	P-	100-07		Manchester & Taunton Sts		No flow			-	-	1	2	-	06/30/10
254	P-	100-10		NE of Ashton Rd & Jenny Pl (SE)		No access			-	-	1	2	-	08/29/06
255	P-	100-11		NE of Ashton Rd & Jenny Pl (NW)		No flow			-	-	1	2	-	04/29/10
256	P-	100-12		NE of Ashton Rd & Jenny Pl (NE)		No flow			-	-	1	2	-	10/14/09
257	P-	100-13		Holme Ave & Lewin Pl (N)		No flow			-	-	1	2	-	08/26/09
258	P-	100-14		Holme Ave & Lewin Pl (S) (manhole sample)		No flow			-	-	1	2	-	09/09/09
259	P-	100-15		Arlan Ave & Cloverly Rd		No flow			-	-	1	2	-	05/06/10
260	P-	100-18		Willits & Cloverly Rds		No flow			-	-	1	2	-	08/17/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

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261	P-	100-20	Ryerson Rd & Angus Pl (S)		No flow			-	-	1	2	-	07/12/10
262	P-	100-22	Ryerson Rd & Angus Pl (N)		No flow			-	-	1	2	-	05/11/10
263	P-	100-23	N of Ashton & Ryerson Rds	Y	No flow			-	-	1	2	-	07/06/10
264	P-	100-24	Angus Rd & Angus Pl (S)	Y	No flow			-	-	1	2	-	10/06/09
265	P-	100-25	Angus Rd & Angus Pl (N)		No flow			-	-	1	2	-	10/06/09
266	P-	103-02	Pine Rd & Shady Ln		No flow			-	-	1	2	-	04/23/10
267	P-	104-01	Pine Rd & Longmead La (S)		No flow			-	-	1	2	-	06/22/10
268	P-	104-02	Pine Rd & Longmead La (N)		No flow			-	-	1	2	-	08/17/09
269	P-	104-04	Verree Rd & Pennypack Creek		No flow			-	-	1	2	-	07/28/11
270	P-	104-05	Norvelt Dr & Bloomfield Ave		No flow			-	-	1	2	-	06/21/10
271	P-	104-08	S of Rising Sun Ave & Krewstown Rd		No flow			-	-	1	2	-	03/11/13
272	P-	105-03	NE of Roosevelt Blvd & Grant Ave	Y	No flow			-	-	1	2	-	07/08/10
273	P-	105-04	NE of Marshall & Bruce Sts (on Blue Grass Rd)		No flow			-	-	1	2	-	06/21/10
274	P-	105-05	NE of Marshall & Bruce Sts (on Blue Grass Rd)		No flow			-	-	1	2	-	04/29/10
275	P-	105-09	SE of Blue Grass Rd & Grant Ave		No flow			-	-	1	1	-	10/22/07
276	P-	105-11	NE of Blue Grass Rd & Grant Ave		No flow			-	-	1	2	-	12/08/09
277	P-	105-12	NE of Grant Ave & Blue Grass Rd		No flow			-	-	1	2	-	06/21/10
278	P-	108-01	E of Cargill Ln & Bloomfield Ave		No flow			-	-	1	2	-	09/08/09
279	P-	108-02	Jennifer Ter & Moredun Ave	Y	No flow			-	-	1	2	-	09/18/02
280	P-	108-04	W of Alicia St & Millwood Rd (off Kings Oak Ln)		No flow			-	-	1	1	-	08/04/10
281	P-	108-05	Greycourt & Pocasset Rds		No flow			-	-	1	1	-	10/31/07
282	P-	108-06	Alburger Ave & Charette Rd		No flow			-	-	1	1	-	06/08/10
283	P-	108-07	E of Darlington Rd & Alburger Ave	Y	No flow			-	-	1	1	-	07/12/10
284	P-	108-08	W of Kings Oak Ln N & Kings Oak Ln E		No flow			-	-	1	1	-	10/15/07
285	P-	108-10	Pecan & Strafford Drs		No flow			-	-	1	1	-	10/15/07
286	P-	108-11	SE of Darlington Rd & Strafford Dr		No flow			-	-	1	1	-	10/15/07

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

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287	P-	108-12		E of Bloomfield Ave & Verree Rd		No flow			-	-	1	1	-	10/15/07
288	P-	108-18		W of Creswood Rd & Rising Sun Ave (on Walley Ave)		No flow			-	-	1	1	-	10/15/07
289	P-	108-19		N of Alton St & Rising Sun Ave (off Walley Ave)		No flow			-	-	1	1	-	10/15/07
290	P-	108-20		N of Northeast & Rising Sun Aves (S of creek)		No flow			-	-	1	1	-	10/15/07
291	P-	108-22		Redd Rambler Ter & Redd Rambler Dr		No flow			-	-	1	1	-	10/15/07
292	P-	108-23		W of Oakfield Ln & Redd Rambler Rd		No flow			-	-	1	1	-	10/03/07
293	P-	109-05		E of Walley & Norwalk Rds		No flow			-	-	1	1	-	10/03/07
294	P-	112-01		SE of Welsh & Darlington Rds	Y	No flow			-	-	1	1	-	10/02/07
295	P-	112-02		SE of Welsh & Darlington Rds		No flow			-	-	1	1	-	10/29/07
296	P-	112-05		Kismet & Laramie Rds		No access			-	-	1	1	-	07/16/10
297	P-	113-02		SE of Northeast Ave & Red Lion Rd		No access			-	-	1	1	-	07/16/10
298	P-	113-03		SE of Northeast Ave & Gorman St		No access			-	-	1	1	-	07/16/10
299	P-	113-05		NW of Bustleton Ave & Red Lion Rd		No access			-	-	1	1	-	07/16/10
300	P-	113-12		NW of Bustleton Ave & Red Lion Rd (NW)		No access			-	-	1	1	-	07/16/10
301	P-	113-13		NW of Bustleton Ave & Red Lion Rd		No flow			-	-	1	2	-	04/07/10
302	P-	116-02		N of Rennard St & Tomlinson Rd		No flow			-	-	1	2	-	06/22/10
303	P-	4	*	Hybrid CSO outfall (Cottage St & Holmesburg Ave) (manhole)	Y	No flow			-	-	1	2	-	06/28/10
304	Q-	101-04		NE of Pearson Ave & Crispin St		No flow			-	-	1	2	-	04/08/10
305	Q-	101-06		SE of Grant Ave & Fordham Rd		No flow			-	-	1	2	-	04/13/10
306	Q-	101-07		NW of Grant Ave & Leon St		No flow			-	-	1	2	-	04/13/10
307	Q-	101-08		NW of Grant Ave & Leon St		No flow			-	-	1	2	-	04/28/10
308	Q-	101-11		Grant & Torresdale Aves		No flow			-	-	1	2	-	04/28/10
309	Q-	101-12		SE of Grant & Torresdale Aves		No flow			-	-	1	2	-	05/06/10
310	Q-	101-13		NW of Constance Rd & Brook Ln (Stevenson St)	Y	No flow			-	-	1	2	-	05/06/10
311	Q-	101-14		N of Constance Rd & Brook Ln		No flow			-	-	1	2	-	05/10/10
312	Q-	101-15		NE of Constance Rd & Brook Ln (Carteret Dr)	Y	No flow			-	-	1	2	-	05/11/10

	STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score												
	Outfall Inspections as of 3/31/2013												
	Outfall Code		**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
	==	====	=====================	=====	=======	=======	==========	==========	=======	========	==========	========	=========
313	Q-	101-18	NE of Rowena Dr & Brook Ln (at Morrell Ave) (manhole sample)		No flow			-	-	1	2	-	05/11/10
314	Q-	102-01	NE of Hegerman St & Frankford Ave		No flow			-	-	1	2	-	04/19/10
315	Q-	102-03	SE of Stevenson & Tulip Sts		No flow			-	-	1	2	-	04/19/10
316	Q-	102-04	N of Grant Ave & James St		No flow			-	-	2	2	-	04/23/10
317	Q-	106-06	Chesterfield Rd & Wessex Ln		No flow			-	-	1	2	-	07/09/10
318	Q-	106-07	Wessex & Churchill Lns		No flow			-	-	1	2	-	04/30/10
319	Q-	106-10	Churchill Ln & Glenbrook Pl (outfall submerged)	Y	No flow			-	-	1	2	-	04/30/10
320	Q-	106-13	W of Waldermire Dr & Red Lion Rd		No flow			-	-	1	2	-	04/30/10
321	Q-	106-19	W of Dorchester Rd & Waldemire Dr (outfall submerged)		No flow			-	-	1	2	-	07/06/10
322	Q-	106-20	W of Oakhill Rd & Waldermire Dr		No flow			-	-	1	2	-	07/08/10
323	Q-	106-22	Morrell Ave & Nottingham Ln (manhole sample)		No flow			-	-	1	2	-	07/08/10
324	Q-	107-01	E of Crosland Rd & Telfair Dr	Y	No flow			-	-	1	2	-	05/20/10
325	Q-	107-03	E of Parkview & Greendale Rds		No flow			-	-	1	2	-	05/20/10
326	Q-	107-04	Dimarco Dr & Lawnbrook Rds		No flow			-	-	1	2	-	05/20/10
327	Q-	107-05	SE of Greendale Rd & Dimarco Dr		No flow			-	-	1	2	-	07/07/10
328	Q-	107-06	SE of Orchard Ln & Crestmont Ave		No flow			-	-	1	2	-	05/20/10
329	Q-	109-06	E of Roosevelt Blvd & Red Lion Rd		No flow			-	-	1	2	-	07/06/10
330	Q-	109-07	NE of Roosevelt Blvd & Greymont St		No flow			-	-	1	2	-	07/07/10
331	Q-	110-01	SW of Charter & Norcom Rds		No flow			-	-	1	2	-	07/07/10
332	Q-	110-02	SW of Darnell & Decatur Rds		No flow			-	-	1	2	-	07/07/10
333	Q-	110-03	SW of Darnell & Decatur Rds		No flow			-	-	1	2	-	06/30/10
334	Q-	110-04	S of Darnell & Decatur Rds		No flow			-	-	1	2	-	04/21/10
335	Q-	110-05	W of Academy Rd & Chalfont Dr (off Drummond Rd)		No flow			-	-	1	2	-	04/21/10
336	Q-	110-08	S of Academy & Comly Rds		No flow			-	-	1	2	-	07/12/10
337	Q-	110-09	S of Academy & Comly Rds		No flow			-	-	1	2	-	04/08/10
338	Q-	110-19	E of Keswick Rd & Helmer Dr		No flow			-	-	1	2	-	10/18/11

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
	==	====	======================	=====	=======	=======	==========	==========	=======	========	==========	========	========
339	Q-	110-21	SW of Charter & Norcom Rds		No flow			-	-	1	2	-	07/09/10
340	Q-	114-01	NW of Byberry Rd & Hilspach St		No flow			-	-	1	2	-	07/12/10
341	Q-	114-02	E of Bennett Rd & Roosevelt Blvd		No flow			-	-	1	2	-	07/12/10
342	Q-	114-03	NW of Comly & Caroline Rds		No flow			-	-	1	2	-	07/27/10
343	Q-	114-05	SW of Comly & Norcom Rds		No flow			-	-	1	2	-	11/16/09
344	Q-	114-08	SW of Townsend & Thornton Rds		No flow			-	-	1	2	-	11/03/09
345	Q-	114-09	SW of Townsend & Thornton Rds (S of creek)		No flow			-	-	1	2	-	05/26/10
346	Q-	114-10	N of Colman Ter & Colman Rd		No flow			-	-	1	2	-	05/26/10
347	Q-	114-11	NE of Coleman Ter & Coleman Rd		No flow			-	-	1	2	-	08/04/10
348	Q-	114-13	SW of Tyrone & Woodhaven Rds		No flow			-	-	1	2	-	07/09/10
349	Q-	114-14	Basile & Woodhaven Rds		No flow			-	-	1	2	-	11/03/09
350	Q-	114-15	NE of Bennet Rd & Roosevelt Blvd (N of creek)		No flow			-	-	1	2	-	11/03/09
351	Q-	114-16	NE of Bennet Rd & Roosevelt Blvd (S of creek)		No flow			-	-	1	2	-	08/26/09
352	Q-	114-17	SW of Comly & Norcom Rds		No flow			-	-	1	2	-	11/10/09
353	Q-	114-18	NW of Woodhaven & Thornton Rds		No flow			-	-	1	2	-	06/28/10
354	Q-	115-02	Medford & Ancona Rds	Y	No flow			-	-	1	2	-	06/28/10
355	Q-	115-03	Ancona & Tyrone Rds	Y	No flow			-	-	1	2	-	08/17/09
356	Q-	115-04	E of Ancona & Tyrone Rds	Y	No flow			-	-	1	2	-	08/13/09
357	Q-	115-06	Academy & Ramer Rds	Y	No flow			-	-	1	2	-	10/22/09
358	Q-	115-07	SE of Calpine & Ramer Rds	Y	No flow			-	-	1	2	-	10/22/09
359	Q-	115-08	NE of Academy & Torrey Rds (S of creek)		No flow			-	-	1	2	-	11/09/09
360	Q-	115-10	S of Vinton & Medford Rds (N of creek)	Y	No flow			-	-	1	2	-	11/09/09
361	Q-	115-13	NE of Torrey & Academy Rds (N of creek)		No flow			-	-	1	2	-	09/08/09
362	Q-	115-14	S of Vinton & Medford Rds (S of creek)		No flow			-	-	1	2	-	09/08/09
363	Q-	115-15	Medford and Ancona Rds		No flow			-	-	1	2	-	09/08/09
364	Q-	115-16	Galdi Ln & Cliffe Dr		No flow			-	-	1	2	-	11/16/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code			**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
	==	====		======================	=====	=======	=======	==========	==========	=======	========	==========	========	========
365	Q-	115-17		McCarthy Cir & Cliffe Dr		No flow			-	-	1	2	-	09/09/09
366	Q-	115-18		Knight Rd & McCarthy Cir		No flow			-	-	1	2	-	11/16/09
367	Q-	115-19	*	McNulty & Mechanicsville Rds		No flow			-	-	1	2	-	06/28/10
368	Q-	117-02		N of Audubon Ave & Byberry Rd	Y	No flow			-	-	1	2	-	09/03/09
369	Q-	117-05		SE of Byberry Rd & Trina Dr		No flow			-	-	1	2	-	11/23/09
370	Q-	118-01		NE of Roosevelt Blvd & Hornig Rd		No flow			-	-	1	2	-	10/13/09
371	Q-	118-02		SE of Roosevelt Blvd & Hornig Rd		No flow			-	-	1	2	-	10/14/09
372	Q-	118-03		W of Byberry & Black Lake Rds		No flow			-	-	1	2	-	10/14/09
373	Q-	118-04		W of Byberry & Black Lake Rds		No flow			-	-	1	2	-	10/14/09
374	Q-	118-05		Byberry Rd & Evans St		No flow			-	-	1	2	-	10/14/09
375	Q-	118-06		NE of Woodhaven Rd & Evans St		No flow			-	-	1	2	-	10/21/09
376	Q-	119-02	*	Mechanicsville Rd & Poquessing Creek		No flow			-	-	1	2	-	10/21/09
377	Q-	120-03		SE of Petoni Pl & Bustleton Ave		No flow			-	-	1	2	-	11/23/09
378	Q-	120-04		SE from Bustleton Ave & Petoni Pl		No flow			-	-	1	2	-	11/23/09
379	Q-	120-05		NE of County Line Rd & Overhill Ave		No flow			-	-	1	2	-	10/13/09
380	Q-	120-06		Poquessing Ave & Trevose Rd		No flow			-	-	1	2	-	10/21/09
381	Q-	120-07		Maple Ave & Trevose Rd		No flow			-	-	1	2	-	10/05/09
382	Q-	120-09		NW of Trevose Rd & Edison Ave (outfall submerged)		No flow			-	-	1	2	-	10/05/09
383	Q-	120-11		SE of Philmont Ave & Lukens St		No flow			-	-	1	2	-	10/05/09
384	Q-	120-14	*	Laura Ln & Bustleton Ave		No flow			-	-	1	2	-	11/17/09
385	Q-	121-04		NE of Poquessing Creek Ln & Poquessing Creek Dr		No flow			-	-	1	2	-	10/05/09
386	Q-	121-06		NE of Carter Rd & Poquessing Creek Dr		No flow			-	-	1	2	-	10/05/09
387	S-	010-01		SW of Pattison Ave & Broad St		No flow			-	-	2	2	-	10/05/09
388	S-	011-01		Patrol Rd & League Island Blvd		No flow			-	-	1	2	-	10/05/09
389	S-	019-01		E of 58th St & Eastwick Ave		No flow			-	-	1	2	-	10/05/09
390	S-	030-01		Schuylkill Expressway & Vine St		No flow			-	-	1	2	-	10/05/09

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
	==	====	======================	=====	=======	========	==========	==========	=======	========	==========	========	=========
391	S-	030-02	Schuylkill Expressway & Arch St		No flow			-	-	1	2	-	10/06/09
392	S-	046-05	NE of Winding & Neill Drs		No flow			-	-	1	2	-	10/13/09
393	S-	046-08	Conshohocken Ave & W Country Club Rd		No flow			-	-	1	2	-	07/23/10
394	S-	051-01	Main & Salaignac Sts	Y	No flow			-	-	1	2	-	09/03/09
395	S-	051-04	SW of Main & Cotton Sts		No flow			-	-	1	2	-	09/03/09
396	S-	051-06	Rector St & Manayunk Canal	Y	No access			-	-	1	1	-	09/18/06
397	S-	052-05	S of Sumac St & Rochelle Ave	Y	No access			-	-	1	1	-	09/18/06
398	S-	059-06	Main St & Krams Ave		No access			-	-	1	1	-	09/25/06
399	S-	059-08	Main St & Green Ln (W)		No access			-	-	1	1	-	09/13/06
400	S-	059-10	Main St & Green Ln (E)		No access			-	-	1	1	-	09/13/06
401	S-	059-11	Main & Carson Sts		No flow			-	-	1	2	-	10/04/06
402	S-	075-03	NW of Steeple & Belfry Drs		No flow			-	-	1	1	-	07/07/10
403	S-	075-04	E of Hagy's Mill Rd & Cathedral Ave		No flow			-	-	1	2	-	07/07/10
404	T-	050-01	N of Delaware Ave & Lewis St		No access			-	-	1	2	-	09/21/06
405	T-	050-02	Bath St & Frankford Creek		No access			-	-	1	2	-	08/29/06
406	T-	055-01	W of Deal St & Kensington Ave		No access			-	-	1	2	-	03/24/03
407	T-	056-02	Aramingo Ave & Tacony Creek (W)		No access			-	-	1	2	-	09/05/06
408	T-	056-03	Aramingo Ave & Tacony Creek (E)		No flow			-	-	1	2	-	10/11/06
409	T-	056-04	Aramingo Ave & Tacony Creek (N)		No access			-	-	1	2	-	10/11/06
410	T-	056-05	Belgrade St & Tacony Creek		No flow			-	-	1	1	-	07/06/10
411	T-	056-06	SW of Roxborough & Thompson Sts		No flow			-	-	1	1	-	07/27/10
412	T-	056-07	SE of Roxborough & Richmond Sts		No flow			-	-	1	1	-	08/04/10
413	T-	056-08	SW of Roxborough & Richmond Sts		No flow			-	-	1	1	-	12/02/09
414	T-	063-01	Whitaker Ave & Tacony Creek (N)		No flow			-	-	1	1	-	10/29/07
415	T-	063-02	S of I St & Wyoming Ave (manhole sample)		No flow			-	-	1	1	-	10/29/07
416	T-	063-03	S of Wyoming & Castor Aves		No flow			-	-	1	1	-	10/29/07

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		**Location**	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	**Priority Score**	Inspection Date
	==	====	======================	=====	=======	========	==========	==========	=======	========	==========	========	=========
417	T-	063-04	NE of Wingohocking & Frogmoor Sts		No access			-	-	1	2	-	08/14/06
418	T-	063-05	E of Cayuga & Potter Sts		No flow			-	-	1	1	-	07/01/10
419	T-	063-06	E of Potter & Bristol Sts	Y	No flow			-	-	1	1	-	07/12/07
420	T-	071-01	NE of Tabor Rd & Olney Ave (E of creek)		No flow			-	-	1	1	-	07/01/10
421	T-	089-02	Hasbrook & Kerper Sts		No flow			-	-	1	1	-	07/01/10
422	T-	098-02	E of Fillmore St and Shelmire Ave	Y	No flow			-	-	1	1	-	07/06/10
423	T-	098-03	Cottman Ave & Barnes St		No flow			-	-	1	1	-	12/02/09
424	W-	052-01	Lincoln Dr & Gypsy Ln		No flow			-	-	1	1	-	12/02/09
425	W-	052-02	W of Main St & Kelly Dr (ramp B)		No flow			-	-	1	1	-	07/12/07
426	W-	060-04	Lincoln Dr & Walnut Ln		No flow			-	-	1	1	-	07/12/07
427	W-	060-06	Henry Ave & Hermit Ln		No flow			-	-	1	1	-	10/22/07
428	W-	060-07	Henry Ave & Lincoln Dr		No flow			-	-	1	1	-	10/03/07
429	W-	060-08	SE of Kingsley St & Walnut Ln	Y	No flow			-	-	1	2	-	05/01/06
430	W-	067-05	Henry & Leverington Aves	Y	No flow			-	-	1	2	-	06/21/06
431	W-	068-01	Greene St & N Mt Pleasant Rd		No flow			-	-	1	2	-	05/02/06
432	W-	068-06	SE of N Mt Pleasant & Wayne Aves		No flow			-	-	1	2	-	05/11/06
433	W-	075-02	Seffert & Lawnton Sts		No flow			-	-	1	2	-	07/11/06
434	W-	076-02	Cathderal & Glenroy Rds		No flow			-	-	1	2	-	05/24/06
435	W-	076-03	Lomond Ln & Glenroy Rd		No flow			-	-	1	2	-	05/10/06
436	W-	076-05	NE of Summit Ave & Cadillac Ln (on Summit Ave)		No flow			-	-	1	2	-	05/09/06
437	W-	076-06	Summit Ave & Cadillac Ln		No flow			-	-	1	2	-	05/09/06
438	W-	076-11	E of St Martins Ln & Cherokee St		No flow			-	-	1	2	-	05/09/06
439	W-	084-03	Ronnie & Lykens Lns	Y	No flow			-	-	1	2	-	05/08/06
440	W-	084-04	Ayrdale Rd & Lykens Ln		No flow			-	-	1	2	-	05/08/06
441	W-	086-05	W of Anderson St & Woodbrook Ln		No flow			-	-	1	2	-	05/30/06
442	W-	095-02	Erdenheim St & Meadowbrook Ave		No flow			-	-	1	2	-	05/31/06

STORMWATER OUTFALLS: Inspection, Dry Weather Flow, Fluoride, Fecal Count and Priority Score

Outfall Inspections as of 3/31/2013

	Outfall Code		Location	Tested	Flow (gph)	Fluoride (mg/l)	Fecal Count (# per 100 ml)	Pollution Index	Rank - Order	Complaint Factor	Water Source Factor	Priority Score	Inspection Date
	==	====	======================	=====	=======	========	==========	==========	=======	========	==========	========	=========
443	W-	095-03	E of Bells Mill Rd & Stenton Ave		No flow			-	-	1	2	-	09/18/02
444	W-	095-04	Paper Mill Rd & Stenton Ave		No flow			-	-	1	2	-	06/05/06
445	W-	095-05	Stenton Ave & Birch Ln		No flow			-	-	1	2	-	06/15/06

Notes:

1. The Rank-order and Priority Score for the outfalls are based on the most recent fecal coliform test conducted on the dry weather flow from wet outfalls.

2. Fluoride data is included on this list but not used in the Priority Score calculation.

3. The Pollution Index is obtained by multiplying Fecal Count by the observed Flow.

4. Rank-order is the characteristic of logarithm (base 10) of the Pollution Index.

5. The Complaint Factor, on a scale of 1 to 10, is based on the perceived severity of complaints.

6. The Water Source Factor equals 1 if the outfall does not impact a drinking water source, and 2 if it does.

7. Blank cells denote that no data is available.

8. Outfall codes listed in red are Priority Oufalls. These priority outfalls were developed as part of the 1998 consent order.

9. Outfall codes listed in blue are Wet Outfalls that have not yet been tested.

10. All 434 stormwater outfalls included in the 2005 SW NPDES permit are included in this list. The 11 additional outfalls listed here are noted by a * at the end of the outfall code.

11. A Y(es) in the Tested column means that at least some property dye tests have been completed in the outfall.

12. Where flow estimates were not available, a default value of 100 gph was assumed.

13. Where fecal count was not available, a default value of 1 was assumed.

14. Inspections and sampling completed by IWU. Analysis completed by BLS.

APPENDIX O –
FY2014 POLLUTANT MIGRATION/INFILTRATION
TO THE MS4 SYSTEM

Date	Location	Pollutant	Drainage Type	Follow-up Actions
7/1/2013	Porter St and Rosewood St	Construction materials dumped in inlet	Combined	IWU found signs of white paint on inlet grate at TBI Deli, but inlet appeared to be clear and taking water. A warning letter was sent out on 7/3/2013
7/3/2013	Reed St and Waer St	Grease flowing down curb line	Combined	Grease did not enter inlet. IWU told the owner of Warm Daddy's Restaurant that he was responsible for clean-up and the owner said it was a mistake. A warning letter was sent out 7/5/2013
7/11/2013	7421 Glenmore Ave	Truck washing fluids in storm drain	Separate	Owner of Oil Patch Fuel Co. was told by IWU that he would need a containment around the 3 oil tanks outside, but owner said that they used a truck washing company and that any washing there was few and far between
7/17/2013	3401 Fox St	#6 Oil Spill	Combined	After vandals removed valves from a 75,000 gallon oil tank owned by Car Visions, oil spilled around the tank and CSX's rail line. CSX began clean-up immediately but Car Visions delayed prompting the USEPA to take over clean-up a few days later. Additionally, absorbent booms were installed at the 2 Dobson's Run Schuylkill River outfalls
8/1/2013	1600 block S Wilton St	Oil Odor from inlet	Combined	IWU detected no odors, but a crack in the concrete was a possible cause. Inlets were reported to Inlet Cleaning to clear out debris, then possibly to Sewer Maintenance for repair.
8/2/2013	2200 E. Somerset St	Oil spill from employees and Freon gas in air	Combined	IWU met with Owner of Intergalactic Metal Recyclers who gave a tour of their systems; only 1 gasoline tank is double walled. Owner said they don't accept cars with any Freon. Employees quickly put spill absorb on a mixture of motor oil and water on the ground. PADEP is working with the company.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
8/5/2013	3144 Passyunk Ave	Odor from petroleum contaminated soil	Combined	Phila energy solutions was excavating portions of plant to install new rail line and soil was stockpiled. PES consolidated soil, covered material with clean soil, sand, activated carbon, and plastic sheets to prevent further odor detection
8/8/2013	65 N 51st St	#2 heating oil spill	Combined	Home renovators cut a hole in a 275 gallon basement #2 heating tank and pumped approximately 100 gallons to the street and storm drain. Oil was diked by PRD before reaching 1st inlet. Clean Venture cleaned the oil before it went to the combined sewer system.
8/20/2013	Pennypack Creek-Winchester Ave	Sewage Odor	Separate	IWU traced the sewage to outfall P-105-6 which had strong sewage discharge into creek then to a choked sanitary sewer. The sewer was filled with grease and cleaned that evening. Monitoring continued and PADEP was notified.
8/20/2013	61st & Baltimore	Gasoline Odors at stormwater outfall	Combined	IWU conducted a full investigation by checking the outfall, intercepting unit, 2 other near outfalls, sewer lines, and doing an LEL reading. No odors were present.
8/20/2013	SEWPCP: 25 Pattison Avenue	Green discoloration on primary tanks	Non-contributing	Bright green discoloration was visible and looked like a green fluorescent dye possibly from a construction site or plumber. Later, the green dye was noticed at the effluent outfall and the plant manager notified the PADEP, USEPA, and the Coast Guard. SEWPCP will continue monitoring and no clean-up was necessary

Date	Location	Pollutant	Drainage Type	Follow-up Actions
8/28/2013	Oxford Ave & Devereaux Ave	Non-PCB Mineral Oil spill	Combined	A vehicle accident caused a transformer to spill approximately 50 gallons of non-PCB mineral oil to the street and inlet. A small amount of oil reached the inlet covered by debris, but PECO removed debris and spread oil dry to capture the oil before entering the inlet. There was little impact on the inlet or storm system.
8/29/2013	1600 W Norris St	10% Glycol Spill	Combined	The contractor of GW Carver School broke a pipe while maintaining the HVAC system and approximately 100 gallons of 10% glycol spilled to the sump pit. They disabled the sump pit and IWU agreed to let them slowly discharge it to the combined sewer system.
8/26/2013	3401 N Broad St	Hazardous materials in sewers	Combined	PWD/IWU investigated Temple University Hospital and spoke to Dr. Lily Lodhi who said that expired IC bags containing saline and sucrose are cut and sewered in the sink and Temple Hospital agreed to send a letter seeking approval from IWU in the future for any compounds sewered.
9/9/2013	3503 Chalfont Drive	Oil spill to Inlet	Separate	A resident spilled a tank of oil to the street then drove away. The Fire Department placed oil dry on the trail of oil leading to the inlet, which had an oil sheen visible. The outfall appeared oil free. A warning letter was sent o the resident.
9/12/2013	Hasbrook St and Unruh St	Sewage flowing to creek	Separate	IWU observed gray coloration entering the creek. IWU found a choked sewer that was surcharged and notified Sewer Maintenance who relieved the choke. IWU checked the creek later and the gray coloration was gone.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
9/19/2013	NEWPCP: 3895 Richmond Street	Green discoloration	Non-contributing	Green color observed throughout the plant outfall and on the Delaware river. PADEP was notified and IWU obtained a sample from Abbey Dye with a result of 0.15 units (due to fluorescein dye) which is in compliance with permit upper limit of 0.15. IWU will have Abbey investigate to determine the cause of the slug discharge.
9/25/2013	9218 Old Newtown Rd	Paint and solvent in inlet	Separate	IWU visited the home of the resident dumper, but there was no answer and no evidence of paint or solvent in the inlet, although vehicle repairs were evident. A warning letter was sent to the resident.
9/26/2013	Rising Sun St & Sentner St	Cement spill in inlet	Combined	IWU observed evidence of cement and stone at inlet and contacted the cement contractor of a newly installed sidewalk who denied any dumping. IWU tested the inlet and found no obstructions. IWU asked that the contractor to tell all employees that it is illegal to dump anything at an inlet and a warning letter was sent out.
9/26/2013	Strahle & Roosevelt Blvd	Liquid ethanol spill	Separate	A van on fire on Roosevelt Blvd contained a 275 gallon tote containing liquid ethanol. The fire was large and required foam to control run-off. IWU notified Baxter WTP and PADEP of the potential flow into Pennypack Creek from the storm sewer, but no signs of spill were evident on the creek or outfall.
9/27/2013	NEWPCP: 3895 Richmond Street	Green dye discharge	Non-contributing	Discharge notification from Abbey Dye at 9:15am for 3750 gallons of wastewater at a rate of 2.6 gpm. IWU was notified of a green color and sampled at Abbey Dye. IWU advised a PADEP rep and will consider modifying the permit for Abbey Dye.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
9/30/2013	Gorgas Lane Outfall 67-01	Sewage discharge	Separate	IWU found no blockage that could cause the discharge at 67-01. The discharge dissipated and the issue was turned to Sewer maintenance for cleaning. IWU followed up by taking a sample and will investigate again after the manholes are cleaned out
10/1/2013	NEWPCP: 3895 Richmond Street	Cumene Odors	Non-contributing	TPO II on duty said that cumene odors were present near the aeration tanks at 8:00am, but no odors were detected by IWU in the PTB or final effluent building. Honeywell said that there were high cumene readings of 50 lb/hr at 7:00am which is above average of 0.5-3 lb/hr but lower than the limit which is 90lb/hr. Shortly after, Honeywell notified IWU that their results were back within normal range.
10/7/2013	SEPWPCP: 25 Pattison Avenue	Foam entering the plant	Non-contributing	Reports of foam in effluent for a half hour. IWU found no foam in the feeder lines and inspected Inolex Chemical Company and found no sign of foam. Heavy rain at the time of inspection was increasing flow in the receiving sewer. IWU inspected the feeder lines the next day and found no issue.
10/9/2013	NEWPCP: 3895 Richmond Street	Green discoloration in effluent on river	Non-contributing	Reports of green dye on the final tanks. Dye passed through the plant and was visible at the outfall, but no color was visible on final tanks at the time of inspection. IWU collected a sample from Abbey Color Incorporated with a result of 0.07% sodium fluorescein, well below permit limit of 0.3%. They had been discharging since 10/8 at 11:00am. PADEP and IWU will monitor and meet with Abbey to try to eliminate any discoloration.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
10/11/2013	SWWPCP: 8200 Enterprise Ave	Kerosene Odor	Non-contributing	Operator of SWPCP said a slight sheen was visible. IWU met with plant manager and she said the odors were noticed in the bar screen area and have started to dissipate. IWU inspected the bar screen area but was unable to detect kerosene odors. During inspection, there was heavy precipitation which caused flooding throughout the drainage area. IWU will continue to monitor the plant and the TPO on duty will notify IWU of any odors.
10/12/2013	NEWPCP: 3895 Richmond Street	Green discoloration in effluent	Non-contributing	TPO2 on duty noticed green dye and IWU found that effluent had a light green discoloration, but nothing was visible beyond that point. IWU inspected the sewer at Abbey Color Inc and collected a sample. They began discharging on 10/11/2013 at 11:00 am and stopped on 10/12/2013 at 11:00am. IWU continued to monitor.
10/14/2013	Frankford Ave & Oxford St	Hydraulic Oil Spill	Combined	Oil spilled onto street from a broken hydraulic line on a SEPTA El train. The oil spilled into a sewer inlet. SEPTA hired Clean Venture to remove the oil from the trap in the inlet. No oil was present in the sanitary sewer at this time and all clean-up costs were paid for by SEPTA.
10/18/2013	34th & Lancaster Ave	Unknown flow	Combined	Load control discovered a terra cotta pipe. Sewer Maintenance unclogged the pipe so water flowed out of it instead of around it in the ground. IWU sampled for fluoride and fecal coliform and the sample had dirt and some oil in it. IWU informed contractor of the permit discharge process and issued them a groundwater discharge permit to discharge to combined inlet.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
10/23/2013	Packer Ave & dead end	Oil on the river	Non-contributing	IWU observed a slight sheen and small brown dots of oil around outfall D-69 which was not discharging. The Coast Guard erected an absorbent boom around the outfall. The interceptor unit was working properly and no oil was present in the main sewer line. The following day, no problems were identified and all costs for clean-up were paid by the Coast Guard.
10/30/2013	Midvale Ave & Cresson St	Cement Run-off to inlet	Separate	Cement run-off from SEPTA was going directly to Schuylkill from storm inlet. IWU observed that when cement mixers were being cleaned, cement solids were contained, but the cement filled liquid flowed into the inlet. IWU spoke to the Superintendent of Construction who agreed to make the runoff flow onto the soil or track area.
10/31/2013	3925 Walnut St	Grease blockage	Combined	3 restaurants showed documentation of monthly maintenance of grease interceptors. IWU found that Tap House Restaurant had an additional low volume drain line grease remediation system which uses chemical additives to emulsify grease. The City does not allow chemical additives so the owner was sent a letter about the incident.
10/30/2013	2500 Cambria St	Heating oil spill	Combined	150 gallons of heating oil spilled at T.M. Pierce School. The District believed that the boiler room sump pit had discharged once causing around 150 gallons of No. 2 heating oil to be pumped to the combined sewer system, ending at the SWWPCP. IWU notified the plant, who reported no issues.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
12/20/2013	949 N. Bernard St	Sewage and Used Motor Oil	Combined	IWU inspected the inlet and noticed a brown slit material on the curb and rungs with a faint smell of oil, but no visible sheen. The residents denied the events. IWU returned to the site after another call of concern and explained that residents dumping illegally can face up to $25,000 fine and the residents agreed to properly dispose of their waste in the future.
12/18/2013	Ridge Ave & Shawmont Ave	Gasoline Odors in building	Separate	Building shows high LEL levels and sanitary sewer had readings of 15% LEL and a light odor. The adjacent gas station tested negative for odors or LEL readings. Sewer maintenance flushed the sewer which lowered the LEL readings. PGW put test borings in the street where high LEL levels were found. It was a vapor problem. IWU will continue to monitor and building will remain closed.
12/23/2013	Frankford Ave & Torresdale Ave	Water Main Break	Combined	Outfall F09 had a heavy flow as a result of break. IWU observed water flowing over a wall onto the embankment of the Frankford Creek but, there were no observed dead fish. IWU went downstream and saw trash, debris, an oil sheen, and scum with no dead fish. IWU went farther downstream and the flow was slower, but there was still trash, debris, and silt. Distribution was rerouting potable water and Flow Control was considering opening more pathways so flow could go to NEWPCP.
1/1/2014	Waldemire St & Chalfont St	Brown chemical spill in Poquessing Creek	Separate	IWU collected a grab sample from the bridge and the color was light brown and smelled of burnt wood. IWU learned of an ongoing wood mulch fire. Water from the fire had been entering the creek since 12/29

Date	Location	Pollutant	Drainage Type	Follow-up Actions
1/4/2014	1314 S. 2nd St	Gasoline Spill	Combined	A resident's truck had a gas leak and an estimated 5 gallons of gasoline were spilled. The sewer was flushed. No odors or LEL's were detected. Absorbent material had been spread on the garage floor. IWU took more LEL readings the next day and all clean-up costs were paid by the owner.
1/7/2014	3624 Conrad St	Sewage Odors	Separate	IWU inspected the floor drain next to the grease interceptor of the kitchen in Thomas Mifflin School and smelled no odors. The interceptor had never been serviced and the floor drain trap was dry. IWU instructed custodian to add a bucket of water to the floor drain monthly and have grease interceptor serviced.
1/27/2014	5401 Chester Ave	Oil Spill	Combined	Because there weren't enough drums to remove an oil/water mixture from a basement that had a water line break, the mixture was pumped to the sanitary sewer. IWU notified SWWPCP. After, IWU checked the sewer and clean venture was hired to remove the remaining oil.
1/28/2014	Stenton Ave & Northwestern Ave down to Valley Green	Possible Grease	Non-contributing	Sewer maintenance noticed a discoloration of the Wissahickon creek and saw pockets of grease trapped in ice. IWU was unable to find any unusual dischargers and notified PADEP. IWU and Sewer Maintenance continued to monitor the creek.
1/29/2014	8400 Germantown Ave	Grease in Storm Drain	Separate	IWU met with manager of Iron Hill Restaurant who said they hire an outside company to clean equipment. They send all discharge through restaurant's grease trap and place tarps down to ensure that grease does not enter sewer. IWU inspected the back of the building, the inlet, and the downstream outfalls and found no evidence of grease.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
2/6/2014	11500 Norcom Rd	Zinc dust in fire water runoff	Separate	2 fires at Atkore International due to zinc dust in the air caused zinc dust to enter fire water runoff. The runoff was contained in the basement. The slurry was confined by the wastewater treatment system and the Fire Department monitored the site while Atkore removed the zinc dust.
2/21/2014	8600 block of West George St	Oil spill	Combined	IWU inspected a report of a small container of oil spilled in the street but could not find any evidence of oil in the sanitary sewer, inlets, or street. No evidence of illegal dumping was present. IWU will inspect again.
2/28/2014	3634 Miller St	Oil Spill	Combined	IWU was unable to detect oil in the street but, there was a dark oil stain near a recycling container on the sidewalk. No contacts were recorded.
3/3/2014	4067 N. Reese Street	Sewage	Combined	IWU found a garden hose extended from basement window carrying raw sewage across the sidewalk to the street. The owner assured IWU that the broken pipe would be repaired that day. IWU spoke with the caller who agreed to call IWU directly if pumping continued. IWU will follow up with a violation request if the action continues.
3/11/2014	2100 S. 61st St	Garage Fire with possible Oil leak	Combined	IWU inspected the building and found oil on the floor with no drains in the garage. A light sheen was visible on the curb mixed with the fire water runoff, but largest amount of petroleum remained inside the building. IWU found no oil in the sanitary sewer. The owner paid for the clean-up costs and IWU continued to monitor.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
3/21/2014	2800 Plum St	Oil Spill	Combined	Oil absorbent wipes were placed along the curb line at the largest area of the hydraulic oil spill. Sand was also spread throughout the area and then cleaned up after.
3/25/2014	144 N. Ruby St	Sewage dumping to street	Combined	IWU spoke to the homeowner who said her basement had flooded due to a drain pipe failure so she had pumped waste to the street but stopped pumping at the request of IWU. IWU observed the pavement by her curb vent had dropped ~4" indicating that the curb trap had been broken or leaking for a long time. IWU followed-up with a violation to repair the curb trap
3/25/2014	1748 Street Rd	Floor degreaser washed to storm drain	Separate	Pep Boys was sweeping degreaser to the parking lot storm drains because the floor drains were sealed. The manager agreed not to discharge the washing material to the parking lot drains. IWU sent a warning letter and notified Pep Boys corporate office.
3/26/2014	1117 S. 54th St	Inlet Odors	Combined	IWU received reports that buckets of human waster were routinely dumped to the inlet. IWU found toilet paper and evidence of waste at the inlet and residents at the property did not know the source. The inlet was flushed with hydrant water to remove the material and odors from the neighborhood
3/27/2014	2445 Allegheny Ave	Dumping Charcoal BBQ waste in inlet	Combined	IWU found that the inlet was completely blocked by BBQ debris and used charcoal. The owner of the corner deli agreed to dispose of the charcoal in a metal drum. IWU requested a warning letter to be sent to the deli.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
3/31/2014	Dawson St & Sharp St	Oil filled transformer explosion	Separate	Oil soaked a vehicle and sprayed droplets of oil in the immediate area. No flow reached the stormwater inlet or Manayunk Canal and PECO contracted clean up service to clean the vehicle and street.
4/2/2014	NEWPCP: 3895 Richmond Street	Green Coloration on the Delaware	Non-contributing	IWU found no signs of green color on the Delaware river. Abbey Dye had reported a discharged and the permit administrator was notified.
4/3/2014	2700 George St	Oil Spill	Combined	A small amount of oil was spilled when a truck's crankcase was pierced as it ran over a cast iron inlet. IWU requested Sewer maintenance to reset the inlet frame and cover.
4/3/2014	3167 Reach St	Oil Spill	Combined	Oil and water filled a basement after vandals tampered with equipment. Oil was mostly absorbed by clothing and trash and there was no basement level floor drain. An oil/water mixture did flow out of the basement through cracks in the walls to unknown locations. IWU notified NEWPCP, but no oil odors were reported. a clean-up was performed.
4/11/2014	2501 S. 63rd St	Chemical Odors	Combined	IWU noticed a strong caustic odor in Morton Elementary School. The atmosphere was tested for toxics and the sanitary sewers were checked, but nothing except a light caustic odor in the sewer registered and there was no evidence of choking. It was suspected that someone placed a drain cleaning solution into a clogged drain. IWU said to relieve the choked drain and flush out the system.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
4/14/2014	752 S. 4th St	Paint Thinner Odors in building	Combined	IWU was to make sure the sewer was not impacted from lacquer thinner odors in a building. IWU did not detect any odors, visible sheens, or atmospheric readings outside of normal range. The drain and sewer was flushed. SEWPCP was notified. IWU will monitor in the future.
4/16/2014	6336 Magnolia St	Dumped Oil in driveway	Combined	Because of heavy rains, not much evidence of illegal dumping existed, but a light sheen was visible on the cement of several properties and no oil was present in sanitary sewer. The owner was uncooperative. IWU explained that oil cannot be dumped and that the residents will be responsible for clean-ups in the future.
4/16/2014	118 W. Clarkson St	Dumping of oil and wet cement in inlet	Combined	The owner of the concrete company said they do not dump anything in the drains. IWU observed a drain where mechanical work was done on heavy equipment and the owner was told to cover the drain during work. He agreed to cover the drain and dispose of oil using absorbent.
4/24/2014	325 N. Columbus Blvd.	Raw Sewage pumped in the Delaware River	Combined	A plumbing company was installing a small private sewer and the ditch was filling up with river water during high tide so they had to pump out the water, which was only groundwater/river water mix.
4/26/2014	City Line Ave & Conshohocken Ave	Gasoline Spill	Combined	A pump at a Sunoco gas station had been hit and released an unknown amount of gasoline to the storm sewer. Clean-up was performed. IWU found a slight sheen on the creek and a gasoline odor. Absorbent booms were used to remove any gasoline in the creek. Gasoline was removed from lot and curb. The sewer system was also flushed.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
5/2/2014	4921 Cottman Ave	Possible oil dumping to street	Combined	IWU found that the fluids from Cottman Auto parts are pumped to 275 gallon totes and properly disposed. The oil on the street was the result of the recent heavy rains that ran over the oil soaked concrete pad. IWU did not find any evidence of oil dumping during the inspection.
5/6/2014	1901 W. Somerset St	Sewage pumped to Inlet	Combined	IWU visited the location several times with no response and observed sewage being pumped from beneath the cellar doors of the property. A warning letter was sent to the property and IWU is working to shut off their service.
5/8/2014	5100 Princeton Ave	Oil sheen on Delaware River	Combined	The sheen appeared unbroken and the odor was that of diesel fuel. There was no oil present at the interceptor, boat ramp or in the sewer. Baxter WTP, NEWPCP, and PADEP were notified. No odors were reported from NEWPCP. IWU contacted the I-95 General Contractor Foreman who reported no loss of diesel fuel.
5/10/2014	7700 Brewster Ave	Ink and Masking Materials Discharged to Drains	Separate	IWU visited the property and collected the MSDS which will be submitted for evaluation to determine if a permit, pretreatment or oil water interceptor is appropriate for routine cleaning activities.
5/20/2014	Cecil B Moore Ave & Hancock St	Cleaning Water Discharged to street	Combined	IWU observed water flowing to the street and into an inlet and at that time a horse trailer was being cleaned. IWU spoke to an employee in the front office and explained to them that truck washing should be performed on the facility site and that it should not run off into the inlets.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
5/28/2014	5698 Rising Sun Ave	Grease Discharger	Combined	A meeting was scheduled to discuss the significant non compliance at Michel's Bakery due to large quantities of grease entering the intercepting chamber T-4. IWU went over Michel's Wastewater Discharge Permit, its requirements, and possible fine amounts including the cost of clean-up. Michel's Bakery agreed that more attention is needed and is currently looking into a Dissolved Air Flotation (DAF) system for treatment.
6/5/2014	16th St between Chestnut St & Sansom St	Oil Spill	Combined	Spill occurred when a truck fuel tank hit a sign post. Approximately 10 gallons of the 25 gallon diesel spill from a truck accident flowed to the inlet. SEWPCP was notified. Oil dry was used to soak up the oil spilled and the inlet was flushed.
6/4/2014	NEWPCP: 3895 Richmond Street	Cumene Odors	Non-contributing	IWU checked the sampler at the Honeywell plant and there was no evidence of a slug discharge. IWU also collected a grab sample from Gaul and Lefevere Streets and no cumene odor was observed.
6/5/2014	Route I-95 at Cottman Ave	Water Pump-out	Combined	IWU inspected the construction site and told their contacts that they must apply for a Groundwater Discharge permit. They were also told that they would be charged the cost of conveyance for the pumped water. IWU followed-up and no more discharges have occurred and the company is submitting a groundwater permit application.

Date	Location	Pollutant	Drainage Type	Follow-up Actions
6/8/2014	NEWPCP: 3895 Richmond Street	Green Dye at outfall	Non-contributing	No fluorescein dye was visible at the plant or river at IWU's inspection. At the final effluent North Channel there were a lot of algae and the flow was a deeper green. A sample was taken at the channel and outfall. The chlorine contact area also looked a deeper green, but did not appear fluorescent. The discharge at the plant outfall appeared slightly greener than the surrounding river but it did not appear to be fluorescein. Abbey Dye reported a discharge from 6/7 that ended at 11:00 on 6/8.

APPENDIX P - City of Philadelphia – Snow and Ice Operations Plan Winter 2013-2014

Streets Department
1401 JFK Blvd, 7th Floor
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City of Philadelphia

Streets Department

Winter 2013 – 2014

Snow and Ice Operations Plan

November 14, 2013

Honorable Michael A. Nutter, Mayor
Richard Negrin, Managing Director
Rina Cutler, Deputy Mayor, Transportation & Utilities
David Perri, Streets Acting Commissioner
Donald Carlton, Deputy Commissioner
Patricia McConnell, Acting Deputy Commissioner
Stephen Lorenz, Chief Roadway Engineer

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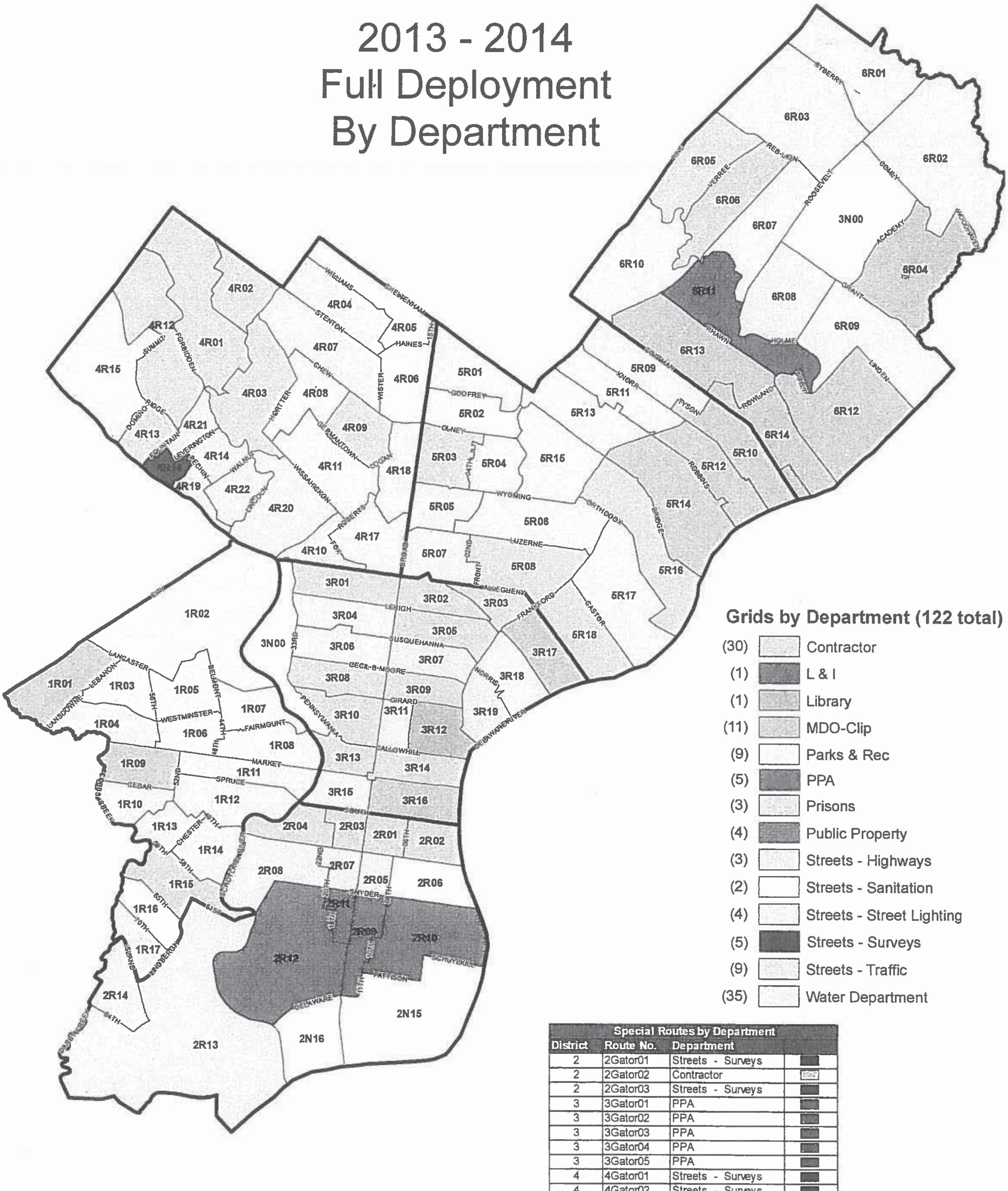
2013 - 2014
Full Deployment
By Department



Grids by Department (122 total)

- (30) Contractor
- (1) L & I
- (1) Library
- (11) MDO-Clip
- (9) Parks & Rec
- (5) PPA
- (3) Prisons
- (4) Public Property
- (3) Streets - Highways
- (2) Streets - Sanitation
- (4) Streets - Street Lighting
- (5) Streets - Surveys
- (9) Streets - Traffic
- (35) Water Department

Special Routes by Department

District	Route No.	Department	
2	2Gator01	Streets - Surveys	
2	2Gator02	Contractor	
2	2Gator03	Streets - Surveys	
3	3Gator01	PPA	
3	3Gator02	PPA	
3	3Gator03	PPA	
3	3Gator04	PPA	
3	3Gator05	PPA	
4	4Gator01	Streets - Surveys	
4	4Gator02	Streets - Surveys	
4	4Gator03	Contractor	
4	4Gator04	Contractor	
6	6Pickup01	Contractor	
6	6Pickup02	Water Department	
6	6Pickup03	Prisons	
6	6Pickup04	Contractor	
6	6Pickup05	Streets - Traffic	
6	6Pickup06	Prisons	

Section 1 – Snow & Ice Removal Operations Plan

Snow & Ice Removal Operations Plan

Plan Summary

Philadelphia, like many other northeastern cities in the United States, often faces winter storms that bring potentially dangerous accumulations of ice, sleet, freezing rain, and snow.

In order to provide roadway conditions that are safe for traffic on primary, secondary, and tertiary (residential) streets throughout the entire City of Philadelphia, the Streets Department has prepared a Snow and Ice Removal Operations Plan outlining the City's response to adverse winter weather conditions. This document outlines procedures and responsibilities for responding to winter weather emergencies

The goal of the Plan is to ensure a continuity of City services by reducing, if not eliminating, the occasions when the City government will have to close or reduce City services due to severe winter weather, particularly with regards to curbside trash collection. The chief objective for the City in all severe winter weather is to allow all Philadelphians to return to their normal daily activities as quickly as possible.

The Plan prioritizes route systems, indicates the appropriate distribution of resources, and identifies the duties and responsibilities of all personnel engaged in the response. Also, the Plan delineates necessary linkages with other City departments and agencies including but not limited to, the Office of Fleet Management and the Office of Emergency Management.

In addition, the Plan outlines areas requiring planning before, during, and after a winter weather storm, understanding that the severity of storms and the resulting conditions vary depending on many environmental factors, the plan allows for flexibility in the department's response. A matrix (see: Chart A, page 3) indicating the storm type with a brief description and resources required to respond to the emergency is provided. An in depth description of resources required to respond to each storm type is provided in subsequent sections of the plan.

Chart A - RESOURCE DEPLOYMENT WINTER 2013 / 2014

POST STORM FORECAST: ABOVE FREEZING TEMPERATURES

	STORM TYPE	HIGHWAY DIVISION	SANITATION DIVISION	NEIGHBORHOOD OPERATIONS	BRINE APPLICATION *	CONTRACTORS	LIFT SETS
1	SLEET / FREEZING RAIN	X			X		
2	1 - 3 INCHES OF SNOW	X		Partial clearing focusing on higher terrain (15 routes)	X		
3	3 - 6 INCHES OF SNOW	X		Partial clearing focusing on higher terrain	X		
4	ABOVE 6 INCHES OF SNOW	X	X	Partial clearing focusing on higher terrain	X	X	X
5	ABOVE 12 INCHES OF SNOW	X	X	Full Deployment (121 routes)	X	X	X

POST STORM FORECAST: BELOW FREEZING TEMPERATURES

	STORM TYPE	HIGHWAY DIVISION	SANITATION DIVISION	NEIGHBORHOOD OPERATIONS	BRINE APPLICATION *	CONTRACTORS	LIFT SETS
6	SLEET / FREEZING RAIN	X		Partial clearing focusing on higher terrain (15 routes)	X		
7	1 - 3 INCHES OF SNOW	X		Partial clearing focusing on higher terrain	X		
8	3 - 6 INCHES OF SNOW	X	X	Partial clearing focusing on higher terrain	X		
9	ABOVE 6 INCHES OF SNOW	X	X	Partial clearing focusing on higher terrain	X	X	X
10	ABOVE 12 INCHES OF SNOW	X	X	Full Deployment (121 routes)	X	X	X

* For pre-storm forecasts of rain to snow, brine will not be pre-applied. It will wash away.

Essential Staff

A. Purpose

The Streets Department is the primary response agency for the City in winter weather events such as snow and ice storms. As such, it is essential the Department maintain an adequate workforce in such emergencies.

B. Definitions

Weather Event – Includes all weather emergencies as declared by the Managing Director's Office, in consultation with the Mayor's Office, and any weather event that requires the mobilization of staff to maintain clear roadways.

***Essential Staff* – All Department employees and any employees assigned to Streets Department Operations during a weather event are deemed essential, and must report to work unless otherwise instructed by the appropriate supervisor. (See: Streets Order No. 100 – Change #6, page 6)**

C. Policy Statement

When a weather emergency occurs, all personnel, as determined essential by the appropriate supervisor, will be required to report to their assigned functions. Since there are significant differences in the size and severity of weather events, those employees required to report may vary from event to event. When possible, employees will be notified by the appropriate supervisor/manager as to their status prior to an event. However, since such notification is not feasible in all situations, employees should report for duty unless otherwise instructed.

During weather events all employees should monitor local news broadcasts for information, and should contact their work location to obtain direction on their work status.

Employees who are not instructed to report for duty during a weather event shall be permitted to utilize accrued vacation, comp, or AL leave during weather events. Employees not engaged in storm operations may be required to report to work, at the discretion of their supervisor, if the nature of their regular work assignments has become critical.

Employees may be assigned shift work as required by the event response plan.

D. Responsibilities

Streets Commissioner –The Commissioner will serve as incident commander for snow and ice operations. These duties include supervise the logistical response of the Streets Department to winter storm events, and consult with the Managing Director and Deputy Mayor for Transportation and Utilities regarding the declaration of a Snow Alert, or the declaration of a Snow Emergency and the activation of the Emergency Operations Center (EOC).

The decision to activate the EOC will be made by the Deputy Mayor for Transportation, the Deputy Mayor for Public Safety, and the Managing Director.

The Streets Commissioner, MOO, MOTU will contact the Philadelphia School District and the Philadelphia Archdiocese regarding winter storm events.

Chief Roadway Engineer – The Chief Roadway Engineer will develop and maintain a comprehensive snow plan that defines required staffing levels during weather events, and identifies specific job positions and functions. Direct all field operations during winter weather events.

Supervisors – The supervisors will maintain a list of employees, and notify those employees assigned to snow operations as required by this policy. Supervisors are to grant leave time only as prescribed in this policy statement, or in the event of extraordinary circumstances.

Human Resources Division – The Humans Resource Division will distribute the Essential Staff Policy to all employees prior to the winter season.

Residential Snow Coordinator –The Residential Snow Coordinator under, direction of the Chief Roadway Engineer, coordinate all residential snow activity.

Field Staff - All personnel, including all supporting departments, will be under the direction of the Streets Department personnel. In the interest of public safety, all personnel will report directly to Streets Department supervisors, and will not be released until directed by the Chief Roadway Engineer. All are expected to be in place, on time, and ready to perform the duties for which they have been trained. Exceptions will be at the Streets Commissioner's and Managing Director's discretion.

Department of Streets
Office of the Commissioner
City of Philadelphia

October 2, 2006

Streets Order No. 100 – Change #6

Subject: Essential Staff Policy

General

The City of Philadelphia Streets Department's mission is to maintain clean and safe streets. The Department delivers a number of City services that are critical to maintaining public health and safety in our communities. These essential services include, but are not limited to, maintaining all traffic control devices and street lighting, the safe operation and maintenance of our roads and bridges, timely and consistent removal of trash and debris, and during winter weather events the plowing and salting of City streets. In the performance of such functions, it is essential that employees of the Department report to work on time when scheduled to provide services to the public. Since each division has varying needs, each division head is responsible for implementing staffing policies to effectively manage the number of employees required for duty on a mandatory basis, to insure that these essential services are delivered and that public health and safety are maintained in communities at all times.

To maintain the essential services identified above, employee leave may be cancelled as determined necessary by the division head. In addition, employees assigned to essential services are required to continue their assignments until properly relieved.

Winter Weather Events

During a winter weather event, all Streets Department employees are expected to report to work at their regularly scheduled time unless notified to report to a different location and/or at a different time. All employees with a valid Pennsylvania Commercial Driver's License (CDL) shall be considered essential during a winter weather event. Any employee holding a valid Pennsylvania Driver's License will be considered essential if notified of such by the Department. During an event, the times and location of reporting may vary significantly depending upon the nature of the event. The Department will notify, in a timely manner, essential employees whose starting time and location are modified. However, all employees should monitor weather conditions and are expected to report for duty during winter weather events or snow emergencies.

Since there are significant variations in the time, nature and intensity of events, the assignments of employees will vary. Some employees may be excused from reporting during an event. Those employees excluded from reporting shall be granted exemptions on a case by case basis provided their assigned function will not be required as dictated by the event, and if the Department Head, or designee, grants such exception.

Compliance

The Streets Department cannot successfully deliver core services without the participation of its entire team. Due to the critical nature and importance of the work to be performed, an employee who does not work his or her assigned hours may be subject to disciplinary action up to and including discharge.

Goals

The Streets Department is the lead City agency for development and implementation of Philadelphia's snow and ice removal program. The goals of the program are to maintain safe egress for citizens throughout the duration of a storm and to return the City to normal operations as soon as possible after the event has ceased. The Department works closely with other City agencies to clear and make safe more than 2,500 miles of streets and roadways. This allows businesses and City agencies to maintain their normal operations during most events. Significant resources in the form of vehicles, materials, and staff are dedicated to the operation. As in similar emergency response plans, priority is given to major thoroughfares, our primary route system; however, the plan also addresses the needs of all streets within the City limits.

Sanitation serivce is a critical function for the citizens of Philadelphia; as such, an important component of the plan is to maintain trash and recycling collections. To minimize the need to mobilize the Sanitation fleet, and the subsequent cessation of this service, the current plan augments the Streets Department's current resources with a reserve snow fighting fleet of vehicles from various departments. The Streets Department and supporting agencies are committed to provide the most efficient and effective snow and ice removal operations as possible and are continually evaluating new methods and processes.

Scope

The Roadway System

There is a network of approximately 2,575 miles of City and State roads within the boundaries of the City of Philadelphia. The responsibility for maintaining these roadways during winter storms is split among the Pennsylvania Department of Transportation (PennDOT), the Streets Department and Parks and Recreation. Of the 360 miles of state roads, PennDOT maintains 50 miles of limited access state highways, including I-95, I-76 Roosevelt Blvd Extension, I-676 and expressway ramps. The remaining 310 miles are state roads that the State contracts with the City for snow and ice removal. This amounts to a total of 2,525 miles of City and State roads that the City maintains.

Parks and Recreation removes snow and ice from 35 miles of Park roads, including Lincoln Drive, Kelly Drive and Martin Luther King Drive. Snow and ice removal on the remaining 2,490 miles of City streets is the responsibility of the Streets Department. The Highway Division maintains general responsibility for the organization and deployment of City forces during winter storm operations. In storms of large accumulation, the Sanitation Division will be mobilized to supplement the snow removal effort with vehicles outfitted with plows. Finally, private contractors supplement City forces in storms of significant magnitude.

In order to provide effective service during winter storms, the City's streets are divided into primary, secondary, and tertiary route systems. The primary route system encompasses 665 miles, including 110 miles of Snow Emergency Routes. The secondary route system includes another 700 miles of streets (both systems exclude the roadway maintained by Parks and Recreation). The balance of City streets falls into the tertiary street system, covering approximately 1,125 miles of streets, 25 miles of which are private streets where the residents contract for private snow removal.

Route Priority

When a Snow Emergency is declared, Snow Emergency and Primary Routes become the first priority for snow removal efforts. The Snow Emergency route System is clearly marked and consists of the major street network within the City. Primary routes include major access roads through the central business district, and in and out of neighborhoods. The majority of primary routes encompass major and minor arterials, which serve the highest traffic volumes and distribute traffic throughout the City.

The secondary route system, which includes other streets that primarily convey traffic within neighborhoods, is the second focus of snow removal efforts. Most SEPTA routes fall within the boundaries of the primary and secondary route system.

The tertiary system includes most local residential streets. These streets are cleared based upon storm type as defined in this document.

The primary and secondary route systems are salted as soon as significant moisture has accumulated on roadways, thereby minimizing travel conditions that are potentially dangerous. Plowing begins when there is such a sufficient buildup of snow that salting is no longer effective. Plowing and salting will occur on local and residential streets as defined in this document. Reserve and active snow fighting equipment will be deployed when conditions warrant.

Residential streets that are inaccessible for snow and ice removal efforts due to illegally parked vehicles cannot be treated until those vehicles are removed by the owner, or ticketed and subsequently towed.

Snow Emergency Declaration

The Mayor, Managing Director, Deputy Mayor for the Public Safety, Deputy Mayor for Transportation and Utilities, Deputy Managing Director of Emergency Management

(DMD-EM) and the Commissioner of Streets will determine if a declaration of a Snow Emergency is necessary.

A snow emergency declaration allows curb to curb plowing on designated snow emergency routes (see: Section 2 for Snow Emergency Route Listings). No parking is allowed on snow emergency routes during a snow emergency. The Philadelphia Parking Authority and Police Department are responsible for ticketing and towing vehicles parked on snow emergency routes.

Winter Weather Action Outline

Snow and ice removal operations are divided into three elements:

Planning

The Deputy Commissioner for Transportation, the Chief Roadway Engineer and the Deputy Commissioner of Sanitation, under direction of the Streets Commissioner, are responsible for developing a comprehensive winter response plan. The planning activity will include all other support departments such as Fleet, Parks and Recreation, Water, OEM and others. Planning will encompass continuing communications with the Office of Fleet Management to ensure that vehicles are properly maintained and outfitted for salting and snow removal. Further, the plan includes periodic reviews of the Snow and Ice Operations and the route structures.

During this phase, responsibilities are outlined, key positions are identified, and crews are trained. In addition, materials are requisitioned, received, and stockpiled; equipment is repaired and readied, and snow routes and route maps are reviewed and revised as needed.

Operations

The operations phase begins when the forecast is for temperatures consistent with snow, ice, sleet or freezing rain, with at least a 50 percent chance of precipitation. Highway Districts and the Residential Snow Coordinator are notified of the possibility of precipitation.

The Highway Division directs all snow removal efforts undertaken by the Streets Department. The Division operates under the supervision of the Chief Roadway Engineer, and is divided into six regional Highway Districts, supervised by District Highway Engineers. District Highway Engineers and the Residential Snow Coordinator, in consultation with the Snow Headquarters, located at the Bridge Maintenance Office at Whitaker Avenue and Luzerne Street, direct winter weather operations.

The 6 Highway District yards are at the following locations:

Highway District 1 --	48th Street and Park side Avenue
Highway District 2 --	63rd Street and Essington Avenue
Highway District 3 --	22nd Street and York Street
Highway District 4 --	Stenton Avenue and Sylvania Street
Highway District 5 --	Whitaker Avenue and Luzerne Street
Highway District 6 --	State Road and Ashburner Street

The 6 Residential District Headquarters are at the following locations:

District 1 --	3033 63rd St. (63rd St. & Eastwick Ave.) - trailer
District 2 --	3033 63rd St. (63rd St. & Eastwick Ave.) - trailer
District 3 --	4501 G St. (G & Ramona Ave.)
District 4 --	4501 G St. (G & Ramona Ave.)
District 5 -- & Snow Headquarters	4040 Whitaker Ave. (Whitaker & Luzerne)
District 6 --	8401 State Road (State & Ashburner)

Resources are deployed as needs dictate, however, operations generally follow a set pattern. Once the storm arrives and precipitation is falling creating icy or snow-covered streets, salting operations begin. Salt trucks are deployed to cover the route structure. Salting will continue until it is no longer necessary or has become ineffective.

As snow continues to fall and build up on the streets, plows are deployed to the routes. Plowing will continue until the streets are passable and safe for use by vehicular traffic. At this time, individual complaints are addressed.

Cleanup and Assessment

Following each storm, the snow removal equipment is cleaned; spreaders and plows are removed and stored; personnel are released from snow duty; and final reports are submitted. At this time, after action reviews are undertaken. If contractors are used, all paperwork will be submitted and prepared for billing.

Participating Organizations – Assignments & Responsibilities

Assignments and Reporting Structure

All personnel involved in winter weather operations will be under the direction of Streets Department. ***Once deployed to snow operations, they will be relieved from their respective daily assignments and will not be released, except for emergency, to their respective operating departments without approval of Streets Department snow headquarters.***

Streets Department

The Streets Commissioner is the incident commander for all winter weather operations The Highway Division coordinates the citywide program for snow removal from the City street system and is directly responsible for salting and plowing the primary, secondary, and tertiary route structures. In addition, the Chief Roadway Engineer is responsible for the supervision and organization of all snow removal efforts. With the approval of the Streets Commissioner, the Chief Roadway Engineer is responsible for mobilizing necessary plowing and lifting operations. These operations may require the cessation of normal Sanitation Division operations under certain conditions, and the conversion of Sanitation vehicles for plow operations. However, the Department's goal is to minimize the impact on Sanitation operations and avoid the delay or interruption of curbside collection services. In addition, private contractors may be called in to supplement the efforts as conditions dictate. Sanitation personnel, Highway personnel and contractors are responsible for plowing under the direction of the Highway Division.

Parks and Recreation

Parks and Recreation maintains a portion of the roadways in and around the Park system, the Benjamin Franklin Parkway and some residential grids.

Office of Fleet Management

The Office of Fleet Management is responsible for the maintenance and repair of all vehicles in the City's fleet is responsible for opening fuel sites (see: Fuel Site Locations Table) during winter weather events, providing and installing chains, and where necessary, assisting with the installation of plows, with the exception of the Sanitation Division, which installs chains and plows on compactors.

Fuel Site Locations

LOCATION	SITE #	DEPARTMENT	FUEL TYPE	NORMAL DAYS AND HOURS OF OPERATION**
24TH & WOLF	2	POLICE 1 dist.	NO LEAD	7DAYS-24 HOURS
11TH & WHARTON	3	POLICE 3&4dist.	NO LEAD	7DAYS-24 HOURS
R 8200 ENTERPRISE	5	WATER	DIESEL AND NO LEAD	RESTRICTED (GATE) MON-FRI 7:30AM - 3PM
INTERNATIONAL AIRPORT	6	COMMERCE	DIESEL AND NO LEAD	MON-FRI 8:00 AM -3:30P M
51ST & GRAYS	7	STREETS	DIESEL	MON-FRI 7:00 AM - 3:30 PM
55TH & PINE	8	POLICE 18 dist.	NO LEAD	7DAYS-24 HOURS
61ST & THOMPSON	9	POLICE 19 dist.	NO LEAD	7DAYS-24 HOURS
25TH & TASKER	11	SCHOOL	DIESEL AND NO LEAD	MON-FRI 7:00 AM - 3:30 PM
GIRARD & MONTGOMERY	13	POLICE 26 dist.	NO LEAD	7DAYS-24 HOURS
21ST & PENNSYLVANIA	14	POLICE 9 dist.	NO LEAD	7DAYS-24 HOURS
26TH & GLENWOOD	15	STREETS	DIESEL AND NO LEAD	MON-FRI 7:00 AM - 10:00 PM
7800 PENROSE	17	WATER	DIESEL AND NO LEAD	MON-FRI 6:00 AM - 6:00 PM
R 3900 RICHMOND	18	WATER	DIESEL AND NO LEAD	RESTRICTED (GATE) MON-FRI 7:00AM - 3PM
DELAWARE & WHEATSHEAF	19	STREETS	DIESEL AND NO LEAD	MON-FRI 6:00 AM - 5:00 PM
100 E. HUNTING PARK	21	FLEET	DIESEL AND NO LEAD	7DAYS-24 HOURS
29TH & CAMBRIA	23	WATER	DIESEL AND NO LEAD	MON-FRI 8:00 AM - 4:30 PM
22ND & HUNTING PARK	24	POLICE 39 dist.	NO LEAD	7DAYS-24 HOURS
HARBINSON & LEVICK	25	POLICE 15 dist.	NO LEAD	7DAYS-24 HOURS
BROAD & CHAMPLOST	26	POLICE 35 dist.	NO LEAD	7DAYS-24 HOURS
GERMANTOWN & HAINES	28	POLICE 14 dist.	NO LEAD	7DAYS-24 HOURS
RIDGE & CINNAMINSON	29	POLICE 5 dist.	NO LEAD	7DAYS-24 HOURS
DOMINO & UMBRIA	31	STREETS	DIESEL AND NO LEAD	MON-FRI 7:00 AM - 11:00 PM
STATE & ASHBURNER	32	FLEET	DIESEL AND NO LEAD	M0N-FRI 7:00 AM - 11:00 PM
ACADEMY & REDLION	33	POLICE 8 dist.	NO LEAD	7DAYS-24 HOURS
BUSTLETON & BOWLER	34	POLICE 7 dist.	NO LEAD	7DAYS-24 HOURS
17TH & MONTGOMERY	35	POLICE 22&23dist.	NO LEAD	7DAYS-24 HOURS
GERMANTOWN & CARPENTER	38	FIRE	DIESEL AND NO LEAD	7DAYS-24 HOURS
3RD & SPRING GARDEN	39	FIRE	NO LEAD	7 DAYS-24 HOURS
FOX & ABBOTTSFORD	40	WATER	DIESEL AND NO LEAD	MON-FRI. 7:00-AM - 5:00 PM
4040 WHITAKER	41	STREETS	DIESEL AND NO LEAD	MON-FRI 6:00AM - 11:30 PM

	28TH & THOMPSON	43	FIRE eng. 34	DIESEL	7 DAYS-24 HOURS
	COTTMAN & LORETTA	44	FIRE eng. 71	DIESEL	7 DAYS-24 HOURS
	8205 ROOSEVELT BLVD	45	FIRE eng. 18	DIESEL	7 DAYS-24 HOURS
	711 S BROAD	46	FIRE eng. 01	DIESEL	7 DAYS-24 HOURS
	4TH & SNYDER	47	FIRE eng. 53	DIESEL	7 DAYS-24 HOURS
	CHAMONIUX & FORD ROAD	48	FAIRMOUNT PARK	DIESEL AND NO LEAD	MON-FRI 7:00 AM - 3:30 PM
	63RD & LANCASTER	49	FIRE eng. 54	DIESEL	7 DAYS-24 HOURS
	48TH & PARKSIDE	50	STREETS	DIESEL	MON-FRI 7:00 AM - 6:00 PM
	10TH & CHERRY	51	FIRE eng. 20	DIESEL	7 DAYS-24 HOURS
	4TH & GIRARD	52	FIRE eng. 29	DIESEL	7 DAYS-24 HOURS
	82ND & TINICUM	53	FIRE eng. 69	DIESEL	7 DAYS-24 HOURS
	52ND & WILLOWS	54	FIRE eng. 68	DIESEL	7 DAYS-24 HOURS
	FOULKROD & DARRAH	56	FIRE eng. 14	DIESEL	7 DAYS-24 HOURS
	BUSTLETON & BOWLER	57	FIRE eng. 62	DIESEL	7 DAYS-24 HOURS
	812 HENDRIX	58	FIRE eng. 58	DIESEL	7 DAYS-24 HOURS
	CHELTEN & BAYTON	59	FIRE eng. 19	DIESEL	7 DAYS-24 HOURS
	3031 GRAYS FERRY	60	FIRE eng. 47	DIESEL	7 DAYS-24 HOURS
	BELGRADE & ONTARIO	61	FIRE eng. 28	DIESEL	7 DAYS-24 HOURS
	13TH & SHUNK	62	FIRE eng. 49	DIESEL	7 DAYS-24 HOURS
	24TH & RITNER	65	FIRE eng. 60	DIESEL	7 DAYS-24 HOURS
R	NORTHEAST AIRPORT	67	COMMERCE	DIESEL	RESTRICTED MON-FRI. 7:30 AM - 3:30 PM
	ACADEMY & COMLY	68	FIRE eng. 22	DIESEL	7 DAYS-24 HOURS
	RIDGE & CINNAMINSON	69	FIRE eng. 39	DIESEL	7 DAYS-24 HOURS
R	7790 DUNGAN RD	70	POLICE	NO LEAD	RESTRICTED
	PARK & CAMBRIA	71	FIRE eng. 50	DIESEL	7 DAYS-24 HOURS
	5931 OLD YORK ROAD	72	FIRE eng. 51	DIESEL	7 DAYS-24 HOURS
	43RD & MARKET	73	FIRE eng. 05	DIESEL	7 DAYS-24 HOURS
	BELGRADE & HUNTINGDON	74	FIRE eng. 06	DIESEL	7 DAYS-24 HOURS
	5332 RISING SUN AVE	75	FIRE eng. 61	DIESEL	7 DAYS-24 HOURS
R	BYBERRY & WOODHAVEN	95	SCHOOL	DIESEL	RESTRICTED
R	BROAD & LEHIGH	96	SCHOOL	DIESEL	RESTRICTED
R	OGONTZ & OLNEY	97	SCHOOL	DIESEL	RESTRICTED
R	63RD & PASSYUNK	98	SCHOOL	DIESEL	RESTRICTED
	3033 S 63RD ST	80	STREETS	DIESEL	7 DAYS-24 HOURS

TOTAL NUMBER OF SITES IS SIXTY FOUR (64)

"R" = RESTRICTED TO VEHICLES ASSIGNED TO THE DEPARTMENT ONLY!!!!

Managing Director's Office

The Managing Director, in consultation with the Mayor, has the authority to declare a snow emergency and if necessary close City offices. This plan should limit, if not eliminate, the need to enforce any closures during snow events.

When a snow emergency is declared the Managing Director's Office is responsible for coordinating the citywide response to the emergency. Streets Department personnel, along with personnel from other departments, participate in the staffing of the Emergency Operations Center, located at 3rd and Spring Garden Streets in the Fire Administration Building, and in other coordinated efforts as necessary.

Police Department

Police Department support is required to support existing parking regulations. Police will ticket vehicles identified as impeding snow removal efforts including, but not limited to, vehicles parked on corner radii and double-parked vehicles. Police officers will stop all private entities placing snow in previously cleared streets. During declared snow emergencies, Police support will ensure snow emergency routes are clear.

Other City Departments

The tertiary route structure is maintained by the following City Departments under the direction of the Residential Snow Coordinator.

Streets Department
Water Department
Public Property
Parks & Recreation
Managing Director's Office
Licenses & Inspections
Prisons Department
Revenue Department
Free Library

Snow Fighting Equipment Inventory

Streets Department 2013/2014 Fleet Summary

Listed below is the Streets Department's fleet inventory for snow operations. Due to the age of the fleet and the challenges facing the Office of Fleet Management, we have concerns about the reliability of the equipment. Winter operations place a great strain on aging vehicles, and equipment availability will have a significant impact on the Department's ability to effectively respond to weather events. With projected downtime, the City will be challenged to field a full complement of equipment to cover all routes.

The result of insufficient equipment will be slow response time, particularly on residential streets. To address this issue, in part, the Streets Department has lease agreements to provide supplemental equipment for both large and residential streets. The Department also continues to work closely with the Managing Director's Office to identify interdepartmental equipment that can supplement the inventory.

All departments are required to provide a full complement of necessary vehicles for snow operations for clearing the roadway system.

Streets Dept. Snow Vehicles	
Highway Salt	88
Loaders, Highway, Backhoe	23
Loaders, Highway, Articulated	14
Compactors	243
Total:	368
Departmental Snow Vehicles	
Assigned to Residential	96
Brine, MDO (CLIP)	2
Brine, Highway	3
Total:	101
Other Departments (Not assigned to Residential):	87
Total Snow Equipment Inventory:	**556**

Route Designations and Treatment

The primary and secondary route systems are divided into 148 specific routes. Salting and/or plowing of these routes will continue until the routes are deemed passable and safe for vehicular traffic.

The tertiary street system is covered in a grid pattern determined by each District Highway Engineer and the Residential Snow Coordinator. These streets are salted/plowed as storm type dictates (see Chart A, page 3). Grids are assigned and the plows attempt to clear all streets in that grid. Streets that are blocked by parked cars or other obstructions will not be treated until the obstruction is removed. Double-parked vehicles or vehicles parked on corner radii will be ticketed and towed by Police to permit snow removal efforts.

All tertiary grids will not be treated during every storm. The City's topography will primarily dictate the specific areas that will be treated during every storm type. Storm severity will dictate the expansion of treatment in the tertiary network. Regional commerce, public health, mass transit issues, and time of year will guide these decisions.

Snow and ice on the tertiary street system will be cleared to provide one passable lane for each direction that the specific streets can accommodate. Residential efforts are designed to allow access to the primary and secondary route system and mass transit.

In the event of major storm accumulations, specific business corridors within the Highway Districts are targeted for snow removal upon completion of primary, secondary and tertiary routes.

Use of Salt and Other De-icing Materials

Salt (sodium chloride) or a brine solution of the same chemical, or in extreme situations, sand or other abrasives, will be spread on Philadelphia's roadway network to ensure safety for the traveling public.

Salt brine is a liquid containing a 23 per cent sodium chloride solution. Applied at rates of 30 gallons per lane mile, this treatment should effectively melt the first 2 inches of snow. The treatment can also be applied before storms begin. The Department will utilize this program in the Northwest and Northeast sections of the city, areas that typically have greater accumulations. It should provide greater service delivery at a reduced cost, especially in the higher elevation areas of the City.

Storm Types and Response

There are ten (10) basic storm types that require different responses as outlined below.

POST STORM FORECAST: Above Freezing Temperatures

Storm Type	Deployment of Fleet
1 Sleet/Freezing Rain	City salt truck deployment and primary and secondary routes only.
2 1 to 3 inches of snow	City salt truck deployment on primary and secondary routes. Partial residential deployment in limited areas of higher elevation. If cold temperatures are forecast, limited plowing may occur. (No contractors).
3 3 to 6 inches of snow	City and contractor salt truck deployment on primary and secondary routes. Partial residential deployment in limited areas of higher elevation. A snow lifting will be deployed in the central business district.
4 Above 6 inches of snow	As above, plus the declaration of a "snow emergency." Sanitation compactors will plow the primary and secondary route system. Additional contractor equipment will be deployed to clear intersections and the lifting operation will be expanded to outlying commercial corridors.
5 Above 12 inches of snow	As above, plus a full residential neighborhood operation will be deployed across the City.

POST STORM FORECAST: Borderline and Below Freezing Temperatures

Storm Type	Deployment of Fleet
6 Sleet/Freezing Rain	City salt trucks deployed on primary and secondary routes only. Partial residential deployment in limited areas of higher elevation.
7 1 to 3 inches of snow	City salt truck deployment on primary and secondary routes. Salting operation for tertiary streets may occur once the primary and secondary network is complete. This operation will be performed by primary and secondary route vehicles that can navigate smaller streets. Partial residential deployment in limited areas of higher elevation. If cold temperatures are forecast, limited plowing may occur.
8 3 to 6 inches of snow	As above, plus a snow lifting will be deployed in the central business district.
9 Above 6 inches of snow	As above, plus the declaration of a snow emergency. Sanitation compactors will plow the primary and secondary route system. Additional contractor vehicles will help clear snow and additional lifting operations may be deployed in neighborhoods with smaller tertiary streets upon completion of outlying commercial corridors.
10 Above 12 inches of snow	As above, plus a full residential neighborhood operation will be deployed across the City. Additional contractor vehicles will be utilized.

Weather Forecasting Services

The City of Philadelphia will, in addition to monitoring local national weather forecasts for our metropolitan region and maintaining contact with local media forecasts, contract with independent private weather service contractors to ensure that forecasts are made specific to our needs. The city recognizes that there are unique geographic differences within our boundaries, and expects detail in our contracted services to assist in deployment decisions.

Storm Operations

Storm Conditions

Philadelphia's geographic position contributes substantially to the forecasting uncertainties that it faces. Due to our location, with the mountains to our west and the Atlantic Ocean to our east, forecasters usually must watch storm systems for as long as possible before determining if they are going to hit Philadelphia or be deflected to the east or west. In addition, there are thousands of types of winter storms - each storm combines a number of factors that lends to its uniqueness.

The Streets Department must be prepared to deal with these planning uncertainties, as well as uncertainties that occur during the storm. For example, the Blizzard of March 1993 was originally forecasted as a 3" storm. It mushroomed into a major storm of upwards of 12 inches, including sleet and freezing rain. The unexpected change in forecast made it more difficult for the Streets Department to mobilize the most effective response to react to a storm of such magnitude.

There are several other variables that affect the Department's timely response to storm events. These variables are briefly outlined below. Each of the variables listed may have a significant impact on the Department's response. Proper planning and the development of appropriate procedures, combined with some level of operational flexibility is a priority to develop the most appropriate, effective response possible, given the existing conditions.

Storms may fail to materialize at the forecasted hour. Conversely, storms may stall, thereby increasing the duration of the event and the amount of accumulation. These factors increase the expense associated with responding to a storm and the chance of work force fatigue.

During a storm, the type of precipitation may change. Different types of precipitation require different responses. For example, plowing may be hampered as ice accumulates on the top of the snow, creating a hard crust.

The time of the year also impacts the Department's response to storms. In the late fall and early spring months when the temperature is warmer, it may be possible to fight a storm of four to five inch accumulation with salt alone. In colder months, plowing would be necessary.

If two or more severe storms occur in rapid succession, the Department's response may be affected. Response to the initial event may be expanded in anticipation of the subsequent storm.

Low temperatures increase the amount of salt necessary to melt off precipitation.

Winds can create havoc during storms. Although light breezes help to dry roadways following storms, stronger winds may hamper snow fighting efforts by drifting snow, down wires and fallen trees across cleared roadways.

Significant elevation differences exist between the southern portion of the City and the areas in the northeast and northwest. In the northeast and northwest, snow frequently accumulates to greater depths.

The Department's Snow and Ice Operations Plan presents a flexible framework providing effective response to all types of storms.

It is the goal of the City of Philadelphia that for the majority of the winter weather events that typically affect this city, we will have, depending on storm type and response protocol, all routes identified in these response protocols clear within 24 hours of the fall of the last flake. Storms outside of the protocol upper limits may lead to significant adjustments in this time line.

Storm Types 1, 2 & 3

Deployment

Streets Department

Chief Roadway Engineer

- Notifies District Highway Engineers of mobilization time
- Notifies Residential Snow Coordinator of mobilization time
- Notifies Highway Division Snow Headquarters, located at the Bridge Maintenance Yard – 4010 Whitaker Avenue, personnel to report at specified deployment time
- Notifies Office of Fleet Management of mobilization decision

- Notifies maintenance supervisors
- Notifies Parks and Recreation
- Notifies Municipal radio

Highway District Engineers
- Notify Maintenance Supervisors to assemble salting staff
- Notify spotters to report at specified deployment time

Highway District Maintenance Supervisors
- Notify personnel to report at specified deployment time

Residential Snow Coordinator
- Notifies personnel identified in Sections 4.6 & 4.8 of partial residential deployment

Office of Fleet Management
- Will open garages for Fleet maintenance support and fueling sites for duration of event

Parks and Recreation
- Responsible to activate operation for salting Park road system and Benjamin Franklin Parkway

Operations

Highway Districts

Spotters monitor street conditions. Salt trucks are loaded and positioned at the start of an assigned route. As street surfaces accumulate sufficient moisture for effective salting, spotters notify Maintenance Supervisors to begin salting activity. Spotters will provide route condition reports to their district headquarters on two (2) hour intervals. District headquarters will compile this data and forward to Highway Division Snow Headquarters.

Residential Districts

Spotters monitor street conditions. Trucks are positioned at the start of an assigned route. Treatment of the street surface begins upon notification from the Residential Snow Coordinator. Spotters will provide route condition reports to their district headquarters on two (2) hour intervals. District headquarters will compile this data and forward it to the Residential Snow Coordinator, who in turn summarizes the information and forwards it to Highway Division headquarters.

Highway Division Snow Headquarters

Snow Headquarters will:
- Inform Highway Districts of weather forecasts
- Monitor, through Highway Districts, the status of all salting operations
- Maintain a log of all service calls for snow and ice related activities
- Monitor weather conditions and forecasts. Analyze the data and forward it to the appropriate parties
- Analyze reports from the field and make changes to future operations where required
- Forward emergency calls from Police and Fire Departments to Highway Districts
- Maintain Snow Route Status Report
- Order commodities as required to maintain an adequate supply at all Districts

Office of Fleet Management

- Repair vehicles as necessary
- Report vehicle down time to Snow Headquarters

Parks and Recreation

- Treat park road system and Benjamin Franklin Parkway as required by conditions

Cessation of Operations

Highway Districts
- District Engineers release spotters to regularly assigned duties. District Engineers collect route inspection information.

Residential Districts
- Release spotters and drivers to their respective departments. Forward all reports to Residential Snow Coordinator who, in turn, forwards them to Highway Division Snow Headquarters. Supervise the cleaning and redeployment of residential snow equipment.

Highway Division Snow Headquarters
- Compile final report on personnel, equipment utilized and material usage and forward to Streets Commissioner.

- Estimate cost of event

Office of Fleet Management

- Compile final report on equipment costs and return to normal Fleet repair activities

Parks and Recreation

- Compile final report on personnel and equipment utilized
- Return to normal Park maintenance activities

Storm Types 6, 7, & 8

Same as response 1, 2 & 3, except the following additions:

Deployment

Streets Department

Chief Roadway Engineer

- Notifies District Highway Engineers and Residential Snow Coordinator of decision to salt/plow tertiary system (Note: Storm type 6 only, partial to full residential deployment depending on event specifics).
- Will advise everyone for potential of multiple shifts

Residential Snow Coordinator

- Notifies personnel identified in Sections 4.6 & 4.8 of partial to full residential deployment

Storm Types 4, 5, 9 & 10

Deployment

Streets Department

Chief Roadway Engineer

- Notifies District Highway Engineers of initial mobilization time for salting operations and subsequent mobilization time for plowing operation. Advises district that Sanitation, contractor equipment and residential roadway treatment will occur
- Notifies Highway Division Snow Headquarters, personnel to report at specified deployment time.

- Notifies Assistant Contract Coordinator to order contractor support equipment at specified time
- Notifies Residential Snow Coordinator of mobilization time
- Notifies Deputy Commissioner for Sanitation for full deployment of Sanitation resources, both for plowing primary and secondary routes
- Notifies Office of Fleet Management of mobilization decisions
- Advises all involved of anticipated number of shifts
- Orders activation of 686 snow
- Notifies 311 Coordinator

Contractor Coordinator

- Contact private sector vendors and orders equipment for each highway district. Assistant Chief Highway Engineer advises of deployment time and likelihood of deployment duration
- Advises contractors of lifting set (if any) requirements

Highway District Engineers

- Notify Maintenance Supervisors to deploy their staff at specified time
- Notify spotters to report at specified time
- Notify inspection staff for contracted equipment to report at specified time
- Are advised that residential street system snow removal has been activated

Residential Snow Coordinator

- Notifies personnel identified in Sections 4.6 & 4.8 of residential deployment

Highway District Maintenance Supervisors

- Notify personnel to report at specified deployment time

Streets Department - Sanitation Division

Deputy Commissioner-Sanitation

- Mobilizes plows for primary/secondary route system at six Sanitation yards at specified time.
- Notify Chief of Operations to designate a Sanitation representative for Highway Division Snow Headquarters
- Notify division management of deployment times and subsequent suspension of curbside collections

- Notifies the public that trash pickup will not occur in the common drivings

Office of Fleet Management

- Will deploy sufficient resources to support fleet maintenance activities for duration of winter weather event
- Will open fuel sites for duration of event
- Will support Sanitation Division of Streets Department during plow and chain mounting for Sanitation compactors and support equipment

Parks and Recreation

- Responsible to activate operations for salting/plowing road system and Benjamin Franklin Parkway

Office of the Managing Director

- Will issue declaration of snow emergency
- Will activate the city's Emergency Operations Center located at the Fire Administration Building 3rd and Spring Garden Streets.

Operations

Streets Department

Highway Division

- Spotters monitor street conditions
- District Highway Engineers assign inspection staff to contract salting vehicles
- Salt trucks are loaded & positioned at the start of an assigned route. As street conditions accumulate sufficient moisture for salt to be effective, spotters notify districts to begin salting operation. Salt will be applied prior to plowing operations or until no longer effective.
- Plowing operations will begin at 2" accumulation and continue until routes are clear
- Chief Roadway Engineer directs Residential Snow Coordinator to begin Tertiary Street plowing/salting when needed.
- Highway District Engineers direct Sanitation plowing commencement

- All spotters & inspectors will provide route condition reports on two (2) hour intervals. Each district headquarters will compile this information & forward to Highway Division Snow Headquarters
- Highway District Engineers will insure that all routes are salted upon completion of plowing efforts
- Highway District Engineers will direct snow lifting/melting operations within their respective district.

Residential Snow Districts

- Spotters monitor street conditions. Trucks are positioned at the start of an assigned route. Treatment of the street surface begins upon notification from the Residential Snow Coordinator. Spotters will provide route condition reports to their district headquarters on two (2) hour intervals. District headquarters will compile this data and forward it to the Residential Snow Coordinator, who in turn summarizes the information and forwards it to Highway Division Snow Headquarters.

Sanitation Division

- Sanitation Assistant Chiefs of Operation and District Managers direct Sanitation Operations and report progress to Highway District Engineers.
- At the Highway District Engineers direction, they will adjust on-street operations for specified route assignments
- Progress reports are to be provided at two (2) hour intervals to Highway District Sanitation Coordinator
- Managers will insure that all vehicles are manned at shift change. Personnel will not be released without replacement

Highway Division Snow Headquarters

Snow Headquarters will:

- Inform Highway Districts of weather forecasts
- Monitor, through Highway Districts, the status of all salting operations
- Maintain a log of all service calls for snow and ice related activities
- Monitor weather conditions & forecasts. Analyze the data & forward it to the appropriate parties
- Analyze reports from the field & make changes to future operations where required
- Forward emergency calls from Police and Fire Departments to Highway Districts
- Maintain Snow Route Status Report

- Order commodities as required to maintain an adequate supply at all Districts
- Snow Headquarters will provide Emergency Operations Center (EOC) reports every two hours detailing manpower and equipment deployed, route conditions, weather updates and identified trouble spots

Office of Fleet Management (OFM)

- OFM will provide necessary manpower & garage space as need to support storm type
- OFM will supply vehicle status reports to Highway Division Snow Headquarters, the Managing Director's Office and Emergency Operations Center on an hourly basis

Parks and Recreation

- Treat Park road system and Benjamin Franklin Parkway as required by conditions

Cessation of Operations

Streets Department

Highway Division

- Highway District Engineers will release all equipment to their respective departments for regularly assigned duties. Highway District Engineers will release all personnel to their regularly assigned duties.
- District Maintenance Supervisors will insure salt truck operators return unused material to stockpiles and wash truck beds, augers and spinners.
- Highway District Engineers will compile final contractor billing information
- All storm related information on personnel, equipment deployed, contract support & material used will be compiled by each district and forwarded to Snow Headquarters.
- Deactivate 686-SNOW

Residential Districts

- Release spotters and drivers to their respective departments. Forward all reports to Residential Snow Coordinator who in turn forwards them to

Highway Division Snow Headquarters. Supervise the cleaning and redeployment of residential snow equipment.

Sanitation Division

- Sanitation Division will dismount plows, remove chains and ready fleet for return to normal collection/cleaning activities

Highway Division Snow Headquarters

- Compile final report on all elements deployed for specific storm type
- Forward report to Streets Commissioner
- Compile cost estimate for event
- Direct highway districts post storm clean up deployment

Office of Fleet Management (OFM)

- OFM to compile final report on equipment repair costs and vehicle status and return to normal fleet repair activities

Parks and Recreation

- Compile final report on personnel and equipment utilized
- Return to normal Park maintenance activities

Office of the Managing Director

- End snow emergency declaration and close EOC

Snow Removal Support Personnel Assignments

The following functions will be performed by Streets Department personnel not directly involved with the operation of snow fighting equipment:

Bridge Maintenance Unit

The Bridge Maintenance Unit will remove snow on the sidewalks of the City's bridges as well as removing snow from the 17 stairways in Manayunk. Highway maintenance district yard personnel and Sanitation area personnel may be called to assist with this effort as dictated by storm type.

Highway Maintenance District personnel and Sanitation area personnel

Highway maintenance district personnel and Sanitation area personnel, as dictated by storm type, will be provided hand snow removal equipment and may clear snow from curb ramps and open city inlets to allow melting snow access to the drainage system. Snow may also be cleared from areas surrounding fire hydrants.

All City Departments

All City departments will be responsible for removing snow on the sidewalks abutting their facilities.

Highway Division Support Personnel

Highway Division support personnel will continue snow removal support functions as part of their daily work activities after Sanitation workers return to regular trash collection. Snow removal equipment will supplement these efforts as it becomes available.

PWD Support (Philadelphia Water Department)

During major events, PWD crews may be dispatched to clear snow at inlets to prevent intersection flooding.

Police Department Support

The Philadelphia Police Department will enforce existing ordinance/regulations prohibiting the discharge of snow back onto city streets. Private plow contractors caught in the act of plowing snow from private property onto city streets risk fine and/or forfeiture of equipment. Also, the snow may be placed back into the parking lot.

SWEEP Support (Streets & Walkways Education and Enforcement Program)

SWEEP Officers will, beginning in commercial corridors, enforce sidewalk clearance - Ordinance 10-719. Upon completion, enforcement will expand to schools, hospitals, etc., culminating in residential inspection.

Public Relations and Education

PPA and Major Media Notification

PPA will use the local major media and community newspapers to ensure that notification of the Department's plan is timely as well as effective.

Key communications tools include:

- Issuing of press releases/advisories
- Posting information on Streets Department's website including list of FAQs, snow tips and status of departmental services as appropriate. Suggested snow tips will include:
    - "Park car as far away from the corner as possible. Cars parked too close to the corner limit the turning radius of snow equipment."
    - "Obstructions, such as, illegally parked cars affect our ability to plow effectively."
    - For effective snow and ice management partnership, City and citizens need to work together.
        - Snow shall not be thrown into the streets
        - Sanitation may not be picking up trash or recycling in driveways
- Posting information on community websites/list serves
- Posting information on the City's Government Access Cable Channel 64
- Utilizing OIT to distribute announcements via email
- Work with OEM on all media notifications

Notification System

The Department will again utilize a voice mail messaging system to reach essential personnel during snow alerts. The system is designed to contact employees on each designated shift and to confirm receipt of the voice mail message. The system will not only reduce the time spent making individual telephone calls, it will also enable supervisors to alert essential personnel, in a timely manner, to report for work.

When appropriate, messages will also be distributed to inform residents on the status of services.

311/Streets Department Communication Protocols for Snow Events

During storm events, all snow related inquiries will be accepted by 311, however, formal service requests will not be taken until 311 is notified by the Chief Roadway Engineer that the event is officially declared over. During the event, 311 will advise the public of the level of deployment and let citizens know if their street is to be serviced depending on the level of service as defined by "SnowCAT". After the event is ended, 311 will resume taking complaints from the public and the requests will be forwarded to the Streets Department for response within 24 hours.

Customer Affairs

Residents are also able to call the Streets Department's Customer Affairs Unit at 215-686-5560 for information. When appropriate, "updated" advisories regarding the status of services will be pre-recorded on the Customer Affairs' voice mail system.

Responding to Citizens' Complaints

- Delegation – Service requests are, as always, delegated from the centralized system to operational units for appropriate action.
- Tabulation – Information can be gathered from the Customer Affairs Unit's computerized system to provide a post-storm picture of complaints.
- Planning – This information can be further utilized to plan appropriately and change plans for future snow events.

School Closure Policy

When inclement weather is present or anticipated that may impact schools opening or closing early, Streets, SDP, MDO, and MDO/OEM will conference to determine appropriate action relating to storm conditions.

Post Season Survey/Spring Maintenance

Beginning February 15 of each year and continuing through April 15th, weather permitting, sweeps will be made of the Philadelphia road network, identifying defects for the upcoming spring repair season. Streets Department personnel, as well as those involved with residential inspection, will perform this task.

Operational Guidelines - Snow Fighting in Philadelphia

Material Resources

Salt inventory is dictated by several factors: storage capacity (including salt domes at secure, satellite locations throughout the city), availability of product, and environmental concerns. A salt dome is located at each of the six Highway District Yards

The Department orders salt as the inventory is depleted to maintain maximum capacity throughout the winter, as the budget allows. Initial salt orders are placed against purchase orders cut from a blanket purchase order under the Commonwealth of Pennsylvania's contract.

Subsequent product may be obtained from the City of Philadelphia's citywide rock salt contract. This contract provides for a primary and secondary vendor, and has language that includes the product specification, testing procedures, delivery locations, quantities and requirements, weight certifications, and liquidated damages. This contract is normally utilized only after the Streets Department has fulfilled its obligation under State contract requirements.

Requisitioning

The District Supervisor keeps an up-to-date inventory of the materials used for snow and ice removal during the winter months. S/he notifies the Administrative Officer (AO) as orders need to be placed. An overall salt inventory for all six Districts is maintained by the AO.

At the end of the winter season, the Chief Roadway Engineer, the Director of Planning & Analysis, and the Fiscal Officer review the remaining salt inventory to determine the necessary amount of salt needed to meet the following year's requirements. Accordingly, the State is notified of our estimated quantities, as is the Procurement Department for use in developing contracts for the following year. For the 2003, 2004, 2005 and 2006 seasons, the Streets Department had an average salt usage of 46,722 tons.

Salting Policy

The Highway Division endeavors to maximize every application of de icing salt in order to maintain the safest roads possible in the most economical way while protecting the environment. The policy includes:

Personnel Training: The Streets Department is committed to providing continuing personnel training to ensure that staff is well equipped to perform their jobs effectively.

Equipment: The Streets Department and Office of Fleet Management should update and replace equipment in an economically responsible manner.

Calibration of Spreaders: Regardless of whether automatic or manual controls are used, they should be calibrated before the snow season starts. Poorly maintained and uncalibrated controls are responsible for excessive salt use.

Use of Automatic Controls: The use of automatic controls is recommended for spreaders to make sure the correct amount of salt is being spread at all times.

Adequate Covered Storage: Storage facilities are vital to any winter operation. They must have sufficient capacity and good cover preferably under roof. Stock piles should be covered to prevent loss of materials and to protect the environment

Proper maintenance procedures should be followed around storage areas. Outside stockpiles should be properly shaped and should be on impermeable pads. There must also be proper drainage to keep the salt dry and protect the surrounding area. A method for disposal or retention of the leached salt should be in place.

Safeguarding the Environment: Salt and de-icing materials should be used in a manner that safeguards the environment. If misused, de-icing can pollute. If improperly used or stored it can get into wells or ground water. Excessive salt use can be damaging to certain plants and trees when runoff leaves sodium chloride in the soil.

Application: The application of salt alone depends on the type of precipitation, temperature, and snowfall intensity. When there is adequate frozen precipitation on the pavement (non plowable depth), and the temperature is above 25 degrees Fahrenheit, straight salt is optimized. Below 25 degrees Fahrenheit, a mixture of salt and abrasives will be used. The initial treatment of the roadway before plowing operations begin is to reduce ice or snow bonding to the pavement. Salt application rates range from 200 to 800 pounds per two-lane mile, depending on the storm conditions. Salt can be applied in a windrow or full width, which is sometimes necessary. Brine, formed by salt and water, will run to other parts of the road and be spread by traffic. Plowing operations should be timed to allow maximum melting. Salt reaction time is usually 20 to 30 minutes. (Reaction time increases as temperature decreases.)

Equipment Resources

Certain specialized equipment is required to support the snow and ice removal plan; specifically, snow plows, salt spreaders, and snow loaders. Much of this equipment is available within the Department. Additional equipment is obtained through contract and is provided by other operating departments and the City's reserve fleet.

Spreaders: Spreaders include tailgate and V-box spreaders are used to apply salt or sand, which are the primary de-icing chemicals used for fighting winter storms. Application rates are set for various conditions following Salt Institute guidelines.

Plows: Plows are mounted on Highway Division dump trucks and Sanitation Division compactors of the Streets Department, as well as equipment in supporting departments for residential plowing once accumulation predictions are for 4" or more snow.

Contract Equipment: City equipment is supplemented by the use of private sector contracted equipment for significant weather events. This equipment is used to assist clearing snow and ice from the primary/secondary network, as well as hauling snow from the CBD.

Residential Equipment: The Office of Fleet Management has provided a dedicated fleet of reserve equipment for fighting snowstorms in the residential network. This is supplemented by active reserve pieces from various city departments.

Footbridge/Sidewalk Clearance Protocol: Bridge Maintenance employees of the Streets Department are dispatched after each event ends to clear snow from pre-determined footbridges and from the sidewalks of bridges in the CBD.

Communication: All vehicles will be equipped with either radios or cell phones for communication during the events.

Winter Maintenance Facilities: The six Highway Division maintenance facilities serve, along with Snow Headquarters, located in the Bridge Maintenance Yard, as the bases of all snow removal operations. During significant events, they are supplemented by Sanitation area facilities. Salt is stored at the six Highway Division yards.

Operation and Safety: Equipment will be operated in a safe, effective manner by trained, properly licensed, operators. Winter is the season when equipment fails to start, personnel take shortcuts, traction is poor, visibility is poor, and other motorists may not see the operators of other vehicles. All drivers and crews should make required checks prior to and during the use of equipment to ensure safe operations are maintained. Pre and post trip inspections are mandatory.

Personnel Resources

All Streets Department personnel are subject to reporting to duty during snow and ice storms. Failure to notify the supervisor of the inability to work during a storm is grounds for disciplinary action. Please see the Essential Staff Policy in Section 1.

The Highway Division is responsible for overall coordination of snow and ice control preparations. Supervisors are responsible for providing the direction required for effective snow and ice control.

Clothing: The lack of proper clothing is a direct cause of most frostbite occurrences, falls, and in many cases is a factor in equipment accidents. All crews are urged to dress for the possibility that they may be stranded without heat for several hours. It is contemplated that within two hours assistance will be provided to any crew experiencing difficulty.

Communications: On street communications are maintained by inspectors and spotters, who are in constant communication with the Highway and Sanitation Districts and Snow Headquarters.

Personnel Notification Lists (and equipment and other assignments) are included in this manual. Phone trees are to be initiated as necessary at the beginning of a snow alert.

Reporting Procedures

Status Reports: District Highway Engineers will be responsible for maintaining contact with all supervisors and operators in their districts and reporting on the progress of the field personnel to the Snow Headquarters. District Highway Engineers or their designee will make their first report one hour after notification of the snow alert and will continue to make reports every two hours throughout the duration of the snow removal operations.

Accident Reports: The following are the responsibilities of the driver if an accident should occur during snow removal operations:

- Check for injury to persons, never admit liability, call 911 immediately for medical emergencies and state that there is a medical emergency;
- Obtain identification of the other vehicle and driver;
- Notify Police immediately either through radio dispatcher or by telephone. Do not leave the scene of an accident except in cases where physical harm is threatened. If physical harm is threatened, relocate then notify the police;
- Notify supervisor by radio or telephone immediately;

- Forms 77-501 (Employee Accident/Incident Information) and 77-502 (Citizen Accident Information) should be carried in every vehicle and thoroughly completed at the scene of any accident then forwarded to either a supervisor or directly onto Form 82-S-87 (Traffic Accident Report);
- Employee should not sign statements, suggest any settlement or volunteer information about the accident except as noted above. All other requests for statements or signatures should be forwarded to the City of Philadelphia's Risk Management Department;

Non-Municipal Employees contracted for snow removal operations should follow all of the directives listed above except completion of Form 82-S-7 which should be completed by the City on duty supervisor.

Training

Requirements and Timelines: Training will be held for all personnel involved in snow removal as needs determine. Snow plow training for Highway Division and Sanitation Division personnel is part of on-going CDL training. Residential training is an intensive effort that will take place in November of each year for required personnel.

Field Inspection Procedure

Spotters/inspectors will report on actual roadway conditions on two-hour intervals. Reports will include surface condition, material application, plow progress, and problem locations. Conditions which have prevented the removal of snow and ice, such as illegally parked cars, abandoned cars, vehicles stuck in snow, etc. will be noted for follow-up removal efforts. Spotters/inspectors will file field reports with their respective coordinators after each event.

Primary/Secondary - Spotters/inspectors are to report on the condition of the network, with a focus on identifying areas that are particularly troublesome for immediate follow-up.

Residential - Spotters/inspectors, as well as the residential navigators, are to report on residential conditions, noting streets that will require follow-up work due to problems encountered during the initial effort.

Frequency of Report & Detail - Reports are to be made every two hours to the district managers and forwarded to Snow Headquarters. Detail to include whether road is passable, snow covered, salted, plowed or bare pavement. Conditions are coded and noted on inspector's reports.

Expectations - It is the City's expectation that the road network be at least passable.

Policy on Snow Plowed into Street

As noted in the Philadelphia Code, Chapter 9, Section 601 (4) (f), Chapter 9, Section 404 and Chapter 10, Section 720, snow is not permitted to be plowed or shoveled onto City streets. Enforcement and penalties are described in the respective chapters.

Police Department Responsibility - Police Department personnel are to stop private contractors from plowing snow off of parking lots and driveways into city streets.

Streets Department Responsibility - SWEEP Officers will be dispatched to warn residents about throwing snow in the streets, as well as enforcing the 6-hour timeline to have your sidewalk shoveled to a minimum of a 36-inch path.

Communication

Internal - Communication of on-street activity during winter weather events will occur at two-hour intervals. Spotters and inspectors will report to their respective coordinators route conditions and any identified trouble spots on their assigned routes. Operators will report any mechanical problems to both their headquarters and the Office of Fleet Management. All district coordinators will forward the two-hour updates to Highway Division Snow Headquarters, where the information will be compiled.

External - Highway Division Snow Headquarters will disseminate all information concerning winter weather events to external sources. Route progress reports, street conditions, equipment and personnel deployed, and materials used will be included in these reports. For major events, this information will be forwarded at two-hour intervals to the EOC / OEM.

Section 2 – Snow Emergency Routes

2. - Snow Emergency Routes

2.1 Snow Declaration

The Mayor, through the Managing Director, has the authority to issue a Snow Emergency Declaration for significant events. This declaration implements parking regulations on dedicated snow emergency routes.

2.2 Citizen Responsibility

Citizens are required to remove their vehicles from snow emergency routes.

2.3 Inspector Responsibility

Inspectors are required to report locations where cars have not been moved and to ensure that designated routes are plowed completely curb to curb.

2.4 Police / Parking Authority Support and Timelines

Police Tow Squad and Parking Authority tow vehicles will remove vehicles from snow emergency routes. Towing will begin at the designated snow emergency starting time and continue as necessary until the declaration is lifted.

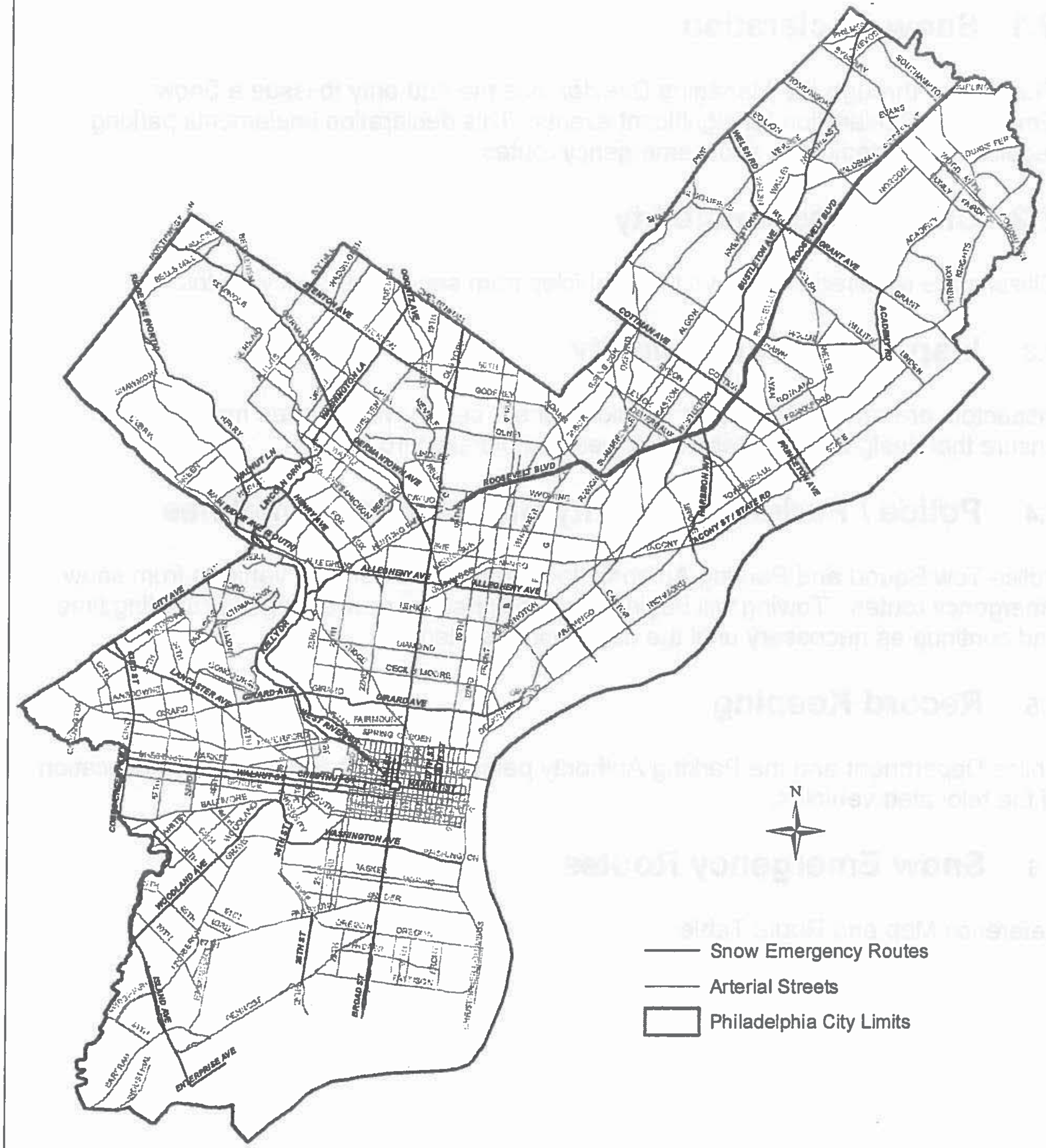
2.5 Record Keeping

Police Department and the Parking Authority personnel will keep records of the location of the relocated vehicles.

2.6 Snow Emergency Routes

Reference Map and Route Table

CITY OF PHILADELPHIA
Snow Emergency Routes



City of Philadelphia
Snow Emergency Routes

ON	FROM	FROM_HUNDRED	TO	TO_HUNDRED
06TH ST	I-676 OFF RAMP	300 N	MARKET ST	UNIT BLOCK
07TH ST	MARKET ST	UNIT BLOCK	I-676 ON RAMP	300 N
15TH ST	I-676 OFF RAMP	300 N	MARKET ST	UNIT BLOCK
16TH ST	MARKET ST	UNIT BLOCK	I-676 ON RAMP	300 N
20TH ST	CHESTNUT ST	UNIT BLOCK	MARKET ST	UNIT BLOCK
26TH ST	I-676 ON/OFF RAMPS	2500 S	PENROSE AVE	3800 S
34TH ST	UNIVERSITY AVE	1100 S	GRAYS FERRY AVE	1100 S
38TH ST	WALNUT ST	200 S	UNIVERSITY AVE	200 S
63RD ST	CITY AVE	2100 N	WALNUT ST	100 S
ACADEMY RD	FRANKFORD AVE	9100	GRANT AVE	9400
ALLEGHENY AVE	HUNTING PARK AVE	2900 W	I-95 ON/OFF RAMPS	2800 E
BEN FRANKLIN PKWY	ART MUSEUM CIRCLE	2300	16TH ST	1600
BRIDGE ST	HARBISON AVE	2100	I-95 ON RAMP	2300
BROAD ST	CHELTENHAM AVE	7200 N	I-95 ON/OFF RAMPS	3800 S
BUSTLETON AVE	FRANKFORD AVE	5200	ROOSEVELT BLVD	6300
BUSTLETON AVE	ROOSEVELT BLVD	UNIT BLOCK	COUNTY LINE	UNIT BLOCK
CHESTNUT ST	COBBS CREEK PKWY	6200	20TH ST	2000
CITY AVE	CITY BOUNDARY	7700	I-76 ON RAMPS	3800
COBBS CREEK PKWY	WALNUT ST	200	WOODLAND AVE	2100
COTTMAN AVE	I-95 OFF RAMP	5000	FILLMORE ST	UNIT BLOCK
ENTERPRISE AVE	ISLAND AVE	8400	I-95 ON/OFF RAMPS	8200
GIRARD AVE	LANCASTER AVE	4700W	I-95 ON/OFF RAMPS	800 E
GERMANTOWN AVE	BROAD ST	UNIT BLOCK	NORTHWESTERN	UNIT BLOCK
GRANT AVE	WELSH RD	1300 E	ACADEMY RD	3000 E
GRAYS FERRY AVE	34TH ST	3300	WASHINGTON AVE	2600
HARBISON AVE	BRIDGE ST	5200	ROOSEVELT BLVD	6500
HENRY AVE	CATHEDRAL RD	8500	HUNTING PARK AVE	3000
HUNTING PARK AVE	HENRY AVE	3000 W	KELLY DR	3300
ISLAND AVE	WOODLAND VE	2200	ENTERPRISE AVE	4000
KELLY DR	LINCOLN DR	4600	ART MUSEUM CIRCLE	2300
LANCASTER AVE	CITY AVE	6300	GIRARD AVE	4800
LINCOLN DRIVE	RIDGE AVE	3600	WISSAHICKON AVE	5900
MARKET ST	SCHUYLKILL AVE	2300	I-95 ON RAMP	100
OGONTZ AVE	WASHINGTON LN	7400	CHELTENHAM AVE	8000
POPLAR ST	WEST COLLEGE AVE	2500	GIRARD AVE	2400
PRINCETON AVE	TORRESDALE AVE	4700	I-95 ON/OFF RAMPS	5000
RIDGE AVE (NORTH)	NORTHWESTERN VE	9100	CATHEDRAL RD	8600
RIDGE AVE (SOUTH)	WALNUT LN	5600	CITY AVE ON RAMP	4500
ROOSEVELT BLVD	09TH ST	800 W	CITY BOUNDARY	16000 E
SCHUYLKILL AVE	MARKET ST	UNIT BLOCK	WALNUT ST	100
SEDGLEY AVE	ALLEGHENY AVE	1000 W	ALLEGHENY AVE	900 W
STENTON AVE	NORTHWESTERN AVE	9600	BROAD ST	1400
TACONY ST/STATE RD	BRIDGE ST	5200	TACONY-PALMYRA BRIDGE	6300
TORRESDALE AVE	COTTMAN AVE	7200	PRINCETON AVE	7100
UNIVERSITY AVE	38TH/39TH ST	300/400	34TH ST	600
WALNUT LN	WAYNE AVE	400 W	RIDGE AVE	500
WALNUT ST	BROAD ST	1400	COBBS CREEK PKWY	6200
WASHINGTON AVE	GRAYS FERRY AVE	2600	CHRISTOPHER COLUMBUS BLVD	UNIT BLOCK
WASHINGTON LN	WAYNE AVE	200 W	OGONTZ AVE	2000 E
WAYNE AVE	WALNUT LN	6100	WASHINGTON LN	6200
WELSH RD	CITY BOUNDARY	UNIT BLOCK	GRANT AVE	1100
WEST COLLEGE AVE	POPLAR ST	900	GIRARD AVE	900
WEST RIVER DRIVE	ART MUSEUM CIRCLE	2300	FALLS BRIDGE	2700
WISSAHICKON AVE	LINCOLN DR	6000	WALNUT LN	6000
WOODLAND AVE	COBBS CREEK PKWY	7200	UNIVERSITY AVE	3800

Section 3 – Snow / Plow Routes

3. - Snow / Plow Routes

3.1 A sample plow route is attached.
A complete set of routes as described in the plan is available
On the Streets Intranet site @
ftp://170.115.28.16/Maps/Highways/Snow/

Highway Snow Operations (Map Location)

Go to the Streets Department's intranet site
http://streetsweb.city.phila.local/

Select "Streets GIS"
http://streetsweb.city.phila.local/streets_gis.html

Select "Divisional Maps"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/

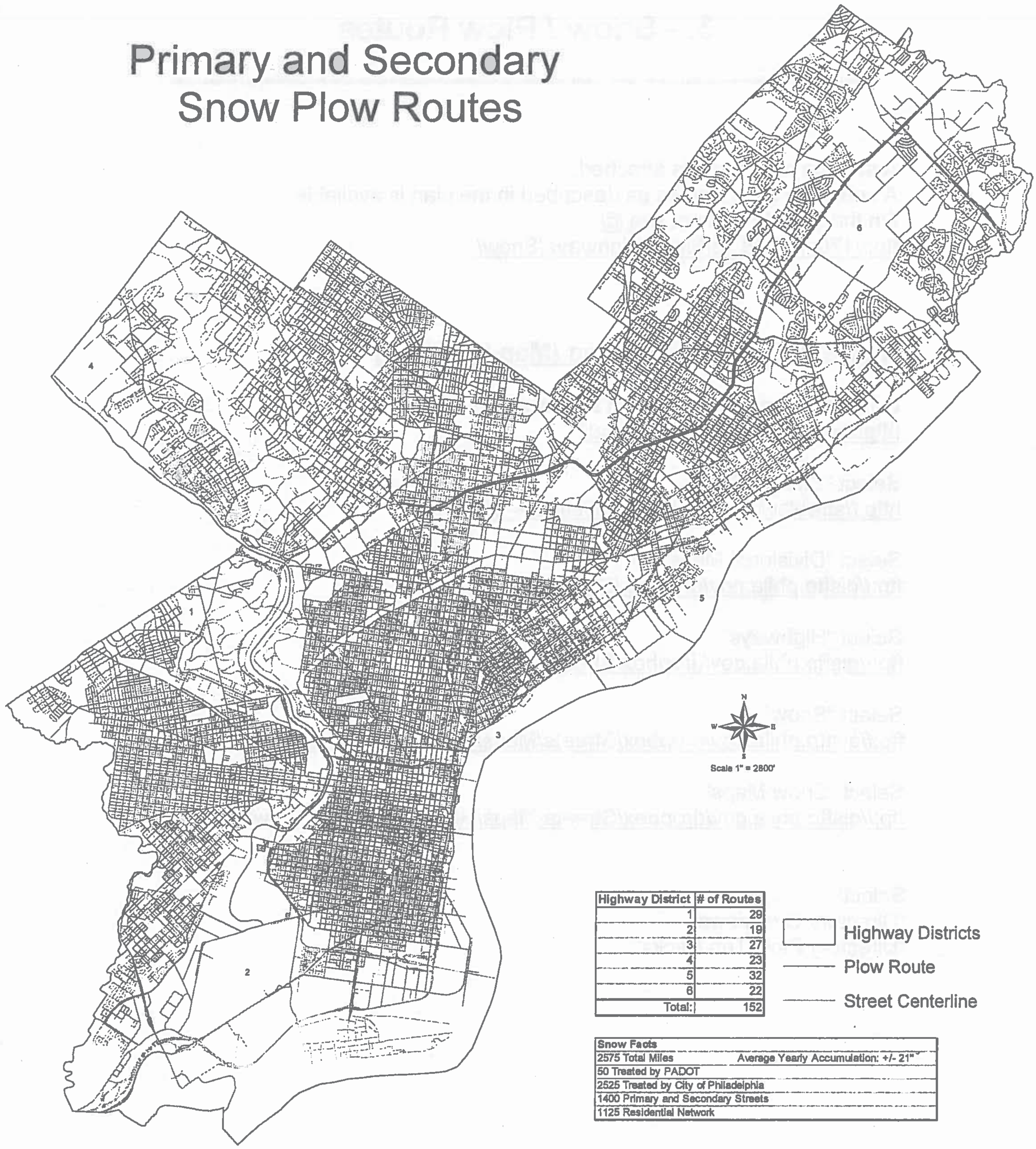
Select "Highways"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/

Select "Snow"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/Snow/

Select "Snow Maps"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/Snow/Snow%20Maps/

Select:
"Directory Overviews"
"Directory Plow Trip Packs"

Primary and Secondary Snow Plow Routes



Highway District	# of Routes
1	29
2	19
3	27
4	23
5	32
6	22
Total:	152

Snow Facts	
2575 Total Miles	Average Yearly Accumulation: +/- 21"
50 Treated by PADOT	
2525 Treated by City of Philadelphia	
1400 Primary and Secondary Streets	
1125 Residential Network	

1st Highway District Plow Route 05

N

Plow Route
Travel Route

Highway Maintenance Yard
4804 PARKSIDE AVE
Sanitation Maintenance Yard

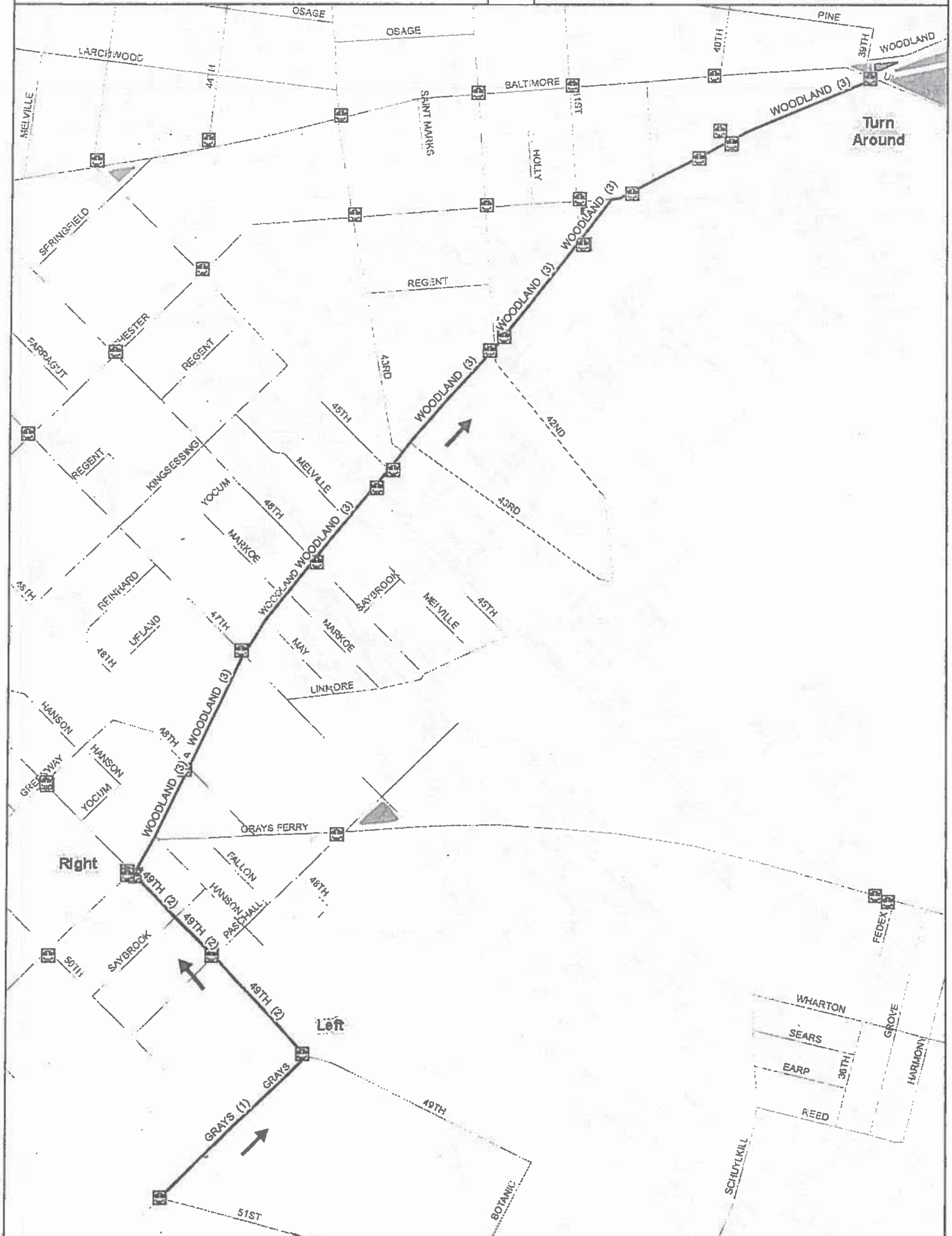
City Miles	State Miles	Total Route Miles	Number of Plows = 2	Highway Field Office 215-685-0168
Plow 6.55	Plow 5.52		Estimated Time for Completion 3 hrs	Highway Yard Office 215-685-0170
Travel 0	Travel 0	12.07		Sanitation Office 215-685-2601

Fall 2007

Highway District 1 Plow Route 05

Plow Route — Travel Route — Page 1 of 4

SEPTA Bus Stops — Curb Islands



ROUTE	RECORD_ID	ON	FROM	TO	ACTION	TURN	COMMENTS
1plow05	1	GRAYS AVE.	51ST ST.	49TH ST.	P	L	STARTS AT SANITATION YARD
1plow05	2	49TH ST.	GRAYS AVE.	WOODLAND AVE.	P	R	
1plow05	3	WOODLAND AVE.	49TH ST.	UNIVERSITY	P	TA	

Fall 2007

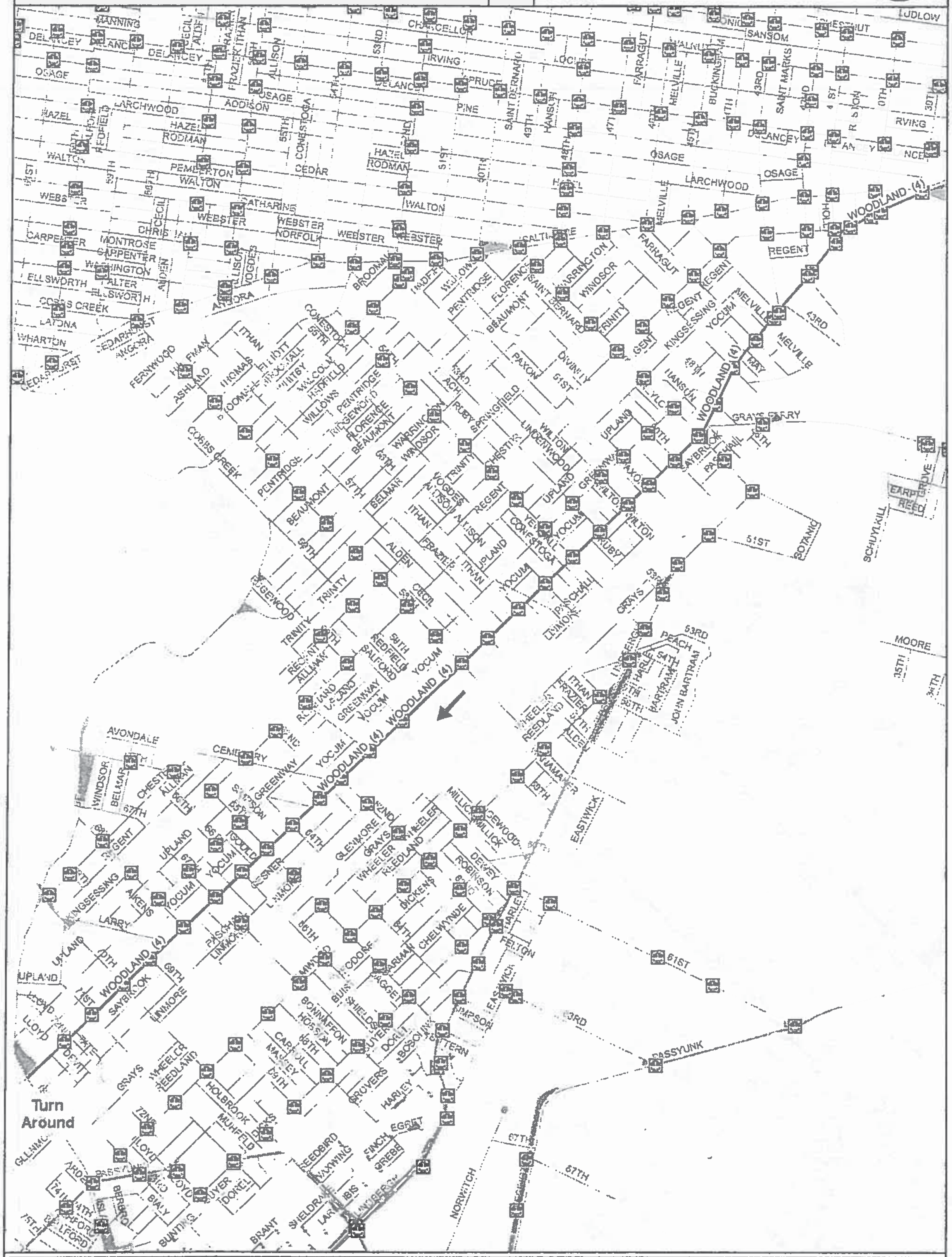
Highway District 1 Plow Route 05

Plow Route — Travel Route — Page 2 of 4

N

SEPTA Bus Stops

Curb Islands



ROUTE	RECORD_ID	ON	FROM	TO	ACTION	TURN	COMMENTS
1plow05	4	WOODLAND AVE.	UNIVERSITY	ISLAND AVE.	P	TA	

Fall 2007

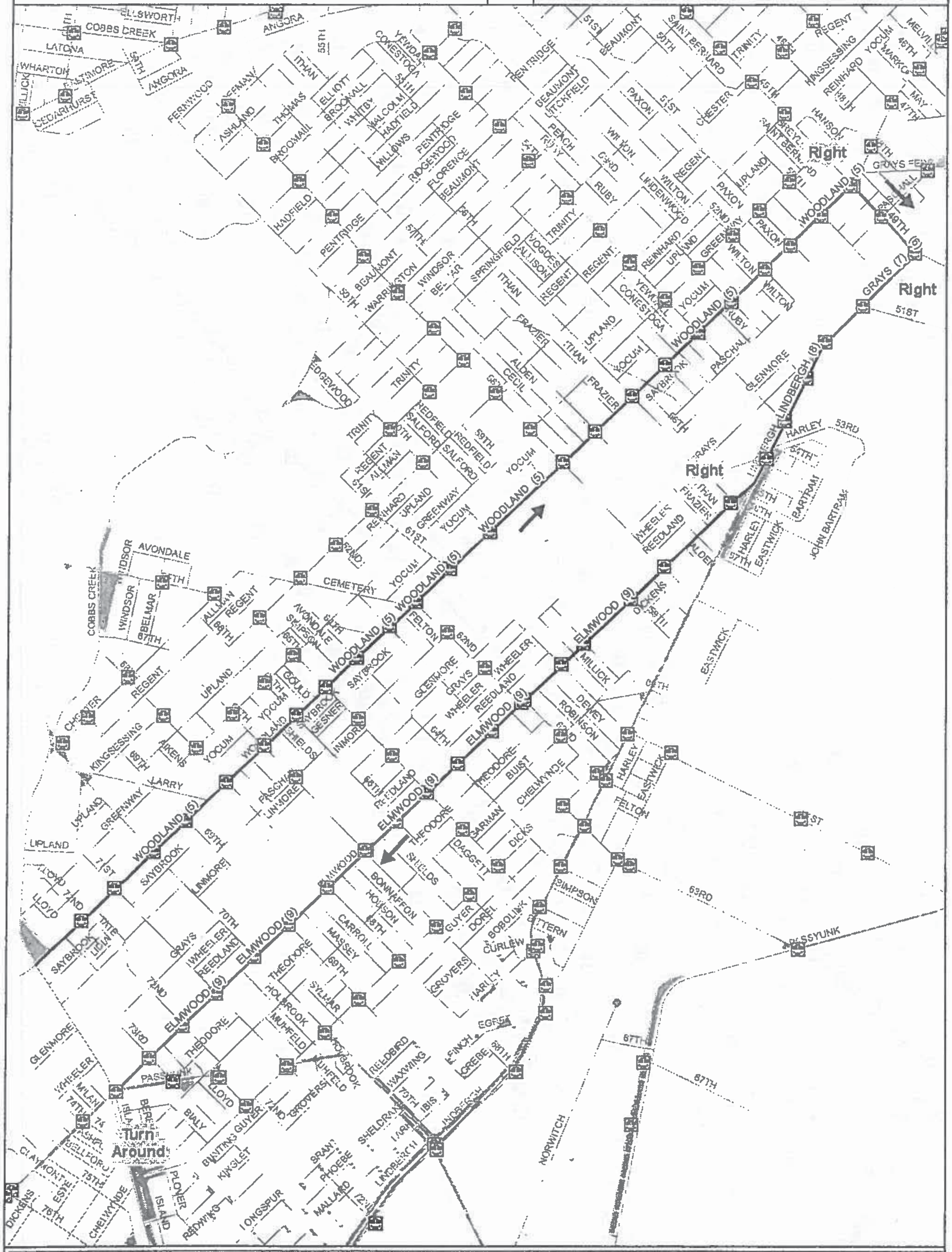
Highway District 1 Plow Route 05

Plow Route — Travel Route — Page 3 of 4

N

SEPTA Bus Stops

Curb Islands



ROUTE	RECORD_ID	ON	FROM	TO	ACTION	TURN	COMMENTS
1plow05	5	WOODLAND AVE.	ISLAND AVE.	49TH ST.	P	R	
1plow05	6	49TH ST.	WOODLAND AVE.	GRAYS AVE.	P	R	
1plow05	7	GRAYS AVE.	49TH ST.	LINDBERGH BLVD.	P	S	
1plow05	8	LINDBERGH BLVD.	GRAYS AVE.	ELMWOOD AVE.	P	R	
1plow05	9	ELMWOOD AVE.	LINDBERGH BLVD.	ISLAND AVE.	P	TA	

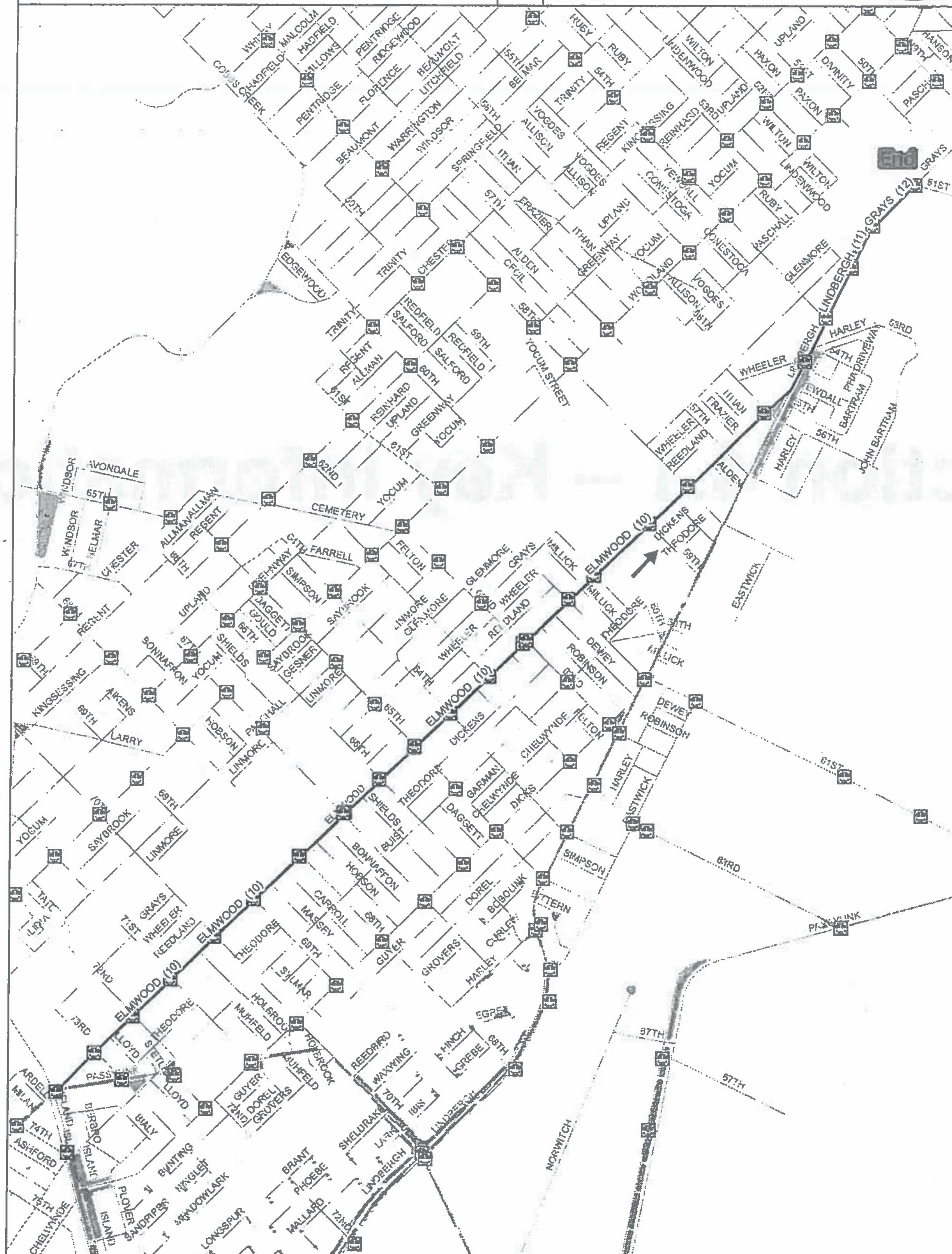
Highway District 1 Plow Route 05

Plow Route — Travel Route — Page 4 of 4

N

SEPTA Bus Stops

Curb Islands



ROUTE	RECORD_ID	ON	FROM	TO	ACTION	TURN	COMMENTS
1plow05	10	ELMWOOD AVE.	ISLAND AVE.	LINDBERGH BLVD.	P	S	
1plow05	11	LINDBERGH BLVD.	ELMWOOD AVE.	GRAYS AVE.	P	S	
1plow05	12	GRAYS AVE.	LINDBERGH BLVD.	51ST	P	E	

Section 4.1 – Key Information

EMERGENCY TELEPHONE NUMBERS

FUNCTION:	TELEPHONE NO.
MUNICIPAL RADIO	215-686-4514
EMERGENCY OPERATIONS CENTER (Streets Dept. Reps)	215-686-1100
FAX NUMBER	215-686-1117
POLICE DEPT. TOWING SERVICE COORDINATOR	215-685-9134
(Lieutenant McWilliams)	215-439-0990
SEPTA STAFF REPRESENTATIVES	
Control Center (street closings, detours, etc)	215-580-8484
Jim Fox Chief Officer - Control Center	215-580-8051
Jack Power - Deputy Chief Officer	215-580-8552
Bryant Shuford - Deputy Chief Officer	
Aleta Washington Director - Bus Operations	215-580-8667
Storm Center (only open during snow emergencies)	215-580-8481 thru 580-8488
STREETS COMMISSIONER	
David J. Perri, P.E	215-686-5460
HIGHWAY DIVISION SNOW HEADQUARTERS	215-685-9828 thru 685-9832
SANITATION DIVISION SNOW HEADQUARTERS	215-686-0492/0493
FAX MACHINES	
Highway Division Administration	215-686-5064
Highway Division Snow Headquarters	215-685-9827
Sanitation	215-686-7812

TELEPHONE AND RADIO CALL NUMBERS

Name	Title	Cell Number	Office Phone	Radio No.	Frequency
David J. Perri	Commissioner	906-9903	686-5460	1	F1 & F2
Donald Carlton	Deputy Commissioner, Sanitation	906-9115	686-5470	2	F1 & F2
Keith Warren	Operations Chief, Sanitation	906-3052	686-5550	200	
Stephen Lorenz	Chief Roadway Engineer	215-906-2142	686-5498	2	F1 & F2
Michelle Brisbon	Assist Roadway Engineer				
Richard Montanez	Chief Traffic Engineer	215-834-5294	686-5515	3	F1 & F2
Nancy Sen	Residential Coordinator	906-1388	686-5507	7	F1 & F2
Madeleine Antinucci	Construction Engineer 2	267-825-4856	686-5505	2450	F1 & F2
William White	Construction Engineer 1	215-605-3148	686-5506	260	F1
David Lawrence	Bridge Maint. Engineer		685-9828	2403	F1
Stephen DeShields	Highway Operations Manager	906-4728	685-9821	2405	F1
Garry Howell	Ops. Assistant Administrator, Sanitation	906-9171	696-5486	203	F1 & F2
Faruq Scott	Ops. Assistant Administrator, Sanitation	906-6927	686-5189	201	F1 & F2
William Smith	Ops. Assistant Administrator, Sanitation	906-4408	686-5459	202	F1 & F2
Raymond Jackson	Special Ops. Supervisor, Sanitation	906-7466		204	F1 & F2
Shakoor Cornwell	Special Ops. Assistant, Sanitation	906-8810		2801	F2
Andrew Richardson	Special Ops. Assistant, Sanitation	906-9175		2802	F2
Sanitation Snow Headquarters			686-0492/0493		
EOC -Street Represenatitives					
Michelle Knox	(EOC) Administrative Officer	906-6575	686-5558		
Fleet Support					
Chris Cocci		906-4228	686-1825/26		
Thomas Finley		906-3839	685-1853		
Joe Rosati		267-234-3254	683-2850		
Dennis Sroczyk		200-3844	685-9800		
Joseph Gissinger		520-7754	685-9119		

STREETS DEPARTMENT RADIO CALL NUMBER LISTING

NAME	TITLE	RADIO #	FREQUENCY
PERRI, David	Commissioner	1	F1 & F2
CARLTON, Donald	Deputy Commissioner, Sanitation	2	F1 & F2
MONTANEZ, Richard	Chief Traffic Engineer, Traffic & Street Lighting	3	F 1 & F2
LORENZ, Steve	Chief Roadway Engineer	2	F1 & F2
Michelle Brisbon	Asst Chief Roadway Engineer		
	Deputy Commissioner, Transportation		
ANTINUCCI, Madeleine	Construction Engineer II, Surveys	2450	F1 & F2
BONANNO, Salvatore	Construction Project Tech. III, 2nd Hwy.	223	F1
BROCKINGTON, Byron	Dist. Supv., Area 6L, Sanitation	2603	F2
BROWN, Cynthia	Dispatcher, Area 5, Sanitation	2500	F2
BROWN, Joanne	Dist. Supv., Area 5L, Sanitation	2501	F2
FOUNTAIN, Chris	Highway Ops. Asst. Mgr.	2412	F1
BUNDY, Greg	St. Repair Supv., 2nd Highway	221	F1
CARRINGTON, Charles	Dispatcher, Area 6, Sanitation	2600	F2
CLARKE, Brian	Dist. Supv., Area 6B, Sanitation	2602	F1
COOPER, Troy	Spec. Ops. Assistant, Sanitation	210	F2
CROMWELL, Terry	Dist. Supv. Area 3C, Sanitation	2301	F2
WHITE, Bill	Highway District Engineer, 3 & 4	240	F1 & F2
DeSHIELDS, Stephen	Highway Ops.Manager	2405	F1
DIXON, Paul	Sanitation Ops. Asst. Admin., Area 1, 2, 3	201	F2
DONADIO, Dionne	Dist. Supv. CWC, Sanitation	2703	F2
EGLETON, Darryl	St. Repair Supv., 3rd Highway	231	F2
FRANCIS, Ron	Constructin Project Tech III, 6th Hwy	263	F2
GETTY, John	Highway District Engineer, 5 & 6	250	F1 & F2
GUESS, Willie	Dist. Supv., CWC, Sanitation	2702	F2
HESPER, Paul	St. Repair Supv., 6th Highway	261	F1
HOWELL, Garry	Sanitation Ops. Asst. Admin., Area 4, 5, 6	203	F2
KRAMER, Thomas	Dispatcher, Area 1, Sanitation	2100	F2
LAWRENCE, David	Bridge Maint. Ops. Engineer, Highways	2403	F2
LEO, Frank	Program Coordinator, Sanitation	209	F1 & F2
LORCH, William	Dist. Supv., CWC, Sanitation	2701	F2
BRISBON, Michelle	Asst. Chief Highway Engineer	2401	F 1 & F2
MATTHEWS, Michael	Dist. Supv., Area 6A, Sanitation	2601	F2
McKENDRICK, Iyenda	Dispatcher, Area 4, Sanitation	2400	F2
MELLETT, Martin	Disct. Supv., Area 1B, Sanitation	2102	F2
MENDOZA, Pablo	Dist. Supv., Area 3F, Sanitation	2302	F2
PANKEY, Steven	Dist. Supv., Area 1A, Sanitation	2101	F2
POPE, Steven	Dispatcher, Area 6, Sanitation	2600	F2
ROBERTSON, William	Construction Project Tech III, 4th Hwy.	243	F1
RODGERS, Darcella	Dispatcher, Area 2 & 3, Sanitation	2200	F1
RUDDEROW, Brian	Construction Project Tech III, 1st Hwy.	213	F1
SAILER, John	Highway District Engineer, 1 & 2	210	F1 & F2
SCOTT, Faruq	Dist. Supv., Area 4G, Sanitation	2401	F1
SEN, Nancy	Residential Coordinator	7	F1 & F2
SMITH, William	Ops. Asst. Admin., CWC, NWT, SWEEP, NWT	202	F2
TABER, James	Construction Project Tech. III, 3rd Hwy.	233	F1
THOMAS, Latees	St. Repair Supv., 5th Highway	251	F1 & F2
TITUS, Keith	Dist. Supv., Area 2D, Sanitation	2202	F2
WARREN, Keith	Chief of Operations, Sanitation	200	F1 & F2
WEST, Thomas	Dist. Supv., Area 2B, Sanitation	2201	F2
WHARTON, Mark	Dispatcher, CWC, Sanitation	2700	F2
WHITE, Kenneth	Dist. Supv., Area 4M, Sanitation	2402	F2
WHITE, William	Construction Engineer I, Surveys	260	F1
WILLIAMS, Kevin	St. Repair Supv., 4th Hwy.	241	F1
YATES, Paul	Construction Project Tech. III, 5th Hwy.	253	F1
YOUNG, Victor	St. Repair Supv., 1st Hwy.	211	F1
ZUCCARO, Joseph	Dist. Supv., Area 5F, Sanitation	2502	F2

Section 4.2 Highway Division Snow Equipment Operators

1st Hwy. Snow Assignments 2013/ 2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
970071	Crew cab	7	F. Miller	1st HWY	216	Yes			
970081	Crew cab	7	A. Williamson	1st HWY	215	Yes			
995123	Crew cab	7	R. Hill	1st HWY	218	Yes			
015033	Crew cab	7	J. Miller	1st HWY	214	Yes			
025024	Crew cab	7	R. Deal	1st HWY	212A	Yes			
075168	Crew cab	7	R. Daniels	1st HWY	None	Yes			
105008	Crew cab	7	T. Gilmore	1st HWY	None	Yes			
005546	10 Wheeler	17	K. Brown (CMU)	1st HWY	None	Yes			
095274	Loader		G. Palmer	1st HWY					
005171	Loader		W. Kelly	1st HWY					
127049	Backhoe			1st HWY					
065192	Backhoe			1st HWY					
055170	Backhoe			1st HWY					
960157	Backhoe			1st HWY					
127039	P/U			1st HWY		Yes			
127014	SUV		V. Young	1st HWY	None				
015036	Crew cab	7	A. Gilliard	CMU	#?	Yes			
960178	Tri-Axle	20	G. Lark	CMU	SS419	Yes			
960185	Tri-Axle	20	G. Kent	CMU	SS25	Yes			
035337	Tri-Axle	20	M. Smith	CMU	SS520	Yes			
035357	Tri-Axle	20	D. Johnson	CMU		Yes			
960183	Tri-Axle	20	R. Dowell	CMU		Yes			

2nd Hwy. Snow Assignments 2013/ 2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
970070	Crew Cab	7	W. Lowman	2nd HWY	224	Yes			
015015	Crew Cab	7	K. Bynum	2nd HWY	228	Yes			
015028	Crew Cab	7		2nd HWY	227	Yes			
075169	Crew Cab	7	D. White	2nd HWY	225	Yes			
015039	Crew Cab	7	A. Czarnik	2nd HWY	222	Yes			
105009	Crew Cab	7	L. Maziarz	2nd HWY	None	Yes			
970072	Crew Cab	7	T. Conquest	2nd HWY	None	Yes			
005548	10 Wheeler	17	C. Carroll	2nd HWY	229	Yes			
075331	Loader		K. Dixon	2nd HWY					
055174	Backhoe		J. White	2nd HWY					
127048	Backhoe		C. Heath	2nd HWY					
127027	SUV		G. Bundy	2nd HWY	None				
136004	Crew Cab	7	I. Morris	CMU	None	Yes			
025051	Tri-Axle	20	J. Gary	CMU	SS612	Yes			
035338	Tri-Axle	20	A. Johnson	CMU	SS522	Yes			
035354	Tri-Axle	20	J. Johns	CMU	SS412	Yes			
075174	Tri-Axle	20	T. Tolbert	CMU	SS1172	Yes			

3rd Hwy. Snow Assignments 2013/ 2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
995121	Crew Cab	7	M. Moore	3rd HWY	235	Yes			
015038	Crew Cab	7	M. Davis	3rd HWY	238	Yes			
005583	Crew Cab	7	B. Khaliq	3rd HWY	236	Yes			
025271	Crew Cab	7	A. Hall	3rd HWY	234	Yes			
075170	Crew Cab	7	G. Maxwell	3rd HWY	239	Yes			
127040	Crew Cab	7	V. Landon	3rd HWY		Yes			
136002	Crew Cab	7	H. Bass	3rd HWY		Yes			
005547	10 Wheeler	17	S. Jones	3rd HWY	232	Yes			
055149	P/U		D. White	3rd HWY		None			
025117	Loader		C. Dickers	3rd HWY	3B				
095275	Loader		T. Sapp	3rd HWY	3A				
055168	Backhoe		M. Weems	3rd HWY					
056188	Backhoe		I. Morrison	3rd HWY					
127047	Backhoe		R. Reynolds	3rd HWY	233				
127029	SUV		D. Egleton	3rd HWY	231	None			
105014	Crew Cab	7	C. Hulsinger	CMU	None				
015020	Tri-Axle	20	N. Coney	CMU	SS313	Yes			
015021	Tri-Axle	20	A. Clements	CMU	SS007	Yes			
015022	Tri-Axle	20	W. Brockington	CMU	SS15	Yes			
035355	Tri-Axle	20	C. Jenkins	CMU	SS27	Yes			
000053	D/S Tri	27	V. Sterns	CMU	None	None			
127068	P/U		J. Goodman	CMU	None	Yes			

11/8/2013

4th Hwy. Snow Assignments 2013/2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
970074	Crew Cab	7	E. Mack	4th HWY	244	Yes			
970077	Crew Cab	7	N. Thomas	4th HWY	242	Yes			
015014	Crew Cab	7	K. Jones	4th HWY	245	Yes			
015027	Crew Cab	7	D. Carroll(CMU)	4th HWY	246	Yes			
015040	Crew Cab	7	M. Kennedy	4th HWY	248	Yes			
025025	Crew Cab	7		4th HWY	249	No			
075167	Crew Cab	7		4th HWY	243	Yes			
105010	Crew Cab	7	J. Balsley	4th HWY	None	Yes			
005543	10Wheeler	17	A. Smith	4th HWY	247	Yes			
065056	P/U Crew			4th HWY					
127041	P/U			4th HWY		Yes			
127010	SUV		K. Williams	4th HWY					
005172	Loader		J. Jones	4th HWY					
075332	Loader		K. Padgett	4th HWY	None				
995125	Crew Cab	7	N. Alderman	CMU	LS2	Yes			
960179	Tri-Axle	20	P. Pettet	CMU	SS700	Yes			
960182	Tri-Axle	20	J. Roundtree	CMU	SS421	Yes			
960180	Tri-Axle	20	A. Appling	CMU		Yes			
035356	Tri-Axle	20	J. Montgomery	CMU	SS625	Yes			
075177	Tri-Axle	20	R. Morris	CMU	SS1169	Yes			
000054	D/S Tri.	27	T. McFarland	CMU	None	None			
127067	P/U		M. Breslin	CMU	None	Yes			

11/8/2013

5th Hwy. Snow Assignments 2013/2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
995126	Crew Cab	7	R. Steward	5th HWY	256	Yes			
015037	Crew Cab	7	R. Powell	5th HWY	252	Yes			
025022	Crew Cab	7	S. Pronchick	5th HWY	254	Yes			
105012	Crew Cab	7	K. Littles	5th HWY	258	Yes			
970078	Crew Cab	7		5th HWY		Yes			
995124	Crew Cab	7		5th HWY		Yes			
005544	10 Wheeler	17	C. Queen	5th HWY	253	Yes			
126085	Loader		F. Turco	5th HWY	5A				
127044	Backhoe		S. Cartledge	5th HWY	5B				
127042	P/U Crew		G. Harris	5th HWY					
137036	SUV		L. Thomas	5th HWY					
995122	Crew Cab		G. Broughton	CMU	2442	Yes			
136004	Crew Cab		D. Stroud	CMU	None	Yes			
960181	Tri-Axle		K. Hill	CMU	SS420	Yes			
035335	Tri-Axle		A. Deloatch	CMU	SS632	Yes			
035336	Tri-Axle		J. Hughes	CMU	SS217	Yes			
075176	Tri-Axle		R. Smalls	CMU	SS13	Yes			
136024	Trac.Trailer		R. Rodriguez	CMU	None	None			

6th Hwy. Snow Assignments 2013/2014

Truck #	Type	Tons	Operator	Vehicle Unit	Radio #	Plow	AVL	Calcium Tank	Comments
970079	Crew Cab	7	C. Friel	6th HWY		Yes			
995127	Crew Cab	7	J. Brown(BMU)	6th HWY		Yes			
015035	Crew Cab	7	K. Pollock	6th HWY		Yes			
025023	Crew Cab	7	G. Young	6th HWY		Yes			
105013	Crew Cab	7	C. Stones	6th HWY		Yes			
005545	10 Wheeler	17	T. Morgan	6th HWY		Yes			
025118	Loader		G. Roznowski	6th HWY					
055167	Loader		S. Flanagan	6th HWY					
127011	SUV		P. Hesper	6th HWY					
970080	Crew Cab	7	M. Rhorer	CMU	LS1	Yes			
960177	Tri-Axle	20	R. Brown	CMU	SS629	Yes			
960186	Tri-Axle	20	C. Cox	CMU	SS630	Yes			
025050	Tri-Axle	20	L. Brown	CMU	SS624	Yes			
035358	Tri-Axle	20	M. McDonald	CMU	SS312	Yes			
075175	Tri-Axle	20	D. Bowers	CMU	SS1171	Yes			
075261	Trac.Trailer	30	D. Newman	CMU	None	None			
980092	Trac.Trailer	30	H. Greer	CMU	None	None			

Equip	Type	Capacity	Operator	Dist	Phone #
005171	Loader		W. Kelly	1st	
005546	Crew Cab	17	K. Brown	1st	
015033	Crew Cab	7	J. Miller	1st	
015036	Crew Cab	7	A. Gilliard	1st	
025024	Crew Cab	7	R. Deal	1st	
035337	Tri-Axle	20	M. Smith	1st	
035357	Tri-Axle	20	D. Johnson	1st	
075168	Crew Cab	7	R. Daniels	1st	
095274	Loader		G. Palmer	1st	
105008	Crew Cab	7	T. Gilmore	1st	
960178	Tri-Axle	20	G. Lark	1st	
960183	Tri-Axle	20	R. Dowell	1st	
960185	Tri-Axle	20	G. Kent	1st	
970071	Crew Cab	7	F. Miller	1st	
970081	Crew Cab	7	A. Williamson	1st	
995123	Crew Cab	7	R. Hill	1st	
005548	C/C Tandem	17	C. Carroll	2nd	
015015	Crew Cab	7	K. Bynum	2nd	
015028	Crew Cab	7	C. Jenkins	2nd	
015039	Crew Cab	7	A. Czarnik	2nd	
025051	Tri-Axle	20	J. Gary	2nd	
035338	Tri-Axle	20	A. Johnson	2nd	
035354	Tri-Axle	20	J. Johns	2nd	
055174	Loader		J. White	2nd	
075169	Crew Cab	7	D. White	2nd	
075174	Tri-Axle	20	T. Tolbert	2nd	
075331	Loader		K. Dixon	2nd	
105009	Crew Cab	7	L. Maziarz	2nd	
127027	SUV		G. Bundy	2nd	
127048	Loader		C. Heath	2nd	
136004	Crew Cab	7	I. Morris	2nd	
970070	Crew Cab	7	W. Lowman	2nd	
970072	Crew Cab	7	T. Conquest	2nd	
000053	D/S Tri-Axle	27	V. Sterns	3rd	
005547	C/C Tandem	17	S. Jones	3rd	
005583	Crew Cab	17	B. Khaliq	3rd	
015020	Tri-Axle	20	N. Coney	3rd	
015021	Tri-Axle	20	A. Clements	3rd	
015022	Tri-Axle	20	W. Brockington	3rd	
015038	Crew Cab	Crew Cab	M. Davis	3rd	
025117	Loader		C. Dickers	3rd	
025271	Crew Cab	Crew Cab	A. Hall	3rd	
035355	Tri-Axle	20	C. Jenkins	3rd	
055149	Pick-up	2	D White	3rd	
055168	Loader		M. Weems	3rd	
065188	Loader		I. Morrison	3rd	
075170	Crew Cab	7	G. Maxwell	3rd	
095275	Loader		T. Sapp	3rd	
105014	Crew Cab	7	C. Hulsinger	3rd	
127029	SUV		D. Eglton	3rd	
127040	Pick-up	2	V. Landon	3rd	
127047	Loader		R. Reynolds	3rd	
127068	Pick-up	2	J. Goodman	3rd	
136002	Crew Cab	7	H Bass	3rd	
995121	Crew Cab	7	M. Moore	3rd	
000054	D/S Tri-Axle	27	T. McFarland	4th	
005172	Loader		J. Jones	4th	
005543	C/C Tandem	17	A. Smith	4th	
015014	Crew Cab	7	K Jones	4th	
015027	Crew Cab	7	D. Carroll	4th	
015040	Crew Cab	7	M. Kennedy	4th	
025025	Crew Cab	7		4th	
035356	Tri-Axle	20	J. Montgomery	4th	
065056	Pick-up			4th	
075167	Crew Cab	7		4th	
075177	Tri-Axle	20	R. Morris	4th	
075332	Loader		K. Padgett	4th	
105010	Crew Cab	7	J. Balsley	4th	
127010	Escape		K. Williams	4th	
127041	Pick-up	2		4th	
127067	Pick-up	2	M. Breslin	4th	
960179	Tri-Axle	20	P. Pettet	4th	
960180	Tri-Axle	20	A. Appling	4th	
960182	Tri-Axle	20	J. Roundtree	4th	
970074	Crew Cab	7	E. Mack	4th	
970077	Crew Cab	7	N. Thomas	4th	
995125	Crew Cab	7	N. Alderman	4th	
005544	C/C Tandem	17	C. Queen	5th	

Equip	Type	Capacity	Operator	Dist	Phone #
015037	Crew Cab	7	R. Powell	5th	
025022	Crew Cab	7	S. Pronchick	5th	
035335	Tri-Axle	20	A. Deloatch	5th	
035336	Tri-Axle	20	J. Hughes	5th	
075176	Tri-Axle	20	R. Smalls	5th	
105012	Crew Cab	7	K. Littles	5th	
126085	Loader		F. Turco	5th	
127042	Pick-up	2	G. Harris	5th	
127044	Loader		S. Cartledge	5th	
136003	Crew Cab	7	D. Stroud	5th	
136024	Trac-Trailer	30	R. Rodgiquez	5th	
137036	SUV		L. Thomas	5th	
960181	Tri-Axle	20	K. Hill	5th	
970078	Crew Cab	7		5th	
995122	Crew Cab	7	G. Broughton	5th	
995124	Crew Cab	7		5th	
995126	Crew Cab	7	R. Stewart	5th	
005545	C/C Tandem	17	T. Morgan	6th	
015035	Crew Cab	7	K. Pollock	6th	
025023	Crew Cab	7	G. Young	6th	
025050	Tri-Axle	20	L. Brown	6th	
025118	Loader		G. Roznowski	6th	
035358	Tri-Axle	20	M. McDonald	6th	
055167	Loader		S. Flanagan	6th	
075175	Tri-Axle	20	D. Bowers	6th	
105013	Crew Cab	7	C. Stones	6th	
127011	Escape		P. Hesper	6th	
960177	Tri-Axle	20	R. Brown	6th	
960186	Tri-Axle	20	C. Cox	6th	
970079	Crew Cab	7	C. Friel	6th	
970080	Crew Cab	7	M. Rhorer	6th	
980092	Trac-Trailer	30	H. Greer	6th	
995127	Crew Cab	7	J. Brown	6th	
075261	Trac-Trailer	30	D. Newman	6th	

Assignments	CMU Vehicles	2012 - 2013		
Dist	Last	First	Vehicle	Type
1ST	GILLIARD	ALBERT	015036	C/C
1ST	SMITH	MARGRET	035337	TRI
1ST	JOHNSON	D	035357	TRI
1ST	LARK	G	960178	TRI
1ST	DOWELL	R	960183	TRI
1ST	KENT	G	960185	TRI
2ND	GARY	JOHN	025051	TRI
2ND	JOHNSON	ANTHONY	035338	TRI
2ND	JOHNS	JULIUS	035354	TRI
2ND	TOLBERT	TIMOTHY	075174	TRI
2ND	MORRIS	I	136004	C/C
3RD	STERNS	VINCENT	000053	D/S TRI
3RD	CONEY	NORMAN	015020	TRI
3RD	CLEMENTS	A	015021	TRI
3RD	BROCKINGTON	W	015022	TRI
3RD	JENKINS	C	035355	TRI
3RD	HULSINGER	C	105014	C/C
3RD	GOODMAN	J	127068	P/U
4TH	MCFARLAND	T	000054	D/S TRI
4TH	CARROLL	D	015027	C/C
4TH	MONTGOMERY	J	035356	TRI
4TH	MORRIS	RONALD	075177	TRI
4TH	BRESLIN	M	127067	P/U
4TH	PETTIT	PAUL	960179	TRI
4TH	APPLING	A	960180	TRI
4TH	ROUNDTREE	JOEL	960182	TRI
4TH	ALDERMAN	NORMAN	995125	C/C
5TH	DELOATCH	ALGENE	035335	TRI
5TH	HUGHES	J	035336	TRI
5TH	SMALLS	R	075176	TRI
5TH	STROUD	D	136003	P/U
5TH	RODRIQUEZ	R	136024	Tractor
5TH	HILL	KENNETH	960181	TRI
5TH	BROUGHTON	GARY	995122	C/C
6TH	BROWN	L	025050	TRI
6TH	MCDONALD	M	035358	TRI
6TH	BOWERS	DONALD	075175	TRI
6TH	BROWN	R	960177	TRI
6TH	COX	CARLTON	960186	TRI
6TH	RHORER	M	970080	C/C
6TH	GREER	H	980092	Tractor
6TH	NEWMAN	D	075261	Tractor

Section 4.3 Sanitation Plow Operations

CITYWIDE CLEANING SNOW PLOW INVENTORY	
Number of Quick Hitch Plows	22
Number of Vehicles Assigned	8
Number of Vehicles Available	8
Sets of Chains	36

VEHICLES FOR SNOW REMOVAL

Shift Start ______ 6

Date

Shift End ______

Plow Count in Yard

Pin	Q-Hitch	P-Angle	U-Body

CWC		Vehicle Types					Plow Type		Status	Down	Down	Transfers	Transfers	
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	32 YD Compacter	Pin	Q-hitch	Up / DN	Time In	Time Out	in from Area	out to Area	Reason for being down
Totals	6													
1	065046			x										
2	065043			x										
3	025071			x										
4	005077		x											
5	005076		x											
6	005064		x											
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
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28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														

AREA 1

Snow Plow Inventory	Number
Number of Plow Blades (Regular)	32
Number of Plow Blades Down	3
Number of Plow Blades Ice	2
Number of Plow Blades Available	32
Number of Vehicles assigned	32
Number of Vehicles available	37
Number of Chains available	276

Shift Start ____________

VEHICLES FOR SNOW REMOVAL

Shift End ____________

Date / /

AREA 1		Vehicle Types					Plow Type Needed		Vehicle Status	Down Time	Down Time	Transfers	Transfers	Plow Count in Yard			
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25YD Compacter	32YD Compacter	Pin	Q-hitch	Up / DN	In	Out	in from Area	out to Area	Pin	Q-Hitch	P-Angle	U-Body
Totals	41	0	1	30	3	0	0	33	1/DN						33	0	0
														Reason for being down			
1	O25064		X					X									
2	O15062			X				X									
3	O15069			X				X									
4	O15071			X				X									
5	O45080			X				X									
6	O35126				X			X									
7	O25211				X			X						cannot use frame is cracked			
8	960012			X				X									
9	960013			X				X									
10	960033			X				X									
11	960034			X				X									
12	960039			X				X									
13	960060			X				X									
14	O75037			X				X									
15	O75048				X			X									
16	O95238			X				X									
17	O95239			X				X									
18	O95240			X				X									
19	O95244			X				X									
20	O95248			X				X									
21	O95251			X				X									
22	126012			X				X									
23	126013			X				X									
24	126034			X				X									
25	126036			X				X									
26	126038			X				X									
27	126039			X				X									
28	126040			X				X									
29	126043			X				X									
30	960058			X				X									
31	O45081			X				X									
32	O75041			X				X									
33	O75055			X				X									
34	O75068			X										No Plow Frame			

VEHICLES FOR SNOW REMOVAL

Shift Start ____________ Shift End ____________

Date / /

AREA 1		Vehicle Types					Plow Type Needed		Vehicle Status	Down Time In	Down Time Out	Transfers in from Area	Transfers out to Area	Plow Count in Yard			
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25YD Compacter	32YD Compacter	Pin	Q-hitch	Up / DN					Pin	Q-Hitch	P-Angle	U-Body
Totals	41	0	0	5	2	0	0	5	3/DN					Reason for being down			
35	O65042			X				X									
36	O65045			X				X									
37	O65047			X				X									
38	O65048			X				X									
39	O65051			X				X									
40	O95012				X									No Plow Frame			
41	O95009				X									No Plow Frame			

AREA #2	
Snow Plow Inventory	**Number**
Number of Plow Blades (Quick Hitch) :	20
Number of Plow Blades (Fiber Glass) :	0
Number of Plow Blades (PIN's) :	1
Number of Plow Blades Available :	20
Vehicles Assigned :	18
CHAINS SETS (NEW) :	67
CHAINS SETS (OLD) :	28

Chain inventory	Number
2T729	13 Boxes, 9 Singles
2T897	16 Boxes, 14 Singles
2T881	1 Box
2T892	8 Boxes
7A1945	25 New, 19 Singles
2-579	4 – Chains for Pick Ups
2-575	8 – Chains for Pick Ups
SP-563	4 – Chains for Pick Ups

Shift Start ____________ **VEHICLES FOR SNOW REMOVAL** Shift End ____________

Plow Count in Yard

Pin	Q-Hitch	P-Angle	U-Body
1	20	0	0

AREA 2		Vehicle Types					Plow Type Needed		Status	Down	Down	Transfers	Transfers	
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	Radio Number	Pin	Q-hitch	Up / DN	Time In	Time Out	in from Area	out to Area	Reason for being down
Totals		0	1	20	0		1	20						
1	005065		x				x							
2	960066			x										
3	960078			x				X						
4	015068			X				X						
5	015073			X				X						
6	015078			X				X						
7	015082			X				X						
8	015083			X				X						
9	025070			X				X						
10	025072			X				X						
11	025074			X				X						
12	035350			X				X						
13	035351			X				X						
14	035353			X				X						
15	075057			X				X						
16	095252			x				X						
17	065182			X				X						
18	065049			X				X						

AREA #3	
Snow Plow Inventory	**Number**
Number of Plow Blades (Quick Hitch) :	13
Number of Plow Blades (Fiber Glass) :	10
Number of Plow Blades (PIN's) :	0
Number of Plow Blades Available :	23
Vehicles Assigned :	35
CHAINS SETS (NEW) :	67
CHAINS SETS (OLD) :	28

VEHICLES FOR SNOW REMOVAL

Shift Start ____________ Shift End ____________

Date

AREA 3

	Vehicle	Vehicle Types: Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	Radio Number	Plow Type Needed: Pin	Q-hitch	Status Up / DN	Down Time In	Down Time Out	Transfers In from Area	Transfers out to Area	Reason for being down
Totals	32													
1	035128				X	2381		X						
2	015063			X		2382		X						
3	015066			X		2383		X						
4	015067			X		2331		X						
5	035131			X		2332		X						
6	035330			X		2324		X						
7	035331			X		2335		X						
8	035332			X		2336		X						
9	035334			X		2337		X						
10	035348			X		2338		X						
11	035349			X		2339		X						
12	035352			X		2340		X						
13	075053			X		2341			X					
14	075060			X		2342			X					
15	085135			X		2343			X					
16	085144			X		2344			X					
17	085150			X		2345			X					
18	095242			X		2346			X					
19	095245			X		2347			X					
20	095247			X		2348			X					
21	095249			X		2349			X					
22	095250			X		2350			X					
23	005069			X		2351			X					
24	005070			X		2352			X					
25	015080			X		2353			X					
26	045082			X		2354			X					
27	065185			X		2355			X					
28	065186			X		2356			X					
29	126048			X		2357			X					
30	126049		X			2358			X					
31	126052		X			2359			X					
32	126021			X		2360			X					

Plow Count in Yard			
Pin	Q-Hitch	P-Angle	U-Body

AREA 4	
Snow Plow Inventory	**Number**
Number of Plow Blades (Regular)	31
Number of Plow Blades Down	2
Number of Plow Blades Ice	0
Number of Plow Blades Available	29
Number of Vehicles assigned	29
Number of Vehicles available	40

Snow Chain Inventory	Number
Number of TA1945 Chains (New)	51 Boxes
Number of TA1945 Chains (Old)	28
Number of 881 Chains (New)	1 Boxes
Number of 881 Chaines (Old)	22
Number of QG2845 Chains (New)	8 Bags
Number of QG2845 (Old)	26
Number of New Spreaders	15 Sets
Number of Spreaders (Old)	30

Shift Start ____________

VEHICLES FOR SNOW REMOVAL

Shift End ____________

Date:

PAGE 1 OF 1

AREA 4

		Vehicle Types					Plow Type Needed		Status	Down Time	Down Time	Transfers	Transfers
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	Radio Number	Pin	Q-hitch	Up / DN	In	Out	in from Area	out to Area
Totals	40		2	26	12			37					
1	005067		X			2464		X					
2	005068		X			2413		X					
3	960030			X		2441		X					
4	960054			X		2440		X					
5	015061			X		2443		X					
6	015081			X		2466		X					
7	025073			X		2444		X					
8	045077			X		2445		X					
9	985004				X	2446		X					
10	995005				X	2447		X					
11	995011				X	2448		X					
12	995017				X	2465		X					
13	995021				X	2478		X					
14	995044				x	2479		X					
15	995057				X	2452		X					
16	995062				X	2458		X					
17	075038			X		2451		X					
18	075040			X		2450		X					
19	075043			X		2461		X					
20	075044			X		2459		X					
21	075045			X				X					
22	075050				X	2457		X					
23	085129			X		2453		X					
24	085132			X		2455		X					
25	085138			x		2454		X					
26	085145			X		2431		X					
27	085146			X		2438		X					
28	085149			X		2462		X					
29	085152			X		2469		X					
30	085154			X		2449		X					
31	085155			X		2463		X					
32	095241			X		2468		X					
33	126018			X				X					
34	126024				X			X					
35	126025				X			X					
36	126030				X			X					
37	126041			X				X					
38	126042			X									
39	126050			X									
40	126051			X									

Plow Count in Yard

Pin	Q-Hitch	P-Angle	U-Body
2	31	0	0

Reason for being down

AREA 5	
Snow Plow Inventory	**Number**
Number of Plow Blades (PIN)	1
Number of Plow Blades (Quick Hitch)	30
Number of Plow Blades Ice	0
Number of Plow Blades Available	31
Number of Vehicles assigned	38
Number of Vehicles available	38
Number of Vehicles down	
Number of Chains	107 Sets

VEHICLES FOR SNOW REMOVAL

Shift Start ____________ Shift End ____________

CREATED [illegible]

AREA 5

Plow Count in Yard			
Pin	Q-Hitch	P-Angle	U-Body
0	39		

	Vehicle	Vehicle Types: Open Bulk	Vehicle Types: 20YD Compacter	Vehicle Types: 20YD (HD) Compacter	Vehicle Types: 25 YD Compacter	Radio Number	Plow Type Needed: Pin	Plow Type Needed: Q-hitch	Status Up / DN	Down Time In	Down Time Out	Transfers in from Area	Transfers out to Area	Reason for being down
Totals	41	0	0	30	8		0	33						
1	960036			X		2544		X						
2	960040			X				X						
3	960047			X		2572		X						
4	960049			X		2573		X						
5	960052			X		2548								
6	015064			X		2575		X						
7	015065			X		2551		X						
8	015072			X		2549		X						
9	015075			X		2541		X						
10	025213													
11	025239			X		2554		X						
12	025240			X		2555		X						
13	045074			X		2546		X						
14	045078			X		2513		X						
15	045079			X		2514		X						
16	065043													
17	065044			X		2569		X						
18	075039			X		2566		X						
19	075042			X		2577		X						
20	075054			X		2550		X						
21	075058			X		2569		X						
22	075059			X		2580		X						
23	075061			X		2585		X						
24	075062			X		2545		X						
25	075073			X		2564		X						
26	085136			X		2562		X						
27	085140			X		2547		X						
28	085147			X		2584		X						
29	085148			X		2561		X						
30	085151			X		2553		X						
31	995048				X	2581								
32	995049				X	2558		X						
33	995050				X	2582		X						
34	995052				X	2583		X						
35	126014				X	2584		X						
36	126015													
37	126016													
38	126017			X		2560		X						
39	126019			X		2557		X						
40	126031													
41	126044													

AREA # 6		
Snow Plow Inventory		**Number**
Number of Plow Blades (Regular)		28
Number of Plow Blades		0
Number of Plow Blades Ice		2
Power Angle		0
Number of Plow Blades Available		30
Number of Vehicles assigned →	{ 34 Quick Hitch }	43
	{ 9 Pin Hitch }	0
Number of Vehicles available →	{34 Quick Hitch }	30
	{ 9 Pin Hitch }	0
Number of Vehicles down		13
SET OF CHAINS		106
SETS OF SPREADERS		106

VEHICLES FOR SNOW REMOVAL

Shift Start ____________ Shift End ____________

AREA 6		Vehicle Types					Plow Type Needed		Status	Down Time	Down Time	Transfers	Transfers	Plow Count in Yard			
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	32 YD Compacter	Pin	Q-hitch	Up / DN	In	Out	In from Area	out to Area	Pin	Q-Hitch	P-Angle	U-Body
Totals	63	1	0	24	19	0	0	39						0			0
														Reason for being down			
1	045072			X				X									
2	045073			X				X									
3	045075			X				X									
4	045076			X				X									
5	025241			X				X									
6	025242			X				X									
7	015070													can't use			
8	015076			X				X									
9	015077													can't use			
10	015079			X				X									
11	985005				X			X									
12	995006				X			X									
13	995022				X			X									
14	995063				X			X									
15	995045													can't use			
16	995053				X			X									
17	995055				X			X									
18	960061			X				X									
19	075036			X				X									
20	075056			X				X									
21	075063			X				X									
22	075064			X				X									

80

Shift Start ______________ VEHICLES FOR SNOW REMOVAL Shift End ______________

AREA 6		Vehicle Types					Plow Type		Status	Down	Down	Transfers	Transfers	Plow Count in Yard			
		Open	20YD	20YD (HD)	25 YD	32 YD	Needed			Time	Time	in from	out to	Pin	Q-Hitch	P-Angle	U-Body
	Vehicle	Bulk	Compacter	Compacter	Compacter	Compacter	Pin	Q-hitch	Up / DN	In	Out	Area	Area	0			0
Totals	63	1	0	24	19	0	0	39						Reason for being down			
23	075065			X				X									
24	075066			X				X									
25	075067			X				X									
26	075046				X			X									
27	065183			X				X									
28	065184			X				X									
29	075030													can't use			
30	075031													can't use			
31	075032													can't use			
32	075033													can't use			
33	075034													can't use			
34	075035													can't use			
35	085131			X				X									
36	085142			X				X									
37	085153				X			X									
38	095243			X													
39	095246			X													
40	126045			X													
41	126053			X													
42	985002													can't use			
43	095026	X															
44	035127				X			X									

Shift Start ____________ **VEHICLES FOR SNOW REMOVAL** Shift End ____________

AREA 6		Vehicle Types					Plow Type Needed		Status	Down	Down	Transfers	Transfers	Plow Count in Yard			
	Vehicle	Open Bulk	20YD Compacter	20YD (HD) Compacter	25 YD Compacter	32 YD Compacter	Pin	Q-hitch	Up / DN	Time In	Time Out	in from Area	out to Area	Pin	Q-Hitch	P-Angle	U-Body
Totals	63	1	0	24	19	0	0	39						0			0
														Reason for being down			
45	126020				X			X									
46	126022				X			X									
47	126023				X			X									
48	126026				X			X									
49	126027				X			X									
50	126028				X			X									
51	126029				X			X									
52	126032				X			X									
53	126033				X			X									
54	075171													can't use			
55	075172													can't use			
56	075173													can't use			
57	095005				X			X									
58	095006													can't use			
59	095007													can't use			
60	095008													can't use			
61	095017													can't use			
62	095018													can't use			
63	095019													can't use			
64																	
65																	
66																	

Section 4.4 Residential Street System – Deployment Maps

RESIDENTIAL SNOW OPERATIONS

Office Location & Phone List *2013-2014*

Residential Snow Operations HQ

LOCATION: Bridge Maintenance Bldg, 4040 Whitaker Avenue
PHONE: 215-685-9814 or 685-9835
FAX: 215 685-9827 **Email: StreetsResSnowHq@Phila**

RESIDENTIAL Coordinator: Nancy Sen — Rich Montanez
CELL: 215-906-1388 — 215-834-5294

HQ Staff: Lynn Genetti, Oneather Kent-Fulton, Audrey Powell, William Walter

Operations/Spotter Mgr: Christopher Renfro 267-825-4862

1st Highway Residential Operations

REPORTING LOCATION: 2nd Highway Maint. Yard (Trailer near Dome) - 3033 63rd St (63rd & Eastwick)
NOTE: Enter trailer door marked "1st Residential" Operations
PHONE: 215-685-4243 **Email: Snow Res1@Phila.gov/Streets/Phila**

RESIDENTIAL MANAGERS: Mark Washington — Robert Birrell
CELL: 215-275-9269 — 215-906-9701

2nd Highway Residential Operations

REPORTING LOCATION: 2nd Highway Maint. Yard (Trailer near Dome) - 3033 63rd St (63rd & Eastwick)
NOTE: Enter trailer door marked "2nd Residential" Operations
PHONE: 215-685-4244 **Email: Snow Res2@Phila.gov/Streets/Phila**

RESIDENTIAL MANAGERS: Kristin Del Rossi — Nick Kulp
CELL: 215-475-2440 — 215-906-6042

3rd Highway Residential Operations

REPORTING LOCATION: Traffic Sign & Signal Shop - 4501 G Street (G & Ramona)
PHONE: 215-685-3957 **Email: Snow Res3@Phila.gov/Streets/Phila**

RESIDENTIAL MANAGERS: Tony Moreland — Keisha Duckett
CELL: 215-906-5263 — 215-906-5244

4th Highway Residential Operations

REPORTING LOCATION: Traffic Sign & Signal Shop - 4501 G Street (G & Ramona)
(DOMINO TRAILER CLOSED — SALT DISPENSED ONLY)
PHONE: 215-685-3956 **Email: Snow Res4@Phila.gov/Streets/Phila**

RESIDENTIAL MANAGERS: Michael Faulkner — Patrice Nuble
CELL: 215-906-7416 — 267-886-6037

5th Highway Residential Operations

REPORTING LOCATION: Highway Garage Bldg, Asphalt Conference Room, 2nd Floor, 4040 Whitaker Avenue
PHONE: 215-685-9817 — 267-964-7742
Email: Snow Res5@Phila.gov/Streets/Phila

RESIDENTIAL MANAGERS: Jerrell Flint — Michael Matela
CELL: 215-906-9372 — 215-964-7742

6th Highway Residential Operations

REPORTING LOCATION: Streets Training Center, 8401 State Road -- (State & Ashburner)
PHONE: 215-685-8105 **Email: Snow Res6@Phila.gov/Streets/Phila**

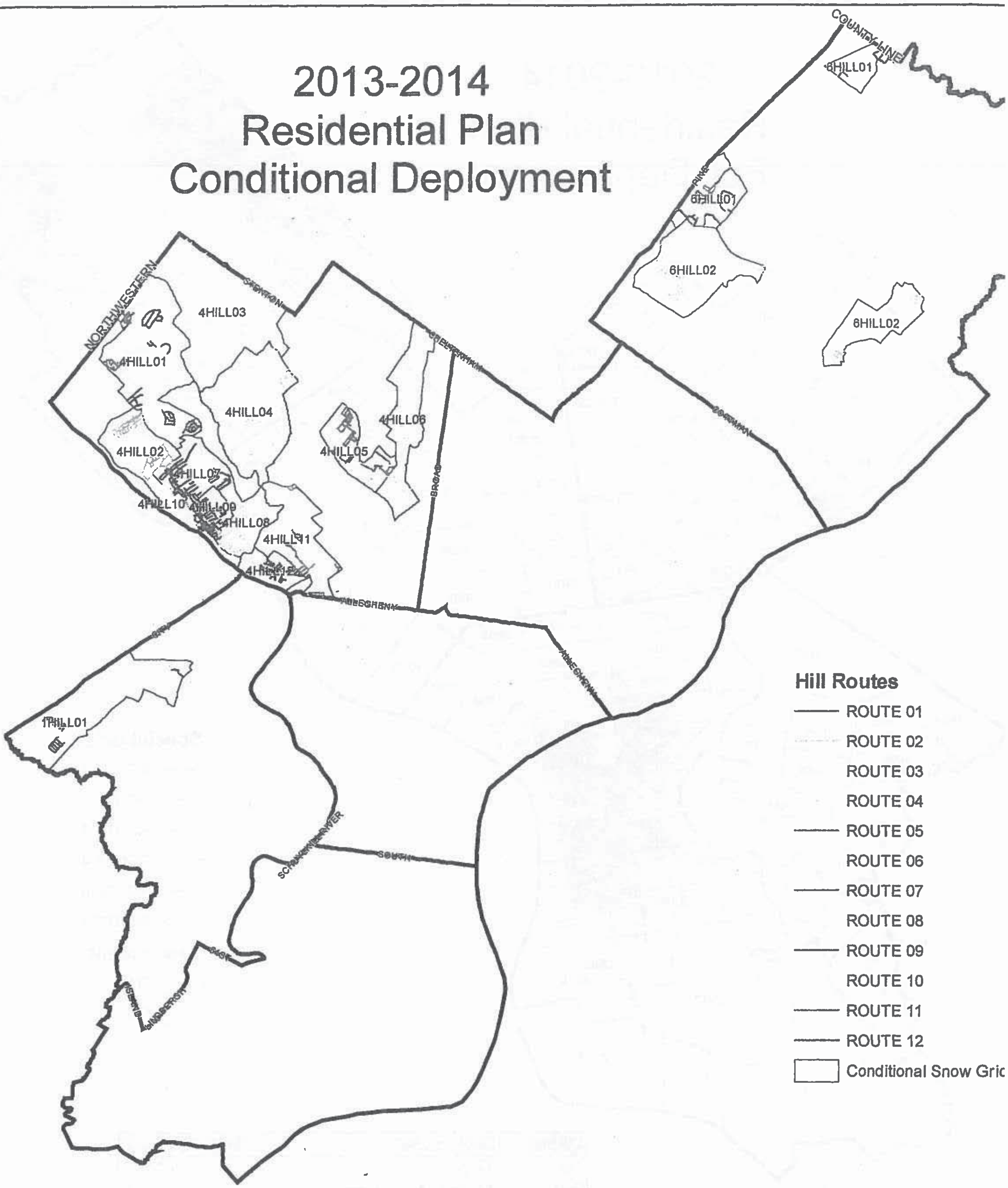
RESIDENTIAL MANAGERS: Shawn McKeown — James Gartland
CELL: 216-906-6828 — 215-906-9150

	Route Assignment	Shift	Duty	Employee Name	Department	Work Location
			RESIDENTIAL FULL DEPLOYMENT - HEADQUARTERS & DISTRICT OFFICE ASSIGNMENTS			
1st RESIDENTIAL OFFICE						
	1R Office	A	Res Mgr	WASHINGTON, MARK	Streets Department	Surveys-Bridges
	1R Office	B	Res Mgr	BIRRELL, ROBERT	Streets Department	Transportation & Planning
	1R Office	A	Office-Phones	CLYDE, CHARLOTTE	Streets Department	Transportation & Planning
	1R Office	B	Office-Phones	BROWN, CHARESE	Streets Department	Admin - Payroll
	1R Office	A	Office-Data	STEINBRENNER, MAX	Streets Department	GIS
	1R & 2R Office	A & B	Trucks	CHAPMAN, JONATHAN	Streets Department	Traffic
2nd RESIDENTIAL OFFICE						
	2R Office	A	Res Mgr	DEL ROSSI, KRISTIN	Streets Department	Traffic
	2R Office	B	Res Mgr	KULP, NICHOLAS	Streets Department	TEPS
	2R Office	A	Office-Data	BROWN, LOUIS	Streets Department	Transportation & Planning
	2R Office	A	Office-Phones	BROWN-JACKSON, ANGELA	Streets Department	Admin-Commissioners Ofc
	2R Office	B	Office-Data	APONTE-SAVOIE, LISA	Streets Department	Admin - Payroll
3rd RESIDENTIAL OFFICE						
	3R Office	A	Res Mgr	MORELAND, ALBERT	Streets Department	Hwy Construction
	3R Office	B	Res Mgr	DUCKETT, KISHA	Streets Department	Traffic
	3R Office	A	Office-Phones	DRAKE, DEBORAH	Streets Department	Traffic
	3R Office	A	Office-Data	MATHEW, SMITHA	Streets Department	TEPS
	3R Office	B	Office-Data	BROWN, NICOLE E	Streets Department	Admin - Payroll
	3R & 4R Office	A & B	Trucks	KENT, JOSEPH	Streets Department	Traffic
4th RESIDENTIAL OFFICE						
	4R Office	A	Res Mgr	FAULKER, MICHAEL	Streets Department	STREET LIGHTING
	4R Office	B	Res Mgr	NUBLE, PATRICE L	Streets Department	Traffic
	4R Office	A	Office-Phones	BANKS, LISA	Streets Department	STREET LIGHTING
	4R Office	B	Office-Phones	MACMILLAN, LUCILLE	Streets Department	Traffic
	4R Office	A	Office-Data	GORDON, CLAUDIA	Streets Department	Transportation & Planning
	4R Office	B	Office-Data	WILLIAMS, DAVID	Streets Department	Admin - Payroll
5th RESIDENTIAL OFFICE						
	5R Office	A	Res Mgr	FLINT, JERRELL A	Streets Department	Surveys -City Plans
	5R Office	B	Res Mgr	MATELA, MICHAEL R	Streets Department	IT
	5R Office	A	Office-Phones	CARTER, LYNNE	Streets Department	Sanitation-Solid Resources
	5R Office	B	Office-Phones	WILSON, KENNETH	Streets Department	Admin - Personnel
	5R Office	A	Office-Data	WEBB, MICHELLE	Streets Department	Survey-TEPS
6th RESIDENTIAL OFFICE						
	6R Office	A	Res Mgr	MCKEOWN, SHAWN J	Streets Department	Hwy ROW Unit
	6R Office	B	Res Mgr	GARTLAND, JAMES	Streets Department	Hwy ROW Unit
	6R Office	A	Office-Phones	CONNELL, KATHRYN	Streets Department	TEPS
	6R Office	B	Office-Phones	FELDER, DONNA	Streets Department	Admin - Training
	6R Office	A	Office-Data	SINCLAIR, PATRICIA	Streets Department	Admin - Training
	6R Office	A & B	Trucks	MARCELLINO, DOMENIC C	Streets Department	Admin - Training
RESIDENTIAL HEADQUARTERS						
	HQ Office		Office -HQ	POWELL-KINSEY, AUDREY	Streets Department	Highway Admin
	HQ Office		Office -HQ	SACOUTO, ANTONIO B	Streets Department	IT
	HQ Office		Office -HQ	GENETTI, LYNN	Streets Department	Transportation & Planning
	HQ Office		Office -HQ	KENT-FULTON, ONEATHER	Streets Department	Transportation & Planning
	HQ Office		Office -HQ	WALTER, WILLIAM	Streets Department	Transportation & Planning
	HQ Office		Office -HQ	RENFO, CHRISTOPHER	Streets Department	Bridges
	HQ Office		Office -HQ	MONTANEZ, RICHARD	Streets Department	Traffic

		RESIDENTIAL FULL DEPLOYMENT - SPOTTER ASSIGNMENTS					
	Duty	Assignment	Shift	Employee Name	Department	WorkLocation	Vehicle #
1st Residential							
	Res Spotter	1R Field	A	BRIDGES, LAWRENCE	Streets Department	Surveys-2nd	
	Res Spotter	1R Field	A	LAFOREST, LOUIS	Streets Department	Surveys-4th	
	Res Spotter	1R Field	A	CALLAHAN, PATRICK	Streets Department	Traffic	
	Res Spotter	1R Field	A	COCCHIA, SAMUEL R	Streets Department	Traffic	
	Res Spotter	1R Field	A	LOVETT, GARY	Water Department	Construct-PWD Surveys	
	Res Spotter	1R Field	B	ROSS, MICHAEL	Licenses and Inspections	C & T Fire Inspector	L&I
	Res Spotter	1R Field	B	SCHAFFER, HENRY	Water Department	Baxter Operations - IWU	070049
	Res Spotter	1R Field	B	WHITAKER, ISAAC	Water Department	Construction	
	Res Spotter	1R Field	B	BORGES, EDUAR	Water Department	Southwest WPCP	110005
2nd Residential							
	Res Spotter	2R Field	A	REIBSTEIN, ALEXANDER	Streets Department	Traffic Egr	
	Res Spotter	2R Field	A	GILL, SUNIL	Streets Department	Traffic	
	Res Spotter	2R Field	A	COOKE, NICHOLAS	Streets Department	Transportation & Planning	
	Res Spotter	2R Field	A	HOLLORAN, JOE	Water Department	Construction	
	Res Spotter	2R Field	A	HILL, H NIELLE	Water Department	Construction	
	Res Spotter	2R Field	A	RAWLINGS, ATOY	Water Department	Construct-PWD Surveys	
	Res Spotter	2R Field	B	KHOLBOEV, AKMAL	Water Department	Construction	
	Res Spotter	2R Field	B	JONES, DUANE	Water Department	Construction	
	Res Spotter	2R Field	B	ST CLAIR, MICHAEL	Water Department	Construction	
	Res Spotter	2R Field	B	REID, COURTNEY	Water Department	Construct-PWD Surveys	088008
	Res Spotter	2R Field	B	HUBBARD, MIKE	Water Department	Southwest WPCP	110006
3rd Residential							
	Res Spotter	3R Field	A	GUALTIERI, STANLEY	Streets Department	Surveys-5th	025054
	Res Spotter	3R Field	A	HENDERSON, DOMINIC	Streets Department	Traffic	960572
	Res Spotter	3R Field	A	MATTHEW, BOBBY	Streets Department	Transportation & Planning	Zip
	Res Spotter	3R Field	A	SEGERS, DERRICK	Water Department	1101 Market	
	Res Spotter	3R Field	A	HENRY, MORRIS	Water Department	Construction	
	Res Spotter	3R Field	A	KONSTANTINIDIS, STEVE	Water Department	Construction	
	Res Spotter	3R Field	A	ANDERSON, JOHN	Water Department	Construct-PWD Surveys	
	Res Spotter	3R Field	B	HAMPTON, BYRON L	Water Department	ARA Bldg	
	Res Spotter	3R Field	B	KEELEY, CARRIE	Water Department	Baxter Operations - IWU	070048
	Res Spotter	3R Field	B	TRAN, TRIDUNG	Water Department	Baxter Operations - IWU	070049
	Res Spotter	3R Field	B	HARLEY, JAMES	Water Department	Construction	
	Res Spotter	3R Field	B	MASON, WILL	Water Department	Construct-PWD Surveys	
	Res Spotter	3R Field	B	TAYLOR, ANDREW	Water Department	Construct-PWD Surveys	
4th Residential							
	Res Spotter	4R Field	A	DRUMWRIGHT, ROBERT	Streets Department	Admin - Safety	
	Res Spotter	4R Field	A	SEN, RYAN	Streets Department	Bridges	
	Res Spotter	4R Field	A	DRAGAN, TIMOTHY Z	Streets Department	TEPS	
	Res Spotter	4R Field	A	DLUGOSZ, DAVID	Streets Department	Traffic	
	Res Spotter	4R Field	A	MCGINLEY, KEVIN	Streets Department	Traffic	
	Res Spotter	4R Field	A	SMILAN, MICHAEL	Water Department	Construction	080123
	Res Spotter	4R Field	B	PENDERGRASS JR, TED	Licenses and Inspections	4000 N. American St	
	Res Spotter	4R Field	B	PATTERSON, SUSAN	Water Department	ARA Bldg	070038
	Res Spotter	4R Field	B	MATTIOLI, LOU	Water Department	Baxter Operations - IWU	070044
	Res Spotter	4R Field	B	CAHILL, JOHN	Water Department	Construction	
	Res Spotter	4R Field	B	DEMBY, MARC	Water Department	Construct-PWD Surveys	

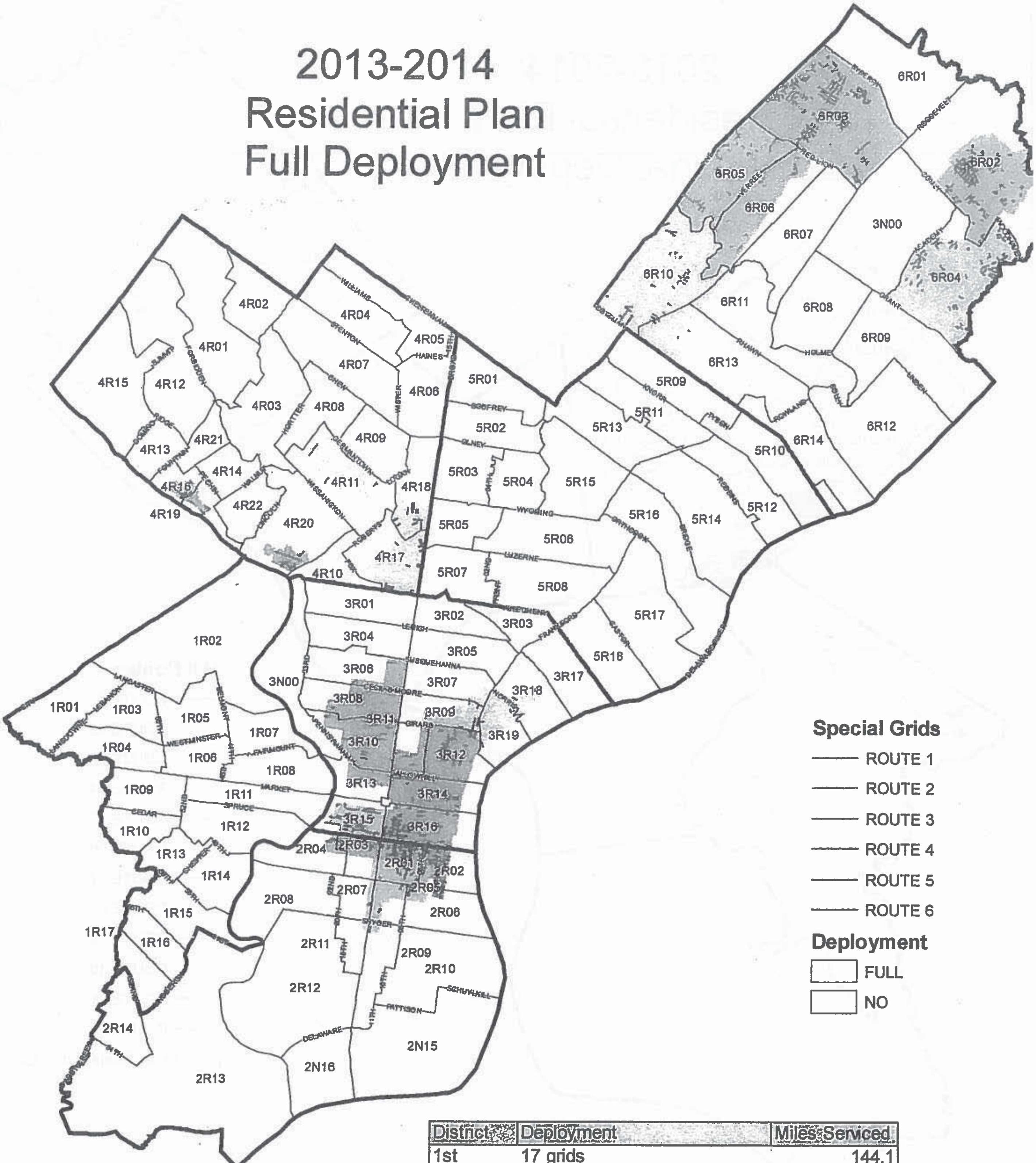
	Duty	Assignment	Shift	EmployeeName	Department	WorkLocation	Vehicle #
RESIDENTIAL FULL DEPLOYMENT - SPOTTER ASSIGNMENTS							
5th Residential							
	Res Spotter	5R Field	A	BARILE, TYLER	Streets Department	Bridges	
	Res Spotter	5R Field	A	BUSSE JR, CARL E	Streets Department	Surveys-4th	
	Res Spotter	5R Field	A	GRAY, AARON	Streets Department	Surveys-5th	
	Res Spotter	5R Field	A	MCANANEY, FRANCIS J	Streets Department	Surveys-5th	970181
	Res Spotter	5R Field	A	BURKE, DANIEL P	Streets Department	Surveys-9th	005555
	Res Spotter	5R Field	B	BARNES, VERA	Licenses and Inspections	4000 N. American St	
	Res Spotter	5R Field	B	GONZALEZ, GERARDO A	Licenses and Inspections	4000 N. American St	960518
	Res Spotter	5R Field	B	GONSIEWSKI, ROBERT	Water Department	Baxter Operations - IWU	PWD
	Res Spotter	5R Field	B	FOX, JAMES	Water Department	Construct-PWD Surveys	
	Res Spotter	5R Field	B	SCHMIDT, NATHAN J	Water Department	NE Plant - Lewis St	
6th Residential							
	Res Spotter	6R Field	A	FULLER, CHARLES	Streets Department	Surveys-4th	950152
	Res Spotter	6R Field	A	BURTON, KWEKU	Streets Department	Surveys-5th	
	Res Spotter	6R Field	A	ISSAC, ELIAS	Streets Department	Transportation & Planning	Zip
	Res Spotter	6R Field	A	GOLDINER, LONNIE	Water Department	Baxter Operations - IWU	070043
	Res Spotter	6R Field	A	CONNORS, WILLIAM	Water Department	Construction	
	Res Spotter	6R Field	B	DELCASALE, NICHOLAS	Water Department	Construction	
	Res Spotter	6R Field	B	CERRONE, JOSEPH	Water Department	Baxter Operations - IWU	PWD
	Res Spotter	6R Field	B	GORDEN, JOHN	Water Department	Baxter Operations - IWU	PWD
	Res Spotter	6R Field	B	HALAS, LEW M	Water Department	Construction	
	Res Spotter	6R Field	B	WAGNER, ROBIN	Water Department	Construction	

2013-2014 Residential Plan Conditional Deployment



District	Deployment	Miles Serviced
1	1 Route	2.4
4	12 Routes	59.5
6	2 Routes	10.1

2013-2014
Residential Plan
Full Deployment



District	Deployment	Miles Serviced
1st	17 grids	144.1
2nd	14 grids + 3 gators	117.9
3rd	19 grids + 5 gators	197.2
4th	22 grids + 4 gators	206.3
5th	18 grids	253.8
6th	14 grids + 6 pickup	213.5
Summary	104 grids + 12 gators + 6 pickup	
Total	122	1132.8

Residential Snow Operations (Map Location)

Go to the Streets Department's intranet site
http://streetsweb.city.phila.local/

Select "Streets GIS"
http://streetsweb.city.phila.local/streets_gis.html

Select "Divisional Maps"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/

Select "Highways"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/

Select "Residential Snow"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/ResidentialSnow/

Select Overviews
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/ResidentialSnow/Overviews/

Select "hwy_ResidentialDeploymentCombined2012.pdf"
ftp://gisftp.phila.gov/dropbox/Streets/Maps/Highways/ResidentialSnow/Overviews/hwy_ResidentialDeploymentPlan2013.pdf

Section 4.5 Residential Street System – Snow Fighting Vehicles

2013 2014 Residential Truck List -- Conditional Residential Vehicles

Conditional Deployment - Residential Streets - (15 routes)

Department	# Trucks Provided
Streets	10
Water	3
P&R (Park)	2
	15

* Reassigned from PWD to Streets Traffic (2/13/13)

#	Res. Dist	Vehicle	CDL	Hill Route	Comment	Use	Dept Location	Model	Type	Plow	Salt
1	1	115002	No	1Hill01	Overbrook (1R12 for full)	AR	*Streets - Traffic	FL-70	4x4 Pickup	FM	V-Box
2	4	000181	Yes	4Hill01	Andorra (5R05 for full)	AR	Water-Fox-SM	FL-70	6 Yd Dump	FM	TGS
3	4	085242	No	4Hill02	Roxborough (4R20 for full)	AR	Streets - Traffic	F350	4x4 Pickup c	FM	V-Box
4	4	115005	No	4Hill03	Chestnut Hill (5R15 for full)	AR	*Streets - Traffic	FL-70	4x4 Pickup	FM	V-Box
5	4	135030	No	4Hill04	West Mt. Airy (5R01 for full)	AR	*Streets - Traffic	FL-70	4x4 Pickup	FM	V-Box
6	4	135031	No	4Hill05	Wister/East Germantown (4R10 for full)	AR	Streets - Traffic	F350	4x4 Pickup c	FM	VBE
7	4	135036	No	4Hill06	West Oak Lane/Ogontz (4R15 for full)	AR	Streets - St. Lite	F350	PICKUP 4X4	FM	VBE
8	4	085246	No	4Hill07	Manyunk (NE) (4R19 for full)	AR	Streets - Traffic	F350	4x4 Pickup c	FM	V-Box
9	4	085249	No	4Hill08	Manyunk (South) (4R21 for full)	AR	Streets - Traffic	F350	4x4 Pickup	FM	VBE
10	4	085247	No	4Hill09	Manyunk (Central) (4R04 for full)	AR	Streets - Traffic	F350	4x4 Pickup c	FM	V-Box
11	4	085255	No	4Hill10	Manyunk (NW) (4R22 for full)	AR	Streets - Traffic	F350	4x4 Pickup c	FM	V-Box
12	4	085270	No	4Hill11	Wissahickon (4R12 for full)	DP	P&R(Park)	F350	4x4 Pickup c	FM	V-Box
13	4	085265	No	4Hill12	East Falls (1R07 for full)	DP	P&R(Park)	F350	4x4 Pickup c	FM	V-Box
14	6	000177	Yes	6Hill01	Bustleton (6R01 for full)	AR	Water-Lardners PT	FL-70	6 Yd Dump	FM	TGS
15	6	000174	Yes	6Hill02	Fox Chase (6R03 for full)	AR	Water-Lardners PT	FL-70	6 Yd Dump	FM	TGS

Contingency Vehicles

115001	Ranger/VBE	Construction Inspector (Edith Doheny) will drop @ 4040. Coordinate with Tony Moreland.
115006	Ranger/VBE	Construction Inspector (Rick Wolbert) will drop @ 4040. Coordinate with Tony Moreland.
115005	Ranger/VBE	Construction Inspector (Will Davis) will drop @ 4040. Coordinate with Tony Moreland.
115003	Ranger/VBE	Construction Inspector (Tom Haughney) will drop @ 4040. Coordinate with Tony Moreland.
115004	Ranger/VBE	Construction Inspector (Natee Prasomsan) will drop @ 4040. Coordinate with Tony Moreland.

2013 2014 Residential Truck List -- Conditional Supplement Vehicles for Hwy Yards

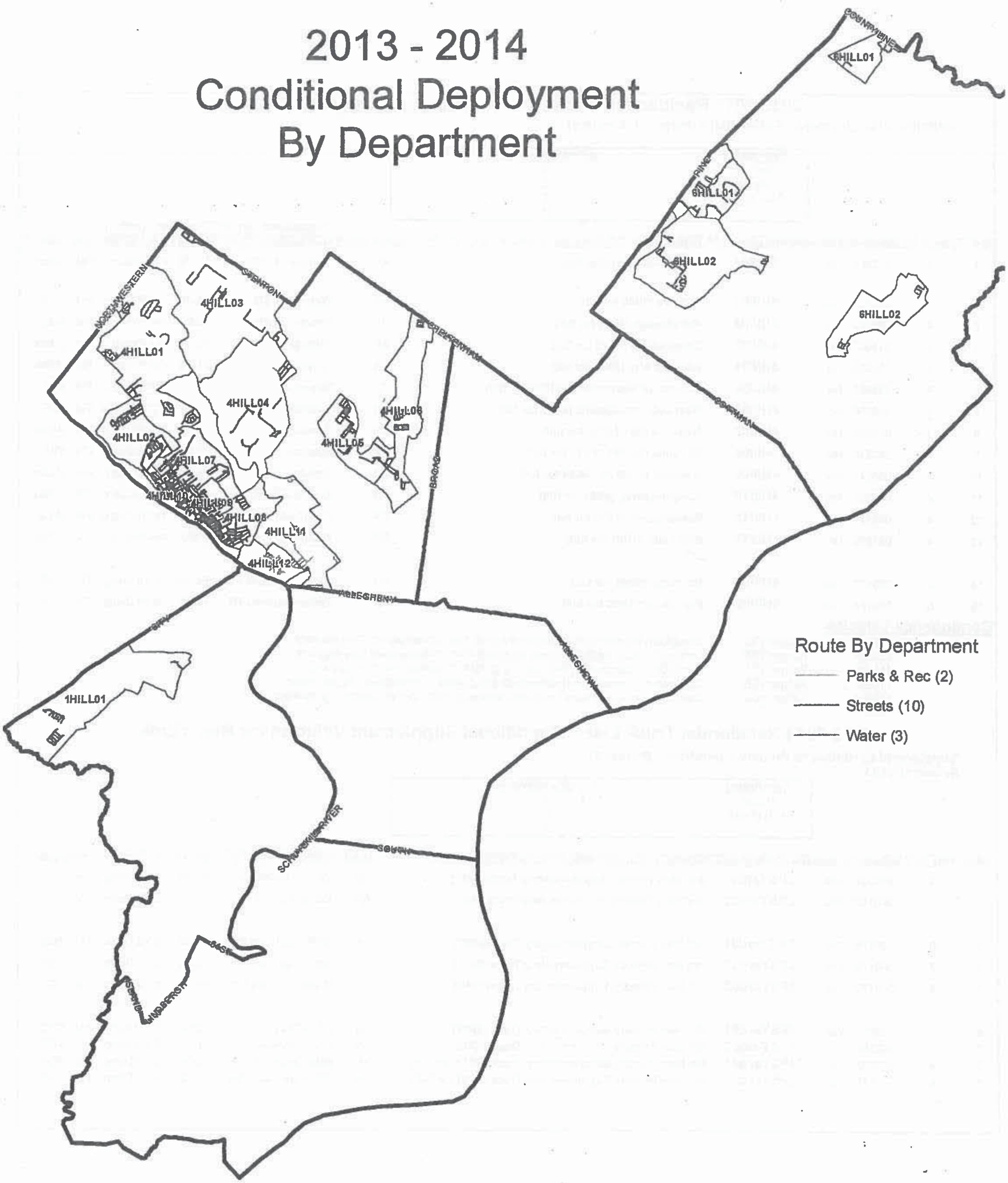
Supplement to Highways Primary Operation - (9 trucks)

Revised: 10/25/13

Department	# Trucks Provided
Water	8
P&R (Park)	1
	9

#	Hwy Dist	Vehicle	CDL	Supplement Route	Comment	Use	Dept Location	Model	Type	Plow	Salt
1	2	970021	Yes	2PSYard01	2nd Hwy Primary Supplementary Truck(5R17)	AR	Water-Mnt-29th st	FL-70	6 Yd Dump	FM	TGS
2	2	000180	Yes	2PSYard02	2nd Hwy Primary Supplementary Truck(5R04)	AR	Water-Fox-SM	FL-70	6 Yd Dump	FM	TGS
3	3	000176	Yes	3PSYard01	3rd Hwy Primary Supplementary Truck(6R07)	AR	Water-Lardners PT	FL-70	6 Yd Dump	FM	TGS
4	3	000173	Yes	3PSYard02	3rd Hwy Primary Supplementary Truck(6R02)	AR	Water-Lardners PT	FL-70	6 Yd Dump	FM	TGS
5	3	000179	Yes	3PSYard03	3rd Hwy Primary Supplementary Truck(6R10)	AR	Water-Lardners PT	FL-70	6 Yd Dump	FM	TGS
6	4	015058	Yes	4PSYard01	4th Hwy Primary Supplementary Truck (3R08)	AR	P&R(Park)	F550	3 YD dump	FM	VBG
7	4	000183	Yes	4PSYard02	4th Hwy Primary Supplementary Truck (1R12 for full)	AR	Water-SM-49th St	FL-70	6 Yd Dump	FM	TGS
8	4	000182	Yes	4PSYard03	4th Hwy Primary Supplementary Truck (5R15 for full)	AR	Water-Fox-SM	FL-70	6 Yd Dump	FM	TGS
9	4	000175	Yes	4PSYard04	4th Hwy Primary Supplementary Truck (5R01 for full)	AR	Water-Inlet Cleaning	FL-70	6 Yd Dump	FM	TGS

2013 - 2014
Conditional Deployment
By Department



2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			1st Residential						
1	025193	No	**1R01**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box G
1	085243	No	**1R02**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	085253	No	**1R03**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	110005	Yes	**1R04**	Water-SE Plant		F350	Pickup	FM	VBE
1	065099	No	**1R05**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-box H
1	085271	No	**1R06**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	085265	No	**1R07**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	085266	No	**1R08**	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	025191	No	**1R09**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box G
1	010097	No	**1R10**	Water-SW Plant	Ford	F250	4x4 Pickup	FM	V-Box
1	010094	No	**1R11**	Water-SE Plant	Ford	F250	4x4 Pickup	FM	NA
1	000183	Yes	**1R12**	Water-SM-49th St	FL	FL-70	6 Yd Dump	FM	TGS
1	110006	Yes	**1R13**	Water-SW Plant		F350	Pickup	FM	VBE
1	010096	No	**1R14**	Water-SE Plant	Ford	F250	4x4 Pickup	FM	VBE
	Vacant	No	**1R15**	Contractor-Vacant					
1	085237	No	**1R16**	Streets-Moffo	Ford	F350	4x4 Pickup crewcab	FM	V-Box
1	010095	No	**1R17**	Water-SE Plant	Ford	F250	4x4 Pickup	FM	NA
	Contractor PU		**1RNav01**						
	Contractor PU		**1RNav02**						

2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			2nd Residential						
2	115006	No	2G01	Streets - Surveys Constr		Ranger			VBE
2	Vacant	No	2G02	Contractor-Vacant					
2	115001	No	2G03	Streets - Surveys Constr		Ranger			VBE
2	065089	No	2R01	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-box H
2	085258	No	2R02	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	Vacant	No	2R03	Contractor-Vacant					
2	085241	No	2R04	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	110001	Yes	2R05	Water-SE Plant		F350	Pickup	V	VBE
2	085256	No	2R06	Streets-Moffo	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	110002	No	2R07	Water-SW Plant		F350	Pickup	V	VBE
2	110003	No	2R08	Water-SW Plant		F350	Pickup	V	VBE
2	085251	No	2R09	Pub Prop	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	085240	No	2R10	Pub Prop	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	085250	No	2R11	Pub Prop	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	025126	Yes	2R12	Pub Prop	FL	FL-80	5Yd v-box	FM	V-BOX
2	080037	No	2R13	Water-SE Plant	Ford	F350	4x4 Pickup crewcab	FM	V-Box
2	010099	No	2R14	Water-SW Plant	Ford	F250	4x4 Pickup	FM	V-Box
	Contractor PU		2RNav01						
	Contractor PU		2RNav02						

2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			3rd Residential						
3	Vacant	No	3G01	Contractor-Vacant					
3	Vacant	No	3G02	Contractor-Vacant					
3	Vacant	No	3G03	Contractor-Vacant					
3	Vacant	No	3G04	Contractor-Vacant					
3	Vacant	No	3G05	Contractor-Vacant					
3	005459	No	3R01	P&R(Rec)	Ford	F250	4x4 Pickup crewcab	FM	MINI
3	065095	No	3R02	P&R(Rec)	Ford	F350	4x4 Pickup	FM	V-box H
3	Vacant	No	3R03	Contractor-Vacant					
3	110004	Yes	3R04	Water-Flow Control	Ford	F350	Pickup	FM	VBE
3	Vacant	No	3R05	Contractor-Vacant					
3	010093	No	3R06	Water-SM-Fox	Ford	F250	4x4 Pickup	FM	V-Box
3	127067	No	3R07	Streets-Hwy-Linestriping	Ford	F350	Pickup	FM	VBE
3	015058	Yes	3R08	P&R(Park)	FORD	F550	3 YD dump	FM	VBG
3	Vacant	No	3R09	Contractor-Vacant					
3	Vacant	No	3R10	Contractor-Vacant					
3	135036	No	3R11	Streets - St. Lite	Ford	F350	4x4 Pickup	FM	VBE
3	135038	No	3R12	Library-19th/Vine	Ford	F350	4x4 Pickup	FM	VBE
3	Vacant	No	3R13	Contractor-Vacant					
3	Vacant	No	3R14	Contractor-Vacant					
3	010098	No	3R15	Water-SW Plant	Ford	F250	4x4 Pickup	FM	V-Box
3	015143	No	3R16	MDO-Clip	Ford	F250	4x4 Pickup crewcab	FM	V-box G
3	045166	No	3R17	MDO-Clip	GMC	2500	4x4 Pickup	FM	V-box H
3	010091	No	3R18	Water-SM-Fox	Ford	F250	4x4 Pickup	FM	V-Box
3	127068	No	3R19	Streets-Hwy-Asphalt	Ford	F350	Pickup	FM	VBE
	Contractor PU		3RNav01						
	Contractor PU		3RNav02						

2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			4th Residential						
4	055173		Salt Loader	Streets-Hwy-4th Yard					
4	115004	No	4G01	Streets - Surveys Constr		Ranger			VBE
4	115005	No	4G02	Streets - Surveys Constr		Ranger			VBE
4	Vacant	No	4G03	Contractor-Vacant					
4	Vacant	No	4G04	Contractor-Vacant					
4	Vacant	No	4R01	Contractor-Vacant					
4	085268	No	4R02	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	065098	No	4R03	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	085247	No	4R04	Streets - Traffic	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	085264	No	4R05	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	085261	No	4R06	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	005165	No	4R07	Streets - Traffic	Ford	F150	4x4 Pickup	FM	N/A
4	005166	No	4R08	Streets - St. Lite	Ford	F150	4x4 Pickup	FM	N/A
4	Vacant	No	4R09	Contractor-Vacant					
4	995041	No	4R10	Streets - Traffic	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	080035	No	4R11	Water-29th Facilities	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	085270	No	4R12	P&R(Park)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	Vacant	No	4R13	Contractor-Vacant					
4	115002	No	4R14	Streets-Hwy-Asphalt		Ranger			VBE
4	085249	No	4R15	Streets - St. Lite	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE
4	115003	No	4R16	Streets - Surveys Constr		Ranger			VBE
4	080034	No	4R17	Water-29th Facilities	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	005167	No	4R18	Streets - St. Lite	Ford	F150	4x4 Pickup	FM	N/A
4	085246	No	4R19	Streets - Traffic	Ford	F350	4x4 Pickup crewcab	V	V-Box
4	085242	No	4R20	Streets - Traffic	Ford	F350	4x4 Pickup crewcab	FM	V-Box
4	135030	No	4R21	Streets - Traffic	Ford	F350	4x4 Pickup	FM	VBE
4	085255	No	4R22	Streets - Traffic	Ford	F350	4x4 Pickup crewcab	V	V-Box
	Contractor PU		4RNav01						
	Contractor PU		4RNav02						

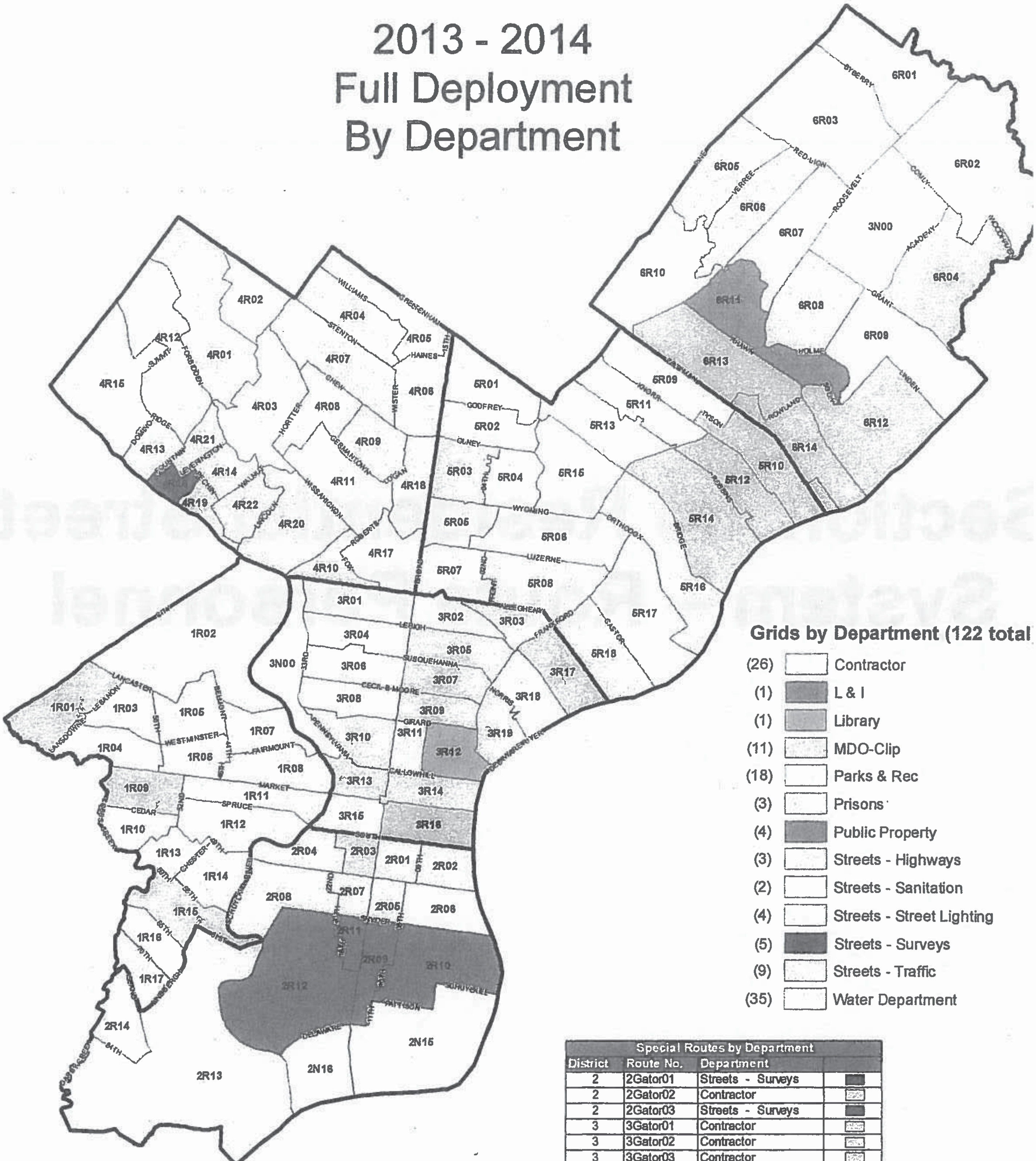
2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			5th Residential						
5	000175	Yes	**5R01**	Water-Inlet Cleaning	FL	FL-70	6 Yd Dump	FM	TGS
5	085238	No	**5R02**	P&R(Rec)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
5	Vacant	No	**5R03**	Contractor-Vacant					
5	000180	Yes	**5R04**	Water-SM-Fox	FL	FL-70	6 Yd Dump	FM	TGS
5	000181	Yes	**5R05**	Water-SM-Fox	FL	FL-70	6 Yd Dump	FM	TGS
5	080032	No	**5R06**	Water-BLS Lab/Juniata&Castor	Ford	F350	4x4 Pickup crewcab	FM	V-Box
5	000060	No	**5R07**	Water-29th Facilities	Ford	F450	2 Yd Dump	FM	VBE
5	Vacant	No	**5R08**	Contractor-Vacant					
5	000062	No	**5R09**	Water-29th St-Shut Off	Ford	F450	2 Yd Dump	FM	VBE
5	025186	No	**5R10**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box G
5	000061	No	**5R11**	Water-29th Facilities	Ford	F450	2 Yd Dump	FM	VBE
5	025189	No	**5R12**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box G
5	080033	No	**5R13**	Water- Delaware Pumping (state/torresdale)	Ford	F350	4x4 Pickup crewcab	FM	V-Box
5	065088	No	**5R14**	MDO-Clip	Ford	F350	4x4 Pickup crewcab	FM	V-box H
5	000182	Yes	**5R15**	Water-SM-Fox	FL	FL-70	6 Yd Dump	FM	TGS
5	Vacant	No	**5R16**	Contractor-Vacant					
5	970021	Yes	**5R17**	Water-29th Facilities	FL	FL-70	6 Yd Dump	FM	TGS
5	Vacant	No	**5R18**	Contractor-Vacant					
	Contractor PU		**5RNav01**						
	Contractor PU		**5RNav02**						

2013 2014 Residential Truck List - FULL DEPLOYMENT

District	Vehicle	CDL	Grid Assigned	Dept Location	Make	Model	Type	Plow	Salt
			6th Residential						
6	Vacant	No	**6Pickup01**	Contractor-Vacant					
6	080036	No	**6Pickup02**	Water-SM-Lardners PT	Ford	F350	4x4 Pickup crewcab	FM	V-Box
6	085267	No	**6Pickup03**	Prisons	FORD	F350	SPREADER/PLOW	FM	VBE
6	Vacant	No	**6Pickup04**	Contractor-Vacant					
6	085252	No	**6Pickup05**	Streets-Traffic	Ford	F350	Pickup 4X4	FM	V-Box
6	085259	No	**6Pickup06**	Prisons	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE
6	000177	Yes	**6R01**	Water-SM-Lardners PT	FL	FL-70	6 Yd Dump	FM	TGS
6	000173	Yes	**6R02**	Water-SM-Lardners PT	FL	FL-70	6 Yd Dump	FM	TGS
6	000174	Yes	**6R03**	Water-SM-Lardners PT	FL	FL-70	6 Yd Dump	FM	TGS
6	135054	No	**6R04**	MDO-Clip	FORD	F350	SPREADER/PLOW	FM	VBE
6	085248	No	**6R05**	Prisons	Ford	F350	4x4 Pickup crewcab	FM	V-Box
6	Vacant	No	**6R06**	Contractor-Vacant					
6	000176	Yes	**6R07**	Water-SM-Lardners PT	FL	FL-70	6 Yd Dump	FM	TGS
6	135031	No	**6R08**	Streets - Traffic	Ford	F350	4x4 Pickup	FM	VBE
6	010092	No	**6R09**	Water-SM-Lardners PT	Ford	F250	4x4 Pickup	FM	NA
6	000179	Yes	**6R10**	Water-SM-Lardners PT	FL	FL-70	6 Yd Dump	FM	TGS
6	970040	Yes	**6R11**	L&I	FL	FL-70	Hooklift	FM	V-BOX
6	135033	No	**6R12**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box H
6	045170	No	**6R13**	MDO-Clip	GMC	Sierra	4x4 Pickup	FM	VBH
6	025188	No	**6R14**	MDO-Clip	Ford	F-350	4x4 Pickup	FM	V-box G
	Contractor PU		**6RNav01**						
	Contractor PU		**6RNav02**						

2013 - 2014
Full Deployment
By Department



Special Routes by Department			
District	Route No.	Department	
2	2Gator01	Streets - Surveys	
2	2Gator02	Contractor	
2	2Gator03	Streets - Surveys	
3	3Gator01	Contractor	
3	3Gator02	Contractor	
3	3Gator03	Contractor	
3	3Gator04	Contractor	
3	3Gator05	Contractor	
4	4Gator01	Streets - Surveys	
4	4Gator02	Streets - Surveys	
4	4Gator03	Contractor	
4	4Gator04	Contractor	
6	6Pickup01	Contractor	
6	6Pickup02	Water Department	
6	6Pickup03	Prisons	
6	6Pickup04	Contractor	
6	6Pickup05	Streets - Traffic	
6	6Pickup06	Prisons	

Map Modified: October 23, 2013 - MxS

Section 4.6 Residential Street System – Route Personnel

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
1st RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
1R01	A	Navigator	ALEXANDER, AARON	Mayor's Office of Community Services	CLIP
1R01	A & B	Driver	BUNDY, JEFFREY	Mayor's Office of Community Services	3033 S 63rd Street
1R01	B	Navigator	LIPSCOMB, LAWERENCE	Mayor's Office of Community Services	3033 S 63rd Street
1R02	A & B	Driver & Navigator	WILLIAMS, KHALIL	Recreation Department	FDR Park
1R03	A & B	Driver & Navigator	GOODWIN, JOHN	Recreation Department	FDR Park
1R04	A	Driver	BUROTN, BERNARD	Water Department	Sewer Maint-49th St
1R04	A	Navigator	BUELAH, ALLEN	Water Department	Southwest WPCP
1R04	B	Driver	JOHNSON, CLOVIES	Water Department	point Breeze
1R04	B	Navigator	FLINT, JUSTIN	Water Department	Sewer Maint-49th St
1R05	A & B	Driver & Navigator	WILDER, CARNELL	Recreation Department	Southern Grounds
1R06	A & B	Driver & Navigator	STARCHIA, KIRK	Recreation Department	FDR Park
1R07	A & B	Driver & Navigator	MILLER, ROBERT	Recreation Department	FDR Park
1R08	A & B	Driver & Navigator	JOYNER, RHONDA	Recreation Department	
1R09	A	Driver	TURRENTINE JUSTIN	Mayor's Office of Community Services	GAT
1R09	A	Navigator	WILSON, MILES	Mayor's Office of Community Services	63rd & Passyunk Ave
1R09	B	Driver	JEFFREYS, LAMONT	Mayor's Office of Community Services	3033 S 63rd Street
1R09	B	Navigator	LEWIS, JAMELL	Mayor's Office of Community Services	3033 S 63rd Street
1R10	A	Driver	LENTINE, JOHN	Water Department	Southwest WPCP
1R10	A	Navigator	CROMWELL, ROMAINE	Water Department	Inlet Cleaning-Fox St
1R10	B	Driver	LYNCH, JASON	Water Department	Southwest WPCP
1R10	B	Navigator	ROACH, RODNEY	Water Department	Southwest WPCP
1R11	A	Driver	INDAN, STEVEN	Water Department	SE Plant
1R11	A	Driver & Navigator	FREEMAN, JOHN M	Water Department	Southwest WPCP
1R11	B	Driver	GLINKOWSKI, ERIC	Water Department	Sewer Maint-49th St
1R11	B	Navigator	FASSETT, SETH	Water Department	Sewer Maint-49th St
1R12	A	Driver	BURTON, ZACHARY E	Water Department	Sewer Maint-49th St
1R12	A	Navigator	JOHNSON, JOETTA A	Water Department	Sewer Maint-49th St
1R12	B	Driver	HAEFNER	Water Department	Southwest WPCP
1R12	B	Navigator	ALEXANDER, CALVIN	Water Department	Sewer Maint-49th St
1R13	A	Driver	PUGH, DERRICK	Water Department	Inlet Cleaning-Fox St
1R13	A	Navigator	JOHNSON, LORENZO	Water Department	Inlet Cleaning-Fox St
1R13	B	Driver	WILSON, ROBERT	Water Department	Inlet Cleaning-Fox St
1R13	B	Navigator	DAVIS, IAN	Water Department	Inlet Cleaning-Fox St
1R14	A	Driver	GOODMAN, LAWRENCE	Water Department	Sewer Maint-49th St
1R14	A	Driver & Navigator	MAHONEY, GLENN	Water Department	Inlet Cleaning-Fox St
1R14	B	Driver	SPENCE JR, THERMON	Water Department	Inlet Cleaning-Fox St
1R14	B	Navigator	BAXTER, CLIFTON	Water Department	Sewer Maint-49th St
1R15	A	Navigator	MURRAY, PATRICIA	Streets Department	Hwy ROW Unit
1R15	B	Navigator	HOUSTON, SERENE	Streets Department	Sanitation A1
1R16	A	Driver	RICE, CHARLES RAY	Streets Department	Sanitation CFM
1R16	A	Navigator	SMITH, DOUGLAS	Streets Department	Sanitation CFM
1R16	B	Driver	HERRINGTON, CHARLES	Streets Department	Sanitation A1
1R16	B	Navigator	BOND, WILLIAM	Streets Department	Sanitation A1
1R17	A	Driver	CARSON III, HARRY LOUIS	Water Department	SE Plant
1R17	A	Navigator	DANIEL, JAMES A	Water Department	Sewer Maint-49th St
1R17	B	Driver	RIVERA, JIMMIE	Water Department	SE Plant
1R17	B	Navigator	GREEN, DWIGHT	Water Department	Sewer Maint-49th St
1ST RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES, AS NEEDED					
1R Nav01	A	Extra Navigator	TALINGTON, ISIAH	Streets Department	Sanitation A1
1R Nav01	B	Navigator	HENDERSON, ANTON	Streets Department	Sanitation A1
1R Nav02	A	Extra Navigator	MULLINGS, NORMAN	Streets Department	Sanitation A1
1R Nav02	B	Navigator	KURTIS, OVERTON	Streets Department	Sanitation A1

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS					
Route Assignment	Shift	Duty	Employee Name	Department	Work Location
1ST RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.					
1R Reserve	Either	Driver	HELLER, STEVEN	Streets Department	3033 S 63rd Street
1R Reserve	Either	Driver	VERDELL, WILLIAM	Streets Department	Sanitation A1
1R Reserve	Either	Navigator	WISE, CHARLES	Licenses and Inspections	
1R Reserve	Either	Navigator	GRIER, SHANON	Licenses and Inspections	11th & Wharton
1R Reserve	Either	Navigator	HARGROVE, ARIANE	Licenses and Inspections	CLIP
1R Reserve	Either	Navigator	BROWN, GERALYN	Licenses and Inspections	COde Enforcement North
1R Reserve	Either	Navigator	BEZOTSKY, GAR	Licenses and Inspections	South Dist
1R Reserve	Either	Navigator	WILLIAMS, DEWAYNE	Mayor's Office of Community Services	3033 S 63rd Street
1R Reserve	Either	Navigator	WILLIAMS, CHARLES	Mayor's Office of Community Services	CLIP
1R Reserve	Either	Navigator	MORRIS, MICHAEL	Streets Department	Sanitation A1
1R Reserve	Either	Navigator	SIMMONS, TERRY	Streets Department	Sanitation A1
1R Reserve	Either	Navigator	WOODARD, LESTER	Streets Department	Sanitation A1
1R Reserve	Either	Navigator	PAYTON, JARVIS H	Streets Department	Sanitation A1
1R Reserve	Either	Navigator	POTEAT, AARON	Water Department	ARA Bldg
1R Reserve	Either	Navigator	GREEN, MARK	Water Department	Inlet Cleaning-Fox St
1R Reserve	Either	Navigator	CLARK, DANIEL	Water Department	Inlet Cleaning-Fox St
1R Reserve	Either	Navigator	FAISON, EDWARD	Water Department	Sewer Maint-49th St
1R Reserve	Either	Navigator	MYERS, ANTHONY	Water Department	Sewer Maint-49th St
1R Reserve	Either	Navigator	SCHIEBER, GARRY	Water Department	Sewer Maint-49th St
1R Reserve	Either	Navigator	WATSON, ANTHONY	Water Department	Sewer Maint-49th St
1R Reserve	Either	Navigator	BOYER, OOM	Water Department	Sewer Maint-49th St
1R Reserve	Either	Navigator	WILLIAMS, CHARLES	Water Department	Sewer Maint-49th St
1ST RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS					
1R Field	A & B	Supervisor	ELEY, JERRY	Mayor's Office of Community Services	GAT
1R Field	A & B	Supervisor	HAGER, JOSEPH D.	Recreation Department	FDR Park
1R Field	A & B	Supervisor	KREEGER, EDWARD	Recreation Department	FDR Park
1R Field	A & B	Supervisor	SPREWELL, SYLVIA	Water Department	Sewer Maint-49th St

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
2ND RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
2Gator01	A	Navigator	GARNER, YVONNE D	Streets Department	Sanitation Sweep
2Gator01	A & B	Driver	CLEGG, CHARLES R	Streets Department	Traffic
2Gator01	B	Navigator	JACKSON, ANTONIO	Streets Department	Sanitation A1
2Gator02	A	Navigator	SCOTT, KIM	Water Revenue	Water Revenue-MSB
2Gator02	B	Navigator	PARIS, GAY	Water Revenue	Water Revenue-MSB
2Gator03	A	Navigator	MCGINTY, WILLIAM	Streets Department	Sanitation A2
2Gator03	A & B	Driver	ANDRES, ROBERT	Streets Department	Traffic
2Gator03	B	Driver & Navigator	ENOCH, JUNIOR	Streets Department	Sanitation A2
2R01	A & B	Driver & Navigator	BROWN, DARRYL	Recreation Department	4TH & GIRARD
2R02	A & B	Driver & Navigator	RIDGEWAY, ALEXANDER	Recreation Department	
2R03	A	Navigator	MCCOY, RICARDO	Streets Department	Sanitation A2
2R03	B	Navigator	TYSON, CHRISTOPHER	Streets Department	Sanitation Sweep
2R04	A & B	Driver & Navigator	MILLER, JOSEPH	Recreation Department	4th & Girard
2R05	A	Driver	MCCLOUD, THOMAS	Water Department	Sewer Maint-Fox St
2R05	A	Navigator	MORGAN, RASHAE	Water Department	Inlet Cleaning-Fox St
2R05	B	Driver	SANDERS, AARON	Water Department	Inlet Cleaning-Fox St
2R05	B	Navigator	SAVAGE, BRIAN	Water Department	Sewer Maint-49th St
2R06	A	Driver	CHEA, WESSEH	Streets Department	Sanitation CFM
2R06	A	Navigator	CLARK, NICHOLAS	Streets Department	Sanitation CFM
2R06	B	Driver	DOUMBIA, MOUSSA	Streets Department	Sanitation A2
2R06	B	Navigator	ROBINSON, KEVIN	Streets Department	Sanitation CFM
2R07	A	Driver	CAMPBELL, MICHAEL J	Water Department	Inlet Cleaning-Fox St
2R07	A	Navigator	WALTON, RICARDO	Water Department	Inlet Cleaning-Fox St
2R07	B	Driver	HINES, JAMES	Water Department	Inlet Cleaning-Fox St
2R07	B	Navigator	LEPORE, MICHAEL	Water Department	Inlet Cleaning-Fox St
2R08	A	Driver	PROCOPIO, RENATO	Water Department	Inlet Cleaning-Fox St
2R08	A	Navigator	GREENFIELD, REGINALD	Water Department	Inlet Cleaning-Fox St
2R08	B	Driver	DONNELLY, PATRICK	Water Department	Inlet Cleaning-Fox St
2R08	B	Navigator	REID, DARRYL	Water Department	Inlet Cleaning-Fox St
2R09	A	Driver	SMITH, WILLIAM A	Public Property	Building Services
2R09	A & B	Driver & Navigator	BIELAWSKI, THOMAS	Public Property	Building Services
2R09	B	Driver	UNDERWOOD JR, ALBERT	Public Property	Building Services
2R10	A	Driver	BUTLER SR, CALVIN	Public Property	Building Services
2R10	A	Driver & Navigator	KALAPARMAMBATH, JOY	Public Property	Building Services
2R10	B	Driver	SMITH, RICHARD	Public Property	Building Services
2R10	B	Driver & Navigator	CALVIN, RUSSELL	Public Property	Building Services
2R11	A	Driver	FORD, MARK	Public Property	Building Services
2R11	A & B	Driver & Navigator	FISCHER, ROBERT	Public Property	Building Services
2R11	B	Driver	MARTINSEN, CHRIS	Public Property	Building Services
2R12	A	Driver	WEST III, JAMES	Public Property	Building Services
2R12	A & B	Driver & Navigator	BREHM, NICK	Public Property	Building Services
2R12	B	Driver	WALKER, WILLIAM	Public Property	Building Services
2R13	A	Driver	SHANNON, GERALD	Water Department	Inlet Cleaning-Fox St
2R13	A	Navigator	HUTCHINSON, WADDELL	Water Department	Inlet Cleaning-Fox St
2R13	B	Driver	PHARO SR, MICHAEL	Water Department	SE Plant
2R13	B	Navigator	RYAN, KISHA	Water Department	Inlet Cleaning-Fox St
2R14	A	Driver	GEDDES, ALBERT	Water Department	Inlet Cleaning-Fox St
2R14	A	Navigator	CORDANO, ALFRED	Water Department	SE Plant
2R14	B	Driver	KANE, JUAN	Water Department	Inlet Cleaning-Fox St
2R14	B	Navigator	GRIFFIN JR, WALTER	Water Department	Inlet Cleaning-Fox St
2nd RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES					
2R Nav01	A	Extra Navigator	HUMPHREY, BERNADINE	Streets Department	Sanitation A2
2R Nav01	B	Navigator	PHELPS-WASHINGTON, JAVESE M	Streets Department	Sanitation Sweep
2R Nav02	A	Extra Navigator	KIRBY, JEFFREY	Streets Department	Sanitation A2
2R Nav02	B	Navigator	LONDON, CASSANDRA	Streets Department	Sanitation Sweep

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS						
	Route Assignment	Shift	Duty	Employee Name	Department	Work Location
2nd RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.						
	2R Reserve	Either	Driver	BUNDY, JEFFREY	Mayor's Office of Community Services	3033 S 63rd Street
	2R Reserve	Either	Navigator	BILLIE, KEITH	Licenses and Inspections	11th & Wharton
	2R Reserve	Either	Navigator	PERLOTTE, STEPHANIE	Streets Department	Sanitation Sweep
	2R Reserve	Either	Navigator	SIMS, ANTHONY	Streets Department	Sanitation Sweep
	2R Reserve	Either	Navigator	BRODIE JR, LIONEL	Water Department	Sewer Maint-49th St
	2R Reserve	Either	Navigator	MARTORANO, MICHAEL	Water Department	Sewer Maint-49th St
	2R Reserve	Either	Navigator	PHILLIPS, LAWRENCE	Water Department	Sewer Maint-49th St
	2R Reserve	Either	Navigator	WATSON, R	Water Department	Sewer Maint-49th St
	2R Reserve	Either	Navigator	WILLIAMSON, JAMES	Water Department	Sewer Maint-49th St
	2R Reserve	Either	Navigator	WEBB, DIANE	Water Revenue	Water Revenue-MSB
2nd RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS						
	2R Field	A & B	Supervisor	STAVOLA, FRANK	Public Property	Building Services
	2R Field	A & B	Supervisor	ZUL, CHARLES	Public Property	Building Services
	2R Field	A & B	Supervisor	FEOLI, FRED	Water Department	Inlet Cleaning-Fox St
	2R Field	A & B	Supervisor	MOSES, MATHEW	Water Department	SE Plant

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
3rd RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
3Gator01	A	Navigator	BEAMON, JOHN E	Streets Department	Hwy ROW Unit
3Gator01	B	Navigator	AIKENS, CRYSTAL	Water Revenue	Water Revenue-MSB
3Gator02	A	Navigator	TASKER, CHERYL	Licenses and Inspections	MSB 11TH Flr
3Gator02	B	Navigator	DRAKE, JEFFREY	Streets Department	Admin - Payroll
3Gator03	A	Navigator	KANEELIL, RAJU	Streets Department	Hwy ROW Unit
3Gator03	B	Navigator	TENANT JR, ROGER S	Licenses and Inspections	4000 N. American St
3Gator04	A	Navigator	SANDERS, REGINA	Streets Department	Sanitation A3
3Gator04	B	Navigator	SPROWAL, DAWN	Streets Department	Sanitation A3
3Gator05	A	Navigator	KYAW, NAN	Streets Department	Surveys -City Plans
3Gator05	B	Navigator	BARBU, CHARLES	Streets Department	Admin-Accounting
3R01	A & B	Driver & Navigator	CULP, KEVIN	Recreation Department	DIIST 1
3R02	A & B	Driver & Navigator	CASINO, MICHAEL T.	Recreation Department	AXE FACTORY
3R03	A	Navigator	WELCH, STEVEN	Streets Department	Admin - Accounting
3R03	B	Navigator	MOORE, STEPHANIE	Water Revenue	Water Revenue-MSB
3R04	A	Driver	BASMAJIAN, WAYNE	Water Department	Water Pumping
3R04	A	Navigator	KALINOWSKI, WITOLD	Water Department	Water Pumping
3R04	B	Driver & Navigator	LENTINE, MICHAEL	Water Department	Water Pumping
3R04	B	Navigator	STYLIES, JAMES	Water Department	Water Pumping
3R05	A	Navigator	MCFARLAND, OMAR	Streets Department	Sanitation A3
3R05	B	Navigator	ROSS, WILLIAM	Streets Department	Sanitation A3
3R06	A	Driver	GRAVES, HARRY	Water Department	Sewer Maint-Fox St
3R06	A	Navigator	BENTLEY, SHARRON	Water Department	Sewer Maint-Fox St
3R06	B	Driver	NELSON, SEAN	Water Department	Sewer Maint-Fox St
3R06	B	Navigator	FASSETT, BRUCE	Water Department	Sewer Maint-Fox St
3R07	A	Driver	PERRY, JONTHAN	Streets Department	Sanitation A3
3R07	A & B	Navigator	SCOTT, GREGORY	Streets Department	Traffic
3R07	B	Driver	GARCIA, ALBERTO	Streets Department	Sanitation A3
3R08	A & B	Driver & Navigator	EVERLY, CHRISTOPHER	Recreation Department	8605 ROOSEVELT BLVD
3R08	A & B	Driver & Navigator	HUNSBERGER, JAMES	Recreation Department	AXE FACTORY
3R09	A & B	Navigator	LUCAS, LANCE A	Streets Department	Traffic
3R10	A	Navigator	AIKEN, VIRGINIA	Licenses and Inspections	MSB 11TH Flr
3R10	B	Navigator	KENNEDY, RENEE	Licenses and Inspections	MSB 11TH Flr
3R11	A & B	Driver	HAYES, JULIAN	Streets Department	STREET LIGHTING
3R11	A & B	Navigator	STAIB, DENNIS	Streets Department	STREET LIGHTING
3R12	A	Driver	BADOLATO, ANTHONY	Library	19th & Vine Streets
3R12	A	Navigator	HOLT, IFE	Streets Department	PMBC
3R12	B	Driver	MERCER, JEROME	Library	19th & Vine Streets
3R12	B	Navigator	INGRAM, HAROLD	Water Revenue	Water Revenue-MSB
3R13	A	Navigator	QUAIL JR, ANTHONY	Streets Department	Sanitation A3
3R13	B	Navigator	MARINE, JOSEPH	Streets Department	Sanitation A3
3R14	A	Navigator	WHITTINGTON, IRVIN	Licenses and Inspections	4000 N. American St
3R14	B	Navigator	MARSHALL, BRENT	Licenses and Inspections	5th & Luzerne
3R15	A	Driver	BLAKLEY, JESSE	Water Department	Inlet Cleaning-Fox St
3R15	A	Navigator	CORE, RONALD	Water Department	Sewer Maint-Fox St
3R15	B	Driver	MCBETH, JERRY	Water Department	Inlet Cleaning-Fox St
3R15	B	Navigator	CROSS JR, DONALD	Water Department	Inlet Cleaning-Fox St
3R16	A	Driver	HEARNS, ALVERETTA	Mayor's Office of Community Services	MSB 9th Floor
3R16	A	Navigator	SMITH, FRANCES	Mayor's Office of Community Services	ESAU
3R16	B	Driver	GARGANO, NICHOLAS	Mayor's Office of Community Services	Holmesburg
3R16	B	Navigator	HORVAY, KEVIN	Mayor's Office of Community Services	Holmesburg
3R17	A	Driver	BALDWIN, ROBERT	Mayor's Office of Community Services	CLIP
3R17	A	Navigator	HIGGINS, MARTIN	Licenses and Inspections	CLIP
3R17	B	Driver	LIU, JIAN	Mayor's Office of Community Services	CLIP
3R17	B	Navigator	BAKER, YVETTE A	Mayor's Office of Community Services	4600 Luzurne
3R18	A	Driver	FLANAGAN, STEFAN	Water Department	Sewer Maint-Fox St
3R18	A	Navigator	RAYNER, RONALD	Water Department	Sewer Maint-Fox St
3R18	B	Driver	BELTON, RUFUS	Water Department	Sewer Maint-Fox St
3R18	B	Navigator	SANDERS JR, JOSEPH	Water Department	Sewer Maint-Fox St
3R19	A	Navigator	PAYNE, WILLIAM G II	Streets Department	Sanitation A5
3R19	A & B	Driver	WILSON, HARRY	Streets Department	TEPS
3R19	B	Driver & Navigator	LEGAGNEAR, RICHARDSON	Streets Department	Sanitation A5
3rd RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES					
3R Nav01	A	Extra Navigator	DAWSON, BASHIR	Streets Department	Sanitation A3
3R Nav01	B	Extra Navigator	REDMOND, JONATHAN	Licenses and Inspections	990 Spring Garden
3R Nav02	A	Extra Navigator	WILSON, RODNEY	Streets Department	Sanitation A3
3R Nav02	B	Extra Navigator	BOONE, ELROY	Streets Department	Sanitation A3

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
3rd RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.					
3R Reserve	Either	Driver	MOORE, KAREEM	Streets Department	Sanitation A3
3R Reserve	Either	Driver	CHATELAIN, ROBERT	Water Department	29th Cambria
3R Reserve	Either	Driver	HARRIS, CARL	Water Department	Inlet Cleaning-Fox St
3R Reserve	Either	Driver	Riley, Anthony	Water Department	Inlet Cleaning-Fox St
3R Reserve	Either	Driver & Navigator	QUARLES, TERRENCE	Recreation Department	AXE FACTORY
3R Reserve	Either	Navigator	PLATTS, TIA	Licenses and Inspections	
3R Reserve	Either	Navigator	FOSTER, DONNA	Licenses and Inspections	MSB 11TH Flr
3R Reserve	Either	Navigator	LANDERS, JOHN	Streets Department	PMBC
3R Reserve	Either	Navigator	MATTHEWS, ROBYN	Streets Department	PMBC
3R Reserve	Either	Navigator	RIVERA, DINA	Streets Department	PMBC
3R Reserve	Either	Navigator	MCMILLIAN, MICHELLE	Streets Department	Sanitation Sweep
3R Reserve	Either	Navigator	GNOZA, WALTER M	Water Department	29th Cambria
3R Reserve	Either	Navigator	MATTHEWS, CLIFTON	Water Department	Inlet Cleaning-Fox St
3R Reserve	Either	Navigator	GIBBS, DOMINICK	Water Department	Inlet Cleaning-Fox St
3R Reserve	Either	Navigator	BALLARD, TAHJEE	Water Department	Sewer Maint-Fox St
3R Reserve	Either	Navigator	CARROLL, JOSEPH	Water Department	Sewer Maint-Fox St
3R Reserve	Either	Navigator	SPENNATO, NEAL	Water Department	Sewer Maint-Fox St
3R Reserve	Either	Navigator	JONES, LAMONT	Water Department	Sewer Maint-Fox St
3R Reserve	Either	Navigator	HARRIS, VICTORIA	Water Revenue	Water Revenue-MSB
3R Reserve	Either	Navigator	KING, S. ELISE	Water Revenue	Water Revenue-MSB
3rd RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS					
3R Field	A	Supervisor	SMITH, ROCHELLE	Mayor's Office of Community Services	MSB 9th Floor
3R Field	A & B	Supervisor	FEIGHERY, JOSEPH	Water Department	Sewer Maint-Fox St

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
4th RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
4Gator01	A	Navigator	ROSE, GREGORY	Streets Department	Sanitation A4
4Gator01	A & B	Driver	PHINIZY, EARL G	Streets Department	Traffic
4Gator01	B	Navigator	COOPER, KENDALL	Licenses and Inspections	South Dist
4Gator02	A & B	Driver	COULTER, ALLEN	Streets Department	Traffic
4Gator02	A & B	Navigator	PSPURILL, EDENA	Streets Department	Traffic
4Gator03	A & B	Navigator	CARR, DENNIS	Streets Department	Traffic
4Gator04	A & B	Driver	HOCKADAY, DEVIN	Streets Department	Traffic
4R01	A	Navigator	DAVIS, RECHI E	Streets Department	Traffic
4R01	B	Navigator	LONDON, TIMOTHY	Licenses and Inspections	Clean and Seal
4R02	A & B	Driver & Navigator	WILLIAMS, SAM	Recreation Department	HENRY AVE
4R03	A & B	Driver & Navigator	GRANER, MARTIN	Recreation Department	DIST 4
4R04	A & B	Driver	VARUGHESE, KURIEN	Streets Department	Traffic
4R04	A & B	Navigator	VARGHESE, THAMPAN	Streets Department	STREET LIGHTING
4R05	A & B	Driver & Navigator	JOHNSON, RAYMOND	Recreation Department	RISING SUN
4R06	A & B	Driver & Navigator	ROMANOWSKI, MIKE	Recreation Department	DIST 3
4R07	A	Driver	GRANT, LANCE	Streets Department	Traffic
4R07	A & B	Navigator	ELLIS, SHAWN	Streets Department	Traffic
4R07	B	Driver	HENRY, JOHN	Streets Department	Sanitation A4
4R08	A & B	Driver	TORRES, RUFINO	Streets Department	STREET LIGHTING
4R08	A & B	Navigator	RYBAKOWSKI, THOMAS	Streets Department	STREET LIGHTING
4R09	A & B	Navigator	HEARD, ELMER	Streets Department	Traffic
4R10	A & B	Driver & Navigator	SANDERS, RICHARD	Streets Department	Traffic
4R10	A & B	Driver & Navigator	SHERMAN, NATHANIEL E	Streets Department	Traffic
4R11	A	Driver	OSBORN, KEVIN	Water Department	29th Cambria
4R11	A	Navigator	ROBINSON, JAMES	Water Department	29th Cambria
4R11	B	Driver	GIBSON, GREGORY J	Water Department	29th Cambria
4R11	B	Navigator	GLENN, DONALD	Water Department	Inlet Cleaning-Fox St
4R12	A & B	Driver	SCHAEFER, MARK	Fairmount Park Commission	Park
4R13	A & B	Navigator	SIMMONS, ANTOINETTE	Streets Department	Traffic
4R14	A	Navigator	WINBUSH, RAYMOND	Streets Department	Sanitation Sweep
4R14	A & B	Driver	ROBINSON, MICHEAL R	Streets Department	Traffic
4R14	B	Navigator	KYNE, EDWIN	Streets Department	Sanitation A4
4R15	A & B	Driver	DIXON, GEORGE	Streets Department	STREET LIGHTING
4R15	A & B	Navigator	PERRY, SHAWN C	Streets Department	STREET LIGHTING
4R16	A	Driver & Navigator	CHEN, JIAN SHI	Streets Department	Traffic
4R16	A & B	Driver	BAKER, ANTHONY	Streets Department	STREET LIGHTING
4R16	B	Driver & Navigator	DESMOND, CHRIS	Streets Department	Traffic
4R17	A	Driver	BURROUGHS, MARVIN	Water Department	29th Facilities Mgmt
4R17	A	Navigator	WEBSTER, LEONARD	Water Department	29th Facilities Mgmt
4R17	B	Driver	SAMPSON JR, HOWARD	Water Department	Inlet Cleaning-Fox St
4R17	B	Navigator	SMITH, STEVEN	Water Department	29th Facilities Mgmt
4R18	A & B	Driver	LARUE, EARL	Streets Department	STREET LIGHTING
4R18	A & B	Navigator	RAMOS, LOURDES	Streets Department	STREET LIGHTING
4R19	A	Driver	HAWKINS, ALBERT M	Streets Department	Traffic
4R19	A & B	Navigator	LOKO, AVESSOU	Streets Department	Traffic
4R19	B	Driver	EVANS, ERIC	Streets Department	Sanitation A4
4R20	A	Navigator	MOORE, JOHN	Streets Department	Traffic
4R20	A & B	Driver	HUTCHINSON, CARL	Streets Department	Traffic
4R20	B	Driver	MCILHENNY, MICHAEL	Streets Department	Sanitation A5
4R21	A	Driver	THORNTON, JAMES	Streets Department	Sanitation A5
4R21	A	Navigator	TALLEY, GARY	Streets Department	Sanitation A4
4R21	B	Driver	MOORE, CORNELL	Streets Department	Sanitation A4
4R21	B	Navigator	SHUMAN, KEVIN	Streets Department	Sanitation A4
4R22	A & B	Driver	APOINTE, ERIC	Streets Department	Traffic
4R22	A & B	Navigator	FORTUNE, YOLANDA	Streets Department	Traffic
4th RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES					
4R Nav01	A	Extra Navigator	BOONE, KEVIN	Streets Department	Sanitation A4
4R Nav01	B	Navigator	EVERTT, NADINE	Streets Department	Sanitation A4
4R Nav02	A	Extra Navigator	CHAPPELL, HERBERT	Streets Department	Sanitation A4
4R Nav02	B	Extra Navigator	TAYLOR JR, ROBERT	Licenses and Inspections	MSB 11TH Flr

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS					
Route Assignment	Shift	Duty	Employee Name	Department	Work Location
4th RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.					
4R Reserve	Either	Driver	FORD, KYLE	Streets Department	Sanitation A4
4R Reserve	Either	Driver	STEVENSON, MARY	Water Department	Sewer Maint-Fox St
4R Reserve	Either	Navigator	HARRIS, LARRY	Water Department	Inlet Cleaning-Fox St
4R Reserve	Either	Navigator	JOHNSON, ANTHONY	Water Department	Inlet Cleaning-Fox St
4R Reserve	Either	Navigator	MATEEN, RAFIQ	Water Department	Inlet Cleaning-Fox St
4R Reserve	Either	Navigator	TYLER JR, KARL	Water Department	Inlet Cleaning-Fox St
4R Reserve	Either	Navigator	PILOSKY, BARRY	Water Department	Sewer Maint-Fox St
4R Reserve	Either	Navigator	SAMUEL, TAYLOR	Water Department	Sewer Maint-Fox St
4th RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS					
4R Field	A & B	Supervisor	MAGOWAN, RON	Fairmount Park Commission	DISTRICT 4
4R Field	A & B	Supervisor	WHITE, JERRY	Recreation Department	DISTRICT 4
4R Field	A & B	Supervisor	FLEMMING, THOMAS	Water Department	Sewer Maint-Fox St

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
5th RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
5R01	A	Driver	THOMAS, GREGORY	Water Department	Inlet Cleaning-Fox St
5R01	A	Navigator	THOMPSON, LAWRENCE	Water Department	Inlet Cleaning-Fox St
5R01	B	Driver	BALL JR, REUBEN	Water Department	Inlet Cleaning-Fox St
5R01	B	Navigator	CARRUTH, MICHAEL	Water Department	Inlet Cleaning-Fox St
5R02	A & B	Driver & Navigator	WILLIS, GERALD	Recreation Department	Dist 3
5R03	A & B	Navigator	BARMORE, ERIC	Streets Department	Surveys-2nd
5R04	A	Driver	WHITE, JEREMIAH	Water Department	Sewer Maint-Fox St
5R04	A	Navigator	GROBES, RONALD	Water Department	Sewer Maint-Fox St
5R04	B	Driver	GREEN, EVELYN	Water Department	Sewer Maint-Fox St
5R04	B	Navigator	ROSALES, RICARDO	Water Department	Sewer Maint-Fox St
5R05	A	Driver	BROWN, CHARLES	Water Department	Sewer Maint-Fox St
5R05	A	Navigator	NEWTON, WILLIAM	Water Department	Sewer Maint-Fox St
5R05	B	Driver	THOMAS, DANIEL	Water Department	Sewer Maint-Fox St
5R05	B	Navigator	HALL, JOSEPH	Water Department	Sewer Maint-Fox St
5R06	A	Driver	JONES, JOSEPH E	Water Department	Water Pumping
5R06	A	Driver & Navigator	RODGERS JR, EDWARD J	Water Department	Water Pumping
5R06	B	Driver	PAONE JR, VINCENT	Water Department	Water Pumping
5R06	B	Navigator	BESS, KEVIN	Water Department	Sewer Maint-Fox St
5R07	A	Driver	GILES JR, EMMIT A	Water Department	29th Cambria
5R07	A	Navigator	DOUGLAS, PERSALL	Water Department	29th Cambria
5R07	B	Driver	JACKSON RICHARD A	Water Department	Inlet Cleaning-Fox St
5R07	B	Navigator	JAROSZEWSKI, MARK	Water Department	Sewer Maint-Fox St
5R08	A	Navigator	PRESLEY, PATRICE	Streets Department	Admin - Personnel
5R08	B	Navigator	WEEDON, GARY	Streets Department	Sanitation A5
5R09	A	Driver	BRYANT, ROBERT	Water Department	29th Cambria
5R09	A	Navigator	BRIGHT, DEXTER	Water Department	Sewer Maint-Fox St
5R09	B	Driver	BARFIELD, LEO	Water Department	Sewer Maint-Fox St
5R09	B	Navigator	GOODE, JALAL	Water Department	Sewer Maint-Fox St
5R10	A	Driver	MARUNICH, MATTHEW	Mayor's Office of Community Services	CLIP
5R10	A	Driver & Navigator	BEUTTENMULLER, MICHAEL	Mayor's Office of Community Services	CLIP
5R10	B	Driver	BAXTER, GARY	Mayor's Office of Community Services	Richmond & Lewis
5R10	B	Navigator	TAYLOR, STEPHEN J	Mayor's Office of Community Services	Richmond & Lewis
5R11	A	Driver	SHAW, MICHAEL	Water Department	29th Cambria
5R11	A	Navigator	HALL, ADAM	Water Department	29th Cambria
5R11	B	Driver	HARRIS, RANDY	Water Department	29th Cambria
5R11	B	Navigator	NAST, BOB	Water Department	29th Cambria
5R12	A	Driver	PEACOCK, JAMES C JR.	Mayor's Office of Community Services	CLIP
5R12	A	Navigator	MARCELEWSKI, JOSEPH	Mayor's Office of Community Services	GAT
5R12	B	Driver	HILL, BRIAN	Mayor's Office of Community Services	Anti Graffiti
5R12	B	Navigator	COYLE, ERIC	Mayor's Office of Community Services	Holmesburg
5R13	A	Driver	PIOTROWICZ, PAUL	Water Department	Water Pumping
5R13	A	Navigator	DELISI, PETER	Water Department	Water Pumping
5R13	B	Driver	JOHNSON, GREGORY D	Water Department	Water Pumping
5R13	B	Navigator	EDDOWES, JOHN	Water Department	Water Pumping
5R14	A	Driver	FARNON, TIMOTHY	Mayor's Office of Community Services	4000 N. American St
5R14	A	Navigator	LAI, RICKY	Mayor's Office of Community Services	CLIP
5R14	B	Driver	WEEKS, REGINALD	Licenses and Inspections	CLIP
5R14	B	Navigator	MATOS, CARLOS	Mayor's Office of Community Services	Richmond & Lewis
5R15	A	Driver	HACKNEY, KEITH	Water Department	Sewer Maint-Fox St
5R15	A	Navigator	COYLE, MICHAEL	Water Department	Sewer Maint-Fox St
5R15	B	Driver	CROSS, TOMMY	Water Department	Sewer Maint-Fox St
5R15	B	Navigator	BLACKSHEAR, KEVIN	Water Department	Sewer Maint-Fox St
5R16	A	Navigator	PRASOMSAN, NATEE	Streets Department	Surveys-Bridges
5R16	B	Navigator	THOMPSON, DOUGLAS	Licenses and Inspections	4000 N. American St
5R17	A	Driver	JORDAN, DARNELL	Water Department	Sewer Maint-Fox St
5R17	A	Navigator	WATSON JR, BILLY W	Water Department	29th Cambria
5R17	B	Driver	CLARK, CURTIS	Water Department	Sewer Maint-Fox St
5R17	B	Navigator	WEEKS, JONATHAN	Water Department	Sewer Maint-Fox St
5R18	A	Navigator	LACEY, PAUL	Streets Department	Surveys-2nd
5R18	B	Navigator	GOODWIN, DERRICK	Streets Department	Sanitation A5
5th RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES					
5R Nav01	A	Extra Navigator	LOCKWOOD, PRESTON A	Streets Department	Sanitation Sweep
5R Nav01	B	Extra Navigator	MITCHELL-EDWARD, MAE	Streets Department	Sanitation Sweep
5R Nav02	A	Extra Navigator	MORALES, JUAN	Streets Department	Sanitation A5
5R Nav02	B	Extra Navigator	STEVENSON, ERIK	Streets Department	Sanitation A5

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS					
Route Assignment	Shift	Duty	Employee Name	Department	Work Location
5th RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.					
5R Reserve	Either	Driver	DUNN, ELMARR	Licenses and Inspections	Richmond & Lewis
5R Reserve	Either	Driver	SABB, MAYNARD	Mayor's Office of Community Services	Richmond & Lewis
5R Reserve	Either	Driver	SOSA, DAVID	Mayor's Office of Community Services	Richmond & Lewis
5R Reserve	Either	Driver	SEARLES, DERRICK	Streets Department	PMBC
5R Reserve	Either	Driver	GRAHAM, RADCLIFFEW	Streets Department	Sanitation A5
5R Reserve	Either	Driver	WHITFIELD, SEAN E	Streets Department	Sanitation A5
5R Reserve	Either	Driver	WOODARD, KENNETH	Streets Department	Sanitation A5
5R Reserve	Either	Driver	RODRIGUEZ, JOSE L	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Driver	WATSON, CARL	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Driver & Navigator	BROWN, MICHAEL	Mayor's Office of Community Services	Richmond & Lewis
5R Reserve	Either	Driver & Navigator	COLON, LUIS	Mayor's Office of Community Services	Richmond & Lewis
5R Reserve	Either	Navigator	BRICKLEY, BRENT	Licenses and Inspections	CLIP
5R Reserve	Either	Navigator	JOHNSON, ROYSHA	Licenses and Inspections	Water Ops
5R Reserve	Either	Navigator	JOHNSON, MICHAEL	Mayor's Office of Community Services	4600 Luzurne
5R Reserve	Either	Navigator	SCOTT, JUNEAU	Streets Department	Sanitation A5
5R Reserve	Either	Navigator	DORSEY JR, DENNIS M	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Navigator	LAPORTE, CHARLES J	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Navigator	ROBINSON, STEVE	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Navigator	STURDIVANT, WILLIAM	Water Department	Sewer Maint-Fox St
5R Reserve	Either	Navigator	NOLAN, FRANK	Water Department	Water Pumping
5th RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS					
5R Field	A	Supervisor	GUZAK, ED	Mayor's Office of Community Services	CLIP
5R Field	A	Supervisor	STEWART, WILLIAM	Water Department	Sewer Maint-Lardner
5R Field	A & B	Supervisor	ELIA, ROSEANN	Mayor's Office of Community Services	CLIP
5R Field	A & B	Supervisor	PAYTON, DARYL	Water Department	Inlet Cleaning-Fox St
5R Field	A & B	Supervisor	LANZA, VINCENT	Water Department	Sewer Maint-49th St
5R Field	A & B	Supervisor	LASALLE, CHRIS	Water Department	Sewer Maint-Fox St
5R Field	A & B	Supervisor	TAMMARO, JAMES	Water Department	Sewer Maint-Fox St
5R Field	A & B	Supervisor	WARREN, TAMIKA	Water Department	Sewer Maint-Fox St

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS

Route Assignment	Shift	Duty	Employee Name	Department	Work Location
6th RESIDENTIAL - ROUTE DRIVERS & NAVIGATORS					
6pickup01	B	Driver	ALLEYNE, MARQUITA	Streets Department	Sanitation A6
6pickup01	B	Navigator	JONES, MIKE	Streets Department	Sanitation A6
6pickup02	A	Driver	WESLEY, STEVEN	Water Department	Sewer Maint-Lardner
6pickup02	A	Navigator	CAULLEY, RANDOLPH	Water Department	Inlet Cleaning-Fox St
6pickup02	B	Driver	BESS, BRIAN	Water Department	Inlet Cleaning-Fox St
6pickup02	B	Navigator	GILLIAM SR, LARRY	Water Department	Inlet Cleaning-Fox St
6pickup03	A	Driver	BITTING, FRANCIS	Prison System	Transportation
6pickup03	A	Navigator	MELLON, JOSEPH	Prison System	Transportation
6pickup03	B	Driver	OHARA, DAVID	Prison System	Transportation
6pickup03	B	Navigator	COLEMAN, THERESA	Prison System	Transportation
6pickup04	A & B	Navigator	BROWN, JOHN H	Streets Department	Admin - Training
6pickup05	A	Driver	MEYERS, ANDRE	Streets Department	Sanitation A6
6pickup05	A & B	Navigator	SHIELDS, KEVIN	Streets Department	Traffic
6pickup05	B	Driver	SUTHERLAND, SUN	Streets Department	Sanitation A6
6pickup06	A	Driver	BOHL, THOMAS A	Prison System	Transportation
6pickup06	A	Navigator	CLARK, EDWARD	Prison System	Transportation
6pickup06	B	Driver	WISINSKI, KEVIN	Prison System	Transportation
6pickup06	B	Navigator	HAWKINS, CHRISTOPHER	Prison System	Transportation
6R01	A	Driver	ROCKMORE, TERREN	Water Department	Inlet Cleaning-Fox St
6R01	A	Navigator	GASKIN, ATIBA	Water Department	Sewer Maint-Lardner
6R01	B	Driver	HOOKER, KEENAN	Water Department	Sewer Maint-Fox St
6R01	B	Navigator	HAYLES, ARDELIA	Water Department	Inlet Cleaning-Fox St
6R02	A	Driver	LUCKEY, ORIN	Water Department	Sewer Maint-Lardner
6R02	A	Navigator	STEVENSON, ROBERT	Water Department	Sewer Maint-Lardner
6R02	B	Driver	COUNCIL, ERIC	Water Department	Inlet Cleaning-Fox St
6R02	B	Navigator	KEY JR, JOHN	Water Department	Sewer Maint-Fox St.
6R03	A	Driver	HARP, CURTIS	Water Department	Sewer Maint-Lardner
6R03	A	Navigator	ALTARE, RICHARD	Water Department	Sewer Maint-Lardner
6R03	B	Driver	COOPER, GARRETT	Water Department	Inlet Cleaning-Fox St
6R03	B	Navigator	WASHINGTON, MARTICE	Water Department	Sewer Maint-Lardner
6R04	A	Driver	LYNCH, THOMAS	Mayor's Office of Community Services	GAT
6R04	A	Driver & Navigator	JOHNS, MICHAEL	Mayor's Office of Community Services	Richmond & Lewis
6R04	B	Driver	HILL, EDWARD	Mayor's Office of Community Services	CLIP
6R04	B	Navigator	HORVAY, JOHN	Mayor's Office of Community Services	CLIP
6R05	A	Driver	DESIDERO, ERIC	Prison System	Transportation
6R05	A	Driver & Navigator	CLARK, TERRANCE	Prison System	Transportation
6R05	B	Driver	PIOTROWICZ, STEVE	Prison System	Transportation
6R05	B	Navigator	SPARANGO, MICHAEL	Prison System	Transportation
6R06	A	Navigator	SCANLON, JOHN	Streets Department	Transportation & Planning
6R06	B	Navigator	MERCHANGE, SANJAY	Streets Department	Admin - Payroll
6R07	A	Driver	QUATTLEBAUM, RODNEY	Water Department	Sewer Maint-Lardner
6R07	A	Navigator	MUNDEN, CHRISTOPHER	Water Department	Sewer Maint-Lardner
6R07	B	Driver	MOON, JAMES	Water Department	Sewer Maint-Fox St
6R07	B	Navigator	CRUZ, ANGELO	Water Department	Sewer Maint-Lardner
6R08	A	Navigator	WHITERS, CASSANDRA	Streets Department	Sanitation Sweep
6R08	A & B	Driver	BUCKNER, CURTIS	Streets Department	Traffic
6R08	B	Driver	FOSTER, LATASHA	Streets Department	Sanitation A6
6R09	A	Driver	SIMPKINS, SHAWN	Water Department	Inlet Cleaning-Fox St
6R09	A	Navigator	LEWIS, RODNEY	Water Department	Sewer Maint-Lardner
6R09	B	Driver	TAYLOR, ERIC	Water Department	Sewer Maint-Fox St
6R09	B	Navigator	MURPHY, HASHIM A	Water Department	Sewer Maint-Lardner
6R10	A	Driver	QUATTLEBAUM, JUDY	Water Department	Sewer Maint-Lardner
6R10	A	Navigator	BUTLER, ALTON L	Water Department	Sewer Maint-Lardner
6R10	B	Driver	BROWN, LINWOOD	Water Department	Sewer Maint-Lardner
6R10	B	Navigator	WHITAKER, CURTIS	Water Department	Sewer Maint-Lardner
6R11	A	Driver	BROWN, JERRY	Licenses and Inspections	4000 N. American St
6R11	A	Navigator	BROWN, NATHANIEL	Licenses and Inspections	Clean and Seal
6R11	B	Driver	RUIZ, EDWIN	Licenses and Inspections	4000 N. American St
6R11	B	Driver & Navigator	RUIZ, DAVID	Licenses and Inspections	4000 N. American St
6R12	A	Driver & Navigator	MCPEAK, JAMES	Mayor's Office of Community Services	CLIP
6R12	A	Navigator	FITZPATRICK, KEVIN	Mayor's Office of Community Services	4000 N. American St
6R12	B	Driver	MORGAN, THOMAS	Mayor's Office of Community Services	Holmesburg
6R12	B	Navigator	CALDWELL, KHIRY	Mayor's Office of Community Services	4000 luzerne
6R13	A	Driver	MCCALL, CONNEL S	Mayor's Office of Community Services	Holmesburg
6R13	A	Navigator	PENN, WILLIAM	Mayor's Office of Community Services	CLIP
6R13	B	Driver	DERENZIS, DANIEL	Mayor's Office of Community Services	CLIP
6R13	B	Navigator	MARSHALL, RICHARD	Mayor's Office of Community Services	CLIP
6R14	A	Driver	ANDRISO, CHRISTOPHER	Mayor's Office of Community Services	GAT
6R14	A	Navigator	CHECO, FABIAN	Mayor's Office of Community Services	CLIP
6R14	B	Driver	KENNY, KEVIN P	Mayor's Office of Community Services	GAT
6R14	B	Navigator	MORRISSEY, MIKE	Mayor's Office of Community Services	4000 Luzerne

FULL RESIDENTIAL DEPLOYMENT - ROUTE ASSIGNMENTS					
Route Assignment	Shift	Duty	Employee Name	Department	Work Location
6th RESIDENTIAL - EXTRA NAVIGATORS FOR CONTRACTOR VEHICLES					
6R Nav01	A	Extra Navigator	GLOVER, DALISHA	Streets Department	Sanitation A6
6R Nav01	B	Extra Navigator	BYRD, DEMETRIUS	Streets Department	Sanitation A6
6R Nav02	A	Extra Navigator	COWAN SR, TYRONE	Streets Department	Sanitation Sweep
6R Nav02	B	Extra Navigator	HIGGINBOTHAM, SYDNEY HAWKINS	Streets Department	Sanitation Sweep
6th RESIDENTIAL - EXTRA PERSONNEL FOR SUBSTITUTION, AS NEEDED.					
6R Reserve	Either	Driver	HIGGINS, LORENZO	Prison System	Transportation
6R Reserve	Either	Driver	BOHENER, DERRICK	Prison System	Transportation
6R Reserve	Either	Driver	JAMES, CECIL	Prison System	Transportation
6R Reserve	Either	Driver	TOLIVER, DARRYL	Streets Department	Sanitation A6
6R Reserve	Either	Driver	RAGIN JR, RONALD ROMEO	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Driver & Navigator	GUSTICK, ANDY	Mayor's Office of Community Services	4000 luzerne
6R Reserve	Either	Driver & Navigator	BARNES, BRANDON	Prison System	Transportation
6R Reserve	Either	Driver & Navigator	RODRIGUEZ, JOSE	Prison System	Transportation
6R Reserve	Either	Driver & Navigator	RUBESH, JOSE	Prison System	Transportation
6R Reserve	Either	Driver & Navigator	MCCOY, JAMES	Streets Department	Sanitation A6
6R Reserve	Either	Driver & Navigator	DEAN, RONNIE	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	PRESEL RICHARD	Licenses and Inspections	990 Spring Garden
6R Reserve	Either	Navigator	IRONS, PAULA	Licenses and Inspections	South Dist
6R Reserve	Either	Navigator	LAWLER, RICHARD	Mayor's Office of Community Services	4000 luzerne
6R Reserve	Either	Navigator	ALTOMARI, MICHAEL	Mayor's Office of Community Services	4000 N. American St
6R Reserve	Either	Navigator	ROKEN, JOHN	Mayor's Office of Community Services	4000 N. American St
6R Reserve	Either	Navigator	WORMLEY, TROY	Mayor's Office of Community Services	4000 N. American St
6R Reserve	Either	Navigator	OKUPINSKI	Mayor's Office of Community Services	Anti Graffiti
6R Reserve	Either	Navigator	BURTON, MATTHEW	Mayor's Office of Community Services	CLIP
6R Reserve	Either	Navigator	NEWSOME-BENTON, ROGERLENE	Prison System	Transportation
6R Reserve	Either	Navigator	DOFILIS, TERESA	Prison System	Transportation
6R Reserve	Either	Navigator	LANE, TAMEKA	Prison System	Transportation
6R Reserve	Either	Navigator	ROBINSON, MYRIAM	Prison System	Transportation
6R Reserve	Either	Navigator	WILKERSON, LATOYA	Prison System	Transportation
6R Reserve	Either	Navigator	RODRIGUEZ, DOMINIC	Streets Department	Sanitation A6
6R Reserve	Either	Navigator	ELIAS, LILLY	Water Department	1101 Market
6R Reserve	Either	Navigator	DORFMON, HARRISON	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	HEATH, CHARLES	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	JONES, JAMES	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	SULLIVAN, JOEL	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	SUMPTER, CURTIS	Water Department	Sewer Maint-Lardner
6R Reserve	Either	Navigator	WILLIAMS, CLAYTON	Water Department	Sewer Maint-Lardner
6th RESIDENTIAL - DEPARTMENT FIELD SUPERVISORS					
6R Field	A & B	Supervisor	COLEMAN, MARIO	Water Department	Inlet Cleaning-Fox St
6R Field	B	Supervisor	LUSTICK, CINDY	Mayor's Office of Community Services	CLIP

Section 4.7 Other Departmental Snow Fighting Equipment

Vehicle	Dept #	Mfr	Model	Vehicle Description	Plow	Salt	Location
				DEPARTMENTAL SNOW TRUCKS (87 total)			
				(pickups & dumps with no specific Residential Assignment)			
CLIP							
025238	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	FM	Snow X	Frankford Ave
025233	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	TA	NA	Lewis St
025234	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	TA	NA	Frankford Ave
025235	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	TA	NA	Frankford Ave
025236	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	TA	NA	Frankford Ave
025237	10	DODGE	DAKOTA	PICKUP 4X4,CREW CAB	TA	NA	Frankford Ave
005164	10	FORD	F150	PICKUP 4X4,W/PLOW	FM	NA	Mural Arts
005478	10	FORD	F250	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	Holmesburg
135033	10	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBH	Holmesburg
135052	10	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	NTI
135054	10	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	NTI
025192	10	FORD	F350	PICKUP 4X4,W/PLOW	FM	BRINE	Holmesburg
025069	10	FLINE	FL80	TRUCK,COMPACTOR 20HD	FM	NA	Holmesburg
045168	10	GMC	SIERRA	PICKUP 4X4 SPREADER/PLOW	FM	VBH	Luzerne
POLICE							
005473	11	FORD	F150	PICKUP 4X4,W/PLOW	FM	NA	HQ Pool
005440	11	FORD	F250	PICKUP 4X4 CREW CAB W/PLOW	FM	NA	Aviation Unit
085245	11	FORD	F350	PICKUP 4X4,W/PLOW	FM	NA	Tow Squad
085254	11	FORD	F350	PICKUP 4X4,W/PLOW	FM	NA	Neighborhood Svcs
035379	11	GMC	SIERRA	PICKUP 4X4,W/PLOW	FM	NA	92nd District
035380	11	GMC	SIERRA	PICKUP 4X4,W/PLOW	FM	NA	Police Academy
045171	11	GMC	SIERRA	PICKUP 4X4,W/PLOW	FM	NA	Traffic Division
045172	11	GMC	SIERRA	PICKUP 4X4,W/PLOW	FM	NA	Tow Squad
STREETS							
876665	12	FORD	C8000	TRUCK,FLUSHER	N/A	BRINE	State & Ashburner
995040	12	FORD	F250	PICKUP 4X4,W/PLOW	FM	NA	Traffic Engineering
970269	12	FORD	F250	PICKUP 4X4,W/PLOW	FM	BRINE	State & Ashburner
970272	12	FORD	F250	PICKUP 4X4,W/PLOW	FM	BRINE	State & Ashburner
127039	12	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBE	48 & Parkside
127040	12	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBE	3rd Hwy Yard
127041	12	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBE	4th Hwy Yard
127042	12	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBE	5th Hwy Yard
015052	12	FORD	F350	TRUCK,UTILITY	FM	NA	Street Lighting
015053	12	FORD	F350	TRUCK,UTILITY	FM	NA	Street Lighting
990044	12	FLINE	FL70	TRUCK,FLUSHER	N/A	BRINE	State & Ashburner
FIRE							
015042	13	FORD	F250	PICKUP 4X4,W/PLOW	FM	NA	Fire Academy
085244	13	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Fire Warehouse
HEALTH							
115179	14	FORD	F350	PICKUP 4X4 SPREADER/VPLOW	FM	VBE	Health
025125	14	FLINE	FL70	TRUCK,HOOKLIFT MULTI	FM	NA	Health
PARKS & RECREATION							
005454	16	FORD	F150	PICKUP 4X4,W/PLOW	FM	NA	Grounds Maint
005463	16	FORD	F150	PICKUP 4X4,W/PLOW	FM	NA	Northeast
015141	16	FORD	F250	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBG	Northeast
015044	16	FORD	F250	PICKUP 4X4,SPREADER	FM	VBG	Cobbs Creek
015041	16	FORD	F250	PICKUP 4X4,W/PLOW	FM	NA	Parks
135053	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	District 1
065090	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	
065091	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	South
065092	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	7200 Henry Ave
065093	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBH	5500 Rising Sun
085263	16	FORD	F350	PICKUP 4X4 CREW SPREADER/PLOW	FM	VBE	North
065100	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBH	District 3
065101	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBH	District 5
065102	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBH	North
135034	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	JIM MACO
135035	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	GERALD WHITE
085260	16	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	North
115180	16	FORD	F350	PICKUP 4X4 SPREADER/VPLOW	V	VBE	Parks
015059	16	FORD	F550	TRUCK,DUMP	FM	NA	25th / Sedgely
015056	16	FORD	F550	TRUCK,DUMP 3 CU YD	FM	VBG	Wissahickon

	Vehicle	Dept #	Mfr	Model	Vehicle Description	Plow	Salt	Location
					DEPARTMENTAL SNOW TRUCKS (87 total)			
					(pickups & dumps with no specific Residential Assignment)			
PARKS & RECREATION (continued)								
	015057	16	FORD	F550	TRUCK,DUMP 3 CU YD	FM	VBG	5500 Rising Sun
	970023	16	FLINE	FL70	TRUCK, 5 CU DUMP	FM	TGS	District 5
	025049	16	FLINE	FL80	TRUCK,COMPACTOR 20HD	FM	NA	West River
	025055	16	FLINE	FL80	TRUCK,COMPACTOR 20HD	FM	NA	5747 Frankford Ave
	025127	16	FLINE	FL80	TRUCK,HOOKLIFT MULTI	FM	VBH	West River
	045129	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045134	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045135	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045136	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045137	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045138	16	FLINE	M2	TRUCK,DUMP 5 CU YD	FM	TGS	Parks
	045132	16	FLINE	M2	TRUCK,HOOKLIFT MULTI	FM	VBH	Parks
	045133	16	FLINE	M2	TRUCK,HOOKLIFT MULTI	FM	VBH	Parks
HUMAN SERVICES								
	055005	22	FORD	F450	TRUCK,STAKE BODY	FM	NA	Youth Study Center
HOUSING								
	135032	24	FORD	F350	PICKUP 4X4 SPREADER/PLOW	V	VBE	Supportive Housing
	995120	26	FLINE	FL70	TRUCK,CREW DUMP 5 CU YD	FM	TGS	Clean and Seal
	015017	26	FLINE	FL70	TRUCK,CREW DUMP 5 CU YD	FM	TGS	Clean and Seal
WATER								
	130029	28	FLINE	108SD	TRUCK,DUMP 5 CU YD	FM	TGS	Belmont Plant
	130032	28	FLINE	108SD	TRUCK,DUMP 5 CU YD	FM	TGS	Facilities Mgmt
	130033	28	FLINE	108SD	TRUCK,DUMP 5 CU YD	FM	TGS	Baxter Plant
	970270	28	FORD	F250	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Baxter Plant
	080038	28	FORD	F250	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Inlet Cleaning
	970274	28	FORD	F250	PICKUP 4X4,W/PLOW	FM	NA	BRC
	970276	28	FORD	F250	PICKUP 4X4,W/PLOW	FM	NA	3900 Richmond
	000178	28	FLINE	FL70	TRUCK,DUMP 5 CU YD	FM	TGS	Fox St
	060012	28	GMC	SIERRA	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Belmont Plant
	060013	28	GMC	SIERRA	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Schuylkill Pumping
	060016	28	GMC	SIERRA	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Baxter Plant
LIBRARY								
	085257	52	FORD	F350	PICKUP 4X4 SPREADER/PLOW	FM	VBE	Library

Section 5 – Snow Lifting Accounting Procedures

5. - Snow Lifting Accounting Procedures

Snow Lifting Records

1. **Forms Required**
   a. Snow Equipment Rental 77-298
   b. Snow Contract Labor Record 77-298 (previously done on Form 77-299)

2. **Snow Equipment Rental Form (77-298)**
   a. The District Engineer will be responsible for recording the following information for each piece of equipment assigned to their location on the yellow copy of form 77-298, the contractor will record the same information on the manila copy of form 77-298.
      1. Highway District
      2. Contractor
      3. Who notified you
      4. Day of the week
      5. Time called
      6. Type of equipment ordered
      7. Operation to be performed by the equipment
      8. Where the equipment is to be assigned

   b. The contractor will assign the equipment and the operator as directed by the Streets Department, and record the license number of the equipment, and the name and address of the operator on the manila copy of form 77-298. The form will be given to his operator to be used as his assignment and time record.
   c. The District Engineer will give the yellow copy of form 77-298 to his inspector assigned to the operation. The inspector will be told to report at the designated time and location for the start of operations. The inspector will sign-in the equipment assigned to him on the yellow copy of form 77-298, recording the following information:
      1. Equipment license number
      2. Contractor's employee name
      3. Contractor's employee address
      4. Starting time

   The contractor's operator will indicate on the manila copy of form 77-298 the <u>Time Started.</u>

d. The inspector will call his District Engineer at hourly intervals and inform him of the progress being made. When the assignment is completed the inspector and the contractor's operator will each note Time Stopped on their form 77-298.

e. The City of Philadelphia will pay only for the operating time for the contractor's equipment. Stand-by time or lost time will be entered under "Penalty Time" and an explanation of the cause under "Penalty Remarks". When additional assignments are given to the inspector, he will complete "Location From To" on form 77-298. He will give this information to the contractor's operator, who will note this added assignment on his copy of form 77-298.

f. Whenever the contractor replaces a piece of equipment, or replaces an operator, the contractor will initiate a new form 77-298. The inspector at the worksite will then prepare a new form 77-298 (yellow copy) to cover the replacement. Procedures will then proceed as previously outlined.

g. When a form 77-298 is completed, the city inspector will sign his copy (yellow copy) and the contractor's operator copy (manila copy). The inspector's copy of the form will be returned at the end of his tour of duty to his District Engineer.

h. When a form 77-298 is completed, the contractor's operator will sign his copy (manila copy) and the city inspector's copy (yellow copy). The operator's copy of the form will be returned to his employer.

i. The reverse side of form 77-298 can be used for remarks or explanations of unusual situations. On forms 77-298 containing the time record for dump trucks the city inspector will note on the reverse side the following information:

1. The time the dump truck leaves the work location to unload
2. The time the dump truck returns to the work location from unloading.

j. When the District Engineer receives the city inspector's forms, his personnel will enter on each line the "Total Working Hours". This is the number of hours at the site (start-finish) less the "penalty time" lost. Appropriate travel time will be added for each piece of equipment.

k. The District Engineer will check the city inspector's form (yellow copies) and will then forward them to the Administrative Office, Highway Division, Department of Streets.

l. The contractor will use his copies of the form 77-298 to prepare his invoice, in triplicate, will be drawn on the Accounting Division, Office of the Director of Finance, Room 1330 Municipal Services Building, and sent directly to Administrative Office, Highway Division, Department of Streets for pre-auditing. The invoice will contain the following information and will be submitted for each 24 hour period:

1. Contractor's name and address
2. Purchase Order number
3. Number of pieces, kind and class of equipment in operation

4. Location of operations, i.e.: streets on which equipment operated
5. Dates and hours of work at specified rate per hour for
    a. Equipment with operator
        Regular time
        Premium Time
    b. Foreman
        Regular time
        Premium Time
    c. Laborers
        Regular time
        Premium Time
    d. Travel time for equipment only (rate times the standard level travel time allowed)

m. The Administrative Office, Highway Division, Department of Streets will summarize the form 77-298 (yellow copy) and prepare a receiving report (form 71-20) in the usual manner for each 24 hour period. The receiving report and supporting form 77-298 (yellow copy) will be forwarded to the Accounting Division, Office of the Director of Finance, Room 1300 Municipal Services Building.

n. The Accounting Division, Office of the Director of Finance will check the 77-298 forms (yellow copies) and the contractor's invoice against each other to determine the accuracy of the invoice.

o. Time calculations for equipment and personnel will be based on full 15-minute periods. For example, a piece of equipment operating for 4 hours and 27 minutes will be paid for 4 ½ hours.

3. Contractor Labor-Snow Emergency Form (77-298)

a. Procedures applicable to "Snow Equipment Rental", form 77-298 are also applicable to "Contract Labor – Snow Emergency", form 77-298 except as indicated below.

b. The contractor's foreman will maintain the contractor's time record for the foreman and the labor crew.

c. The attached sample illustrates the use of form 77-298.

4. The Chief Roadway Engineer will terminate Snow lifting operations.

Section 6 – Snow Removal Cost Accounting Procedures

6. - Snow Removal Cost Accounting Procedures

Snow and Salting Cost Accounting Procedures

A. Purpose

The Purpose of this procedure is to (1) provide a means for determining the cost of plowing and salting city streets and legislative routes within the city street system, and (2) provide a method for allocating these costs to both legislative routes and city streets.

B. Scope

The use of the forms described in this procedure shall apply to ALL agencies involved during snow and salting operations. Since the methods of attaching snow and ice storms vary, the accounting for costs will be compiled separately. Parks and Recreation shall report to the Department of Streets the cost of plowing and salting the Kelly Drive (Legislative Route #67292).

C. Definitions

1. Light snow requiring only de-icing techniques shall be considered Salting Operations
2. Snow operations shall include storms of such magnitude that plowing and de-icing operations are necessary.
3. The Snow Season will extend from October to April of the following year.

D. Cost Accounting Policies

1. The cost of snow emergency headquarters and agencies outside the Department of Streets (other than Fairmount Park) shall be allocated to snow. Show headquarters is normally opened when storm conditions require plowing operations. Even though there is preliminary salting, the entire cost will be allocated to Snow Operations. However, if only salting is required, the cost of snow headquarters and that of other agencies will be allocated to Salting Operations.

2. The ratio of State and City costs shall be calculated by comparing the sum of the City and State plow miles in Snow Operations. For salting, the ratio shall be computed by applying the percentage of City and State salt route miles to the tons of salt required for each route. Plow miles and salt route miles shall be the product of the linear mileage and the number of cuts or passes made by the vehicle.

3. For Streets Department, the labor cost will be the actual hourly labor cost for each employee. The vehicle cost will be the average hourly operational cost of a vehicle by type as determined by PennDOT. The Accounting Section of the Department of Streets will supply these costs.

4. Standby time prior to plowing or salting will be charged at the district City - State ratio of the actual storm.

    a. In the event that standby personnel are not used, the cost will be shared in the ratio of existing City-State miles or roadway.

    b. For snow, this ratio shall be City 58.6%, State 41.4%; for salting operations City 66.5%, State 33.5%. These ratios are subject to change when snow and salt routes are revised.

5. The cost of snow removal on legislative routes is not chargeable to PennDOT since $2.5 million is paid to the City on an annual basis for this service.

E. Forms

The following forms will be used in conjunction with this procedure. Instructions for the use of these forms are described in the body of the procedures.

77-307 Rev. 4/71, 77-307A - Report on Snow Plowing / Salting
77-360 = Salting Report

Time and Costing Snow and Salting Operations, formerly recorded on forms 77-308 Rev. 8/98 and 77-308A, are now recorded in the Snow Storm Information System (SSIS), a MS Access database designed by the IT unit of the Streets Department.

F. Snow Operations

All personnel reporting for snow duty will sign in on the approved time sheet for their department or agency. Prior to leaving the yard the inspector will receive Form # 77-307 Rev. 4/71 which will delineate the route.

Each District prior to the snow season will type on Form 77-307 Rev. 4/71 the following information:

1. Legislative route number if the street segment is part of the State highway system.
2. The street that is to be plowed or salted.
3. The "from – to" limits of plowing or salting.
4. The mileage of the street segment.
5. The route number or letter.

The inspector (plowing) or the truck driver (salting) will complete the following items:

6. The date and day of the week.
7. The operation, plowing or salting, day or night
8. Driver's name
9. Truck number
10. The number of cuts or passes required
11. Time reported for duty
12. Time started plowing/salting
13. Time finished plowing/salting

If the inspector/driver works on more than one route, items (12) and (13) are to be completed for the time spent on the route – NOT THE TOTAL TIME. Item (11) is time reported for duty and will not change even though the route may change.

14. Any delays in route
15. Cause of delay
16. The inspector/driver will sign his name to the report

The inspector supervisor in district will calculate item (17) Total Miles plowed for each segment, total all miles plowed and determine the City and State shares, item (18).

19. Will be used during salting operations

The Highway district office will then determine the ratio of City and State plow miles for each route, and by summing the routes, the district ratio.

The time of ALL personnel combating a storm will be accounted for in the SSIS (previously tracked on form 77-308 rev. 8/72).
The District or Area Office completes this information as follows:

1. Organization – 5th Highway, Area 2, Water Department, etc.
2. Condition
3. Date personnel called in and released
4. Time personnel called in and released
5. Employee name

6. Employee number
7. Function – the particular function the person was performing (e.g.: plow driver, inspector plow, auto repair, install chains, etc.)
8. Vehicle number – if applicable
9. Hours – the district office will enter the actual number of hours worked in the appropriate column (regular, time and a half, double time)
10. Vehicle cost – the hourly operating cost multiplied by the operating hours. The Accounting Section will supply these costs.

The Sanitation Area office will complete items #1 through #10.

The following items (#11 through #13) will be completed by the Highway District Office or the Chief Roadway Engineer for those not assigned to a particular district:

11. Salt – this section is used only for Salt Operations. It is the district breakdown of City-State salt used, cost of salt used, and the percentage.
12. Plow miles – the district breakdown of City-State plow miles and percentage.
13. Percentage breakdown of Labor and Vehicle costs. The percentage of City-State expense is calculated by multiplying the ratio of City-State plow miles or salt by the labor and vehicle expense.

During severe storms when contractor personnel are called to augment City personnel, it is the responsibility of the Highway District Engineers to insure that the contractors submit the following necessary information required when invoicing the City:

1. Number of pieces, kind and class of equipment in operation
2. Number of foremen, operators, laborers, regular hours worked, premium hours worked, hourly rates
3. Location of operations (e.g.: streets on which equipment operated)
4. Dates and hours of work at specified hourly rates

At the time invoices are received by Highway District Offices it will be the responsibility of each Highway District Engineer to call and discuss with the Accounting Officer the cost applicable to the State as per existing agreements between the Commonwealth of Pennsylvania and the City of Philadelphia with respect to snow plowing and salting operations.

G. Salting Operations

Since the rate of salt expended on a street varies by such factors as the type of spreader and size and speed of vehicle, the use of miles salted by itself is not an indication of the labor required to complete a route. Therefore, for Salting Operations, the City - State ratio will be used and defined in Section "D".

Personnel called-in to combat an ice storm will sign in on the authorized sign-in sheet for the Highway yard. The streets repair supervisor will issue the salt truck operator Form # 77-307 rev. 4/71, which delineates the route. The equipment operator will complete the form as described under Snow Operations, and will note in column (10) the number of passes necessary for each street segment. Upon completion of the route the operator will sign the form and return it to the streets repair supervisor.

The streets repair supervisor will perform the following tasks:

1. Issue form 77-307 rev. 4/71 to the equipment operator before he starts the route
2. Complete items (17), (18) and (19) which are the City-State mileage and the salt used for the route.
3. Complete form 77-360, which is self-explanatory for each load of salt that leaves the yard.
4. Complete SSIS information as described under Snow Plowing for each person in his district.

The streets repair supervisor will then forward Forms 77-307 rev. 4/71 and 77-360 to the Assistant Chief Engineer Maintenance who will calculate the labor, equipment and material cost and the City-State ratio.
Time sheets, salting reports, time and cost reports, and route reports shall be filed together chronologically by storm in the office of the Assistant Chief Engineer Maintenance. These records will be held for four (4) years and then disposed according to the Records Retention Schedule.

H. Responsibilities

1. Accounting Section Streets Department

a. The Accounting Section will determine the average fringe rates to be applied to labor, retrieve PennDOT vehicle rates, and distribute the information to all divisions of the Streets Department.

b. SSIS will accumulate the cost of each snow and ice storm. The Accounting Section will prepare any cost reports required by PennDOT on a schedule determined by PennDOT.

2. Sanitation Division Streets Department

a. Each Sanitation District will be responsible for accurately entering all necessary data in SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm.

b. Time sheets and supporting data will be kept in the Area office. These will be filed chronologically by date of storm for every snow season. Records will be kept for four (4) years after the snow season.

c. Sanitation Headquarters will summarize the payroll cost of each storm and submit these costs to the Budget Officer within two (2) days after the storm.

3. Highway District Offices

a. For Snow Operations the Highway district office will calculate the plow miles for each route on Form # 77-307 rev. 4/71 and determine the City / State ratio for each route and the district as a whole.

b. For Snow Operations the District Office and Yards will be responsible for accurately entering all necessary data in SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm.

c. The Chief Engineer of Highways will determine the City-wide ratio from the separate districts and apply this ratio to the cost of snow headquarters and other agencies. He will then forward information to the Accounting Officer.

d. The Chief Engineer of Highways will submit a written report of the Highway snow labor cost to the Budget Officer no later than two (2) days after the storm.

e. For Salting Operations the street repair supervisor will forward form 77-360 and form 77-307 to the office of the Assistant Chief Engineer Maintenance.

f. After Salting Operations the office of the Assistant Chief Engineer Maintenance will be responsible for accurately entering all necessary data in SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm, and inform the Chief Roadway Engineer and the Accounting Officer of the information available.

g. The Assistant Chief Engineer Maintenance will submit a written report of salting costs within two (2) days of the storm.

Appendix Page

APPENDIX Q –
FY2014 SANITARY INFILTRATION EVENTS

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Discharge (GPM)	Abatement Date	Abatement Time	Abatement
8/19/2013	10:00 AM	11036 Rennard St- Philmont Shopping Center	Choked Sewer – Found grease and solids in wet well, stream, manhole, and sanitary sewer	P-116-01	14.0	8/19/2013	11:30 AM	Flushed open and removed grease from sanitary lines, well, and storm drain.
8/20/2013	7:30 PM	Old Bustleton and Ambassor	Choked Sewer – Found sanitary sewer choked at manhole	P-105-06	0.008	8/20/2013	9:40 PM	Sewer was flushed open and grease and debris were removed.
8/20/2013	12:30 PM	Delaware River	Non-Sewer Spill – Found by-pass pumping from sanitary sewer to storm sewer	D-074-01	N/A	8/20/2013	2:30 PM	Contractor immediately stopping pumping to storm and instead pumped to sanitary.
8/26/2013	9:20 AM	9200 Bustleton Ave	Choked Sewer – Found 10’’ TCP sewer choked because of grease build up	P-105-06	0.083	8/26/2013	10:20 AM	Relieved choked sewer with flusher truck
9/12/2013	5:00 AM	6610 Hasbrook St	Choked Sewer – Found choked sewer at manhole	T-089-02	1.0	9/12/2013	11:50 PM	Flushed open and removed debris from sanitary sewer with flusher truck
9/30/2013	1:50 PM	Outfall W-067-01	Choked Sewer – Examine all upstream sanitary and storm, but found no chokes. The sewer may have relieved itself.	W-067-01	0.005	9/30/2013	5:00 PM	Could not locate choke. Will clean debris and refer area to be viewed and possibly cleaned
11/14/2013	2:30 PM	Lexington and Rhawn- Under the bridge	Defective Sewer Pipe – Found broken manhole chamber and sewer line	P-091-05	0.003	11/14/2013	8:00 PM	Set up bypass pumping until creek area is accessed to make repairs
11/15/2013	3:30 PM	5812 Morris St	Other – Sewage accumulation at outfall. Entrance to sanitary sewer was blocked due to construction activities	W-060-10	0.1	11/15/2013	4:00 PM	The blockage was removed and the sanitary sewer overflow stopped
12/4/2013	10:00 AM	Pelham and Quincy	Choked Sewer – Found 10’’ TCP choked and getting into 3’X 2’ Storm sewer	W-068-05	0.19	12/4/2013	6:40 PM	Un-choked sanitary sewer, pulled rags and debris, and put de-chlorine in storm sewer
12/5/2013	10:00 AM	Lexington and Rhawn- Under the bridge	Defective Sewer Pipe- During by-pass, air hose came off and sewer water passed in work area.	P-091-05	10	12/5/2013	10:10 AM	Applied lyme to control odors and connected the air hose back to the air bag to stop discharge.

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Discharge (GPM)	Abatement Date	Abatement Time	Abatement
1/2/2014	3:00 PM	300 W. Mt. Pleasent	Choked Sewer – Found 10'' Sanitary sewer choked by grease	W-068-05	0.002	1/2/2014	6:40 PM	The block was CCTV'D and the sewer was TV'D. Sewer was un-choked by flusher.
1/14/2014	4:00 PM	Tacony Creek	Non-sewer Spill– Broken air valve cause a sanitary sewer overflow	THL-0210A	N/A	1/14/2014	4:50 PM	The ball valve was shut off which stopped the overflow
2/27/2014	12:00 PM	9858 Bustleton Ave	Choked Sewer – Choked sanitary sewer	P-109-04	2	2/27/2014	6:40 PM	Vactor was used to remove grease and debris from sewer, which relived the choke
4/23/2014	7:40 AM	Crescentville Rd and Adams Ave	Non-Sewer Spill– Hole in discharge hose while by-pass pumping	THL-B0370	N/A	4/23/2014	8:00 AM	By-pass pump was shut down and the damaged hose section was removed and replaced.
5/1/2014	10:20 AM	Lower Level Wissahickon	Sewer Capacity Limitation– Found manhole surcharging from manhole	WLL-0680	0.004	5/2/2014	8:30 AM	Area was cleaned and lined. Monitoring will continue
5/20/2014	8:30 AM	206 Lincoln Dr- Fairmount park	Sewer Capacity Limitation– manhole discharging clear sewage	WHL-B0750	0.01	5/20/2014	11:50 AM	Distribution Unit turned hydrant off while flushing water main.